

**THE MASSACHUSETTS DIVISION OF
FISHERIES AND WILDLIFE:
1866-2012**



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Division of Fisheries & Wildlife**

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2015

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Clockwise: Salmon taken at Deer Island in the Merrimack River, 27 March 1937,
by Mr. Scott, drawbridge tender. Photo © *MassWildlife* • Lori Erb, radiotelemetry, Blanding's
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Clockwise: Ruffed Grouse Display © by Tom O'Shea
• Coastal Swamp *Metarranthis pilosaria* Moth © by Mike Nelson
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THE MASSACHUSETTS DIVISION OF FISHERIES AND WILDLIFE:

1866-2012

INTRODUCTION

“It is therefore necessary that memorable things should be committed to writing, (the witness of times, the light and the life of truth,) and not wholly betaken to slippery memory, which seldom yieldeth a certain reckoning”— Sir Edward Coke (1660)¹

The Commonwealth² of Massachusetts³ had a population⁴ of 6,547,629 in 2010, the third highest in density (839.4 people per mi²) among the 50 states. It is 44th in size (8092 mi²)⁵ among the states and is comprised of 14 counties⁶ and 351 incorporated cities and towns, with no unincorporated areas. It was the second state to be settled by Europeans and the ninth to ratify the U.S. Constitution.

This is a history of one Massachusetts governmental agency⁷—the Division⁸ of Fisheries and Wildlife (hereafter “DFW” or “Division”)—from its beginning as a Fisheries Commission in 1866 to 2012. Although the focus is on the structure, programs, and accomplishments of DFW, those cannot be segregated from the social history of the state nor from the resultant environmental changes. Human actions have altered the planet^{9,10,11,12} since the era when Neolithic hunter-gatherers first congregated in permanent agricultural settlements¹³. Consequent to these perturbations, the natural environment of Massachusetts in 2012 only weakly resembles that of 1600^{14,15,16,17}. Accordingly, historical events and coincident actions, perspectives, laws, attitudes and thought processes are set forth as necessary to facilitate our understanding of the eventual inception and evolution of the Commonwealth’s fish and wildlife management agency. Direct quotations are frequently used to tell the story in a participant’s or observer’s own words.

The Division of Fisheries and Wildlife is charged in statute¹⁸ to conserve, maintain, and protect the natural and aesthetic qualities of the environment for the benefit and enjoyment of the people. In essence, the Division is responsible for managing the abundance and diversity of the state’s wild animals, plants, and habitats. The agency’s management philosophy is thereby based on an understanding that the health and well-being of living things is inseparable from the condition of the abiotic elements of the environment, that the condition of wildlife and wild plants are indicators of environmental quality, and that appropriately managed wild plants and animals are a source of appreciation and recreation¹⁹.

This book is necessarily reductionist. It is impractical to include everything that occurred during the 147 years since the creation of the Fisheries Commission. Those readers interested in trends or details of a particular management practice, installation history, personnel change, species history, statutory or regulatory change, stocking record, harvest tally, or thought process are referred to the Annual Reports of the Division of Fisheries & Wildlife (and its predecessors), the minutes of the Fisheries & Wildlife Board, the annual “Abstracts” of the fisheries and wildlife laws, the annual progress reports or final reports of the Division’s several Federal Aid or contracted projects, and other DFW documents or records. Readers should also note that harvest and stocking tallies included herein may be rounded and that sex, age, and season classes may be

grouped. In some instances, tallies may have been omitted from the available records for a particular year or span of years. Animals or eggs distributed to cooperators as breeding stock may also not be included in all tallies. Readers are further referred to the chapter notes for references and additional commentary.

Readers may approach this book from several perspectives, depending on their level of interest. Those desiring a simple overview may find it convenient to read only the Introduction, the four quarterly summaries, and the concluding Summary. Alternatively, the addition of the three chapters covering 1600-1865 will elucidate the environmental, social and political ramifications which ultimately led to the formation of a formal fish and wildlife agency. Finally, the reader may then select as many of the 15 subsequent decades (and individual years) as desired in order to understand changes in fish and wildlife populations, management actions and public attitudes over time.

THE GOODLIEST CONTINENT THAT WE EVER SAW: THE 1600s.

“For that part of the Countrey wherein moſt of the *English* have their habitations: it is for certaine the beſt ground and ſweeteſt Climate in all thoſe parts, bearing the name of *New England*”—William Wood (1634)¹

Prior to European settlement, Massachusetts was populated by several clusters of Algonquian tribes and bands, from the Pocumtuck and Nipmuc in the west and central to the Massachusett and Pokanoket (Wampanoag) in the north and east². Cautious and apprehensive but desirous of trade, the tribes were soon overwhelmed and decimated by introduced infectious disease^{3,4} and by wars with the Europeans and with other tribes^{5,6,7}.

European fishermen and traders had been visiting the New England coast and interacting with these native tribesmen since at least 1524^{8,9}. However, none of these visitors attempted to settle—even briefly—until Bartholomew Gosnold (1572-1607) established a trading camp on Cuttyhunk Island in Buzzard’s Bay, Massachusetts in 1602. Gosnold (who named Cape Cod for its “great store” of codfish) remained about one month^{10,11} exploring the area, trading with the Indians, and collecting sassafras¹². His list of “commodities such as we saw”¹³ is the first recorded compilation of the fauna and flora of Massachusetts.

Subsequently, Martin Pring¹⁴ (1580-1626) in 1603, Samuel de Champlain¹⁵ (1574-1635) in 1605, and John Smith¹⁶ (c. 1580-1631) in 1614 visited the Massachusetts coast but their observations of wildlife were limited. The “Pilgrims” (English religious dissenters exiled at Leyden in Holland) were subsequently sponsored by English investors and sailed westward in the *Mayflower*, anchoring in Provincetown Harbor on November 11¹⁷, 1620^{18,19}, shifting to Plymouth Harbor on the mainland on December 16¹⁷. While in Provincetown, most adult males signed the “Mayflower Compact”, governing the activities of the Colony. Then, in 1623, certain colonial laws were formally enacted, including the provision “That ffowling fishing, and Hunting be free to all the inhabitants of this gouernment”²⁰. This was a deviation from English common law, which held that while free-ranging wild animals belonged to no one, the landowner had

near-exclusive rights to hunting and angling for them^{21,22,23}. The abundance of wild-life in the Colony, and the small number of gentry, was deemed to warrant free access to the harvest for the eventual benefit of all.

The first two years were lean ones in Plymouth, with half the colonists dying the first winter but more ships and settlers slowly arrived. By 1630, there were ≈300 people, ≈2000 by 1643, and ≈7000 by 1690²⁴. At its peak, Plymouth Colony occupied most of present-day southeastern Massachusetts.

In the fall of 1623, the Dorchester Adventurers established a short-lived settlement at Cape Ann, and in 1625 the trader and liberal Thomas Morton (c. 1579-1647) began his controversial “Merrymount” social experiment at Quincy. In 1629, the 6-ship Higginson fleet arrived at Salem. Then, in April 1630^{25,26}, John Winthrop (1587-1649), carrying a Patent from the Council for New England, led an 11-ship convoy to Massachusetts, settling initially at Charlestown. In 1630, 17 ships totaling 1500 passengers arrived at Massachusetts Bay and Plymouth^{26,27}. Over the next 12 years, nearly 200 ships (“The Great Migration”) brought emigrants to New England²⁸. Colonists soon moved well inward from the coast, with the business-minded William Pynchon (1590-1662)—who came with Winthrop in 1630—founding Springfield on the Connecticut River in 1635²⁸.

These settled New Englanders—people of their times—nonetheless considered themselves to be British, faithful Christians (despite divisive doctrinal questions), and loyal subjects of a monarchical government, and were keenly conscious of their respective positions within the hierarchical class structure of British society. The Puritans, in particular, were deeply religious, socially cohesive, and politically adept but conservative. Yet, these seemingly intolerant gentry started a process which evolved into a democratic commonwealth and influenced how colonial government exploited and managed environmental resources. Winthrop’s famous sermon²⁹ on board the *Arabella* in 1630 sounded an ethic of social collectivism: “...wee must uphold a familiar Commerce together...our Community as members of the same body...that wee shall be as a Citty upon a Hill...”³⁰. He also once remarked that “...democracy is...the meanest and worst of all forms of government...”³¹. Yet, in the context of the times, equality was only an equality among the social elite. Winthrop accepted these social differences but argued forcefully to define and defend true liberty³². As a Commonwealth builder³³, yet true to his heritage and his class, Winthrop set in motion a process which provided welfare, power, innovation, and perpetuity for the governance of Massachusetts.

The Rev. Francis Higginson (1587-1630), arriving in Salem Harbor in June 1629 with a 6-ship convoy, had laid the path for the Winthrop colonists who soon followed. Higginson’s letter of September 1629³⁴ was a masterpiece of promotional literature³⁵, enthusiastically (and optimistically) lauding the “commodities” of the area, citing “...wood, no better in the world..”, “...such abundance of mackerels that it would astonish one to behold...”, and a country that “...doth abound with wild geese, wild ducks, and other sea fowl”.

“Commodities” were important, not only the physical features such as land and water (to encourage farming) but tangible resources including minerals, timber, fish, and peltries, to be harvested for the financial benefit of colonists and their backers. Books by William Wood¹ (fl. 1629-1635), Thomas Morton³⁶, and John Josselyn^{37,38} (fl. 1638-1675) were promotional, often self-justificatory, and sometimes incredible or inaccurate. They provide a unique vision of the landscape, plants, animals, and Indian life of the times. However, in keeping with their interests, the writers focused on the valuable—“...Deare, of which there are greate plenty, and those are very usefull...”³⁹,



Photo © Steven Hurley

Figure 1. Modern reproduction of Aptucxet Trading Post (built on original foundation), Bourne, 2012.

“Otters, whose furre is much used for Muffes...”⁴⁰; the inimical—“...Wolfs...do much harm by destroying of our English Cattle...”⁴¹, “...a small Squerrell...which doth much trouble the planters of Corne...”⁴²; and the amazing—“ ...a Sea-Serpent or Snake... upon a Rock at Cape-Ann...”⁴³.

Although European fishermen had been exploiting the Grand Banks since the 1500s⁴⁴, the once-secondary fur trade surpassed fish as a commercial resource⁴⁵ after 1610 when Champlain was granted a monopoly by the French government. The fur trade was the first major land-based primary resource-based industry⁴⁵ in the New World. The most valued furbearer was the beaver^{45,46}, highly coveted in Europe for making felt hats.

John Smith¹⁶ “...got for trifles...” nearly 1100 beaver, 100 martens, and nearly 100 otter pelts trading briefly along the coast near Monhegan Island, Maine⁴⁷ in 1614. The Plymouth colonists were trading with the Wampanoag as early as 1621, sending the newly arrived *Fortune* back to England with “...2 hoggsheads of beaver and otter skins...” worth about £500⁴⁸. William Bradford^{18,49} (1590-1657) considered the fur trade essential to the survival of the Plymouth colony. Those colonists also entered into a relationship with the Dutch, and in 1626, Isaak De Rasieres⁵⁰ visited Plymouth, selling them £50 of wampum⁵¹, and entering an informal agreement as to their respective trade boundaries. In 1627¹⁸, Plymouth established a trucking house^{18,52} at Aptucxet (Figure 1) in present-day Bourne and did a thriving business there for many



Photo © Bill Byrne

Figure 2. Beaver with branch, Lenox.

years. However, Maine⁴⁶ was the greatest source of beaver for the Pilgrims⁴⁹, with principal trucking houses on the Kennebec and Penobscot rivers. Their fur trade grew rapidly after about 1628, and between 1631-1636 the Pilgrims sent to England 12,000 lb. of beaver and 1000 of otter⁴⁹. The sales of the beaver came to £10,000 profit with the otter receipts paying the cost of transport¹⁸. However, by about 1640 the trade was falling off, due to conflicts with the French, the Massachusetts Bay Colony, and other European colonies. The days of coastal fur-trading were passing⁴⁹ but they had enabled Plymouth to pay off its debts, buy essential supplies, and prepare for the next economic endeavor.

In March 1631⁵³, export of beaver (Figure 2) from the Province of Massachusetts Bay was prohibited without the permission of the colonial governor. Then, in June 1632⁵⁴, the Province established a 12 d. tax (repealed in 1634⁵⁵) on beaver purchased from the Indians and set up a trucking house in each plantation (i.e., settlement). By 1657, the general court of Massachusetts [Bay] decided to further control the fur trade⁵⁶ and the fur trade on the Connecticut River was formalized, with John Pynchon paying £20 for an exclusive license⁴⁹. His account books for 1652-57 showed 8992 beaver skins valued at £5220, 320 otter, and 161 other pelts⁵⁷. Then, between 1658-74, Pynchon shipped 6480 beaver, 718 muskrat, 415 moose, 379 otter, 315 fox and raccoon, and 228 others⁵⁷. Massachusetts traders had also pushed northward into Maine—coming into conflict with the French—and into New Hampshire along the Merrimack River^{49,56}. The volume of the Merrimack trade was second only to that on the Connecticut⁴⁹, leading to the settlement of several Middlesex County towns. In 1657, when harvests were declining, the volume of trade from those areas was about 2000 lbs. of beaver annually⁴⁹. By the time of King Phillip's War, the fur trade had largely faded away, although some activity took place on the Connecticut River until about 1750. Much later, a provincial law of February 1764⁵⁸ prohibited persons other than Indians from hunting beaver and other furbearers in areas to the north and east of the Saco [now in Maine] truck house except where they dwelled.

Wolves were "...the greatest inconveniency the Countrey hath..."⁵⁹ and in November 1630⁶⁰, a bounty on them was established by the Massachusetts Bay Colony. Counties and towns often set their own bounties, in addition to those of the colony or province. Hampshire County paid bounties on 305 adult wolves and 34 whelps in 1698⁶¹ and when the county reward was 20 s. it required much of the county tax to pay for it⁶². In some locales, wolf bounties continued well into the 19th century. Bounties were also a common means of targeting other allegedly noxious animals, including bears, wildcats, squirrels, woodchucks, crows, woodpeckers, and rattlesnakes.

White-tailed deer were valued both for meat and for hides^{62,63}. English merchants had a strong demand for leather goods and deer hides were an article of commerce rivaling that of beaver⁶⁴. Hides and venison were also used domestically. Deer meat sold for 2-2½ d. per pound in the Connecticut Valley c. 1662⁶² and dressed hides were used for breeches, jackets, and gloves. Concerned by the exploitation of deer, Massachusetts enacted a law in March 1693⁶⁵ (amended in December 1698⁶⁶) implementing a closed season on deer from January through June (later July). Enforcement agents ("deer Reeves"^{66,67}) were also frequently appointed. While in some towns these officials were appointed as late as the 1790s, laws were feebly enforced and deer were constantly hunted. The animal nonetheless remained reasonably common in parts of the state well into the 19th century.

European fishermen had been exploiting the vast fishing grounds of North America since the 1500s⁴⁴. Mackerel, cod, halibut, haddock and others were found in illim-

itable numbers along the coast^{15,68} and the anadromous salmon, shad, sturgeon, and river herring abounded in the larger coastal rivers^{69,70}. Both Massachusetts colonies were initially attracted to fishing as an economic venture. William Wood⁷¹ noted that the chief trade fish was cod but that much sturgeon⁷² was taken, pickled, and brought to England. The Plymouth colonists loaded two vessels with salted codfish in 1625⁷³ and set them to sail for England. However, both ventures failed and William Bradford believed (in 1629) that the colonists had always lost [money] by fishing⁷⁴. Instead, a licensing system for non-residents (i.e., Massachusetts Bay) was in effect from 1646-1650⁷⁵. The office of “water bailiff” was created in 1670^{76,77} to collect fines from trash dumpers and taxes on harvested fish. Restrictions were also imposed on fishing, especially for mackerel⁷⁸.

The first shore-based fishing station in northeastern Massachusetts was established at Marblehead in 1631⁷⁹. The Bay Colony then prospered, at least initially, sending 100,000 dried cod to market only one generation after the colony was established⁸⁰. The “Body of Liberties”⁸¹ established by the Massachusetts [Bay] General Court in 1641⁸², and the subsequent Colony Ordinances of 1641-47^{83,84} provided significant authority for public access to most “great ponds”⁸⁵ and to the seashore down to the mean low tide mark (for fishing, fowling, and navigation). Later, England imposed restrictive tariffs in 1660 which excluded most fish originating in colonial markets⁸⁶. Most dried cod thus went to Catholic Spain and Portugal, rather than Anglican Britain⁸⁰. By 1700, Massachusetts was shipping an estimated 50,000 bbl. of dried fish annually⁸⁷.

The early colonists were awed by the apparent vastness of the New England woodlands—the “Great Forest”⁸⁸—the country “...cloathed with infinite thick Woods”⁸⁹ (Figure 3). In New England as a whole, woodlands may have covered 95% of the terrestrial landscape⁹⁰. Higginson, Wood, and Morton extolled the products which could be acquired from Massachusetts’ timber: “...pines, and fir that will yield abundance of turpentine, pitch, tar, masts...⁹¹”, “...good store of Woods...for the building of Ships, and houfes & Mills, and all manner of water-worke...”⁹², and “...Chefnutt...the tymber whereof is excellent for building...”⁹³.

Nevertheless, not all forest products were a component of Massachusetts’ exports and neither New England (nor any other part of North America) supplied a major part of England’s timber needs⁹⁴. William Bradford sent ships to England “laden with clapbord” in 1621 and 1623^{95,96} but transportation costs were high and England could buy most of its lumber more cheaply from

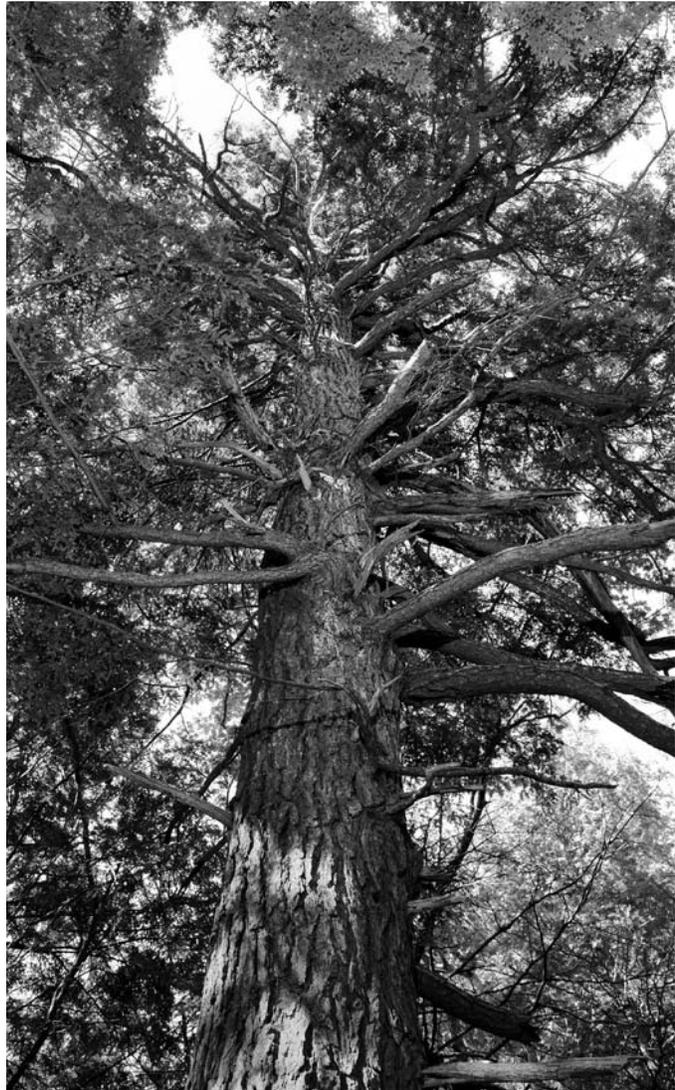


Photo © Bill Byrne

Figure 3. Old growth hemlock, Mount Wachusett.

Scandinavia^{97,98}. Barrel staves^{99,100}, however, were essential to the wine industry and were exported to Spain. Most lumber was used domestically for structures or fences^{92,93,101}, shipbuilding¹⁰², and especially for firewood¹⁰³. Large white pine (>24 inches)—for ships' masts—were reserved to the King^{104,105} in the 1691 Charter of Massachusetts Bay, but were harvested primarily in New Hampshire and southern Maine (due to river access for floating the logs to seaports). In the early 1670s, Sir William Warren (1627-1695) had over 250 masts valued over £35,000 in his timberyards¹⁰⁶.

In the rapidly developing Connecticut River valley, there was some concern to protect local interests. Springfield voted in 1647 that "...no timber, boards, planks, shingle-timber, nor pipestaves should be carried out of the town from the east side of the river"¹⁰⁷. In 1699, Northampton forbade the cutting of oak staddles¹⁰⁸ less than nine inches in diameter on common land and Hadley imposed a 12-inch restriction a few years thereafter¹⁰⁹. However, once the common lands became divided, protective legislation was less frequent and more frequently ignored. Use and devastation of the forests thus continued without any concern as the Colony progressed into its second century, because forests, fish and wildlife were believed to be "furnished by the author of nature with the means of perpetual self restoration"¹¹⁰.

The Puritan Commonwealth was dissolved in 1684 and the New England colonies united in 1687 as the Dominion of New England under the governorship of Sir Edmund Andros (1637-1714). He was overthrown in a local revolt in 1689, following the deposing of King James II¹¹¹. Massachusetts (and other entities, later severed) was subsequently chartered as a Crown Colony—the Province of Massachusetts Bay—in October 1691. The Charter was more restrictive of colonists' rights, but also provided for a 2-house General Court (representatives to the lower house being elected annually by Town Meetings), a Governor's Council, and a royal Governor^{111,112}. Laws passed by the General Court and signed by the Governor also required the assent of the King. However, England never fully realized the influence of forest and natural products on the New England economy¹¹³ and the inhabitants of Massachusetts (and the other colonies) tended to act in their own interests.

THEY DESTROY ALL THAT COMES IN THEIR WAY¹: THE 1700s.

"It is difficult to express in words the thrill of delight that nerves the breast of the tempest-tossed mariner of the long voyage, when Boston Light heaves into sight, and its bright steady eye beams forth over the sea".— Zebedee Small²

Those doughty mariners, approaching land after a long sea journey, were gladdened by the cheering beacon, advising of the nearness of land and yet warning of hazardous rocks and shoals. Still, the danger was not passed, even in daylight, as the ship's navigator still had to contend with tide, wind, or rough seas to conn the vessel into port. So too, the weary passengers, and later their descendants and successors, thrilled with prospects of a new life, yet uneasy with fears of the unknown, faced the beckoning light with the faith and hope that they would prevail over the dark forests and fierce beasts that were obstacles and challenges to their yearning for fertile farmlands, safe homes, and economic success. No wonder they set forth unrestrained. The land was theirs, if bold enough to take it.

Among the many disruptions³ to aboriginal society was the fur trade⁴, exchanging corn, wampum, trinkets, and other incentives for the hides and pelts of game and furbearers. The extent of this trade quickly became voluminous and Indians were allegedly "...the principal agent in the over-hunting of fur-bearers"⁵. Calvin Luther Martin (b. 1948)⁵ ascribed this overkill to a despiritualization of wildlife deriving from the prevalence of foreign epidemic disease and a cascading breakdown of native taboos. This novel thesis has been widely critiqued⁶ and the interactions of Indians with their environment⁷ are more complex and less idealized than often portrayed. Nonetheless, Indian trade in wildlife products clearly became more intensive post-1600 due to their desire for European commodities, encouraged by European traders, and so deprived of their land and a concomitant sense of personal stewardship. The enterprise took its toll on both wildlife and natives, and as settlement reached its centennial, the fur trade shrank to a minor component of the Provincial economy.

The European colonists and their successors also displayed an interaction between their spirituality and exploitation of the forests and wildlife. While believing that God required man to "...replenish the earth, and subdue it: and have dominion over the fish of the sea, and over the fowl of the air..." (Genesis 1:28), some also thought that wanton destruction was "...displeasing to Almighty God, who abhorreth all willful waste and spoile of his good Creatures"⁸. A few religious leaders condemned those changes which contradicted the original Puritan ideals but there was scant thought given to ending trade in natural products, implementing conservation practices, or condemning expansion of the frontier⁹. Eventually, the successors and descendants of those hardy pioneers continued to subdue and exploit a once-vast once-forested environment to survive and prosper in a new homeland. They came slowly to develop their own traditions, attitudes, and practices and to appreciate, interact with, and manage the changed land—a once fearsome wilderness—that became the Commonwealth of Massachusetts.

Politically, the period following the issuance of the Charter of 1691 continued the practice of benign neglect by England, which had been in effect since settlement. A series of 16 colonial governors—seven serving five years or longer—administered the Royal Province during its 73-year existence¹⁰. The early years were characterized by a series of French and Indian wars (1689-1713)¹¹, largely fought northward of Massachusetts. These wars inhibited trade, increased taxes, and weakened the Massachusetts economy. Later, another war against the French (1745-1753) spilled over into Massachusetts, but ended disastrously for the French¹¹. The cessation of warfare allowed Massachusetts to expand westward and restructured the relationship between England and the colonies^{10,12}. The consequent increase in tensions, and the burdensome Intolerable Acts imposed by the Royal government, was followed by a series of riots and rebellions. This burgeoning hostility of the colonials inevitably led to the downfall of the Royal governors and their military successor, and ultimately to the War of American Independence¹³. John Hancock (1737-1793) was sworn in as the first governor under the Massachusetts Constitution of 1780¹⁴. Following the Treaty of Paris in 1783, the several colonies banded together in a Confederation until replaced by the Constitution of the United States in 1789¹⁰.

The fur trade had largely wound down by the mid-1700s. The Boston trade "...is sunk to little or nothing, and the market is so low for beaver in England that 'tis scarce worth the transporting"¹⁵. A cargo from Oxford (Mass.) shipped to England in Aug. 1703 comprised otter, beaver, raccoon, deer, and other skins valued at a mere £44¹⁶. Weak activity on the Connecticut River persisted until about 1750 but the glory days of the Massachusetts fur industry were past. However, the New York trade was far

from finished, and merchants in Albany (N.Y.) dominated the regional trade until about 1730¹⁷ due to the loyalty of the Six Civilized Nations. Then, other business pursuits took over, and smaller firms persisted in the trade until the Revolutionary period. In Massachusetts, due both to habitat changes and to commercial trapping, the beaver had already vanished¹⁸, probably around the time of the Revolution¹⁹.

Despite the precipitous decline in the commercial export of hides and furs, the colonists continued to hunt, trap, and utilize wildlife. One activity drawing their attention was the desire to destroy animals which preyed upon their valued crops and livestock. Despite increasing scarcity, the wolf remained the chief villain well into the 1700s. In Hampshire County, 2852 adults and 191 pups were taken for bounty between 1700-1737²⁰. Even later, wolves were numerous and troublesome in Wenham in 1752-57²¹. As late as 1779, a wolf killed 5 sheep in Newbury on Massachusetts' north shore²². Lenox in the Berkshires was so bothered by wolves in 1782 that the town voted a bounty of 40 s. in addition to that of the Province²³. After these rare occurrences, wolves were virtually exterminated from Massachusetts.

Elk also vanished from Massachusetts during the 1700s. The animal was undoubtedly on the fringe of its range²⁴—if a resident at all—with most reports merely suppositional²⁵. The only definite record is of a herd of 15 (one shot) in Lancaster in 1742^{26,27}.

Birds and mammals were also commonly hunted and trapped for human food, often for personal or local consumption. Judge Samuel Sewall (1652-1730) had a breakfast of "...Venison and Chockalatte." at Dorchester in October 1697²⁸ and in October 1701 he supped on "...Roast-Beef, Venison Pasty, Cake, and cheese..."²⁸ at a wedding party. Market or commercial hunting was alleged to be uncommon in southern New England except near the larger towns²⁹. However, at Northampton in the Connecticut River Valley of Massachusetts, dressed wild turkeys brought 16 d. each in 1717 and 2½ d. per pound in 1766³⁰. In the same area, bear meat sold for 1½-2 d. per pound c. 1721-59³⁰. In Boston, passenger pigeons sold for 18 d. per dozen in 1740³¹, but in Northampton 3-6 d. per dozen in 1728-85 and 9 d. per dozen in 1790³⁰. Heath hens "...were so common on the ancient site of the city of Boston, that laboring people or their servants stipulated with their employers not to have the *Heath-Hen* brought to table oftener than a few times in the week!"³². Ducks, geese, and shorebirds³³ were also commonly taken. In 1710, the Provincial Legislature—distressed at the decline of "water-fowl" in coastal towns—enacted a law prohibiting hunting of them from "disguised" boats or sailboats³⁴. Pelts, hides and feathers were also used for jackets, breeches, leggings, gloves, hats, belts, quilts, and footwear^{30,34,35,36}.

The colonists and settlers, initially inexperienced due to their social status in Britain, soon learned to employ firearms for self-defense, hunting, and entertainment. The matchlocks of the Puritans were succeeded by flintlocks, some imported, others hammered out by local blacksmiths and later by skilled gunsmiths³⁷, culminating in the early 1800s in the renowned Pennsylvania or Kentucky-style long rifle. Despite allegations to the contrary³⁸ (later discredited^{39,40}), muzzle-loading firearms were a common and valued possession in the American colonies and provinces of the 1600s and 1700s^{37,40}. Life was challenging and demanding and firearms were a tool to enable people to survive, settle and flourish in an environment where physical fitness and mental convictions were continually tested.

In addition to commercial fishing endeavors, recreational angling was a favored colonial pastime. In 1794, a 90-year-old resident of Raynham described "taking many

a fish” when he was a boy angling from a canoe in Fowling Pond⁴¹. Nearby, the Rev. Joseph Secombe (1706-1760) angled for salmon, alewives, herring, and eels at Amoskeag Falls on the Merrimack River. He argued in 1739 that “But here, in Fishing... we are all taking something, which God, the Creator and Propagator of all, has given to us to use for Food, as freely as the green Herb. He allows the eating of them, therefore the mere catching them is no Barbarity”⁴².

The commercial cod fishery continued to be the most important Massachusetts fishery in the colonial period⁴³, providing substantial resources and employment to the provincial economy⁴³. Cod fishing grew significantly after the Treaty of Utrecht in 1713, diminishing again during the French and Indian Wars, and reviving after the 1763 Peace of Paris. In 1731, there were 160 vessels and 5000-6000 fishermen sailing from Marblehead alone⁴⁴. In 1747-48, Salem merchants shipped 32,000 quintals⁴⁵ of dry codfish⁴⁴. After the Revolution, in the newly independent United States, President John Adams (1735-1826) argued (and prevailed) that American fishermen had the right to fish on the Grand Banks and in the Gulf of Saint Lawrence⁴⁴. The cod fishery (Figure 4) was key to the success of the early colonists, one writer arguing that “...neither Pilgrims or Puritans were its pioneers, neither the axe, the plough, nor the hoe led [them] to these shores...It was the discovery of the winter fishery on its shores that led New England to civilization, and fed alike the churchmen and the strange emigrants who came with the romance of their faith in their hearts...”⁴⁶.

Whaling was also a business of considerable economic importance for Massachusetts through the 1700s, yielding whale oil for lighting and lubricants, whalebone for corset stays and similar purposes, and ambergris for medicines. Deep sea whaling began about 1712 but predominated (over shore-based whaling) by 1730. It reached a peak just before the Revolution, but then declined until c. 1820 when another surge began^{43,47}.

Anadromous fish—salmon, shad, river herring, and sturgeon—were also subject to commercial harvest. Connecticut shad in barrels were advertised in Boston as early as 1736. On the Connecticut River, shad averaged 1 penny each between 1733-1773, increasing to 2½- 3 d. in 1788, and 4½ d. in 1798⁴⁸. After 1800, shad were scarce, increasing to 1 s. each and people stopped buying them. Similarly, salmon there were initially cheap, 1-1½ d. per pound in 1740, increasing to 2-3 d. in 1781, and 7-8 d. in 1798⁴⁸. After that, dams impeded the run and very few fish were taken. On the

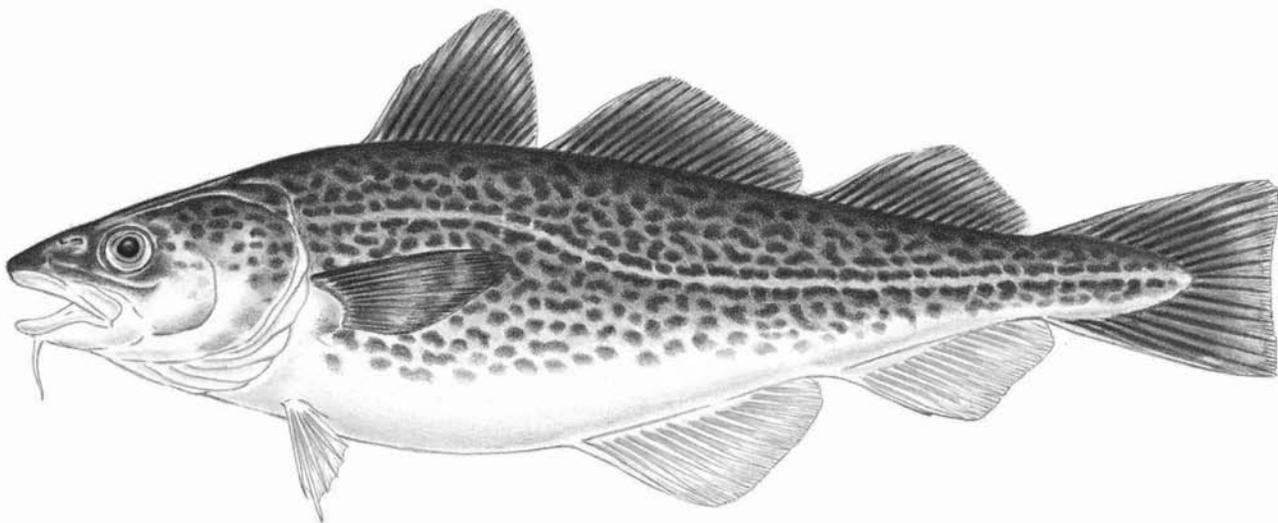


Image © Division of Marine Fisheries

Figure 4. Atlantic Cod.

Merrimack River in 1789, salmon of an estimated market value of \$31,200 and shad of \$700,000 were taken⁴⁹. Realizing the value of the fishery, between 1709 and 1799 the Provincial government (and subsequently that of the State) enacted or amended 64 statutes addressing seasons, dates, and methods of harvest for anadromous fish (principally alewives)⁵⁰. The pernicious effects of dams were also recognized very early with the Legislature requiring in 1741⁵¹ that dam builders make provisions for the passage of anadromous fish. However, 100 years later one scientist lamented: “The building of dams...has almost entirely annihilated this species in our state”⁵². The Turners Falls dam (constructed in 1798) was ultimately responsible for extirpating Atlantic salmon from the Connecticut River.

Settlement was pushing well into present-day Hampden, Hampshire, Worcester, and southern Berkshire counties by 1765^{53,54}. Initially, land clearing proceeded slowly, land speculation was common, and small-scale agriculture served only small localized groups⁵⁵. Later, as settlement increased⁵⁵, transportation improved, and new markets emerged, agriculture became commercialized and deforestation more frequent⁵⁵. In August 1733, the Connecticut Valley towns were urged to improve the growth of timber, and restrictions were imposed, but rescinded in 1741⁵⁷. By about 1730, land speculation was rampant⁵⁶ as was the consequential clearing of the land. Settlers “...ought to inclose and reserve portions of the best woods for the future use of themselves and the general good of the country...”⁵⁸, but they rarely did so. Trees were “...cut down or killed, and the land burnt, leaving a desolate tract of blackened stumps, half-burnt logs, loose soil, and ashes”⁵⁹. In Worcester County, Peter Whitney (1744-1816) remarked “...as there is very little waste land, and the people are numerous, fuel will in a few years be scarce and dear”⁶⁰. About 1765, when Hadley was a village of 100 families, the annual consumption of firewood was about 3000 cords⁵⁷. These bleak and devastated clearings then slowly transformed into productive croplands and grassy pastures subdivided by stone walls, cozy farmhouses, and thriving small villages^{55,61}.

By 1790, the newly constituted Commonwealth of Massachusetts boasted a population of 378,787^{62,63}, 9.7% of that of all states then existing. In the next century, Massachusetts would continue the shift from the daring frontier pioneers, to the small settlers eking out a sparse life, to the homebody farmers on the cleared and planted lands, to the mills and factories of an increasingly urbanized populace. So too, would human attitudes towards their environment evolve.

*NON NOBIS SOLUM*¹: 1800-1865

“Nature, in its ministry to man, is not only the material, but is also the process and the result...The wind sows the seed; the sun evaporates the sea; the wind blows the vapor to the land; the ice, on the other side of the planet, condenses rain on this; the rain feeds the plant; the plant feeds the animal; and thus the endless circulations of the divine charity nourish man”.— Ralph Waldo Emerson (1849)²

Samuel Adams (1722-1803) succeeded to the office of Governor after the death of Hancock. His administration accomplished little³, due to Federalist opposition. The Federalist policy emphasized commerce and trade to the near exclusion of all else^{3,4}.

The tonnage of cod fishing vessels increased from 19,185 tons in 1789 to 69,306 in 1807⁵. Commerce benefited from a series of commercial treaties in 1794-1805, and from the opening of trade with China and the Orient generally⁵. So, New England—especially Massachusetts—was a reluctant supporter of the War of 1812, due to the paralysis of shipping, a nearly bankrupt government, and the perception that England was winning³. After the end of the war, Massachusetts reigned supreme in the maritime trade⁴, especially in the ranking towns of Boston, Nantucket, and Newburyport. Boston shipping alone was 310,309 tons in 1807, one-third of the mercantile value of the United States⁴. However, this coastal boom had little initial effect on the economy of the inland regions. There was almost a total disconnect between the merchant kings and the dirt farmers of western Massachusetts. Capital improvements were minimal and crop yields low⁴. Meanwhile, factories, especially the wool, cotton, and boot-and-shoe industries, began to spring up in the eastern towns (Lowell, in 1822, was among the first)⁶.

With the advent of railroads, new factories cropping up in Worcester and Springfield⁷, and improvements in farm machinery, western Massachusetts began to perk up^{6,8}. By 1845, Massachusetts was producing 4,767,000 bushels of Irish potatoes and 265,500 pounds of tobacco⁸. The railroads proved to be a false hope, however, by expanding into New York and opening Massachusetts to competition with western markets and cheaper products⁶. Smaller, less productive farms failed⁹ and their proprietors shifted to factories and industry, or moved to the fertile lands of the Ohio Valley, or to California to seek a fortune in the gold fields¹⁰. The remaining Massachusetts farmers focused on truck crops, dairying, and tobacco. In the cities, urbanization and industry continued to rise, and the Civil War loomed. Despite the war, by 1863, under the Morrill Act of 1862, the Massachusetts Agricultural College¹¹ was approved and incorporated, with the first class graduating in 1867⁸. However, the number of manufacturing factories grew from 8176 in 1860 to 13,212 in 1870¹². By 1880, 42% of the labor force was in manufacturing and only 10% in agriculture¹².

The Massachusetts “frontier”—the boundary with the last few unsettled tracts—was breached by 1801^{4,13} and the wilderness vanished. The Pequot and ordained minister William Apess (1798-1839) argued—unsuccessfully—in 1835 that the few remaining “Marshpee” Indians (descendants of those who greeted William Bradford and his compatriots) who were “...all kept in a state of vassalage...”¹⁴ by state-appointed overseers, should be allowed to “...manage their own property...” as they once did. In 1862, Senator Samuel Clarke Pomeroy (1816-1891) of Kansas, an advocate of the expansionist Homestead Bill, declaimed “This bill, enacted into a law, shall give civilization and life throughout the silent gorges and gentle sleeping valleys, far away into the deep recesses of the continent...”¹⁵. Finally, the historian Frederick Jackson Turner (1861-1932) proclaimed in 1893 that “four centuries from the discovery of America, at the end of a hundred years of life under the Constitution, the [national] frontier has gone, and with its going has closed the first period of American history”¹⁶.

The early part of the 19th century saw a continuation of the forest clear-cutting that prevailed after the Revolution. Tench Coxe (1755-1824) suggested that settlers who clear their land “...take care to burn the brush and wood, in such manner as to preserve the ashes. Out of the wood ashes, thus saved, he should make as much potash, or pearl-ash, as he can, and dispose of this for ready money...”¹⁷. Thus, the frenetic land clearing served to facilitate both planting and fertilizing of crops and a secondary financial remuneration. The Rev. Timothy Dwight (1752-1817) reported that “...a prodigious mass [of timber is] annually destroyed in the recent settlements for the mere purposes of clearing the ground”¹⁸. In Hadley, there were “...meadows containing five



Figure 5. Grassland at Massachusetts Military Reservation, Cape Cod.

to five hundred acres, interspersed with beautiful and lofty trees..[and] also vast expansions of arable ground...”¹⁸. In addition, dwellings, barns, churches, stores, and other structures were built practically all of native lumber¹⁹. The clearing of the forest continued rapidly through the mid-1800s, with open land peaking at 50-75% and exceeding 90% in some towns^{10,20}.

The Berkshires were the last to be cleared and never fully converted to agriculture²⁰. North-central portions of Massachusetts, as well as the sandy scrub forests in Barnstable and Plymouth counties, also escaped the full impact. But, the infant “Conservation” had begun to speak, and not for us alone: “...the preservation and improvement of the forests...must be effected on a large scale, on a system wisely begun and long continued, by the men of one generation for those of the next”²¹. Similarly, the diplomat and conservationist George Perkins Marsh (1801-1882) of Vermont decried the idea that natural resources were superabundant and inexhaustible. In his chapter “The Woods”, Marsh suggested that “We can repay our debt to our noble forefathers only by a like magnanimity, by a like self-forgetting care for the moral and material interests of our own posterity”²². At about the same time, Henry David Thoreau (1817-1862) urged farmers to plant trees in natural patterns of succession; “...when we experiment in planting forests, we find ourselves at last doing as Nature does”²³.

The extensive conversion of forest land to agriculture also led to substantial changes in wildlife communities²⁴, notable among them an increase in grassland^{25,26} (Figure 5) and shrubland²⁷ species at the expense of forest wildlife. Moose were gone (except as rare vagrants) by 1800²⁸. Wolves were also nearly eradicated. Two lone wolves ranging from Amherst to Montague in 1805²⁹ were hunted down and killed although occasional vagrants may have occurred through 1869³⁰. Wild turkeys were extirpated from Massachusetts in 1851³¹ and the last known cougar was killed in Amherst in 1858³².

The early 1800’s also saw the rise of nature writing, naturalists’ organizations, scientific investigations, and sportsmen’s groups. The Boston Society of Natural History was incorporated in February 1831 “for the promotion of the science of natural

history”³³. In 1837, the Massachusetts Legislature resolved that the governor was authorized to appoint a person(-s) to “...make a further and thorough geological, mineralogical, botanical, and zoological survey of the Commonwealth”³⁴. The “Commissioners” so appointed reported to the Legislature in 1838-41 and subsequently published their surveys between 1839-1846 in a series of five books³⁵. These surveys comprised the baseline faunal and floral surveys of the state, from which all subsequent ones proceeded.

Hunting, too, began to draw a close focus. The sportsman Thomas Doughty, writing in the *Cabinet of Natural History and American Rural Sports* in 1830, set forth the first code of conduct for sportsmen, admonishing them to be respectful, neat and clean, and displaying a correct demeanor, “free from inpetuosity”³⁶. Senator Daniel Webster (1782-1852) of New Hampshire and Marshfield was an avid and conscientious sportsman, especially fond of hunting waterfowl and shorebirds along the coast and quail and ruffed grouse in the grasslands and thickets of Plymouth County³⁷. Elsewhere in the Northeast, Samuel Haight Hammond (1809-1878), an early hunter-conservationist, advocated the preservation of wilderness areas for recreation and rejuvenation: “Where shall we go to find the woods, the wild things, the old forests, and hear the sounds which belong to nature in its primeval state?...I would mark out a circle of a hundred miles in diameter...and make it a forest forever”³⁸.

The marine fisheries continued to be important in the Massachusetts economy, including the cod³⁹ and mackerel⁴⁰ fisheries. Hand-lining from dories gave way to line trawls after about 1850³⁹. The cod and mackerel fishery fleet peaked in 1873 with a tonnage of $\approx 100,000$ ⁴¹. Haddock was also important at times and in 1850 immense quantities were caught in trawls in Massachusetts Bay⁴⁰. Swordfish were also taken, particularly south of Cape Cod, where it was the “fish most pursued”, selling for 3-5¢ per pound in 1844⁴². The whaling industry continued to be strong following the War of 1812, with 82 whaleships based at Nantucket in 1817⁴³. Whaling peaked in 1836, with vessels totaling 144,681 registered tons in the U.S., and 64,260 at New Bedford⁴³. By the Civil War, however, whaling declined as kerosene replaced whale oil for lighting.

Freshwater angling—like recreational hunting—was popular among some, but allegedly uncommon. Jerome Van Crowninshield Smith (1800-1879) acclaimed “...that highly esteemed and well known fish, the trout, which is unrivalled, either as an object of gratification to the palate of the epicure, or as contributing to the innocent sport of the angler”⁴⁴. He enthusiastically appended a treatise on “Trout and Angling” to his flawed *Natural History of the Fishes of Massachusetts*. Sen. Daniel Webster was an angler as well as a hunter, favoring the cold streams of Mashpee and Sandwich on Cape Cod. He once took 12 trout, weighing 17 lbs. 12 oz. in total, from that area, with the largest weighing 2 lbs. 8 oz.⁴⁵. Yet, despite the angling interest, many freshwater fish (both in volume and in species) continued to be taken only for sale in markets.



Photo © MassWildlife

Figure 6. Inlet to Flax (Union) Pond, Wareham, August 1956.

A veteran angler, Samuel Trescott Tisdale (1802-1869) of East Wareham, observed the “depletion of the trout streams” in southeastern Massachusetts, attributing this to the expansion of the railroads (i.e., increased pressure on the fisheries) and expansion of “manufacturing interests” (i.e., habitat destruction and pollution). Tisdale thus decided in May 1850, in collusion with a fellow angler, Preston H. Hodges, to import the “black bass of the northern lakes” from Saratoga Lake, N.Y.⁴⁶. Hodges left Saratoga on July 1, 1850 with 28 live fish, arriving in Agawam⁴⁷ on July 4 and placed the fish in Flax Pond (now known as “Union” Pond) (Figure 6). Tisdale was elated and imported 100 additional bass in November, distributing them in six other ponds in Plymouth Woods. This endeavor was repeated in 1851-52 by Tisdale and others, stocking >30 additional ponds in the area so as to “teem with this superior fish”⁴⁶.

The Massachusetts Legislature enacted about 295 laws between 1800-1865 pertaining to fish and fisheries⁴⁸. About 133 (45%) of these addressed alewives, herring, and shad (principally to allow towns to regulate these fisheries); 49 provided for acts of incorporation or to allow individuals to construct fish weirs; and 27 addressed general issues relating to dams and fish passage. Only seven concerned protection of the trout fisheries in southeastern Massachusetts⁴⁹. Other protective laws addressed fish spearing (c. 60, St. 1806); smelt fishing (c. 112, St. 1811); seasons for salmon and shad on the Connecticut River (c. 103, St. 1812); eel fishing (c. 132, St. 1812); pickerel fishing (c. 109, St. 1817); prohibiting the taking of fish by means of *Cocculus indicus*, a toxicant (c. 43, St. 1831); establishing a study commission on fish propagation (c. 58, Res. 1856); and prohibiting fishing on Sunday (c. 253, St. 1865)⁴⁷. In the distant future, most of these statutes would be addressed in regulation. However, the transition from a concept of inexhaustible resources to finite ones was still new, and there was as yet no agency to regulate, manage, and investigate living natural resources.

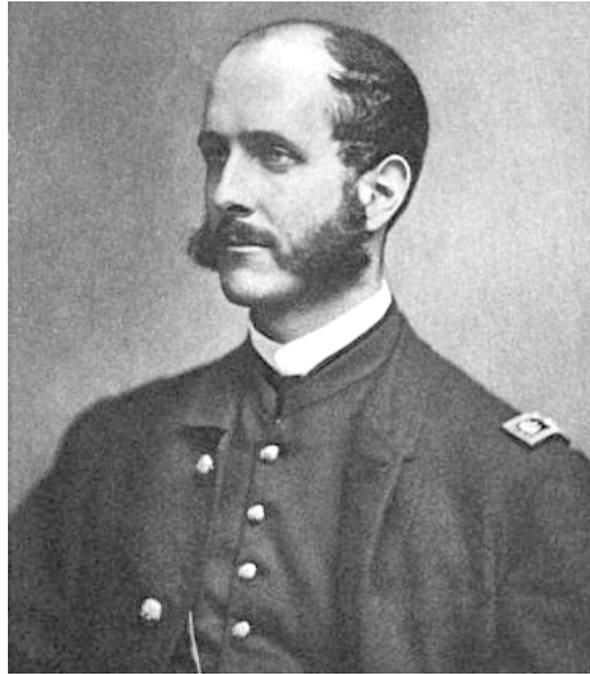
The protection of wildlife (“game”) lagged well behind that for fisheries but still reflected changing societal attitudes. Between 1802-1870, legislation was enacted regarding seasonal restrictions on deer hunting and hounding⁵⁰; seasonal protections on larks, robins, partridge, and quail^{51,52}; prohibitions on shooting on salt marshes except by landowners⁵³; seasonal restrictions on heath hen hunting⁵⁴; seasonal restrictions on night hunting of shorebirds⁵⁵; a 4-year closure on heath hen hunting⁵⁶; additional seasonal restrictions on shorebird hunting⁵⁷; and additional constraints on the hunting and sale of certain songbirds⁵⁸.

Significantly, in 1842^{59,60} the U.S. Supreme Court declared that: “When the Revolution took place, the people of each state became themselves sovereign, and in that character held the absolute right to all their navigable waters and the soils under them for their own common use, subject only to the rights since surrendered by the Constitution to the general government...When the people of New Jersey took possession of the reins of government and took into their own hands the power of sovereignty, the prerogatives and regalities which before belonged either to the Crown or the Parliament, became immediately and rightfully vested in the state”. This landmark case thus set forth the principle of the Public Trust Doctrine—the concept that free-living fish and wildlife cannot be privately owned.

More was yet to come. In 1865, the Governors of New Hampshire and Vermont were concerned about obstructions (i.e., dams) to the passage of anadromous fish on interstate rivers. They communicated that concern to the Massachusetts Legislature, which resolved⁶¹ that the Governor was authorized to appoint two “Commissioners”⁶² to investigate and report on their findings. Theodore Lyman III⁶³ (1833-1897) (Figure 7) and Alfred A. Reed were duly appointed and submitted their report to the Legislature

on January 10, 1866⁶⁴. Their conclusions—basically requirements to successfully restock the rivers with shad and salmon—were to: (1) build fishways over the dams, (2) prevent water pollution, (3) initiate the breeding of salmon in New Hampshire, (4) ban gill-nets and weirs in Connecticut, and (5) enact stringent laws regulating fishing in all states bordering the Connecticut River.

Another significant consequence of the 1865 report was an Act of the Legislature⁶⁵ providing for the appointment of two commissioners to be Commissioners of Fisheries on the Merrimack and Connecticut Rivers, for a term of office of five years. This Act, effective May 15, 1866⁶⁶, was the beginning of the state agency now known as the “Division of Fisheries and Wildlife”.



en/wikipedia.org (public domain)

Figure 7. Commissioner of Fisheries Theodore Lyman (Civil War era).

THE “BOARD OF COMMISSIONERS” YEARS, 1866-1919: A SUMMARY

The two-member Board of Commissioners of Fisheries was established in May 1866 and expanded to three members in 1869. During the Commissioners’ 53-year tenure, their accomplishments and activities included:

—examining the dams on the Merrimack and Connecticut Rivers, ascertaining the issues, if any, to fish passage, and recommending methods and plans for constructing fishways. Those on the Merrimack were completed by 1867; however, the hydropower authorities on the Connecticut were recalcitrant. The Commonwealth filed suit, and prevailed in both the Massachusetts (1870) and United States (1872) Supreme Courts.

—worked cooperatively with New Hampshire to restore a reproducing sea-run population of Atlantic salmon to the Merrimack River. Between 1876-1889, ≈6.3 million fry were released into the Merrimack system (in 2 states) and ≈22,600 adult salmon were passed through the Lawrence fishway. The program ultimately failed because migrating salmon could not pass the Sewalls Falls dam in New Hampshire.

—in cooperation with private individuals, propagated shad at North Andover and Hadley, and stocked millions of shad fry in the Connecticut and Merrimack rivers. Illegal harvest and exploitive capture methodology doomed the effort, at least during the Commissioners’ tenure.

—constructed, acquired or utilized fish hatcheries at Wareham (1868-1870), Winchester (1870-1911), Plymouth, N.H. (joint with N.H., 1878-1895), Sutton (Wilkinsonville, 1891), Hadley (1896-1906), Adams (1898-1916), Sandwich (1911), East Sandwich (1914), and Palmer (1914).

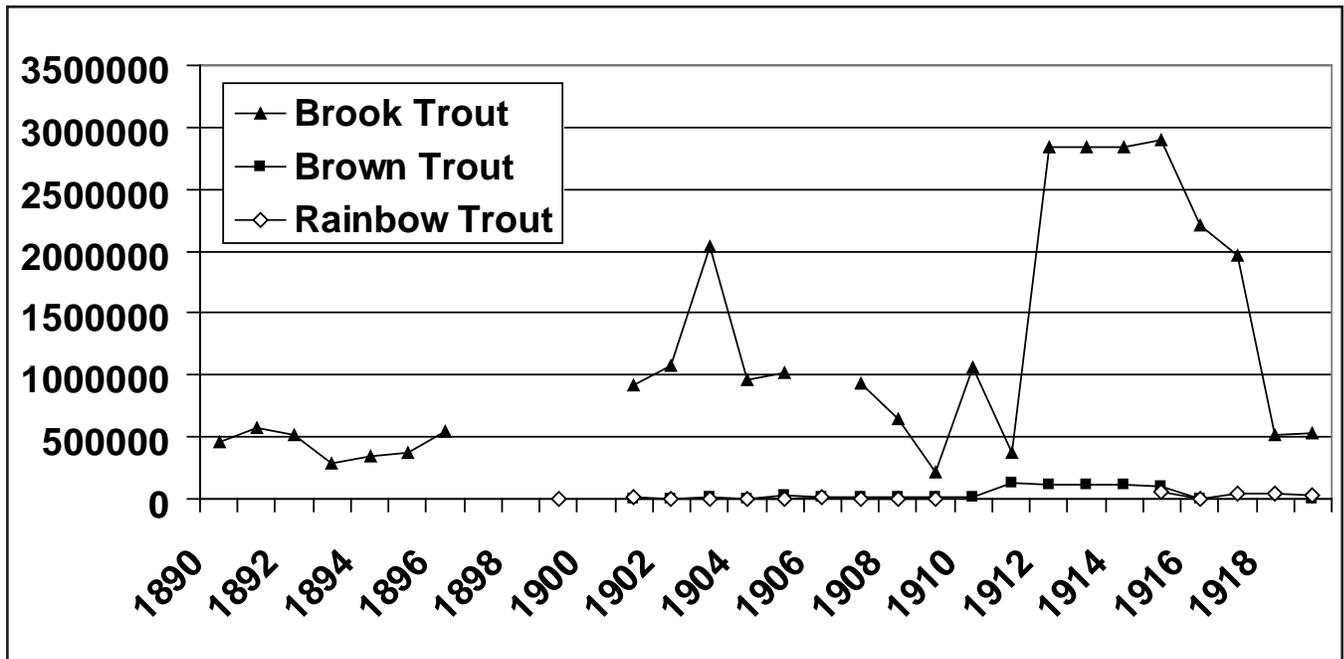


Figure 8. Numbers of Brook, Brown and Rainbow Trout (all age classes) stocked in Massachusetts waters, 1890-1919.

—obtained, propagated, stocked into rivers, stream, and ponds or distributed to private cooperators various species (several unsuccessfully) including brook trout, brown trout (including varieties), rainbow trout (Figure 8), lake trout, landlocked salmon, Chinook salmon, smallmouth bass, largemouth bass, common carp, white perch, yellow perch, walleye, horned pout, pickerel, and freshwater smelt.

—instituted and conducted biological and physical surveys of the great ponds of the state, with emphasis on their suitability for food fish production.

—hired its first biologist (1905) and later an assistant biologist, working primarily on fish and shellfish.

—received legislative authority to act as Game Commissioners (1886) and so undertook subsequent game management activities.

—constructed game farms at Wilbraham (1912) and Marshfield (1914), and utilized temporary cooperative game rearing facilities at Andover, Norfolk, and Sharon, as well as undertaking game breeding at the Winchester and Sutton hatcheries.

—acquired legislative authority to acquire or occupy properties for “reservations” or game refuges, and conducted surveys and habitat management activities on most. Acquired a large tract on Martha’s Vineyard as a heath hen refuge and hired a warden to oversee the area.

—imported Mongolian pheasants from Oregon (1895) which were subsequently propagated and distributed to cooperators and the progeny stocked throughout the state. The Commissioners then promoted and implemented a pheasant hunting season.

—obtained, propagated, stocked into the fields and woodlands of the state or distributed to private cooperators various other game species (most were unsuccessful), including Reeves pheasant, bobwhite quail (including varieties), wild turkeys, mallard ducks, black ducks, wood ducks, Canada geese, white (i.e., snowshoe) hare, “Belgian hare” (i.e., European rabbit), and raccoons.

—investigated white-tailed deer status and distribution, promoted a closed season (approved by the Legislature) which reopened in 1910 (after an 11-year closure) and was then administered for recreational hunting and deer damage control.

—promoted, secured, and instituted hunting licenses for aliens (1905), non-residents (1907), resident aliens (1908), resident citizens (1908), fishing (all persons except minors and women)(1919), and minor trapping (1919).

—undertook surveys and inventories and protective measures—including the hiring of special wardens—regarding song and insectivorous birds, most birds of prey, and gulls and terns.

—investigated and recommended legislative action on seasons, bag limits, and methods of take for upland game birds and mammals, waterfowl and other migratory game birds, and furbearers.

—instituted, expanded and maintained educational and informative programs including exhibitions, lectures, and publications.

—actively engaged in cooperative ventures, meetings, and conferences on the state, regional, and national scenes.

—increased and professionalized the force of law enforcement deputies.

OBSTRUCTIONS TO THE PASSAGE OF FISH: 1866¹-1869

The Civil War was barely ended when the Legislature voted to investigate fish passage issues, a progressive move because the citizenry was still grieving the loss of 13,942 sons of Massachusetts (9.4% of those serving) in battle or from battle-related illness². The Republicans were the party in power in the state, and continued so for 25 years, with the primary aim of sustaining the Federal government and its policies³. A significant and long-lasting result of the war was the allegiance which the ordinary citizen attached to the interests of the Nation over that of the State³. In the following decades, prohibition, labor reform, women's suffrage, transportation, police protection, and public health demanded government attention and regulation³.

Massachusetts had become the second most densely populated state (after Rhode Island)⁴ and the 1860s was the period of greatest growth in manufacturing, with capital investment growing by 74%. Boston—"The Athens of America"—was the country's fourth largest manufacturing center in 1865⁴ and soon became a hub for financial management as well. This rapid modernization had significant consequential effects for workers, as well as for the environment. Fortunately, fisheries and game matters continued to hold reasonable Legislative interest, despite the social focus on modernization.

1866⁵: The 1866 Act⁶ directed the two Commissioners to "examine the several dams on said rivers in this Commonwealth, and shall, after notice to the owners of said dams, determine and define the mode and plan upon which fish-ways shall be constructed suitable and sufficient, in their opinion, to the free passage of salmon and shad up said rivers during their accustomed seasons".

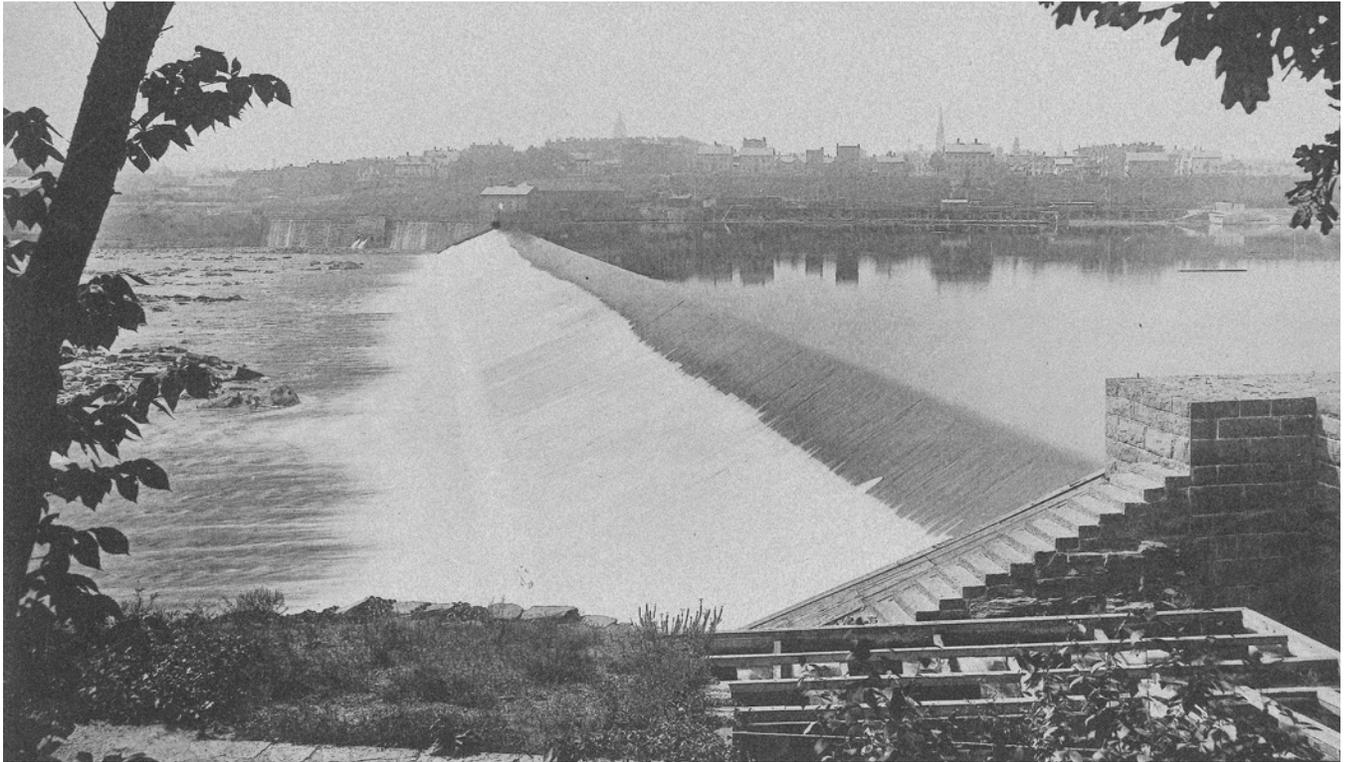


Figure 9. Holyoke Dam, as seen from the East Bank of the Connecticut River, 1887.

—The Commissioners’ first report under this Act described their field evaluations and recommended that: (1) \$10,000 be appropriated for the coming year, (2) seine fishing, or the taking of shad or salmon in any manner, be prohibited above the Lawrence Dam on the Merrimack until 15 April 1871, (3) the same provision to prevail below the Lawrence Dam from 15 April 1868 until 15 April 1870, (4) they be allowed to take fish to restock the river, (5) a fine \leq \$50 be established for fishing within 400 yards of a fishway, and (6) they be empowered to cause tributaries of the Connecticut and Merrimack Rivers to be open to fish passage by compelling dam owners to construct fishways⁶.

1867⁷: The Commissioners reported that the fishways at Lawrence and Lowell were completed in the spring of 1867 and the Merrimack was open to fish passage after 18 years. However, the “great Hadley Falls” dam (Figure 9) on the Connecticut remained “unbridged”.

—They commented at length on the “artificial breeding” of trout and shad and remarked that Seth Green had begun to hatch shad eggs at Holyoke in the summer of 1867.

—Echoing the earlier words of George Perkins Marsh, and foreseeing the later ones of Garrett James Hardin (1915-2003)⁸, Lyman and Reed complained that “...the legislature passes game laws, and nobody pays any attention to them...Because we insist on considering wild animals as our remote forefathers consider them, when men were scarce and wild animals were plenty...a vague idea that [game] by immemorial right, belonged to anybody and everybody”. They lamented that a 1-lb. trout—probably speared illegally in its “bed”—could be bought for 50¢ and the vendor then swears that it was caught out of state.

—The Commissioners of the New England states informally organized as the “New England Commissioners of River Fisheries” and met from time to time to establish a common policy for New England and attempt to restore indigenous fishes and introduce new ones.

1868⁹: The Commissioners' third report complained that the Holyoke Water Power Company was stonewalling their obligation to build a fishway over their dam on the Connecticut River. The Concord, Ipswich, and Merrimack Rivers had all been successfully opened.

—A.C. Hardy, an agent for the Commissioners, began hatching shad at North Andover in 1868 (continuing until 1871) with reasonable success. A small hatching facility was established that same year at Maple Springs, on a tributary of the Agawam River in Wareham, by donation of Samuel T. Tisdale¹⁰. A total of 30,660 brook trout, “St. Croix land-locked salmon”, Atlantic salmon, lake trout, whitefish, and char were hatched there between Nov. 1868 and May 1870¹⁰.

—Disgusted with the belief that “...our inland fisheries with the hook-and-line now amount to practically *nothing*”, the Commissioners recommended that great ponds and minor tidal streams be controlled by the riparian proprietors, *so far as concerns the taking of certain cultivable fishes* [italics in original].

—The State Legislature enacted a landmark piece of legislation in June 1869¹¹, comprising 34 sections, which included: (1) compilation of all the fish passage laws together as the “laws on inland fisheries”; (2) increasing the Board of Commissioners from two to three members, with 5-year terms; (3) providing that the Commissioners may, personally or by deputy, may enforce all fisheries laws, require an owner to construct a fishway, where absent, or construct one at the owner's expense, take fish in any manner at any time for scientific or propagation purposes, pass over or through private property without liability for trespass, and lease ponds <20 acres for propagation; (4) providing riparian property owners exclusive control of most ponds <20 acres; (5) providing that most ponds >20 acres shall be public, and that the public shall be allowed reasonable access for fishing; (6) providing for fines and a statute of limitations; and (7) making several changes in allowable fishing methodology, sale of freshwater fish, and open seasons for salmon, landlocked salmon, shad, black bass, smelt, and white perch.

1869¹²: Edward Augustus Brackett¹³ (1818-1908), a portrait artist, sculptor, author, and fish enthusiast, was appointed in 1869 as the third Fish Commissioner (Table 1).

—The Commissioners' report summarized the above legislation¹¹; remarked on the issues with the Holyoke Water Power Company; discussed the culture of alewives, shad, smelt, salmon, and trout; and commented on the stocking of ponds and the Concord River with black bass.

“SUCCESSFUL CULTIVATION OF FISH¹ IS NO LONGER A MATTER OF DOUBT”²: THE 1870s

The decade saw several significant events³ on the national scene, including the Great Chicago Fire (1871), the deadly Peshtigo forest fire in Wisconsin (on the same day in 1871 as the Chicago Fire), the gradual opening of the Brooklyn Bridge (1872-83), the “Panic of 1873” financial crisis (1873-79), the Battle of the Little Bighorn (1876), the Centennial Exposition (1876), the bitter and contested Hayes-Tilden presidential

election (1876), and the first public telephones (1877). In Massachusetts, the Great Boston Fire of November 1872 destroyed 776 buildings and killed ≥ 30 people. The opening of the Hoosac Tunnel in 1873 facilitated the Commonwealth's path to commerce by rail with the west.

Many notable events in the environmental field took place in the 1870s. The American Fish Culturists' Association was formed in December 1870, later changing their name to "American Fish-Cultural Association" in 1878, and to "The American Fisheries Society" in 1886^{4,5}. In 1871, the U.S. Congress authorized creation of the U.S. Commission on Fish and Fisheries⁴, with one of its initial tasks that of introducing or restoring salmon and shad, especially in federal waters. That same year, the naturalist and essayist John Burroughs (1837-1921) published his first work, *Wake-Robin*, "...a careful and conscientious record of his actual observations and experiences"⁶. The first National Park—Yellowstone—was established by Congress in 1872^{7,8}. Charles Hallock (1834-1917) founded the pioneering outdoor magazine *Forest and Stream* in 1873. Subsequently edited for 35 years by the anthropologist and ornithologist George Bird Grinnell (1849-1938), the magazine dedicated itself to wildlife conservation, helped establish the National Audubon Society, and was a strong advocate and sponsor of the National Park movement⁹. The same year, William Brewster (1851-1919) founded the Nuttall Ornithological Club¹⁰, the first organization in the U.S.A. devoted to ornithology.

In the northern Great Plains, the U.S. Army sent an exploring and scouting party under the command of George Armstrong Custer (1839-1876) into the Black Hills in July-August 1874, accompanied by a photographer and a young G.B. Grinnell. The photographs taken at that time, when compared with present-day ones at the exact same sites, provided a unique window into forest ecology and changes in a forest ecosystem over a 100-year span¹¹.

In Massachusetts, the Massachusetts Anglers' Association (adding "game" to its name 3 years later) was incorporated¹² in 1873, giving a rebuttal to the Fish Commissioners' allegations that hook-and-line fishing amounted to "practically nothing".

1870¹³: Field left the Commission and was replaced by Thomas Talbot. The Commissioners' report stated that the case against the Holyoke Water Power Company had been decided in favor of the Commonwealth¹⁴ and the case had been appealed to the U.S. Supreme Court.

—Fish culture continued at Maple Springs until Tisdale's death early in 1870. Stocking of black bass continued.

—Seven great ponds in Dukes, Essex, Middlesex, Norfolk, and Worcester counties were leased to individuals for fish culture for 5 to 20 years, most for \$1.00 annually.

—Legislation¹⁵ provided for restrictions on seasons, dates, bag limits, and methods of take for various birds, birds' eggs, and deer.

1871¹⁶: The Commissioners had little to comment on, summarizing the state of their initial charges in 1866 and setting forth hopes for the future. Fishways were constructed on the Ipswich, Indian Head, and Neponset Rivers.

—Shad hatching continued at North Andover, where there were 4336 [wild] fish taken and 4.53 million spawn hatched. A portion of the shad stocked in Whitney's Pond returned in the spring (1871) over the fishway at Mystic River.



Photo © MassWildlife

Figure 10. Winchester Fish Hatchery, early 1900s.

—A new statute¹⁷ prohibited the taking of black bass in Lake Cochituate.

1872¹⁸: The Commissioners reported that alewives were “rapidly increasing” and there was an increased number of shad over the Lawrence fishway. Shad hatching at Holyoke continued under the auspices of Seth Green.

—Last spring (1872) “almost every fish dealer in Boston” had young salmon weighing 2-3 pounds, caught in weirs and nets on both sides of Cape Cod. These were undoubtedly fish hatched by the state and put into the headwaters of “our” rivers. The Commissioners obtained (in 1870) a small [hatching] house (built 1867) on the land of B.F. Ham in Winchester (Figure 10) for hatching salmon, which was enlarged to the capacity of 1 million spawn. The Commissioners recommended that they be given control of a small stream and pond for the purpose of keeping breeding fish. The entry of Maine into the restoration program in 1871 generated stability for it, with the cooperation of many individuals¹⁹.

—[Private] establishments for trout breeding were “springing up” all over the state.

1873²⁰: The 1873 Annual Report contained the exciting news that the U.S. Supreme Court decided in favor of the Commonwealth in its suit against the Holyoke Water Power Company²¹, concluding (in part) that: “Properly construed, neither of the charters affords any support whatever to the theory of the respondents, as they do not contain any semblance of a grant to take and subvert the fish rights below the dam”. The Holyoke fishway was then constructed but failed to pass shad. Fifteen of 18 other fishways ordered during the previous year were constructed.

—Salmon continued to be hatched at the Winchester hatch-house. Propagation of landlocked salmon was contemplated. Shad hatching continued at North Andover, and spawn were distributed to four rivers.

—Since 1869, 26 great ponds in eight counties were leased for the cultivation of useful fishes (most stocked with trout or bass), for 5-20 years, including four to town inhabitants collectively, and one (Lake Chauncey) to the “Trustees Reform School”.

—Legislation²² prohibited the catching of smelt statewide by any means except hook and line, except in five locations in Barnstable, Bristol, and Dukes counties.

1874²³: The Commissioners stated that the fishway at Holyoke had been completed in the fall and that the Commissioners of the four affected states (CT, MA, NH, VT) later met at Turners Falls to examine the [new] dam there and to make an assessment as to the best site for a fishway. However, the Turners Falls Company was uncooperative.

—Salmon spawn reared in Maine and hatched at Winchester produced 271,000 fry which were released in the Connecticut and Westfield Rivers. Between 1866-1876, before any adult salmon had returned, nearly 1.3 million fry were released in the Merrimack and the fishways were in excellent condition¹⁹. Shad continued to be hatched at North Andover and South Hadley.

—Landlocked salmon spawn were released in five ponds and one river in Berkshire, Middlesex, and Worcester counties.

—Legislation²⁴ provided that the trout, landlocked salmon, and lake trout seasons were closed between August 20 to the following March 20, and that nets or salmon pots were prohibited at any season.

1875²⁵: The Commissioners reported that they had found the best type of fishway for all types of fish collectively, but were still searching for a design which would be best suited to shad.

—Shad hatching continued on the Merrimack and Connecticut. Landlocked salmon fry were stocked in four towns in four counties.

—There is a “...general and healthy growth of public interest in pisciculture, not here alone but in the whole country.”

—Fifty-four [great] ponds were now under private lease.

1876²⁶: The Commissioners reported on the status of improvements to the Holyoke and Lawrence dams.

—The shad catch on the lower Connecticut was one of the best ever; however, this left few fish for spawning. Shad hatching at North Andover was discontinued in 1876 with the probable result of a falling off in subsequent fisheries.

—About 195,000 landlocked salmon fry were raised and distributed to 24 Massachusetts ponds.

—Black bass were plentiful in the upper part of the Connecticut and were increasing in the Merrimack.

1877²⁷: There were 47 [adult] salmon (weighing 6-20 lbs.) counted at the Lawrence fishway^{18,27} (May-July), causing the Commissioners to estimate the actual passage of 1128²⁸ fish.

—The Commissioners lamented a decline in shad on the Merrimack, but congratulated detectives for apprehending poachers (including 2 North Andover town officials).

—On the Connecticut River, 10-15,000 shad were taken for spawning in 1873 but only 2674 in 1877.

—Thirty ponds were stocked with about 150,000 landlocked salmon fry.

—Legislation²⁹ revised an 1870 law and provided for further restrictions on the taking of birds, birds' eggs, deer, and other game.

1878³⁰: The Commissioners presented a substantial report of the tally of fish over the Lawrence fishway from April 22 until August 25, which included 17 salmon and 5 shad.

—The shad run on the Connecticut was “extremely bad” in 1877 and the Commissioners met with Connecticut authorities in regard to exploitive capture methods (e.g., fish pounds).

—The Commissioners also stated that the Westfield River had been opened as far as Westfield, where four dams still lacked fishways.

—There were 245,000 landlocked salmon stocked in 29 ponds, including Halfway Pond in Plymouth, where they are well established.

—Legislation³¹ prohibited keeping, killing, or shooting at any pigeon or other bird as a game or test of marksmanship or renting or allowing the use of any premises for such purpose.

1878-79³²: The Commissioners' report continued a tally of fish passing the Lawrence Dam, including 28 salmon and 2 shad between May 5 and October 1, 1879.

—Twenty-eight ponds were stocked with 224,763 landlocked salmon fry.

1879-80³³: There was a large run of salmon in the Merrimack in 1880 but few reached the spawning grounds due to drought and illegal night fishing by poachers. There were 23 salmon and no shad over the Lawrence fishway between April 26 and August 10.

—The Commissioners remarked that their duties now included the collection of statistics on shore and river net-fisheries³⁴, which will be set forth in their Annual Reports.

—Landlocked salmon were probably established in several ponds; 21 ponds received fry in 1880.

—Trout were primarily propagated by private entrepreneurs; about 100,000 small fish received from New Hampshire (a joint hatchery in Plymouth) will be distributed to [private] applicants at Winchester in April 1881.

—The Commissioners received 1300 carp from the U.S. Fish Commissioner in Washington, of which 400 were held at the Tewksbury Reservoir and the remainder distributed to 33 Massachusetts cooperators, three in Maine, and three in New Hampshire.

“THE PROTECTION AND PRESERVATION OF BIRDS AND MAMMALS
IN LIKE MANNER AS TO FISH”: THE 1880s

Nationally, the 1880s saw the invention of the electric light (1880), the assassination of President James Abram Garfield (1881) and the perfection of the Kodak camera (1888)¹. Massachusetts saw advances in primary and secondary education, including technical schools, increases in free public schools, and the inception of a common course of study; civil service reform; and advances in public health². The Great Blizzard of March 1888 virtually halted transportation and commerce in the Northeast for weeks. In the U.S., land clearing was down to 28,603,000 acres in 1880-89 against 62,000 for the Northeast region³, but would nearly triple in the Northeast by 1900-09 with the harvesting of successional old-field white pine⁴.

The diversity of sportsmen, naturalists, foresters, scientists, bird watchers, and educators who decried the wanton exploitation of fish, forests, and wildlife began to coalesce—if not always in actual partnership, at least in a common goal—around a framework of natural resource conservation^{5,6}. Carl Christian Schurz (1829-1906), appointed as Secretary of the Interior by President Rutherford Birchard Hayes (1822-1893), fostered conservation issues in the Interior Department and advocated the creation of forest reserves⁵.

The American Ornithologists' Union [AOU] (modeled on the British Ornithologists' Union), was established in 1883 and incorporated in Washington, D.C. in 1888⁷. Its journal—*The Auk*—was hatched, phoenix-like, from the *Bulletin* of the Massachusetts-based Nuttall Ornithological Club in 1884. The sportsman George Bird Grinnell (a charter member of the AOU) partnered with that organization by fiercely promoting bird protection in *Forest and Stream*.

Charles Sprague Sargent (1841-1927), botanist and director of Harvard University's Arnold Arboretum, criticized “...our present reckless methods of forest management...the pine which once covered New England and New York has already disappeared...[in] the Atlantic region the hardwood forests...have everywhere lost their best timber”⁸.

Game mammals also drew attention. Clinton Hart Merriam M.D. (1855-1942) was appointed Director of the newly-formed Office of Economic Ornithology and Mammalogy of the U.S. Department of Agriculture in 1884^{5,6}. Despite his peculiar taxonomic predilections, Merriam actively fostered cooperation between scientists and academia and encouraged a proliferation of mammal specialists, leading to changes in state and federal practice and policy and the birth of game management as a science⁶. Soon thereafter, New York Assemblyman Theodore Roosevelt (1858-1919) proposed the formation of a club of hunting riflemen. Enthusiastically received among the sporting elite, the club—now named the “Boone and Crockett Club”—was organized in January 1888 with Roosevelt as President⁹. Among the club's principal objectives was the preservation of large game animals and the enactment and enforcement of legislation for that purpose.

The period from 1860-1880 was the nadir for black bears in Massachusetts¹⁰ with the animals restricted to a small enclave in northern Berkshire County¹¹. After 1880, a few dispersers showed up elsewhere in the state but bears were nonetheless practically extirpated. With white-tailed deer rapidly declining (“a few still exist”¹²),

hunters mostly focused on small game, including rabbits, squirrels, and raccoons¹³, snowshoe hare¹⁴, and waterfowl.

1880-81¹⁵: The Commissioners surveyed and provided plans for several dams. Lampreys were being taken illegally at the Holyoke fishway and several violators were apprehended.

—At the Lawrence Fishway, 72¹⁶ salmon and four shad were observed between May 8 and September 15. Illegal seining on the Merrimack below the Newburyport chain bridge took many salmon and shad. The drought continued upriver and salmon could not easily reach the spawning grounds. Salmon were reestablished in the [lower] Merrimack and “have a fair chance”.

—Limited numbers of [brook] trout fry (23 cans) were hatched at Winchester and distributed to private propagators. Eighty cans of landlocked salmon fry were stocked or distributed to private individuals.

—Pond leases continued, although progress reports were slow to come in.

1881-82¹⁷: The state’s fishways were “generally in good working order” and a few new ones were completed or in progress. Between May 5 and September 30, there were only 25 salmon¹⁸ and two shad counted at the Lawrence fishway.

—Shad hatching was reinstated at North Andover, but with a delayed start. There were 654 adults taken from the Merrimack, producing about 1 million spawn, of which 40,000 were released above the Lawrence Dam and 800,000 at North Andover. Seinners on the lower Merrimack continued to take fish illegally.

—Landlocked salmon continued to be hatched and stocked, with 29 cans distributed. Fifteen cans of brook trout fry were hatched from last year’s spawn and distributed to propagators. Both rainbow trout and “Lake Superior or salmon trout” may be available next year.

—The carp stocking of 1880 was unsuccessful due to a low initial stocking and poor habitat selection. Further attempts were deemed to be desirable.

1883¹⁹: The Commissioners discussed construction issues with the Pawtucket Dam at Lowell. The salmon tally at the Lawrence fishway was only 12²⁰ fish (and no shad), one of the poorest years of the restoration effort.

—Shad hatching continued at North Andover with about 1.25 million hatched from 428 adults taken. The hatchlings were released above the Lawrence Dam, at North Andover, and in the Ipswich River.

—Twenty-five cans of brook trout fry were distributed to 17 propagators, with an increase projected for the following year. Lake trout (26 cans) from Wisconsin were hatched and distributed to 19 propagators. Rainbow trout propagation was delayed. Landlocked salmon (52 cans) were distributed to 16 cooperators and stocked in one river.

—The U.S. Fish Commissioner provided 4000 carp to Massachusetts in November, of which half were stocked and the remainder held at the Winchester hatchery.

—Pond and stream management improved slightly but could be bettered. All statutes pertaining to fish were compiled into a Chapter of the Public Statutes²¹.

1884²²: The Commissioners advised that the salmon run on the Merrimack was about six times larger than in 1883, but that only 17²³ were passed at Lawrence from May 6 to June 24 and September 24-October 22.

—There were only 166 adult shad captured at North Andover and the hatch produced 252,000 young which were returned to the Merrimack River.

—Twenty-four cans of [brook] trout fry from Winchester were delivered to 17 cooperators, as well as 25 cans of lake trout (to 14 cooperators), and 56 cans of landlocked salmon fry (to 18 cooperators and stocked in one pond).

—Four thousand carp were received from the federal government and delivered to 30 cooperators.

—Reports from leased ponds showed a large increase in fish. Seven of 114 ponds gave a total return of 237,817 fish caught; an overall total estimate was 400,000 fish.

1885²⁴: This year saw 17 salmon (an estimated 750 total²⁵) and five shad passed through the Lawrence fishway, “by far” the largest yet.

—Shad hatching on the Merrimack produced good results; 704 shad were taken with 490 returned alive to the river and 214 distributed. The hatch was ≈500,000 with all released to the Merrimack in New Hampshire and Massachusetts. Shad protection on the Atlantic coast appeared to be dependent on artificial propagation. Adverse conditions, including pollution and the use of exploitive pound nets, apparently limited natural reproduction.

—Carp stocking continued with 2000 young carp distributed to 28 cooperators and one reservoir. Carp cultivation²⁶ was deemed to be a valuable endeavor which should be promoted.

—Forty-six cans of trout fry (to 24 recipients) and 61 cans of landlocked salmon (to 15 recipients) were distributed (most transported at no charge by the railroads).

—Leased ponds showed mixed results. Onota Lake in Pittsfield was found to be properly managed and it produced 6730 pounds of fish, including 1500 of black bass and 1000 of pickerel.

1886²⁷: Another landmark change occurred when, on June 10, 1886, the Commissioners were given authority over all game laws and became the “Commissioners on Inland Fisheries and Game”²⁸.

—In addition to this transfer of authority, the Act: (1) set or changed the open seasons for heath hen, ruffed grouse, woodcock, wood duck, black duck, teal, snipe, plovers and other shorebirds, passenger pigeons, gulls and terns; (2) prohibited selling of or possessing for sale most of these birds; (3) prohibited killing or taking or disturbing the nest and eggs of birds other than English sparrows, grackles, crows, jays, birds of prey, wild geese and fowl other than above; (4) provided for scientific collecting permits; (5) established restricted open seasons for gray squirrel, hare, and rabbit; (6) prohibited ferreting, jacklighting, swivel and punt guns, and pursuing wild fowl from a powered craft; and (7) established provisions for deputies, enforcement powers, and fines.

—At the Lawrence fishway, 14 salmon and no shad were passed. The spring run of salmon was smaller—but the fall run larger—than usual.

—Shad hatching at North Andover continued with 1674 shad taken from the Merrimack (205 were retained for spawning) and about 600,000 young shad hatched.

—The Commissioners again received brook trout eggs from New Hampshire and hatched and distributed 261,500 fry to 49 recipients. Sixteen recipients distributed 100,500 landlocked salmon fry. Nine recipients obtained 1600 young carp, of which 400 were placed in the Tewksbury Reservoir.

—The Massachusetts Legislature formally complained to the State of Connecticut regarding the Enfield Dam on the Connecticut River.

1887²⁹: The Commissioners began formally reporting on both “fisheries” and “game”. All fishways in the state were found to be in good condition, except the one at Middleborough. Normal rainfall resumed and the Merrimack River ran full for the first time in seven years. There were 67³⁰ salmon (1 shad) counted at the Lawrence fishway. The river was opened to hook-and-line fishing.

—An attempt at shad hatching on the Taunton River was a failure. At North Andover, 1753 shad were taken (1537 returned), yielding about 1.2 million hatched. Most (n=950,000) were stocked into the Merrimack; the remainder went to New Hampshire and to two private individuals. Shad harvest on the Merrimack was nearly eradicated due to the use of small-mesh seines, which had been prohibited in 1884.

—Trout were hatched at Winchester and distributed to 60 individuals. Landlocked salmon spawn was much less than previous years and fry distributed to 16 individuals. Carp production continued and the fish were distributed to 19 individuals.

—English sparrows were a nuisance³¹ and the Commissioners recommended killing them at all seasons as “...they are good for the table and that alone”³².

—The Commissioners further advised that “The horned and hooped wild game is nearly gone from Massachusetts. A few wild-eyed and apprehensive deer haunt the pine woods of the Cape...”. The public was reminded that “The holder of the land does not own the game, but he has the right while it remains on his land to its first pursuit, or to permit or debar the public from its pursuit if he desires”.

1888³³: The decrepit Middleborough fishway was replaced with a new and more expensive one. The salmon run at Lawrence was again strong, with 92³⁴ (no shad) taken at the fishway. A number of salmon were taken illegally in the lower Merrimack.

—A decreased number of shad (n=721) were taken at North Andover and 1.010 million hatched. Most (n=490,000) were stocked into the Merrimack, 430,000 were given to New Hampshire for stocking, and the remainder to two cooperators. The shad fisheries in the Connecticut River have been “destroyed by the cupidity of the [commercial] fishermen.”³⁵, declining from a catch of 436,981 in 1879 to 68,450 in 1888.

—Trout were again hatched at Winchester and fry were distributed to 66 cooperators. Landlocked salmon fry were distributed to 13 cooperators. Six cooperators received only 50-60 carp each, even though there was an ample supply.

—Deer were being killed illegally on Cape Cod and legislation regarding game protection was “capricious and largely unwise”. The Commissioners recommended that the open season for woodcock, quail, and partridge should be limited to October through December. The public is “...in favor of the protection of our song and insectivorous birds”.

1889³⁶: The Commissioners reported that 59 salmon³⁷ (no shad) were reported at the Lawrence fishway, a substantially less run than in the previous two years. The commercial shad harvest on the Connecticut River continued to decline, reaching only 42,325, the lowest on record. Illegal harvest of shad on the lower Merrimack was also occurring under the pretext of taking bait fish.

—Shad hatching at North Andover continued with only 98 shad taken and 625,000 hatched. Of these, 240,000 were stocked in the Merrimack, 320,000 to New Hampshire for stocking, and the remainder given to two cooperators.

—Trout fry were distributed to 62 cooperators and carp to 10 cooperators.

—The Commissioners stated that a non-export law was needed to protect grouse and quail from market hunters who kill game for the New York market. Uniform woodcock, grouse, and quail seasons were also needed. Shooting, hunting, and fishing on Sunday is a nuisance and Sunday is the peak day for illegal activity.

WILKINSONVILLE TROUT AND MONGOLIAN PHEASANT: THE 1890s

In the U.S.A., the “Mauve Decade” was characterized by the violent confrontation at Wounded Knee in South Dakota, resulting in a functional end to the Indian Wars (1890), the demonstration of the first commercial gasoline-powered automobile—the Duryea—in Chicopee (Mass.)(1893), the Panic of 1893 and the ensuing economic depression, the Klondike Gold Rush (1896-99), and the Spanish-American War (1898)¹. Massachusetts saw changes in the banking, insurance, textile, shoemaking, confectionery, and transportation industries², as those businesses increasingly became affected by the advent of steam and electric machinery and foreign and southern competition. The newspapers also underwent a revolution in editing and publishing, stimulated by a large increase in advertising³. The first subway system in the United States was constructed in Boston in 1897.

Changes in forest utilization and agricultural patterns continued much as they had in the 1880s. Massachusetts was in a period of forest “devastation”⁴, driven by a decline in agriculture and the exploitation of second growth woodlands. The great “Portland Gale” of November 1898 killed >400 people and sank >150 vessels.

The environmental conservation and protection movement continued to evolve. In Massachusetts, the landscape architect Charles Eliot (1859-1897), writing in *Garden and Forest* in March 1890, advocated the establishment of a private non-profit entity to conserve areas of scenic beauty⁵. Soon thereafter, the Trustees of [Public] Reservations was incorporated⁶ to acquire, hold, maintain and provide access to beautiful and scenic areas within the Commonwealth. Also in 1890, the naturalist and author John Muir (1838-1914) formed the Sierra Club to protect and set aside spectacular scenic areas^{7,8}.

Merriam’s Division of Economic Ornithology and Mammalogy was renamed the Division of Biological Survey in 1895, addressing illegal market hunting and developing census and survey techniques and applied ecological research^{7,8}. The same year, the New York Zoological Survey (now the Wildlife Conservation Society) was organized with

the assistance of the lawyer and sportsman Madison Grant (1865-1937) and the Boone and Crockett Club⁹.

Then, alarmed by the killing of egrets and other birds to acquire plume feathers for ladies' hats, Harriet Lawrence Hemenway (1858-1960) and Minna B. Hall (1851-1944) organized a coalition which led to the formation of the Massachusetts Audubon Society¹⁰ in 1896—the first such entity in the United States. The same year, in ruling on a Connecticut case involving interstate transport of game birds, the U.S. Supreme Court found for the defendant, establishing a long-standing doctrine of state “ownership” of wildlife¹¹.

Freshwater angling continued to be popular in Massachusetts. Brook trout continued in popularity^{12,13, 14} but bass, pickerel, perch, and bullheads did not lack interest, especially among youths (Figure 11). Frank Amasa Bates (1858-1915), fishing in South Carver, claimed that “...hornpout are the most intelligent fish that ever grew...I druther have them than perch, and it's just as much fun to ketch' 'em”¹⁵.



Photo © MassWildlife

Figure 11. Youth with a pickerel taken in Little Long Pond, Rochester.

Rabbits, hare, and upland game birds^{12,14} continued in favor with hunters as did red fox^{16,17}. Fifty pairs of “rabbits” (from out-of-state?) were released on Nantucket in 1891¹⁸ to the delight of houndsmen.

The abundance of waterfowl and shorebirds along the coast—although rapidly diminishing¹⁹—were a strong draw along the coast in Barnstable²⁰, Essex²¹, Nantucket²², Plymouth²³, and Suffolk²⁴ counties. Russell Scudder Nye (1861-1930) of Falmouth praised “...the black duck or black mallard...[which] is the hardest to circumvent and bring to bay...”²⁵. On the other hand, President Stephen Grover Cleveland (1837-1908)—a frequent Cape Cod waterfowler—lauded the “serene duck hunters” who associated for “high aims and purposes”²⁶.

1890²⁷: The Commissioners stated that eight new fishways were built on the Monatiquot River in Norfolk County. Fish passage at the Lawrence Dam from April 22 to October 9 yielded 44 salmon²⁸, believed to be the second largest run of adults to enter the Merrimack.

—Shad continued to decline on the Merrimack, with none passed or caught in seines at Newburyport. However, many were taken at the mouth of the Merrimack. The scarcity of fish greatly affected shad hatching at North Andover. Only 62 were taken, with about 170,000 young hatched.

—The trout harvest during 1890 was “unusually large” mainly due to the stocking of young trout. The demand for trout was great and the Commissioners could not keep up with requests, with 132 cooperating applicants receiving about 3500 fry each. The

Legislature appropriated \$1000²⁹ to establish another hatchery. The private hatchery of the Hampshire Trout Breeding Association received 25,000 brook trout eggs from Michigan and 35,000 from the Commissioners. About 5500 fry were later stocked in Hampshire County and about 275 yearling carp were distributed to 11 cooperators.

—The open seasons on trout, landlocked salmon, and lake trout in the four western counties of the state were increased³⁰.

—Game birds seemed to be increasing and private enterprise was demonstrating that “...some of the best game birds of Europe can be successfully introduced and bred here...”. English sparrows continued as a pest and a bounty law was recommended.

1891³¹: Sixty-seven salmon³² were tallied between April and September at the Lawrence fishway, although there was a lessened run overall due to low water. Illegal fishing continued to be a major problem.

—There were more applicants requesting brook trout than could be satisfied by existing production at Winchester and the private hatchery at Northampton. About 580,000 fry were distributed to 158 applicants. The new state hatchery at Sutton was under construction (it opened in 1891) on two acres of leased land for 10 years at \$25 annually. Interest in carp was low and only five applicants requested and received fish.

—The Commissioners met with their counterparts from other New England states in response to a [Mass.] Senate Resolve³³ relating to the adoption of uniform laws protecting food fishes in New England. The consensus was that such uniform laws were impractical, but that an annual meeting was desirable.

—“Vermin like foxes, skunks, weasels, and red squirrels are an important factor in reducing our game supply” and a bounty law would be a wise measure. The ruffed grouse showed an “...almost unaccountable scarcity”.

—Deputies continued to enforce the fish and game laws, despite limitations on personnel and authority. Fines for illegal taking of woodcock, grouse, quail and ducks were set³⁴ and the evidentiary rules for violations were strengthened³⁵.

1892³⁶: There were 84 salmon³⁷ passed through the Lawrence Fishway, overall comprising the greatest run since the inception of the program³⁷. However, low water and obstructions prevented salmon from reaching the spawning grounds above Concord [N.H.].

—The shad harvest on the Connecticut River was depleted to 2056 taken in fresh water rivers, the lowest in 11 years.

—About 510,000 trout fry were sent to 136 applicants and 20,000 were sent to the new Wilkinsonville (i.e., Sutton) hatchery—nearly completed—for rearing as breeders.

—The Commissioners again urged the implementation of a bounty law.

1893³⁸: The Commissioners discussed the repairs to fishways in Taunton and Middleborough. At the Lawrence fishway, 97³⁹ salmon were passed, another exceptionally large run. However, salmon continued to be blocked from passage beyond Concord [N.H.] due to dams, and thus could not reach the spawning areas for the second year^{38,39}.

—The Sutton hatchery was nearly completed and had received some breeding stock. However, more rearing ponds needed to be constructed and the number of breeders



Photo © Mass Wildlife

Figure 12. Sutton State Fish Hatchery buildings, about 1910.

increased to 15,000. A second hatchery in the western part of the state was desirable. Massachusetts now has one hatchery (i.e., Sutton) , a half-interest in a second (Plymouth, N.H.), and a cooperative agreement in Winchester.

—Eighty-one applicants received ≈ 3500 [brook trout] fry each. The consensus was that stocking fry instead of fingerlings in brooks was the most cost-effective procedure. About 40,000 lake trout were hatched and stocked in two ponds on Cape Cod. There was an interest in white perch and retaining ponds for their culture were being prepared. Only five applications for carp were received and each applicant received 50 carp.

—Low pelt prices diminished the number of trappers seeking predatory animals. A bounty law was needed, similar to the county-enacted bounties for the taking of seals.

—The practicality of importing grouse and pheasants from Europe for stocking in Massachusetts should be explored.

—The Commissioners and their deputies were authorized to arrest without warrant any person found in violation of the fish and game laws in the field⁴⁰.

1894⁴¹: There were only 11 salmon⁴² passed at the Lawrence fishway, an unusually small run compared to 1892-93⁴². The Massachusetts Legislature passed—and the Governor vetoed—a statute removing all restrictions in fishing in the lower

Merrimack. However, even if passed, this would not affect salmon restoration since the dams near Concord [N.H.] blocked access to the spawning areas⁴².

—There was continued discussion on the stocking of fingerling trout (vs. fry). About 350,000 brook trout fry were distributed to 71 applicants and to the Sutton hatchery. The Sutton hatchery (Figure 12) was completed and will be in operation in the coming year.

—Lake trout fry were hatched and liberated in 11 ponds. Ten applicants were provided with 50-60 white perch each (live-captured and held in ponds for distribution) and four cooperators received carp.

—Woodcock and ruffed grouse were scarce, but quail were increasing. The Commissioners recommended that the open season for all upland game run for two months, from October 1 to December 1. The seasons for gray squirrel, rabbit, and hare were closed between March 1 and September 15⁴³, the quail season was closed in 1894⁴⁴, and provisions were made for the sale of game birds taken out of state, or during the open season in Massachusetts⁴⁵.

—An order for 1200 Chinese ring-necked pheasants was placed but all died between Gibraltar and New York. A setting of English pheasant⁴⁶ eggs and a few Mongolian birds were received from private individuals.

1895⁴⁷: The Lawrence fishway was damaged by a spring freshet and was only operable part-time. Twenty-five salmon were passed between June 28 and July 24, and 31 in October⁴⁸, with a considerably larger run than in 1894. However, since the salmon could not migrate beyond the Sewall's Falls Dam at Concord (N.H.), many moved into lower tributaries and were illegally taken⁴⁸. The Massachusetts Legislature repealed⁴⁹ the statutes protecting shad and alewives in the lower Merrimack River, over the objections of the Commissioners and the Governor.

—About 375,000 brook trout fry were distributed to 68 applicants, 100,000 lake trout fry to 14 applicants, and >50 carp each to 10 applicants. White perch were not distributed due to lack of funds.

—The Sutton hatchery was renovated and a new superintendent appointed. The Winchester hatchery must either be rebuilt or abandoned. The joint tenancy of the hatchery at Plymouth, N.H. was ended⁵⁰.

—Quail and ruffed grouse were plentiful, both from increased protection and from favorable climatic conditions.

—Previous experiments in raising English pheasants were unsuccessful. The Legislature appropriated funds⁵¹ for the acquisition of Mongolian pheasants⁵² and in April 1895 three male and nine females were received from Oregon⁴¹ and sent to the Winchester hatchery. By the fall of 1895, the birds had produced 70-80 chicks.

—Public opinion was ahead of legislative enactments: "Land without game or bird life, and water without fish, are a desolation and destruction of the balance of nature"⁴¹.

1896⁵³: The Lawrence fishway was determined to be heavily damaged by spring floods. The Legislature failed to appropriate monies to repair and rebuild it. There was no formal tally of salmon; 10 fish were hand-netted and moved above the dam. The run reaching (but not passing) the dam was estimated at ≈1000 fish, which was the last major run on the Merrimack⁵⁴.

—Between 500-600,000 brook trout fry were hatched and distributed to 60 applicants. Nearly 1200 carp of various ages were distributed. However, due to low demand, the breeding ponds at Tewksbury were discontinued and carp taken from a flowed meadow in the Middlesex Fells.

—The Sutton hatchery was in good order and the Legislature appropriated funds for a second hatchery at East Hadley⁵⁵ (built 1896). The Winchester hatchery must either be rebuilt or abandoned.

—The propagation of Mongolian pheasants was going well; >200 chicks were moved to a covered pen. A few birds were distributed to private propagators and 12 birds which were released in Dalton in 1895 bred and produced chicks. Escaped birds also bred in Winchester.

—Deer “...are coming into the state in considerable numbers...”. Since there is an open season during the month of November (except on Cape Cod); the season should be entirely closed for a period of years.

—The taking, sale or possession of black bass <8 inches in length was prohibited⁵⁶.

—The Commissioners recommended that the Legislature prohibit snaring and that the laws protecting songbirds be enforced. The Commissioners urged a system of paid deputies, at least one per county⁵³ (see 1898-99 below).

1897⁵⁷: The Lawrence fishway was inoperable. Funds were appropriated for repairs⁵⁸; however, this was not accomplished prior to the 1897 season. An estimated 250 salmon returned to the area below the dam⁵⁹.

—The Sutton hatchery and the Hadley hatchery needed improvements to the ponds. Monies were appropriated to rebuild the Winchester hatchery⁶⁰ on a site in the Middlesex Fells. It was sufficiently complete so as to receive eggs by the end of December 1897. The Commissioners hired their first Superintendent of Hatcheries, John W. Delano⁵⁷ (a former Commissioner).

—The Legislature also provided funds for stocking great ponds with food fish⁶¹ and 11 ponds were stocked with white perch⁵⁷. Brook trout fry were distributed to 39 applicants from the Winchester hatchery, 26 from Sutton, and 16 from Hadley.

—The rearing and distribution of Mongolian pheasants was “fairly successful”. Incubators were acquired for use as an alternate to brood hens. Nine pairs and a few extra cocks were liberated in Winchester and some broods observed.

—Legislation⁶² prohibited the sale or possession of the feathers or bodies of protected birds; however, it applied only to those provably taken within Massachusetts.

—The Commissioners recommended that the ferreting law be amended to prohibit possession of a ferret in the field. A closed season on white-tailed deer for “a term of years” was also desirable.

1898⁶³: The Legislature provided funds⁶⁴ for a fourth hatchery, to be situated in Berkshire County. The Commissioners chose a site in Adams, with a supply of “pure spring water”. The renovated Winchester hatchery was opened part-time to the public in view of its physical attractiveness and the general interest in fish propagation.

—The Lawrence fishway was rebuilt on the opposite side of the river. However, no salmon were passed, and only a “handful” appeared at the base of the dam⁶⁵. This was

the end of a “dramatic effort” to restore salmon to a river from which the historical runs had been eradicated⁶⁵.

—Brook trout were distributed to 41 applicants from the Winchester hatchery, to 37 from Sutton, and to 28 from Hadley. Lake trout fry raised from Michigan eggs were stocked in seven lakes and ponds, and fry raised from Maine eggs were stocked in Quacumquasit Pond. White perch were released in 15 ponds.

—The propagation of Mongolian pheasants was quite successful, due to the assistance of skilled cooperators. Broods were reported in Worcester County and near Winchester pheasants are “...more plentiful than ruffed grouse”.

—Legislation was passed prohibiting possession of a ferret in the field⁶⁶, closing the deer season statewide⁶⁷ until November 1, 1903, and amending the law pertaining to sale of bird feathers or carcasses to include those taken outside Massachusetts⁶⁸. Deputies (i.e., enforcement officers) were now to be paid from accrued fines and forfeitures^{63,69}.

1899⁷⁰: Brook trout were distributed from the Adams hatchery (in May) to 21 applicants, from Hadley to 27 applicants, from Sutton to 30 applicants, and from Winchester to 42 applicants. Lake Quinsigamond was stocked with 225 two-year-old rainbow trout and 75 three-to-four-year-old brook trout. No carp were requested, yet carp were selling at 18-25¢ per pound in Boston. A total of 2800 white perch were stocked in six ponds and lakes.

—The Commissioners continued to urge that the open season for all game should be only from October 1 to December 1. Pheasants were doing well in the towns near Winchester.

—The Commissioners were given control of Mill Pond in Yarmouth for the cultivation of food fish⁷¹.

—Sunday hunting was prohibited under the game laws⁷² (i.e., exclusive of the so-called “Blue Laws”). The Act relative to paid deputies was amended⁷³ to clarify its intent and facilitate payments to officers.

“ARTIFICIAL PROPAGATION AND PROTECTION OF NATIVE VARIETIES IS MORE ESSENTIAL THAN INTRODUCTION OF NEW VARIETIES”: THE 1900s

In the U.S.A., the 1900s saw the Philippine War (1899-1902), the assassination of President William McKinley (1843-1901), formal U.S. control of the Panama canal zone (1902), the settlement of the Alaskan frontier (1903), the first successful flight of a powered airplane (1903), the Pure Food and Drug Act (1906), the San Francisco Earthquake (1906), the financial Panic of 1907, and the first Model-T Ford automobile (1908)¹.

Massachusetts’ population was 2,805,346 in 1900^{2,3}, with 86% classified as “urban”. The textile and shoe industries were still the mainstay of the state’s economy but the paper and rubber industries and a wide range of others also flourished. Increases in the labor force, rising productivity, capital investments, favorable trade conditions,

and Boston's lead role in national finance resulted in a favorable economic position⁴. Immigration from Europe and French Canada was high. The state began a reorganization and modernization of state government and saw a rise in labor disputes and activism⁵. Boston was the second most valuable port in the United States in 1900 and the first in fishing. However, these rankings diminished during the decade due to external competition. The first U.S. motorcycle company—Indian Motorcycles—was founded in Springfield in 1901. The Chelsea Fire of 1908 destroyed nearly half the city.

Forest clearing had been high since 1880 and peaked in New England between 1909-1910⁶ when >2.5 billion board feet were harvested across the region. Second-growth forests were widespread and accessible, demand was high, and labor was readily available. The Massachusetts Legislature created a State Forester in 1904 to “promote the perpetuation, extension, and proper management of forest lands...”^{7,8}. The state had acquired parks and reservations in previous years, including the “Province Lands”⁹ and the summit of Mount Greylock¹⁰, but not “State Forests”. The new State Forester urged acquisition of forest reserves and public forest land, although without immediate success.

In 1900, Congress enacted the Lacey Game and Wild Birds Preservation and Disposition Act¹¹ to supplement state laws for protection of “game and birds” by prohibiting interstate commerce of those animals killed in violation of state or territorial law, or imported to avoid the recipient state's prohibitions on sale. The forester and conservationist Gifford Pinchot (1865-1946) drove the formation of the Society of American Foresters in November 1900 to “...further the cause of Forestry...foster a spirit of comradeship...and disseminate[d] a knowledge of the purpose and achievements of Forestry”¹².

In July 1902, the first meeting of the National Association of Game and Fish Wardens and Commissioners was convened at Mammoth Hot Springs in Yellowstone Park¹³. In March 1903, acting under the authority of the Forest Reserve Act of 1891¹⁴, President Theodore Roosevelt issued an Executive Order setting aside Pelican Island in Florida as a bird reservation^{15,16}. The Transfer Act¹⁷ of February 1, 1905 shifted the nation's forest reserves from the Interior Department to Agriculture¹⁸, enabling Pinchot—the first Chief of the Forest Service—to work towards a system of national forests administered by professionals.

Roosevelt also used the Antiquities Act of 1906¹⁹ and a related statute to set aside both large and small tracts of land as National Monuments, commencing with Devils Tower in Wyoming in 1907. In 1905, under the leadership of Thomas Gilbert Pearson (1873-1943) and William Dutcher (1846-1920), most of the then-existing state Audubon Societies (Massachusetts was an exception) were jointly incorporated as the National Association of Audubon Societies (now the National Audubon Society)^{20,21}.

The geologist Nathaniel Southgate Shaler (1841-1906) anticipated consequences from the loss of biodiversity and the need for worldwide conservation and preservation of natural resources, and our “...difficult task of reconciliation with the environment... handing on to our successors all we can of our and their heritage of the earth as little impaired as we can contrive it to be”²².

Upland game were doing reasonably well in 1900²³, but [breeding] waterfowl less so. The Cape Cod gunner Anthony Elmer Crowell (1862-1952) drew on his experiences²⁴ to become one of the most renowned decoy carvers in the United States. White-tailed deer were rebounding as a result of the closed season implemented in 1898^{25,26}. However, most shorebirds, including the Eskimo curlew and American golden plover, were

not faring well. On Nantucket, the Eskimo curlew was seen in an “immense flight” in 1863, a “large flight” in 1883, and one bird in 1893²⁷. The last Massachusetts record was in 1913. The curlew later became extinct, the population having been drastically reduced during 1850-90 by a “perfect storm” of habitat conversion on the Great Plains, reduction or elimination of its insect prey, and unprecedented market hunting²⁸. The passenger pigeon, which William Wood saw about 1630 “...neither beginning nor ending, length, or breadth of these Millions of Millions”²⁹ disappeared from Massachusetts sometime after 1894 and was extinct as a species in 1914³⁰.

1900³¹: A new hydropower dam was constructed at Holyoke.

—The output of brook trout was nearly a record, with fry distributed to 17 applicants from the Adams hatchery, 35 from Hadley, 27 from Sutton, and 41 from Winchester. Some were also distributed as fingerlings. Several thousand landlocked salmon fingerlings, 4000 adult white perch, and 1 million “pike perch” (i.e., walleye) fry were also distributed. Carp were available at Winchester for distribution to interested parties. The calico bass (i.e., black crappie) was being considered for introduction.

—Work was being done on increasing brood stock and improving rearing ponds at the various hatcheries. The introduction of the “tub system” at Sutton (Figure 13) proved to be one of the most important events in the rearing of young fish.

—Also, 10 great ponds were stocked with trout and were opened to angling three days per week from June to November. The Commissioners expressed their intent to examine other great ponds as to their suitability for stocking.

—Pheasants were being seen in “greater or less” numbers in the localities where they have been stocked. Partridge, quail, and woodcock were increasing, apparently in response to the shortening of the open season. Heath hen were greatly diminished but deer were becoming “more or less” common.



Photo © Mass Wildlife

Figure 13. Tub system for trout propagation, Sutton State Fish Hatchery, about 1910. Hatchery Superintendent Arthur Merrill (l.), Commissioner John W. Delano (r.).

—Experiments were made at Winchester for two years with propagation of the Belgian hare³¹ (i.e., European rabbit) with the intent to stock the state with these animals. They were as hardy as native rabbits and more prolific. The fear that they may become a nuisance, as expressed by the U.S. Secretary of Agriculture, was “...believed to be groundless”²³.

—Enforcement was facilitated by distribution of a large number of “Abstracts of the Fish and Game Laws”³². It was often necessary that two or more deputies work together, fortunately, both volunteer and paid deputies seemed to work harmoniously.

—Legislation included a closed season on pheasant between 1900-1905³³, prohibitions on the sale of game birds between 1900-1903 and changes in season dates³⁴, and new authority to regulate fishing in stocked brooks³⁵.

—The Commissioners further recommended a closed season on shooting of gulls and terns, a correspondence between the squirrel and rabbit seasons and that for upland game birds, and a clarification to the Sunday hunting law.

1901³⁶: A recodification changed the Board of Commissioners title from “Inland Fisheries and Game” to that of “Fisheries and Game”, reflecting their enlarged duties to address the sea fisheries.

—About 865,000 brook trout fry, 44,750 fingerlings, and 8500 yearlings were distributed to applicants. Two closed brooks were stocked with 3000 yearlings. In addition, 2.6 million walleye fry, 15,000 rainbow trout fingerlings, 586 “Loch Leven” (i.e., a strain of brown trout) yearlings, 13,000 landlocked salmon fingerlings, and 250 4-year-old brook trout were stocked.

—Surveys of great ponds continued slowly. Stream pollution continued, especially from the discharge of sawdust from mills.

—Ring-necked pheasant were distributed to 55 cooperators and liberated in various parts of the state. Breeding of bobwhite quail and various exotic game birds was under consideration. Belgian hares were distributed and liberated by 25 cooperators; however, the interest among sportsmen subsided. Deer continued to increase.

—Legislation allowed the marketing of Colorado jackrabbits and Nova Scotia white hares³⁷, set a 6-inch minimum length for trout (except in Berkshire County)³⁸, and established a closed season on terns, most gulls, and the passenger pigeon³⁹.

—The Commissioners recommended a statute relative to search and seizure. Additional assistants and expanded authority were needed to conduct scientific investigations.

1902⁴⁰: The Commissioners participated in the Boston Sportsmen’s Show for the first time and cooperated with the Museum of Comparative Zoology at Harvard and with the Massachusetts Institute of Technology.

—The Commissioners stocked 6 million shad fry in Assawompsett Pond, Taunton Great Pond, and Furnace Pond. A record 1.01 million brook trout fry were distributed. Additionally, 65,000 fingerling and 6000 yearling brook trout and 1000 brown trout fingerlings were stocked into streams. Another 6500 rainbow trout fingerlings, 1000 landlocked salmon fingerlings, 2750 adult white perch, and 125 adult brook trout were stocked into 19 great ponds. Also, 350,000 landlocked smelt eggs were planted in ponds. The Commissioners could not determine if the stocking of walleye had been successful.



Figure 14. Brook Trout fishing, Fall Brook, Bernardston.

—Pond surveys continued. Pond and brook fishing was popular (Figure 14).

—Pheasants (n=350) were distributed to 39 cooperators for liberation; the birds were doing very well and may become a game bird in the future. Belgian hare (n=193) were distributed to 27 cooperators but the animal was not yet established. Deer were doing well and some farmers have suffered crop damage.

—Legislation authorized the Commissioners and assistants to make “investigations of questions relating to fish and game”⁴¹ and to prohibit the export of illegally taken fish or game⁴².

1903⁴³: There were reasonable advances in the breeding and distribution of fish, except for shad.

—It was not possible to rear fingerling trout at Hadley. Brook trout fry were less than last year due to the demand for fingerlings; 903,000 brook trout fry and 10,000 brown trout fry were distributed. In the fall, 59,660 fingerling brook trout were placed in brooks and 12,000 landlocked salmon fingerlings, 9000 brown trout fingerlings, 1500 yearling brook trout, and 1000 rainbow trout fingerlings placed in 34 great ponds. Also, 6 million landlocked smelt eggs were placed in ponds to provide eventual food for landlocked salmon. About 1.5 million shad fry were put into Furnace Pond and 2.2 million walleye fry into various ponds.

—Brook and brown trout were stocked in several rivers. There was a growing appreciation of the advancing value of brooks and ponds to the angler because of the increase of fish in them.

—Hunting of game may benefit the state; it is “...both desirable and necessary for man to occasionally get near to nature’s heart”. Upland game was generally plentiful although variable throughout the state. Pheasants increased substantially, especially in the eastern counties, and propagated birds (n=424) were distributed to 59 cooperators. Belgian hares (n=216) were distributed to 32 cooperators.



Photo © MassWildlife

Figure 15. Office of the Commissioners on Fisheries & Game, Boston, 1904. John W. Delano (left) and George W. Field (right).

—The killing of insectivorous birds for food by immigrants was of great consequence and dismay to farmers.

—The Commissioners noted that their specimen collections have increased and that “Additions have been made to the reference library...but little more can be done until it is possible to find a space for books”.

—Legislation provided for the better protection of shorebirds^{44,45}, prohibited the sale of wild trout after 1906⁴⁶, extended the closed season for deer until 1908⁴⁷, and addressed deer damage⁴⁸, increased the penalties for killing songbirds⁴⁹, and provided for bounties on “wildcats”⁵⁰.

1904:⁵¹ The Commissioners reported that a new record was set for breeding and distributing fish, pheasant propagation was less than in 1903, additional attempts to breed game birds (including grouse) were underway, a salaried biologist was hired, and field work continued despite funding limitations.

—However, more office space was required (Figure 15), a “first-class” hatchery was desirable, and there was an increased public demand for “facts, service, or material” including Annual Reports and pamphlets or posters with the fish and game laws.

—There were 954,000 brook trout fry, 40,400 fingerlings, and 200 carp distributed to cooperators, and 1000 rainbow trout fingerlings and 95 adult brown trout stocked in two ponds. Five thousand brown trout fingerlings, 6000 rainbow trout fingerlings, 1200 landlocked salmon fingerlings, and 1.5 million walleye fry were stocked in 15 great ponds. Also, 16 million landlocked smelt eggs were planted in several ponds which had been stocked with landlocked salmon. Frog breeding was being investigated.

—Ponds used for water supply purposes will not be stocked as the Commissioners have no jurisdiction⁵². Sawdust pollution of streams was a continuing problem.

—Natural populations of quail can only be maintained by special efforts, due to climatic conditions⁵³, including the severe winters of 1903-04. Breeding of ruffed grouse was being attempted at Clark University. The cold winter of 1903-04 also affected pheasant propagation; nevertheless, there were 208 pheasants distributed to 42 cooperators. Belgian hare (n=140) were distributed to 31 cooperators.

—Legislation included changes to the laws regarding taking of pickereel⁵⁴, expanded search and seizure powers for enforcement officers⁵⁵, and further protection of shore and marsh birds⁵⁶.

1905⁵⁷: The Commissioners admonished that “The inland fisheries...belong to all the people in common but [were] unwisely destroyed...It is our aim to care wisely for this heritage...In a similar way it is our province to protect the few survivors of our formerly abundant game birds and mammals. The wild turkey and the passenger pigeon, the great auk and the ‘rafts of ducks’ are gone forever”.

—The first biologist, David Lawrence Belding (1884-1970) was hired⁵⁸.

—An up-to-date hatchery with adequate rearing pools, and more working space, was greatly needed.

—The four existing hatcheries distributed 969,000 brook trout fry, 45,875 fingerlings, and 25,000 brown trout fry. Nineteen great ponds were stocked with 5000 rainbow trout fingerlings, 4500 landlocked salmon fingerlings, 3500 brown trout fingerlings, 2000 brook trout fingerlings, 100,000 walleye fry, and 8 million smelt fry. Nineteen other ponds were restocked with 2000 rainbow fingerlings, 2000 landlocked fingerlings, 5000 brown trout fry and 1000 fingerlings, 700,000 walleye fry, 68 adult brook trout, and 12 million smelt eggs. Black bass were stocked in three ponds in Plymouth.

—Pheasant (n=486) and Belgian hare (n=176) were distributed to cooperators. Attempts to breed white (i.e., snowshoe) hare were unsuccessful. Ruffed grouse had been decreasing alarmingly for several years due to changes in habitat and increases in hunters. Woodcock, upland plover, and “pinnated grouse” (i.e., heath hen) (Figure 16) were also doing poorly.

—Deer were increasing, with the population estimated at 5000 statewide. There may be 10-15,000 by the time the season closure expires in 1908.

—Legislation included further restrictions on the taking and sale of trout <6 inches in length⁵⁹, provision for the control or killing of dogs chasing deer⁶⁰, a requirement for alien hunters to be licensed⁶¹, and a closure of the open seasons on upland plover and mourning dove⁶².

—The Commissioners recommended legislation closing the season on pinnated grouse (i.e., heath hen) for at least five years, closing the season on wood ducks, abolishing spring shooting for migratory birds, providing for an open season on male pheasants coincident with the quail season, providing additional protection to certain gulls, and requiring hunters, anglers, and trappers to display all fish and game in their possession to an officer upon request.

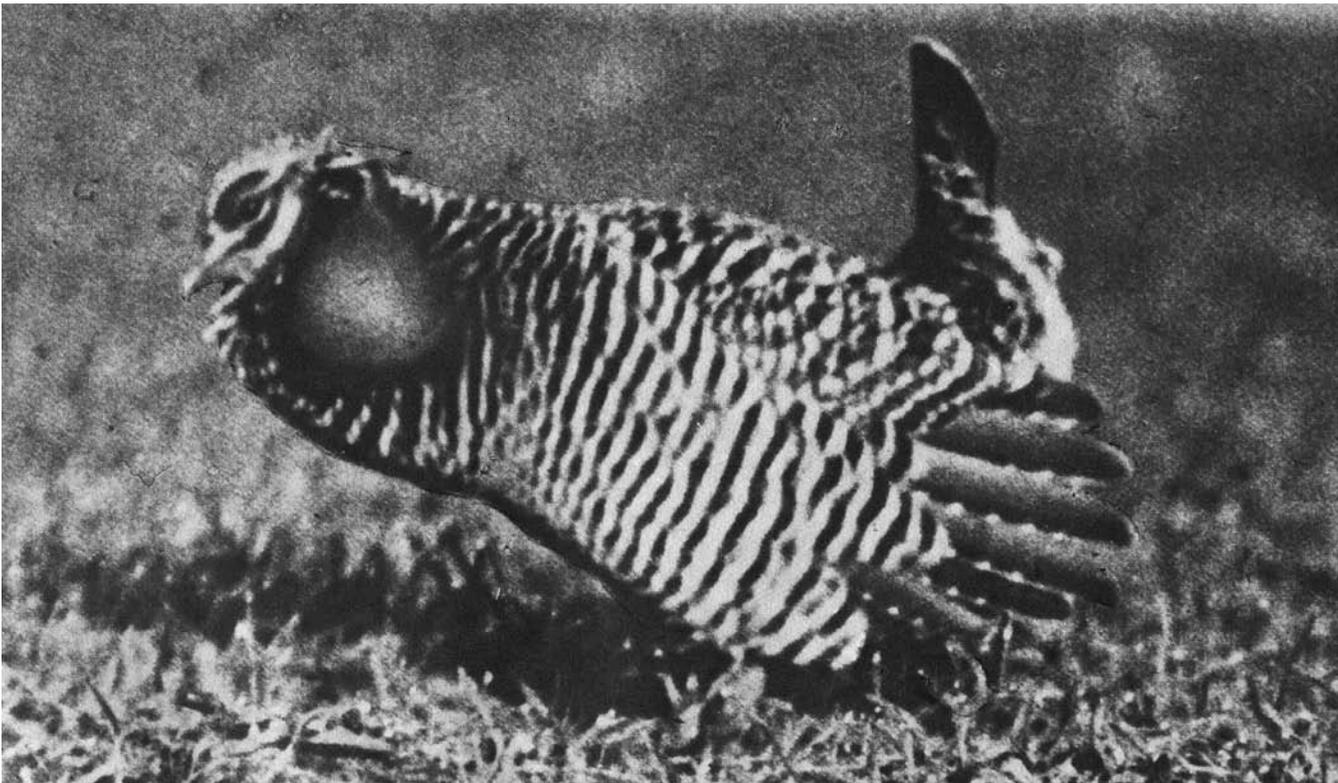


Photo © MassWildlife

Figure 16. Booming Heath Hen, Martha's Vineyard Heath Hen Reservation, 1920s.

1906⁶³: The shad fishery was vastly depleted and is doomed unless great steps are taken to save the fishery.

—The quality of water at the Hadley hatchery was adversely affected by a town reservoir which diverted water from Hart's Brook

—There were 1.334 million brook trout fry, 38,450 fingerlings, 500 yearlings and 2000 fingerling rainbow trout distributed. Twenty-six great ponds were stocked with 7300 brown trout fingerlings and 6 adults, 5750 rainbow trout fingerlings and 51 adults, 3250 landlocked salmon fingerlings, 160 adult brook trout, and 2 million smelt eggs. Seven ponds were restocked with 115 adult brook trout, 23 adult brown trout, 18 adult walleye, and 8 million smelt eggs.

—Pheasants were successfully established (both the English and Mongolian) yielding both recreation for the hunter and damage to agricultural crops. There were >3000 pheasants taken during the first pheasant hunting season. Quail need more protection and propagation. However, since Massachusetts is at the northern limit of quail range, the bobwhite here "leads a precarious existence". Southern quail were regularly liberated by sportsmen's organizations and the Commissioners are now undertaking breeding experiments.

—The Commissioners maintained a warden on the breeding grounds of the heath hen. A serious forest fire burnt through the habitat at hatching time.

—Deputy Rausch was shot in the chest in Rowley by a poacher, who claimed he thought the deputy was a "yeggman".

—Deer damage claims paid between November 1905 to November 1906 totaled \$2007. The sale of game was "sweeping the nation" and violations of the law are frequent and fines are inconsequential. The advantages of hunting licenses deserve further scrutiny.

—Legislation included a closed season on heath hen⁶⁴, a limited open season on walleye⁶⁵, a closed season on wood duck until 1911⁶⁶, regulated seasons and restrictions on sale of other wild ducks⁶⁷, restrictions on the hunting and sale of quail⁶⁸, prohibitions on the sale of prairie chickens⁶⁹, provisions for the Commissioners to occupy properties for scientific investigations⁷⁰, and further restrictions on the discharge of sawdust into brooks and streams⁷¹.

1907⁷²: During the past season, “...our brooks and rivers showed more conspicuously than ever the disastrous effects of the denudation of hillsides by woodcutters and forest fires”.

—There were 855,000 brook trout fry and 71,000 fingerlings distributed. Eighteen great ponds were stocked or restocked with 8000 brown trout, 3000 landlocked salmon, 2000 rainbow trout, 20 walleye, and 3 million smelt eggs. Brown trout (Figure 17) are being taken in numbers in the Westfield River.

—There were 302 pheasants and 54 Belgian hares distributed. The rearing and distribution of Belgian hares was discontinued.

—The annual crop of game was affected by the “insidious attacks” of carnivorous animals, including the domestic cat, and by infectious diseases (including “blackhead”).

—Heath hens were monitored and a warden employed. Donations from private individuals resulted in the purchase of 1600 acres to be placed under the control of the Commissioners. The Commissioners were authorized to purchase an additional 1000 acres of unimproved land for a heath hen reservation.



Photo © Mass Wildlife

Figure 17. Brown Trout taken in the Middle Branch of the Westfield River, Middlefield, April 1930.

—The colony of least and common terns at Katama showed a slight increase. The terns and laughing gulls at Muskeget were affected by cats. Those on the Elizabeth Islands were doing well. Upland plover were nearly vanished. Birds which are “distinctly valuable” to agricultural interests should be protected⁷³. Legal protection was given to many hawks and owls.

—The Commissioners advocated for the implementation of a general hunting license. The laws regarding waterfowl should be amended to cease all hunting on December 31. Poultry farmers want a bounty on foxes.

—Overall, the Commissioners stated that “The greatest hope for the continued maintenance and utilization of our useful birds and mammals lies in greater attention to well-considered attempts at artificial propagation...”.

—Legislation included a prohibition on the hunting of loons on fresh water and eagles anywhere⁷⁴, revisions to the hunting season for gray squirrels⁷⁵, a requirement for non-resident hunters to obtain a hunting license⁷⁶, the protection of certain birds of prey⁷⁷, provisions for a open season on deer no earlier than November

1908⁷⁸, and an authorization for the taking of land on Martha's Vineyard for a heath hen reservation⁷⁹.

1908⁸⁰: The Commissioners expounded on the economic value of conserving fish and wildlife populations, remarking that constantly increasing [public] attention to artificial propagation and protection of native varieties of birds is "...more essential at present than the introduction of new varieties". The value of the song and insectivorous birds is "beyond estimation" but there are between 50,000-100,000 people who hunt or fish and can spend \$1-2 million dollars annually. Support was urged for "the greatest possible number" of sanctuaries and breeding places for birds.

—There were 539,000 brook trout fry and 112,600 fingerlings distributed. There were 3150 rainbow fingerlings, 175 yearlings, and 12 adults; 12,600 brown trout fingerlings, 150 yearlings, and 12 adults; 940 brook trout adults; and 11 million smelt eggs stocked in ponds.

—There were 836 pheasants distributed. There are now 24 paid deputies.

—Legislation included expanded enforcement authority for deputies^{81,82}, and extension to the closed season on deer until 1910⁸³, provision for the sale of rabbits and hares lawfully taken⁸⁴, provision for a 1-month open season on grouse, quail, and woodcock⁸⁵, a season closure on pheasants⁸⁶, and provision for the registration (i.e., licensing) of resident hunters (effective in 1909)⁸⁷.

—The State Board of Agriculture was authorized to hire an ornithologist⁸⁸.

1909⁸⁹: The Winchester hatchery was closed due to the need for extensive repairs to the water supply. It was transferred to the M.D.C. in 1911. Later, it was used by the Boy Scouts (1926-1973) and then became a private residence).

—There were 802,000 trout fry and 128,000 fingerlings distributed. There were 1000 brook trout fingerlings and 1073 adults; 16,800 brown trout fingerlings and 75 adults; 4500 rainbow trout fingerlings' 1675 adult white perch; and 1 million smelt eggs stocked in ponds and rivers.

—There were 668 pheasants distributed. Captive breeding of ruffed grouse was unsuccessful.

—Deer were reasonably abundant, but the population did not appear to increase in 1909. There was \$8000 in deer damage paid to farmers.

—A legislative resolve called for an investigation of the cost of propagating birds and mammals⁹⁰. Legislation provided for the establishment of refuges for birds and mammals⁹¹, restrictions on the taking and sale of trout and salmon⁹², revisions to the open seasons for grouse, quail, and woodcock⁹³, restrictions on the open season for waterfowl⁹⁴, revisions to the open seasons for rabbit and hare⁹⁵, and changes to the licensing structure for non-resident hunters⁹⁶.

“CONSERVATION HAS CAPTURED THE NATION...
[IT] IS A MORAL ISSUE”¹ THE 1910s

In the U.S.A., the 1910s were a turbulent time², reflecting World War I (Aug. 1914-Nov. 1918) and the United States’ entry into the War (Apr. 1917). The surge of almost 1.5 million immigrants from southern and eastern Europe in 1910-1914, the “Black Tom” sabotage in New Jersey (1916), the controversial Espionage Act of 1917 and Sedition Act of 1918, as well as growing labor and social unrest culminating in the 1919 anarchist bombings and the “Red Scare” and the Palmer Raids (1919-20) thrust a sense of foreboding into the nation. The decade also saw the National Park Service established under the Department of the Interior (1916), the introduction of daylight savings time (1918), the ratification of the 18th [prohibition] Amendment (1919) and the founding of Radio Corporation of America (1919).

Superimposed on these events was the great influenza pandemic³ (Jan. 1918-Dec. 1920) which killed 20-50 million people worldwide. Probably arising in the Midwest, its transmission was facilitated by crowding in Army camps—including Camp Devens, Massachusetts—and large troop movements. More people died in one year from influenza than during the “Black Death” of the 1300s in a century. The parallels with 21st century emerging infectious diseases—arising from animal-human interactions—are striking.

Massachusetts also saw the Lawrence Textile Strike (1912), the opening of the Cape Cod Canal (1914), aid to Nova Scotia following the massive Halifax ship explosion (1916), the severe winter of 1917-18, Governor John Calvin Coolidge’s (1872-1933) forceful end to the Boston Police strike (1919), and the ratification of the 74th amendment (allowing referendums) to the Massachusetts Constitution. Textiles, footwear, and worsted goods remained the industries leading in employment⁴.

The forester Gifford Pinchot—emotional in temperament and progressive in outlook—advocated conservation as a utilitarian practice, counterpoised with the protectionism of John Muir. “Conservation”, to Pinchot¹, was development, the “fullest necessary use of all the resources”; the prevention of waste; the development of positive scientific methods for resource conservation; and the ecumenical use of resources for the many, not just the privileged few, for the longest time. An allied attitude was that of the geologist and educator Charles Richard Van Hise (1857-1918) who argued⁵ that the “...purpose of conservation is man. Its purpose is to keep the resources of the world in sufficient abundance so that man may have a happy, fruitful life, free from suffering—a relatively easy physical existence...to reduce the intensity of struggle for existence”⁶.

The American Game Protective [and Propagation] Association was incorporated in New York in September 1911 to promote wildlife restoration on a national and international scale⁷. The Association began hosting an annual “Game Conference” in 1914. It became the “American Game Association” in 1930, merging into the newly organized “American Wildlife Institute”⁸ in 1935 and relinquishing sponsorship of the annual conference⁹. The zoologist and author William Temple Hornaday (1854-1937), who earlier had led the fight to save the American bison¹⁰, vigorously advocated for the preservation of animal and plant life¹¹, including extinct and nearly extinct species.

The Weeks-McLean Migratory Bird Act¹² was enacted by Congress and approved by President William Howard Taft (1857-1930) in March 1913. It eradicated the practice of market and plume hunting for migratory birds, abolished spring shooting, closed

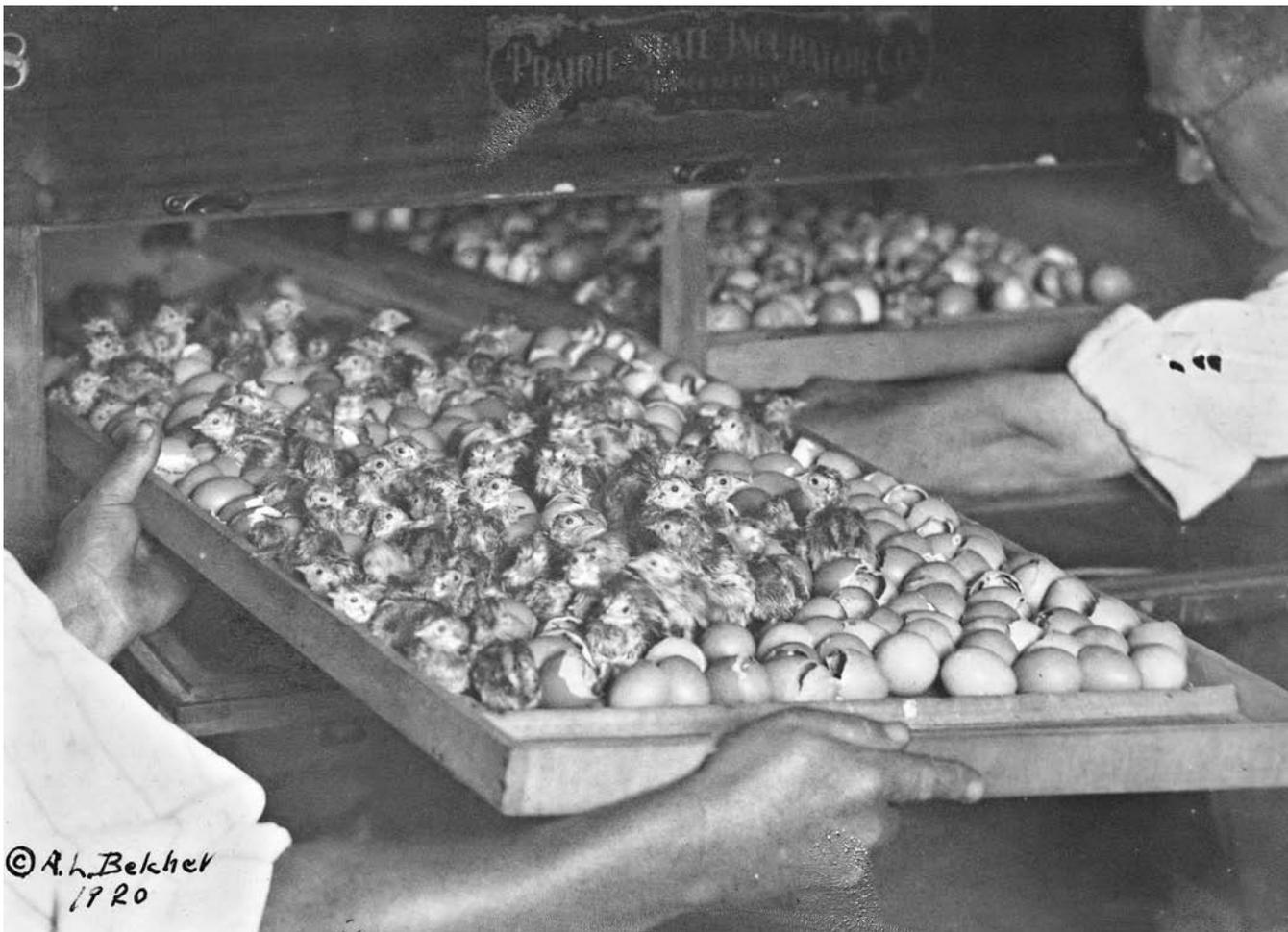


Figure 18. Pheasant chicks newly hatched from incubator, Marshfield State Game Farm, 1920.

entirely the seasons on almost all so-called “nongame” birds, and gave the Secretary of Agriculture powers to set closed seasons for the taking of migratory game birds⁷. However, the law’s constitutionality was challenged and a Senate resolution moved forward a draft treaty between the United States and the Dominion of Canada¹³. The Treaty¹⁴ was formally signed in August 1916⁷ and the enabling Act¹⁵ approved by Congress and President Thomas Woodrow Wilson (1856-1924). The U.S. Supreme Court subsequently upheld the new statute’s constitutionality¹⁶, with Justice Oliver Wendell Holmes, Jr. (1841-1935) commenting “But for the treaty and the statute, there soon might be no birds for any powers to deal with...we are of the opinion that the treaty and the statute must be upheld”.

World War I placed great demands on the nation’s coal supply for military and naval purposes, which demanded that the public minimize fuel consumption¹⁷. These requirements, coupled with an extremely severe winter on the East Coast in 1917-18¹⁸, resulted in coal rationing and a temporary shift back to firewood for heating purposes. Nationally, consumption of fuelwood increased at least 25% to 102.9 million cords in 1917¹⁷. In addition, tremendous amounts of timber were required on the battlefield for shoring trenches and bunkers¹⁹. At the war’s end, however, fuelwood consumption dropped back and continued its slow slide as coal became available once again.

In Massachusetts, the State Forest Commission began to acquire “unimproved” lands for State Forests for reforestation, public access, and as examples of forest management practices. The first three forest acquisitions were Otter River (1915), Myles Standish (1915), and Harold Parker (1916)²⁰.

1910²¹: The Commissioners cautioned that threats to the “natural and normal number of animals” included the large, cosmopolitan unassimilated population which “makes considerable forays” upon fish and wildlife, an exceedingly active market demand²², and a shoreline taken up by municipalities and summer residents. These conditions were disastrous to wild birds, mammals, fish, mollusks, and crustaceans. Set against this “general slaughter” were the sportsmen. Dead wild game must be kept as far from the market as possible.

—There were 925,000 [brook] trout fry and 133,500 fingerlings distributed and 10,000 brown trout fingerlings and 1717 white perch stocked in ponds and rivers. Massachusetts secured a supply of the Potomac catfish (i.e., white catfish) for future stocking.

—Ring-necked pheasants were being reared (Figure 18) and liberated in large numbers. Massachusetts has also been the first state to successfully rear and liberate [bobwhite] quail. There were 696 pheasants and 182 quail stocked.

—The deer season was opened for the first time since 1898, in the five western counties only. Deer damage was a real problem and payments have grown from \$237 in 1903 to \$7351 in 1910. The estimated population prior to the 1910 season was 8000, with 1382²³ deer taken that year, including 717 bucks, 373 does, and 292 unspecified. There were no hunting-related human deaths or injuries.

—There were now 30 deputies, three of whom were assaulted in 1910, including one who was shot in the face with bird shot.

—Legislation included revisions to the open seasons on grouse, quail, and woodcock²⁴, provisions for additional protection to certain birds²⁵, restrictions on hunting methodology for game birds, waterfowl, and rabbits²⁶, provisions for an open season on deer²⁷, increases in the number of deputies²⁸, and a resolve addressing the biological survey of public waters²⁹.

1911³⁰: The Commissioners remarked that the market for the sale of game in Boston is “much demoralized” but that a law preventing the sale of any species of wild bird was highly desirable.

—There were 348,000 brook trout fry and 29,000 fingerlings, 105,000 brown trout fry and 20,000 fingerlings, 1772 adult white perch, and 10 million landlocked smelt eggs distributed. A new trout hatchery was in the planning stage.

—A preliminary report was made regarding the survey of public waters. A detailed report will take years to complete. Initially, great ponds were being surveyed³¹ using an 1873 listing, various physical and biological features were being assessed, and a map was in preparation.

—The Commissioners believed that it is now time to consider the breeding of fur-bearing animals and to regulate the trapping or shooting of furbearers at the time when pelts are of no value.

—There were 625 pheasant distributed. Experiments in ruffed grouse and bobwhite quail propagation continued. One hundred “extremely wild” European gray partridges were received for breeding experiments.

—There were 1270³² deer taken in the 6-day season.

—Legislation included closure of the heath hen³³ and wood duck³⁴ seasons until 1916, the requirement for a liberation permit for releasing fish or spawn into state waters³⁵, a prohibition on the night shooting of waterfowl³⁶, a reduction of the black duck bag limit³⁷, provision for the establishment of a game farm³⁸, changes to the requirements for a resident hunter's certificate³⁹, restrictions on the hunting ground), 1919. and importation of wild turkeys⁴⁰, and provision of funds and authorization for a new fish hatchery⁴¹.



Photo © MassWildlife

Figure 19. Wilbraham State Game Farm, superintendent's house and new barn (rearing facilities in back-ground), 1919.

1912 to 1914⁴²: In a consolidated 3-year report, the Commissioners remarked that several fishways were being rebuilt, biological examinations of state ponds and streams were completed, pollution from manufacturing wastes and sewage was compromising “our finest streams and tributaries”, two new hatcheries and five game farms were constructed, and a number of reservations were established.

—The Commissioners also participated and held office in several national organizations and erected displays and exhibitions at agricultural fairs and other venues.

—The Hadley hatchery will soon be sold⁴³. New hatcheries were put into operation at Sandwich^{44,45} (1911-14)—including a rearing station at East Sandwich and other facilities at Sandwich proper—and Palmer (1912) and a new game farm at Wilbraham (1912)(Figure 19). Game was being propagated at Sandwich and also at facilities^{46,47} in Marshfield (1914), Norfolk (State Hospital, 1912), and Sharon (1912).

—There were 6,772,700 brook trout fry, 1,751,000 fingerlings and 7952 adults; 350,000 brown trout fry, 4000 fingerlings, and 260 adults; 42,800 Chinook salmon fingerlings and 10 adults; 52,600 smallmouth bass fingerlings and 3 adults; 18,000 largemouth bass fry and 2300 fingerlings; 25,000 landlocked smelt adults; 24,812 white perch adults; 27,020,000 walleye fry; 10,200,000 yellow perch fry; and 11,600 horned pout adults distributed.

—Ducks of eight species were propagated at Sutton and Wilbraham, with the mallard showing the most success. Sixty-two white hare were liberated in Berkshire and Hampden counties.

—An open season on pheasants⁴⁸ (both sexes) was held for the first time since 1907 with 8903 birds taken.

—The deer hunting season^{49,50} continued and was open in 11 counties (Dukes, Nantucket and Suffolk were closed) by 1913.

—As of November 1914, the Commissioner's department had 87 employees in addition to the three Commissioners, 31 of which were in law enforcement, 34 in hatcheries, six at reservations and five at game farms. There were currently 37 state reservations,



Figure 20. Bull Moose, Whitney Preserve, October Mountain, Washington, 1915.

nine bird and game preserves, and nine additional areas held under fee or lease.

—Legislation included prohibitions on hunting with or possessing rifles, pistols, or revolvers during the deer season⁵¹, prohibition of poisoning or snaring birds or mammals and regulating trapping⁵², provisions for a closed season on moose^{53,54} (Figure 20), prohibition of the sale of wild birds and game (except hares and rabbits) unless lawfully propagated⁵⁵, and closure of the quail season in Essex County for five years⁵⁶.

Legislative resolves and resolutions provided for an investigation and report on pheasant damage and food habits⁵⁷, a codification of the fish and game laws⁵⁸, and a request to the federal government to enact protection for migratory game birds⁵⁹.

1915⁶⁰: The Commissioners emphasized their important efforts in education, including publications, interactions with the Boy Scouts, exhibitions, and lectures.

—Water pollution continued to degrade streams, and the Commissioners planned to enforce the law⁶¹ regarding “fisheries value” broadly, considering both the present and future production of food fish and the recreational value to the public.

—There were 1,960,000 brook trout fry, 941,000 fingerlings, and 12,125 adults; 105,000 brown trout fry, 2000 fingerlings, and 290 adults; 53,160 rainbow trout fingerlings, 49,600 Chinook salmon fingerlings; 208,000 smallmouth bass fry and 72,320 fingerlings; 144,000 largemouth bass fry; 8,850,000 walleye fry; 10,500,000 yellow perch fry; 100,000 adult white perch; 20,300 adult horned pout; and 1 million landlocked smelt eggs distributed.

—There were 1384 young and 762 adult ring-necked pheasant, 9 “versicolor” pheasant (i.e., green or Japanese pheasant), 6 Reeves pheasant, 7 Mongolian pheasants, 1286 mallard ducks, 4 wood ducks, 12 black ducks, 377 young and 4 adult quail, 19 wild turkeys, and 6 Canada geese liberated between 1913-1915.

—Deer hunting was open in all counties except Nantucket and Suffolk.

—Heath hen were increasing on Martha’s Vineyard. Least terns on Martha’s Vineyard were less numerous than last year but Wilson’s (i.e., common) terns are abundant on Nantucket.

—Legislation included a prohibition on hunting or possession of firearms by resident aliens (except property owners)⁶².

1916⁶³: There was an internal reorganization of the Board of Commissioners to make the central office the “clearing house” and to make operations more efficient. Law enforcement was placed under a chief deputy for the first time. One person was placed in charge of all propagation, both fish and game. The biologist was placed in charge of the “publicity division”. All subsequent annual reports will cover the actual fiscal year (Dec. 1 to Nov. 30) instead of the calendar year as was previously done.



Photo © MassWildlife

Figure 21. Massachusetts Game & Fish exhibit building, Great Barrington Fair, September 1915.

—The Commissioners’ staff exhibited⁶⁴ at 28 fairs and events during the past year (Figure 21) and presented many lectures.

—There were several necessary endeavors to project into the future, including additional surveys and inventories, the propagation and introduction of suitable new species, more extensive scientific investigations, and enhanced public education.

—There were 1,540,000 brook trout fry, 656,955 fingerlings, and 6805 adults; 2500 brown trout fry and 190 adults; 1,900 rainbow trout fingerlings; 371,000 Chinook salmon fingerlings; 19,400 landlocked salmon fingerlings; 122,000 smallmouth bass fry and 58,800 fingerlings; 63,000 largemouth bass fry and 3500 fingerlings; 53,660 adult white perch; 16.8 million yellow perch fry; 14.64 million walleye fry; 96,900 horned pout; 200 pickerel; 26,400 landlocked smelt; and 34 million landlocked smelt eggs distributed.

—In addition, 2147 young and 238 adult pheasants, 1267 young and 120 adult mallard ducks, 264 young quail, and 295 white hare were distributed.

—Bluegill and yellow catfish were being considered for propagation. Shad culture was once again being considered.

—The heath hen was just “holding its own” but consideration was being given to the liberation of these birds on Nomans Land Is. and Cape Cod, and in Myles Standish State Forest.

—Feral cats were destructive to wildlife⁶⁵ (Figure 22). A “savage hunting cat” measuring >3 feet from nose to tail and weighing 22 lbs. was shot in South Carver.



Figure 22. Warden K. Eckert with 12-lb. house cat that killed an adult rabbit, 1929.

—There were 1,319,000 brook trout fry, 643,000 fingerlings, 6295 adults; 44,250 rainbow trout fingerlings; 244,350 smallmouth bass fry and 46,140 fingerlings; 60,885 largemouth bass fingerlings; 28,000 landlocked salmon fingerlings and 1125 adults; 192,000 Chinook salmon fry and 319,075 fingerlings; 77,170 adult white perch; 16 million yellow perch fry; 2000 horned pout fingerlings; 150 adult pickerel; and 36 million “freshwater” smelt eggs and 62,000 adults liberated.

—The fishways on the Merrimack River were being investigated as impediments to the passage of introduced Chinook salmon.

—There were also 1564 young and 301 adult pheasants, 1461 young and 640 adult mallard ducks, 280 young quail, and 104 white hare liberated.

—The pheasant season was open in all counties except Barnstable, Dukes, and Nantucket. Quail were doing poorly and Hampden and Middlesex counties⁷³ were closed to quail hunting for five years.

—Deer were doing well. The deer season now begins on December 1⁷⁴ and will be reported in the 1918 report.

—Heath hens were transferred to Long Island, N.Y. (n=18), but all died. Eight birds were also sent to a private breeder (2 died); the remainder were released on Nomans Land Island but their status is unknown. The Martha’s Vineyard heath hen reservation now has a full-time attendant.

—The Commissioners distributed grain and chaff to “numerous” persons to feed birds during the harsh winter.

—A large colony of gulls and terns on Muskeget Island was threatened by cats. Cats are now prohibited on that island⁷⁵. Other tern colonies were threatened by cats and skunks. The Commissioners will ask for monies for a vermin-control agent to patrol

—Deer hunting was popular and deer doing well. However, in some counties deer must either be exterminated or greatly reduced due to their “menace” to the fruit industry.

—There were 64,901 resident, 386 non-resident, and 80 alien licenses sold.

—Legislation included changes to the minimum length for taking pickerel⁶⁶, changes to the open season for brook trout⁶⁷, a provision that minors under the age of 18 must have written permission of parent to obtain a hunting license⁶⁸, and clarifications on the prohibitions on hunting waterfowl from a powered craft⁶⁹.

1917⁷⁰: Exhibitions, educational endeavors, and participation in national affairs increased⁷¹. Four new state reservations were established.

—Two new hatcheries⁷² were built, one in Montague and one in Sunderland. The Adams hatchery and the Norfolk game rearing facility were discontinued.

these areas next year. Vermin are a great threat but the “inefficiency and harmfulness [of the bounty system] was strikingly manifest”.

—The introduced starling^{76,77} is likely to become as great a pest as the English sparrow and may now be hunted⁷⁸. The European hare^{79,80}—an agricultural pest—has arrived in the state and may be hunted at any time in Berkshire County.

—Legislation included limitations on freshwater fishing implements to hook and line, except for taking alewives, herring and eels⁸¹, and an admonition authorizing and directing the Commissioners and their deputies to enforce the laws relating to dogs⁸².

1918⁸³: The World War affected the Board of Commissioners and the protection of fish and game by public agitation to utilize freshwater fish to offset the high price of food, by mercenary motives on the part of businessmen who sought to exploit this public concern, by the diversion of needed supplies and construction material, and by diminishment of the Commissioners’ staff—10 of whom were called into service (one was killed).

—The Board’s Chairman attended a meeting in Washington of the Migratory Bird Treaty Act Advisory Board, of which he is a member. The interest in lectures, published materials, and news releases on fish and game matters continued. Local fish and game associations were of “real value” in furthering the interests of the Board of Commissioners. Automobiles were becoming a necessity in advancing the work of the deputies.

—There were 501,300 brook trout fingerlings and 11,557 adults; 44,000 rainbow trout fingerlings; 208,000 smallmouth bass fry and 10,500 fingerlings; 44,500 largemouth bass fingerlings; 6350 landlocked salmon fingerlings; 418,900 Chinook salmon fingerlings; 66,850 adult white perch; 725,000 yellow perch fry and 13,050 fingerlings; 17,718 horned pout fingerlings; 3.3 million walleye fry; and 29,000 freshwater smelt adults and 31.95 million saltwater smelt eggs distributed.

—The Sandwich “Bird Farm” was in operation. Game breeding at Sutton was discontinued and the activities were transferred to Marshfield. There were also 1092 young and 232 adult pheasants, 1048 young and 475 adult mallard ducks, 498 young quail, 22 adult Mexican quail, 55 young wood ducks, and 296 white hares distributed.

—Breeding waterfowl continued to be hampered by human encroachment on the nesting areas. The availability of salt water ducks to the hunter is determined by food supply and weather conditions. The black duck appears to be the one duck which would [still] afford good sport in this state as there are still large breeding areas existing. There was uncertainty in the public’s mind as to the effect of the new federal migratory bird law. However, in Massachusetts, the state “...simply imposes on itself more of a restriction than the Federal government asks it to impose”.

—The Commissioners, together with the State Ornithologist, provided funds for caretakers at the major tern and gull colonies. The few Nantucket quail apparently disappeared while those liberated on Martha’s Vineyard appear to be breeding. Ruffed grouse studies continued; however, a great toll was taken during the extremely severe winter of 1917-18. Duck hawks nested on Rattlesnake Mountain in Prescott. Cats, foxes, snapping turtles, and birds of prey were enemies to bird life.

—White hare have disappeared or nearly so in many areas of the state. Hares were liberated regularly (Figure 23) but there was no clear evidence that this resulted in a substantial increase.



Figure 23. Warden W. Waterhouse liberating Snowshoe Hare, 1935 or 1936.

—Every year there was a considerable amount of deer damage to orchards, in part because the fruit-growing industry was rapidly growing. The winter feeding of birds and the planting of fruit- and seed-bearing shrubs was encouraged.

—Legislation included an authorization to commence the construction of fishways on the Merrimack River⁸⁴.

1919⁸⁵: It was necessary to constantly revise the Board's finances, postpone needed repairs and replacements, and to curtail exhibitions and lectures due to the great burden the war placed on the taxpayers.

—Work on the Lawrence and Lowell fishways was started but was held up by finances and construction difficulties. Atlantic salmon eggs (from New Brunswick) were brought to the East Sandwich hatchery but a large hatching loss was incurred.

—The Commissioners distributed 529,930 brook trout fry, fingerlings, and adults; 30,425 rainbow trout fingerlings; 1000 Loch Leven trout; 353,360 Chinook salmon fry; 3000 Atlantic salmon fingerlings; >14.9 million yellow perch fingerlings; 123,600 white perch adults; 2.4 million walleye fry; 63,100 horned pout; 250 pickerel; 26 million freshwater smelt eggs; and 49,700 adult smelt.

—There were 1481 young and 158 adult pheasant, 2218 young and 347 adult mallard ducks, 156 young bobwhite quail, 106 young wood ducks, 65 black ducks, five Mexican quail, and 585 white hare distributed.

—Hunting licenses increased from ≈58,500 in 1918 to ≈73,500 in 1919.

—Since the passage of the spring shooting bill, black ducks showed up year after year in increasing numbers. One Massachusetts-banded mallard was shot on Lake Manitoba.

—Pheasant were holding their own and the season was opened on Nantucket for the first time. Gray squirrels may have been affected by the ongoing chestnut blight⁸⁶. The winter of 1919-20 was a harsh one and may have affected game populations. However, ice fishing has increased in popularity.

—Piping plovers had a very successful year and were found to be “unusually numerous” at Dartmouth. Special deputies were hired to guard bird colonies at Monomoy, Gull Island, and Nauset. Herring gulls were believed to have bred at Monomoy. Ram Island has ≈2000 pairs of common terns, which were increasing.

—Eagles were not increasing. A pair was seen in Bourne and another in Lynnfield. There were a very few in the Berkshires.

—A governmental reorganization consolidated most executive functions into “departments”, to be effective December 1, 1919⁸⁷, including a “Department of Conservation” encompassing forestry, fisheries and game, and animal industry.

—Other legislation included provisions for the spearing of carp and eels⁸⁸, prohibitions on quail hunting in Dukes, Essex, and Nantucket counties until 1922⁸⁹, authorization for the Commissioners to regulate the taking of smelt in great ponds⁹⁰, implementation of a closed season on the hunting and trapping of raccoons⁹¹, provision for a bounty on seals⁹², and the requirement for a freshwater fishing license and provision for a “combined” hunting and fishing license^{93,94}.

THE DIVISION OF FISHERIES & GAME—THE EARLY YEARS, 1920-1947:

A SUMMARY

The “Commission on Fisheries & Game” was replaced on December 1, 1919, by the “Division” of Fisheries & Game, with an appointed “Director” as Chief Executive Officer, subordinate to the “Commissioner” of the Department of Conservation

—After the first Director, William C. Adams, served several terms (resigning in 1931), the Division entered a lengthy period with Directors serving short terms or a single 3-year term.

—The Department was reorganized in 1939, splitting off “Marine Fisheries” and “Wildlife Research & Management” as separate Divisions.

—The Director’s editorials firmly emphasized the role of outdoor recreation as healthy and inspiring, the benefits and services provided by the Division to all the state’s citizens, the need for sustained and adequate funding, the modernization of fish and game propagation facilities, the requirement for scientific surveys and investigations, and the values of public education projects.

—The Division briefly formed an unofficial Advisory Council with several sportsmen’s, birding, and agricultural organizations, and the Director met on a regular basis with representatives from the various sporting County Leagues.

—The Division began cooperation with the Massachusetts State College regarding field investigations, research, and student training courses.

—The Commonwealth acceded to the new Federal Aid in Wildlife Restoration Act in 1939, thereby receiving much-needed funds for game research, surveys and inventories, and habitat development and management.

—Propagation facilities were modernized and upgraded, often with the aid of federal funds from the Works Progress Administration, or with the labor force of the Civilian Conservation Corps.

—Stream surveys and the evaluation of game covers were initiated as well as experimental planting of duck foods in certain rivers.

—Funds were secured for establishing public fishing grounds along streams and rivers and leases were initiated along the Squannacook, Westfield, and other rivers.

—Atlantic salmon restoration was once again the subject of interest and initial efforts were initiated at the East Sandwich Hatchery.

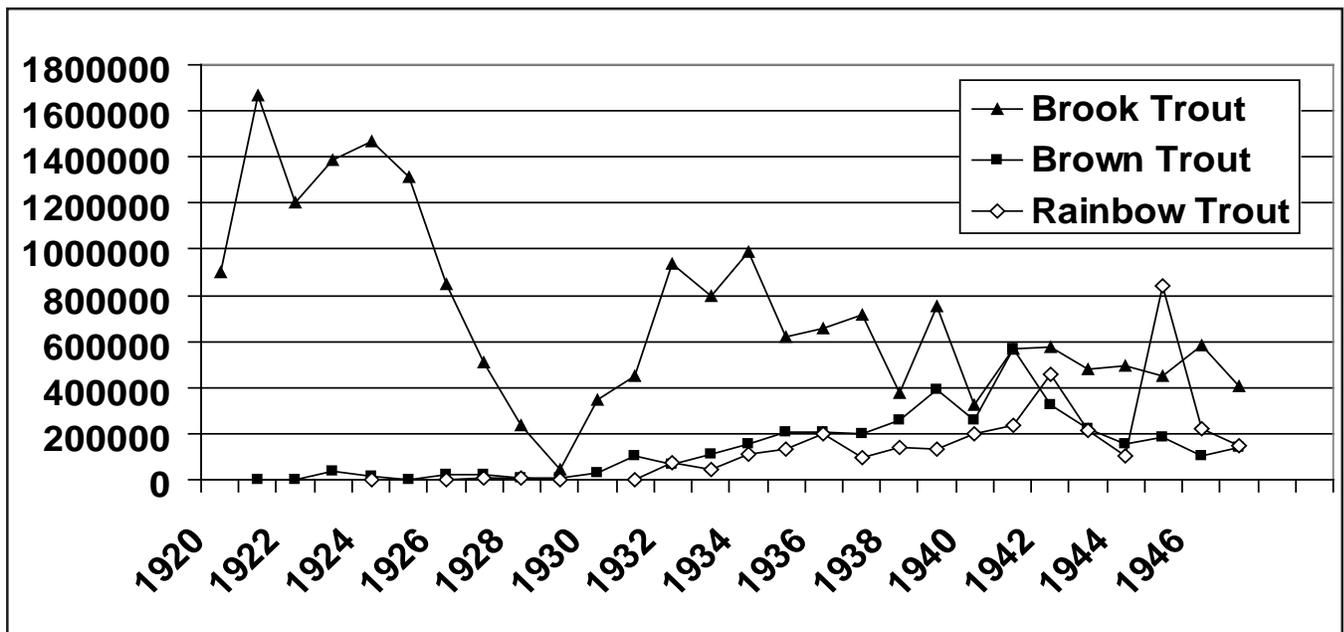


Figure 24. Numbers of Brook, Brown and Rainbow Trout (all age classes) stocked in Massachusetts waters, 1920-1947.

—The Division continued to experiment with propagation or importation and release of both native and non-native species, including muskellunge, ruffed grouse, chukar partridge, Reeves pheasant, wild turkey, [black-tailed] jackrabbit, cottontails, snowshoe hare, and raccoon.

—The Division stocked (including those from clubs and private propagators, state forest pond rearing facilities, and “salvaged” from natural water bodies) (Figure 24) more than 6,644,350 brook, 1,718,500 brown, and 889,850 rainbow trout, 3,344,400 walleye fry, 3,287,400 horned pout, 1,898,450 yellow perch, 1,400,700 white perch, 1,061,100 bluegills, 871,325 black crappie, 719,525 smallmouth bass, 560,000 tadpoles, 269,750 Chinook salmon, 222,500 muskellunge fry, 114,690 pickerel, 29,725 “sunfish”, 15,750 crawfish, 4175 largemouth bass, 2780 rock bass, 1375 landlocked salmon, 750 redbfin pickerel, and 37,490 shiners, suckers, dace and “forage fish”.

—The Division also stocked (including those reared and liberated by clubs and private propagators) 143,660 [ring-necked] pheasant, 73,125 [bobwhite] quail, 33,125 white hare, 18,956 cottontails, 58 raccoons, 42 ruffed grouse, 17 wood ducks, and eight Reeves pheasant.

—Beaver and opossum continued to expand their range in the state and will soon require attention and management.

—The state ornithologist position was established in the Division after its termination in the Department of Agriculture. The ornithologist began work on waterfowl, seabird colonies, and duck hawk (i.e., peregrine falcon) nesting sites.

—The heath hen became extinct, despite substantial efforts by the state and private entities. The heath hen reservation was turned over to the Division of Forestry.

—Billingsgate Island was gifted to the Division as a wildlife sanctuary. Penikese Wildlife Sanctuary continued to be staffed by the Division and was used as a rabbit rearing colony and tern refuge. Maintenance work was done on other sanctuaries as funding permitted. The large tern colony on Ram Island [Mattapoissett] sanctuary was closely monitored.

“THE STOCK MUST HAVE PLACES TO FEED AND TO BREED”: THE 1920s

In the U.S.A., the 1920s were a time of continuing social, political, and economic upheaval¹. The prohibition of alcoholic beverages spawned a surge in organized crime, the Wall Street terrorist bombing (1920) drove crackdowns on anarchists and foreigners, the Teapot Dome oil-leasing scandal (1922-23) tainted the Interior Department, immigration was sharply limited (1924), the staged “*Tennessee v. Scopes*” trial drew attention to the teaching of evolution (1925), Charles Lindbergh flew solo across the Atlantic (1927), and the “Black Tuesday” Wall Street crash (1929) ushered in the Great Depression. In Massachusetts, the murder trial (1920-21) of anarchists Ferdinando Nicola Sacco and Bartolomeo Vanzetti drew worldwide attention, as did the dramatic sinking and salvage of the submarine *S-4* off Provincetown (1927). The Massachusetts Highway Fund was established (1925), dedicating motor vehicle fees to road improvements and traffic law enforcement. The first passenger flights were scheduled from Jeffery Field (later Logan Airport) in 1927. In 1929, Massachusetts became the first state to provide uniformity in traffic control devices and to require insurance as a precondition for registering a motor vehicle².

In 1922, the Massachusetts Department of Conservation acquired the 10,000 acre Whitney estate—the largest contiguous privately owned tract in the state—in Berkshire County³. In conjunction with 1500 acres purchased earlier, and 2000 acres belonging to the City of Pittsfield, the newly named October Mountain State Forest became one of the largest properties in state ownership. Reforestation and reevaluation of New England’s forests also drew attention. Although nearly half of southern New England remained forested, the forester Austin Foster Hawes (1879-1962) admonished that “Never in the history of New England has there been...so great a need for the systematic raising of timber”⁴.

The Ecological Society of America established a committee in 1917 to list “...all preserved and preservable areas in North America in which natural conditions persist[ed]”. Their report “*Naturalist’s Guide to the Americas*”⁵ was published in 1926 and listed 37 named preserved areas in Massachusetts and proposed protected status for 22 others.

The author and professor Dallas Lore Sharp (1870-1929) eulogized the uplifting effects of the outdoors on our wellbeing: “For next to bodily health, the influence of the fields makes for the health of the spirit...What we need to do, and are learning to do, is to go to nature for our rest and health and recreation”⁶. Henry Beston Sheahan (aka “Henry Beston”)(1888-1968) concurred: “For the gifts of life are the earth’s and they are given to all, and they are the songs of birds at daybreak, Orion and the Bear, and dawn seen over ocean from the beach”⁷. Similar in concept, although different in approach, the sportsman and journalist Ernest Miller Hemingway (1899-1961) conceived of hunting and fishing as a source of rebirth and refuge. His collection—collectively a *Bildungsroman*—of semi-autobiographical Nick Adams stories⁸ often emphasizes this belief. This is keenly set forth in “Big Two-Hearted River” (1925) depicting the young Nick’s emotional need to retreat to a Michigan trout stream after his traumatic experiences in World War I.

The 1920s also saw the beginnings of a shift among zoologists from anatomy to populations and community ecology. Charles Sutherland Elton (1900-1991) vigorously argued that “When one starts to trace out the dependence of one animal upon another, one soon realizes that it is necessary to study the whole community living in

one habitat, since the interrelations of animals ramify so far”⁹. The evocative narrations^{10,11} of John Charles Phillips¹² (1876-1938) brought forth his experiences while hunting, fishing, contemplating warblers and trailing arbutus, and serving on the “Associated Committees for Wild Life Conservation”.

The Federal Water Power Act¹³ was enacted by Congress in 1920 to facilitate coordination among federal agencies in developing hydropower by centralizing the scattered authorities in a new Federal Power Commission (later the Federal Energy Regulatory Commission). Later amendments and court decisions encapsulated a significant—although not definitive—role for fish and wildlife issues and their advocate agencies in the hydropower licensing process¹⁴.

Although the Lacey Act ostensibly included all “wild animals and birds”, in practice it was construed as meaning only game birds and furbearing mammals. In 1926, Congress amended¹⁵ the Act to include provisions for unlawful interstate transportation of fish¹⁶, specifically including “black bass” (*Micropterus* spp.). In another landmark case, the U.S. Supreme Court, in *Missouri v. Holland*¹⁷, upheld the Migratory Bird Treaty Act, ruling that the treaty-making powers vested in the federal government by the U.S. Constitution overrode state game ownership rights.

A significant Massachusetts case¹⁸ in 1926 found that “In this Commonwealth the title to wild animals and game is in the Commonwealth in trust for the public, to be devoted to the common welfare”.

After at least 150 years, beaver were back in Massachusetts. A small colony—immigrants from New York—was found in West Stockbridge in 1928¹⁹. These were eventually supplemented by three more live-trapped in the Catskills and released in Yokum Brook in Lenox in 1932²⁰.



Photo © MassWildlife

1920²¹: The Division of Fisheries and Game was created on December 1, 1919 as a component of the new Department of Conservation. William C. Adams (1880-1948) (Figure 25) of Newton, a lawyer and 6-year veteran of the Commission of Fisheries and Game, was appointed as Director (1-year term) by the Governor and confirmed by the Governor’s Council. The enforcement officers were renamed “fish and game wardens”.

Figure 25. Director William C. Adams.

—Concerns expressed by the Director included the belief that all species of fish and game are only “holding their own”, that great emphasis has and will be placed on artificial propagation, and that public concern is low: “Unless he happens to be a fisherman and hunter, or one particularly interested in birds, the preservation of the wild life means little to him and he gives it no consideration”. The hope of the future was

in financial assistance by means of license fees, vigorous efforts by the state “doing things which it can do”, the public education of landowners to do “the things which *they* can do”, and the education of both exploiters and the public to have restraint, make individual contributions, and assist landowners. The educational work of the Division is one of the most important branches of the service.

—There were 94,600 resident sporting licenses, 38,550 resident fishing, 700 various non-resident and alien sporting licenses, 2409 various non-resident and alien fishing licenses, and 1069 minor trapping (not needed for adults) sold in FY1920. The current year was the first for the new fishing license.

—Winter feeding of birds, both feed and grit, must continue in harsh winters. The winter of 1919-20 was one of the most severe in the experience of the Division. Grouse need continued protection and the severe winter took a “terrible toll” on quail. Deer were harassed by dogs in the deep snow and came into the breeding season in poor condition, but the fawn crop appeared to be excellent nonetheless.

—It is now time to place more restrictions on the taking of freshwater fish, due to the substantial increase in angling. The value of stocking Chinook salmon was in doubt, due to lack of returns. Walleye were established in several ponds.

—There were 902,800 brook trout fry, fingerling, and adults; 308,500 “silver trout” (from N.H., now extinct); 248,305 Chinook salmon; 413,675 smallmouth bass fry, fingerlings, and adults; 7000 largemouth bass fingerlings; 250 yellow perch fingerlings; 112,500 white perch adults; 9.75 million walleye fry; 5100 horned pout; 600 pickerel; and 29.75 million freshwater smelt fry distributed.

—There were 3900 young and adult pheasant, 79 quail, 528 mallard ducks, 56 black ducks, 63 wood ducks, 1004 white hare, and 17 eastern cottontail distributed. Black duck rearing was unnecessary as populations are increasing. Mallard propagation was financially prohibitive. Wood ducks will continue to be raised for the time being. Black-tailed jackrabbits (n=20) were liberated on Martha’s Vineyard but evidently did not breed or establish.

—It was a banner year for [Canada] goose shooting (Figure 26) and the flight was sustained until the end of the report period (i.e., 11-30-20).

—Terns were doing well, but a heavy gale in June devastated the Monomoy colony.

—There were now limitations on the open seasons for trapping mink, muskrat, otter, raccoon, and skunk. The excessive trapping of muskrat will require drastic measures (i.e., a 30-day season) to bring their numbers back.

—Legislation included additional protection for certain birds of prey²², revisions to the fishing license requirements²³, authorization for the Commissioners to regulate the taking of salmon²⁴, and various provisions relating to trapping seasons and methodology²⁵. A legislative resolve authorized the sale of the Adams hatchery²⁶.



Figure 26. The successful goose hunter thanks his guide, Essex County, about 1895.

Image © Courtesy of Ernest S. Tucker

1921²⁷: Director Adams was reappointed for a 3-year term. He remarked "...we have wasted our substance in riotous living". Needed remedies will include the removal of pollution of all kinds from coastal waters, fishways to be installed and maintained, permanent coastal bird sanctuaries patrolled against poaching and vermin exterminated, and land to be acquired by the state for public shooting grounds. Finances affect the agency's operation; a license fee increase effective in 1922 will certainly help.

—There are now ≈100 state fish and game clubs with a membership totaling ≈12,000. The Division is pushing forward with education as rapidly as resources permit. It was necessary to limit exhibitions to eight fairs. Some towns have appointed their own fish and game wardens under the appropriate provisions of law.

—The fishways on the Merrimack River are now in operation. It appears that alewives are using them. The so-called "Merrill Pond System" in Sutton was established as a breeding location for pond fish.

—Propagation of Chinook salmon was not attempted this year. The collection and hatching of walleye and distribution of white perch was curtailed due to funding issues. The Division continued to try to establish a breeding stock of brown trout. Work was started to evaluate the stocking of bluegills.

—There were 1,667,800 brook trout fry, fingerlings, and adults; 2000 brown trout yearlings; 102,535 smallmouth bass fry and fingerlings; 16,625 largemouth bass fry and fingerlings; 15,500 white perch; and 103,250 horned pout distributed.

—Winter feeding was unnecessary in 1920-21 due to an open winter. Black duck were doing well and wood duck were slightly up. Gulls and terns increased after the cessation of commercial exploitation but were threatened by the paucity of undisturbed nesting sites, either by people or vermin.

—Oil pollution was becoming more common and alarming, "...large number of ducks have perished in the coastal water of Massachusetts from this cause" as well as many dovebies.

—Quail continued to do poorly; for many years there were scarcely any except south of Boston, including Cape Cod. Heath hen showed a slight increase and were dispersed over Martha's Vineyard.

—The deer harvest (n=1466) was the greatest since 1913. One Berkshire County resident estimated at least 100 moose in the state. Four (one with 46-in. antlers) were illegally killed during the 1920 deer season.

—There were 6010 young and adult pheasants, 38 young and adult quail, 76 young and adult wood duck, and 1073 white hares distributed.

—Trapping was light due to low pelt prices. The fox breeding industry is growing in the eastern states; there are now at least eight breeders in Massachusetts.

—Legislation included authorization for certain persons to hunt vermin on state reservations²⁸; the requirement for a liberation permit for releasing wild birds and mammals²⁹; revisions to the season dates for hunting hares and rabbits in Dukes and Nantucket counties, revisions to bag limits, and a prohibition on sale of those rabbits taken within Massachusetts³⁰; the setting of creel limits on five species of warm water fish³¹; changes to the minimum length (≥ 12 in.) for pickerel³²; provisions for the payment of moose damage³³; and revisions to the licensing laws to include women, to provide for

various combination licenses, and to increase license fees³⁴.

1922³⁵: The Director admonished that land protection was needed. It is essential to reveal the lack of protection existing under present laws and to "...indicate what should be done to provide for all time a net-work of public shooting grounds, bird sanctuaries and public recreation areas in general...It will never be possible to make this plan a reality at a less cost than today".

—The Annual Reports will be shortened in accordance with state law requiring them to be a "brief summary" with recommendations. The tendency towards posting land seems to have diminished due to the educational work of the Division and the organized sportsmen.

—Oil pollution continued to be highly destructive to aquatic life and oiled murre, auklets [sic], grebes, and ducks were examined.

—Experiments are being conducted with white and channel catfish. Propagation of the bluegill with stock received from Pennsylvania was carried out at Stockwell Ponds at the Sutton hatchery. Stock was also obtained from King's Pond in Plymouth, where they had been privately released.

—There were ≈1,204,785 brook trout fingerlings and adults; 1968 brown trout fingerlings and adults; ≈236,950 smallmouth bass fry, fingerlings, and adults; 10,820 largemouth bass fingerlings and yearlings; 23,000 yellow perch fingerlings; 75,200 white perch adults; 14,943 "catfish"; 112,275 horned pout fry, fingerlings, and adults; 7,175,000 walleye fry; 5475 bluegill fingerlings and adults; 451 pickerel fingerlings and adults; and 3 million smelt fry distributed.

—Initial reports presaged a lean flight of Canada geese but both the spring and fall flights of brant were heavy. Monomoy Island was "overrun" with feral cats and skunks but the breeding season was successful nonetheless. Quail did reasonably well in southeastern Massachusetts despite the wet spring. Hare stocking in central and western Massachusetts seemed to have been successful; however, there were few suitable areas for stocking east of Worcester County.

—Fox hunting was more popular than it has been in a generation. Weasels were becoming noticeably numerous and more destructive to game than was formerly realized.

—There were also 7035 young and adult pheasants, 48 young quail, 111 young and adult wood ducks, 17 mallard ducks, and 1110 white hare distributed.

—Legislation included an extension to the closed season on quail in Dukes, Essex, Hampden, Middlesex, and Nantucket counties until 1925³⁶, authorization for fish and game wardens and deputies to enter private lands in performance of their duties³⁷, prohibitions on the use of traps with scented bait on land of another³⁸, and authorization for the possession of lawfully taken or imported fish and game outside the closed season when in compliance with laws of the state of origin³⁹.

1923⁴⁰: The Director again emphasized the critical need for land protection, affirming that when landowners can cut down the forests <etc.> and riparian property owners dam or modify the streams "...the business of protecting and propagating the wild life over the State...can never be carried on with the greatest efficiency and the largest present and permanent results". There now seemed to be a steady increase in the amount of posted lands, especially along streams.



Figure 27. Wardens Seaman and Macker sorting salvaged fish at Gen. Butler Ames Pond, Tewksbury, 1929.

A few catfish were beginning to show up in the Connecticut River. Bluegill, calico bass, and long-eared sunfish were salvaged from ponds in Tewksbury (Figure 27) and Sutton and distributed.

—There were 1,383,500 brook trout fingerlings and adults; 39,230 brown trout fingerlings; 337,160 smallmouth bass fry, fingerlings, and adults; 678 calico bass adults; 41,700 yellow perch fingerlings and adults; 55,907 white perch adults; 14 walleye adults; 185,875 horned pout fry, fingerlings, and adults; 38,353 bluegill fingerlings and adults; 567 long-eared sunfish fingerlings; 1012 roach (*Rutilus* sp.) fingerlings; 6167 pickerel fingerlings and adults; and 146 “miscellaneous species” distributed.

—The Attorney General issued an opinion regarding public rights of way to great ponds⁴¹. The public has certain rights which differ for ponds ≤ 20 acres and those > 20 acres. The control of great ponds is in the Legislature, which may regulate and alter the public rights.

—Quail were very scarce and the season was open in only three counties. There was some gain in Dukes County due to favorable weather. Heath hens have become scarce despite legal protection and the creation of a reservation. Dr. John C. Phillips contributed funds for an intensive biological survey of the bird, to be conducted by Professor Alfred Otto Gross (1883-1970) of Bowdoin College.

—There were 10,466 young and adult pheasant (Figure 28), 45 young and adult quail, 58 wood ducks, 25 mallard ducks, four black ducks, and 1090 white hare distributed.

—No warden protection was given to the gull and tern colonies, in large part due to the widely dispersed nature of the colonies and the Division’s financial inability to give protection to all of them.

—Trappers must now provide an annual report of the furbearers trapped or killed. There were 644 such reports in 1923 with muskrat (n=9128) predominating and skunk (n=3334) second. Fox continued to increase despite the lack of protection.

—Director Adams was elected President of the International Association of Game, Fish & Conservation Commissioners. David Belding resigned as biologist and was succeeded by J[ames] Arthur Kitson (1891-1971).

—The Division was slowly building up a breeder stock of brown trout at the Palmer hatchery but almost all the 1922 hatch was lost. Walleye were established in very few waters, despite intensive effort.



Photo © MassWildlife

Figure 28. Truckload of young pheasants (64 baskets with 512 birds), North Beacon Street Bridge, Watertown, August 1923. Credit: MassWildlife.

—Legislation included a requirement for aliens that prove that they are entitled to resident licenses⁴², a prohibition on the use of snares and poison for taking animals⁴³, a closure of the quail season in Hampshire, Norfolk, and Worcester counties until 1925⁴⁴, a requirement for trappers and fur takers to make an annual report⁴⁵, establishment of a limited open season and minimum length for walleye⁴⁶, a prohibition on the sale of freshwater fish and amending the season dates for certain fish⁴⁷, a prohibition on the sale of brook trout and establishing a minimum length for brown and rainbow trout⁴⁸, an authorization for the Commissioner of Conservation to receive real and personal property in trust⁴⁹, and a provision that Massachusetts law must generally conform to federal law regarding migratory game birds⁵⁰.

1924⁵¹: The Director previously “...discussed the considerations which must underlie any plan to permanently increase [the] wild life supply. There is one further point which should be advanced and emphatically stressed...”. The Division once thought that the diminishment could be checked simply by reducing the taking of animals. However, the destruction by rod and gun is only a temporary phase. The destruction wrought by the wiping out of the producing areas is permanent. The stock must have places to feed and to breed.

—The first bequest of land under the 1923 law was the Nye homestead in Sandwich, given by Ray Nye of Sheboygan, Wisconsin. The land is valuable for fish and game propagation and abuts the East Sandwich hatchery and comprises the land on which the East Sandwich Bird Farm is located.

—There is no evidence that catfish have established themselves and the efforts regarding Chinook salmon are still questionable.

—There were 1,471,216 brook trout yearlings and adults (Figure 29); 13,650 brown trout fingerlings; 2028 rainbow trout fingerlings and adults; 75,100 Chinook salmon fingerlings; 101,720 smallmouth bass fingerlings and adults; 32,240 yellow perch fingerlings and adults; 47,836 white perch adults; 30,420 bluegill fingerlings and adults;

800 sunfish adults; 42,000 horned pout fry; fingerlings, and adults; 2818 pickerel adults; and 15,000 shiners distributed.

—There have been three years of very dry weather during the hunting season, which has impacted public access to the woodlands. Quail were doing alright in the three open counties but were almost non-existent elsewhere. Several additional donors contributed funds to the biological investigation of the heath hen conducted by Professor Gross.

—The shore birds were not holding their own. Some of the smaller species showed an increase, but the larger species did not show satisfactory growth. The breeding colonies of gulls and terns were not receiving adequate protection, due to lack of funds. A caretaker was stationed on Monomoy during June and July to destroy vermin and chase away rowdy beachgoers.

—Penikese Island in Gosnold, formerly a leper colony, was transferred to the Division as a bird refuge and sanctuary. It is a natural breeding ground for sea birds and terns which will be “fostered in every possible way”. The island may also be stocked with quail and cottontail rabbits for use as a source for stocking the mainland.

—Property in Ayer was leased from Warden Edward Evens Backus (b. 1889) in order to expeditiously produce and distribute pheasant eggs. There were 12,232 young and adult pheasants, 56 adult quail, 50 Hungarian partridges, 22 wood ducks, 240 cottontail rabbits, and 1288 white hare distributed from the various game farms.

—Legislation included prohibition of the possession of a ferret without a permit⁵², provision for certain warrantless search and seizure powers to wardens⁵³, authorization for the Metropolitan District Commission to control gulls and terns fouling certain reservoirs⁵⁴, an increase in fees paid to city and town clerks for issuing licenses⁵⁵, and establishing Penikese Island as a bird sanctuary⁵⁶.



Photo © Mass Wildlife

Figure 29. Stewart stocking truck at the Sutton State Fish Hatchery, 1925.

1925⁵⁷: Except for our native black duck, we are entirely dependent on what takes place in other States and in Canada. Whether or not these birds come here depends entirely on what takes place on the breeding and wintering grounds. Migratory birds congregate in the narrow strip just north of the southern U.S. boundary. Here again the hand of man is against them. The natural wintering areas are being drained. It is as much importance to the people of Massachusetts that the production areas of the north are to the residents of those areas, and the “storage” areas of the south are to the southerners.

—License fees fell short of financing the recreational aspects (i.e., less commercial fisheries) of the Division’s work by ≈\$16,350.

—There were 1,314,320 brook trout fingerlings and adults; 320 brown and Loch Leven fingerlings and adults; 61,000 Chinook salmon fingerlings; 151,825 smallmouth bass fry, fingerlings and adults; 13,211 yellow perch fingerlings and adults; 131,025 white perch adults; 102,090 horned pout fingerlings and adults; 3790 bluegill fingerlings and adults; 7646 pickerel adults; and 23 miscellaneous (rainbow trout, large-mouth bass, walleye) adults distributed.

—The hunting season was one of the most favorable in several years due to appropriate weather conditions and a favorable game supply. Quail increased on Martha’s Vineyard due to several years of protection and limited stocking. The heath hen population was lower than at any time in history and emergency efforts are now needed to save it from threatened extinction.

—The new Ayer Game Farm was in operation part-time as an egg-producing farm. There were 6742 young and adult pheasant, 154 adult quail, 297 cottontail rabbits, and 1062 white hare distributed.

—The Federation of Bird Clubs of New England volunteered to pay for wardens to patrol six important gull and tern colonies. Penikese Island will be developed as a rabbit and hare breeding area and a caretaker will be assigned. Five additional sanctuaries (Carr Island, including adjacent Ram Is.; Egg Rock; Milk Island; Mount Watatic; and Ram Island in Mattapoisett) were transferred, purchased, or gifted to the Division.

—Legislation included an extension on the closed season on quail in seven counties until 1928⁵⁸, a provision that the muskrat trapping season end on March 1 consistent with that for other furbearers⁵⁹, a provision that the rabbit and hare hunting seasons end on February 15 except on Nantucket⁶⁰, an increase in the bounty payment for wildcats (i.e., bobcat and lynx)⁶¹, establishing Egg Rock as a wildlife sanctuary⁶², a revision to the licensing laws to provide for a sporting (hunt and fish) license, eliminating separate hunting and fishing licenses, and providing for an adult trapping license⁶³, and a provision that the authorities in charge of state lands may permit hunting or trapping thereon to control wildlife damage, including damage to forest reproduction⁶⁴.

1926⁶⁵: [Unlike in the European countries] “...in the United States...Title to all the game lies in the people. Some years ago it was finally realized that the migratory species of game belongs to all the people of all the states...The states, on the other hand, have complete jurisdiction over the resident species of game found within their borders”. A moderate license fee is now charged to cover the exploitation of these natural resources which are the property of all the people. Our sportsmen are just beginning to realize the extraordinary privileges represented in the low-priced license.

—In this year, with the new fees, income exceeded the budgetary appropriation. Thus, it was argued that the appropriation in future years should be at least equal to the income from licenses and fines. A coastal warden service was established by law, principally to enforce the Public Health regulations regarding contaminated shellfish waters.

—A new group of sportsmen's organizations, the "Massachusetts Associated Sportsmen, Inc." was formed from a substantial number of local fish and game clubs.

—There were 846,305 brook trout fingerlings, yearlings and adults; 23,360 brown and Loch Leven fingerlings, yearlings and adults; 250 rainbow fingerlings; 18,000 Chinook salmon fingerlings; 169,200 smallmouth bass fry, fingerlings and yearlings; 19,650 yellow perch yearlings and adults; 86,500 white perch adults; 153,370 horned pout fingerlings, yearlings and adults; 139,675 bluegill fingerlings and yearlings; and 8218 pickerel fingerlings and adults distributed. Chinook salmon fishing has been reduced to three ponds on Cape Cod.

—Myles Standish State Forest was opened to deer hunting due to the serious damage to the nursery stock. Disease was identified in rabbits imported from the western states and a special permit and 10-day quarantine is now required when persons wish to import rabbits from those areas.

—There were 2591 young and adult pheasant, 241 cottontail rabbits, and 1625 white hare distributed.

—Shorebirds continued to do poorly. The federal government has indefinitely closed the season on golden plover. Land was donated for a wildlife sanctuary in Boxford. The Federation of Bird Clubs continued to acquire coastal bird breeding grounds and to pay for or contribute to wardens at four colonies.

—Penikese Island was staffed by a caretaker. The 79 rabbits first stocked have now increased to "hundreds" and it was planned to trap and distribute some in 1927. Few terns were reared due to heavy storms and a "backward" spring.

—Legislation included an increase in the penalty for taking short pickerel⁶⁶, a provision that the authorities in charge of state forest reservations may allow licensed hunters to hunt deer during the open season to control deer damage⁶⁷, a repeal of the incorporation of the Pasque Island Corporation thus returning the island to local jurisdiction⁶⁸, authorization for landowners and farmers to take hare and rabbits damaging crops <etc.>⁶⁹, provisions for the taking of shiners and suckers for bait⁷⁰, a change to the fees for sporting licenses and revisions to the license classes for minors⁷¹, and a provision for the hiring of coastal wardens⁷².

1927⁷³: [The]"... education of the public to a proper appreciation of our wild life resources and the intelligent use of them, has long been recognized by conservationists throughout the country to be the greatest single need of this generation...[however] there is no concerted movement to start with the abc's of conservation of all our natural resources, to be followed up by a systematic presentation to our growing youngsters and on through to the grown-ups...". The remedy is not easily arrived at. It will require education in all school grades, more research scientists, short and attractive magazine articles, and an informed press supplied with the necessary informative material. "To be able to see the wonders of our wild life stock with a knowing eye is a priceless possession."

—A detailed analysis of revenues was presented to the Commissioner on Administration and Finance, arguing forcefully for an increased appropriation: "...this Division functions in the interests of all the people of the Commonwealth [but] only a very small group of our citizens today are contributing towards its maintenance."

—Additional properties on Little Wachusett Mountain, on Mount Watatic, and the Hoxie property in Sandwich were received as gifts for wildlife sanctuaries. The warden force has now been completely motorized.

—The policy of stocking fall fingerlings was discontinued and fish distributed when they reach legal length. The Division now has its own brood stock of Loch Leven trout. There were 507,465 brook trout fry, fingerlings, yearlings and adults; 23,525 brown and Loch Leven fingerlings, yearlings, and adults; 4420 rainbow yearlings; 12,000 Chinook salmon fingerlings; 190,320 smallmouth bass fry, fingerlings, yearlings, and adults; 9040 yellow perch fingerlings, yearlings, and adults, 83,520 white perch adults; 97,685 bluegill fingerlings, yearlings, and adults; 3810 calico bass adults; 75 sunfish adults; 113,525 horned pout fry, fingerlings, yearlings, and adults; 4275 pickerel fingerlings, yearlings, and adults; 25,000 muskellunge fry; 490,000 walleye fry; 56 lake trout fingerlings and yearlings; and nine landlocked salmon adults distributed.

—The East Sandwich Bird Farm was enlarged by the gift of the Hoxie property. Ayer Game Farm was operated as a year-round station for the first time, including both for hatching and rearing.

—The New England Ruffed Grouse Investigation Committee was proceeding under the direction of Professor A.O. Gross. The Committee planned to continue its work for several more years.

—Quail moved naturally from Penikese Island to Cuttyhunk. A second warden was assigned to the heath hen reservation. Dr. Gross was investigating the effect of disease on the bird as the decline in their numbers continues. There are <30 heath hens remaining. More hunters now seek rails due to the lack of opportunity to hunt shore-birds.

—There were 3619 pheasants, six quail, 240 cottontail rabbits, and 1210 white hare distributed.

—Muskrat topped the list of furbearers taken, with 33,773 reported by 1687 trappers.

—The tern breeding season on Penikese was unfavorable, but with a larger production of young than in the previous year.

—Legislation included an inclusion of Loch Leven trout in the fisheries laws with equal status to brown trout⁷⁴, establishment of creel limits and open seasons for bluegills and shiners⁷⁵, and a requirement that the Director of Fisheries and Game must approve deer and moose damage payments⁷⁶.

1928⁷⁷: The provision of certain species of birds, mammals, and fish is a business proposition, thus financing the enterprise is the most important question. At this time, revenues can only be increased by increasing license fees and by instituting a system whereby the issuance fees retained by city and town clerks may be saved. Several states (e.g., Oregon) have a system whereby sporting goods stores and similar venues issue licenses without a service fee. The Division argued in favor of such a system.

—The Division also argued for an increase in the number of commercial game farms and fish hatcheries and for public participation in a program of vermin control. The Division requested funds to acquire one or more wildlife sanctuaries and provide for their maintenance. There should be at least 10 such properties of 3000-5000 acres across the state.

—Loch Leven trout will now be considered to be “brown trout” for purposes of reporting and stocking. Consolidating all age classes, there were 234,620 brook trout; 9248 brown trout; 6012 rainbow trout; 14,500 steelhead trout; 5120 Chinook salmon; 300,240 smallmouth bass; 33,310 yellow perch; 32,550 white perch; 220,540 bluegills; 90,340 calico bass; 1016 sunfish; 49,770 horned pout; 9022 pickerel; 40,000 muskellunge [fry]; 32 walleye; and two largemouth bass distributed.

—If the Division desires to increase pheasant hunting opportunities, it must increase their numbers. The sportsman does not realize that if he kills one cock bird, it will cost twice its license fee to put that one bird back into the wild.

—The only out-of-state source for stocking cottontails is in the west, where tularemia is prevalent. Thus, the Division does not import stock from there because it wishes to keep Massachusetts disease-free.

—The special warden for the heath hen reservation was discontinued. The birds are still dwindling rapidly; however, the state will continue efforts to preserve the species.

—There were 2423 young and adult pheasant, 295 cottontails, and 1970 white hare distributed.

—Gulls and terns were benefitting from the establishment of coastal sanctuaries. Cottontail propagation on Penikese is now proceeding satisfactorily. It was a good year for common tern production there.

—The Division received a gift of the 5000-acre Edward Howe Forbush sanctuary in Hancock.

—Legislation included a prohibition on apparatus with >10 hooks in any inland waters⁷⁸, a prohibition on snares, nets and traps for taking any bird⁷⁹, an extension of the closed season on quail in seven counties until 1930⁸⁰, an increase of the open season on deer to two weeks^{81,82}, a provision that the Commissioner of Conservation may set seasons for shorebirds (except woodcock) and any Rallidae by rule and regulation⁸³, and a change in the system for evaluating and paying deer damage⁸⁴.

1929⁸⁵: Director Adams summarized his remarks from the previous Annual Reports and presented them in concise format at a national conference⁸⁶. A majority of people visit Massachusetts to enjoy the seashore and countryside rather than to see historical monuments⁸⁷. There is no greater adjunct to these places than an abundance of wildlife. Accordingly, wildlife should receive greater recognition and support than it now does, for both aesthetic and economic reasons. The protection of non-game birds is of equal importance to that for game species.

—The Division continued to advocate that the Act of 1869 be repealed and public rights to fishing in ponds between 10 and 20 acres in size be restored.

—Private gifts added to the Boxford Sanctuary, the Merrill Pond system, and the East Sandwich Bird Farm.

—There were 40,700 brook trout; 5682 brown trout; 1035 rainbow trout; 40,000 Chinook salmon; 286,355 smallmouth bass; 61,505 yellow perch; 59,560 white perch; 198,545 bluegills; 3454 other sunfish; 264,840 horned pout; 14,180 pickerel; 25,000 muskellunge [fry]; 124,980 black crappie (calico bass); 51 largemouth bass; 400 shiners; and 32 walleye distributed.

—The wood duck was holding its own. Goose migration was hampered by aircraft and the construction of coastal flying fields. The Migratory Bird Conservation Act (“Norbeck-Andresen Act”) of 1929⁸⁸ authorized the purchase or lease of waterfowl refuges, and established a Migratory Bird Conservation Commission to review and approve the Secretary of the Interior’s selections⁸⁹.

—Legislation to allow the Director to regulate the grouse season failed. Work continued on developing a breeding stock of bobwhite quail. The heath hen is now functionally extinct as there is only a single male bird remaining^{90,91}. The success in breeding cottontails on Penikese stimulated the establishment of breeding colonies at other locations.

—There were 16,599 young and adult pheasant [a record], 27 adult quail, 476 cottontails, and 2205 white hare distributed.

—Legislation included a requirement for a permit to liberate or import any bird or mammal⁹², establishing the open seasons, creel limits and prohibiting sale of calico bass⁹³, and establishing the open seasons and a minimum length for northern pike and muskellunge⁹⁴. A legislative resolve provided for a special commission to survey and revise the inland fisheries and game laws⁹⁵.

THE ECONOMY COLLAPSES, A PROFESSION ARISES: THE 1930s

The 1930s¹ were initially dismal, characterized by the worldwide poverty-stricken years of the Great Depression, the Dust Bowl in the midwestern U.S.A. in the mid-1930s, continuing acts of gangsterism and rural banditry, and armed clashes in Asia (1931) and Europe (1939) which eventually led to the Second World War. The Social Security Act (1935) was enacted; Boulder Dam was completed (1936), forming the [then] world’s largest man-made reservoir; the 40-hour work week was established (1938); and the U.S. economy began to recover with European orders for military equipment (1939).

In 1930, the unemployment rate in Massachusetts was 6.4%, as compared to 5.0% for the U.S. as a whole². Agricultural production was shrinking and there was a decline in industrial manufactures. Nevertheless, New England had weathered crises before, had a distinct cultural character and set of abilities, and the solutions to the present crisis reflect New England’s genius and are not merely copies of the ideas of others³.

Coastal Massachusetts sustained a surge in rum running during the prohibition years⁴, an illicit boon to the state’s hard-strapped fishermen. Acknowledging metropolitan Boston’s need for water, the Metropolitan District Commission sought to create a large new reservoir in western Massachusetts. The Swift River was dammed and four

towns disincorporated^{5,6} and the 412-billion gallon Quabbin Reservoir (and the adjacent 186 mi² watershed) was created.

The great flood of March 1936⁷—the state’s worst in 300 years—devastated much of the state and stimulated the construction of flood-control reservoirs. Two years later, the Great Hurricane of September 1938 slammed into New England, killing 680 persons and causing \$400 million in property damage⁸.

New England’s forests in the 1930s were “...inferior second-growth...” and largely “...comparatively valueless...”⁹ due to soil deterioration, the effects of insect pests and disease, and a decline in the use of native lumber. However, important changes were aborning. Forests were growing and aging, plantings and regeneration were underway, fire suppression and management was being implemented, and public demand for forest recreation was increasing¹⁰. In Massachusetts, forest inventories and forest-type surveys had begun and a district management system was under discussion¹¹. The massive 1938 hurricane knocked down ≈500 million feet of standing timber in southern New England, but ≈150 million feet were salvaged¹².

In 1930, the American Game Policy Committee of the American Game Conference presented its report¹³ to the Conference. This visionary report set forth seven fundamental actions: (1) extend public ownership and management of game lands as far and fast as possible, (2) recognize the landowner as the custodian of public game on all other land, (3) experiment with ways to bring the parties into concert and adopt the ways which yield game management (4) train men for the profession, (5) find the facts on what to do and how to do it, (6) recognize the non-shooting protectionist and the scientist as co-partners in the endeavor, and (7) provide funds from general taxation, sportsmen and private entities.

Subsequently, a U.S. Senate Committee developed a model state law for game and fish administrative law¹⁴. This model adopted a key provision from the 1930 policy report providing for an independent Game and Fish Commission, with unpaid members appointed for staggered terms, having policy-making powers and (“*it is vital*”)¹³ a chief executive appointed by and responsible to it. In 1936, the Council of Sportsmen’s Clubs of Massachusetts unanimously and vigorously supported the model Commission form of fish and game administration¹⁵ and urged its adoption. Such changes as were eventually adopted are discussed subsequently.

The Migratory Bird Hunting Stamp Act^{16,17} required waterfowl hunters to purchase a \$1.00 revenue stamp (Figure 30) in order to hunt waterfowl, with the proceeds of the sale directed towards purchase of wetlands and waterfowl production areas. The Cooperative Wildlife Research Unit program arose in 1935 at the urging of Jay Norwood “Ding” Darling (1876-1962), then-chief of the U.S. Biological Survey¹⁸. Acting with the partnerships of a state natural resource agency and ammunition manufacturers, a participating land grant university would be assigned a U.S. Biological Survey biologist as unit leader to develop coordinated research and to instruct and train aspiring wildlife biologists¹⁸.

The Federal Aid in Wildlife Restoration (“Pittman-Robertson”) Act of 1937^{17,19} became critical to funding state research and management programs. The Act provided for an 11% tax²⁰ on sporting long arms and ammunition, to be returned proportionately to the states for approved projects. A particularly farsighted aspect required participating states to pass “...laws which shall include a prohibition against the diversion of license fees paid by hunters for any purpose other than the administration



Image © U.S. Fish & Wildlife Service

Figure 30. First federal duck stamp, 1934, designed by J.N. Darling.

of said State fish and game department". Massachusetts assented to the Act on June 7, 1938²¹.

Herbert Lee Stoddard's (1889-1970) detailed monograph on bobwhite quail²² was the first for the biology and management of a game species. The forester and ecologist Rand Aldo Leopold (1887-1948), a pioneer in the relationships between the land and wildlife, and often regarded as the "Father of Wildlife Management", set forth the clarity of his concepts in his classic 1933 text *Game Management*²³. Writing at the peak of the Dust Bowl, in the heart of the dust-stricken area, the ecologist Paul Bigelow Sears (1891-1990) lamented the region's soil erosion and predatory farming which produced "gloomy curtains of dust" and "ruined forests, polluted streams, [and] gullied fields"²⁴.

One of President Franklin Delano Roosevelt's (1882-1945) "New Deal" programs, the Civilian Conservation Corps^{17,25}, arose in 1933 under the Emergency Work Conservation Act of 1933²⁶. Designed for unemployed, unmarried young men, the C.C.C. operated from 1933-1943, planting >3 billion trees, constructing >800 parks, and fostering an appreciation of the outdoors and natural resources. In Massachusetts, there were 68 camps with ≈100,000 men hard at work in the state forests and other rural sites²⁷.

Although there were now federal laws regulating waterfowl harvest, the bleak years of the Dust Bowl affected precisely those parts of North America which were the most productive waterfowl breeding areas¹⁷. John C. Phillips and Frederick Charles Lincoln²⁸ (1892-1960) bluntly stated "No problem to-day so vitally affects the future of our wild waterfowl as the drainage of swamps and marshes. Also no policy...is frequently so utterly fallacious"²⁹. In 1930, sportsmen formed the "More Game Birds in

America” Foundation, directing its principal attention to waterfowl production areas, especially “...a program which will bring neighboring nations of the North American continent into harmonious accord for the good of the game”³⁰. In 1937, the Foundation was broadened and reorganized as “Ducks Unlimited”¹⁷, which became the world leader in waterfowl and wetlands conservation.

The first North American Wildlife Conference—then titled “Wildlife Restoration and Conservation”—was called into session by President Roosevelt in February 1936 to “...bring together individuals, organizations, and agencies interested in the restoration and conservation of wildlife resources”³¹. This conference, now the “North American Wildlife and Natural Resources Conference” continues annually under the oversight of the Wildlife Management Institute. The same year, Reuben Edward Trippensee (1894-1997)³², a forest ecologist and zoologist³³, was appointed to the faculty of Massachusetts State College (now the University of Massachusetts). The first PhD. in his Department, and the leader of the first graduate program, Trippensee saw his role as improving land use through applied ecology and in doing so to identify future fish and wildlife management needs.

The Wildlife Society (the professional society for wildlife biologists) came into being at the Second North American Wildlife Conference in 1937^{34,35}, as did its professional *Journal of Wildlife Management*. In Massachusetts, there were then four “full” (including Phillips and Trippensee) and six “associate” charter members³⁶, including one employee of the Division of Fisheries & Game and one future employee³⁷.

1930³⁸: In reviewing the history of the Division, Director Adams remarked that “...the health-giving recreation of pursuit and the moral development wrought through the enjoyment of other species of wild life not classed as game...promotion of a healthy and inspiring environment and contentment of our people is an important function of government...”. It appears “reasonable to emphasize the need of additional appropriation” to assist in administering the 60% of our wildlife in which the people at large are interested.

—The county sportsmen’s leagues have selected delegates to represent their respective counties in a Council of Sportsmen’s Clubs of Massachusetts. This is a more desirable form of organization than could be set up by legislation. The Massachusetts Fish and Game Association also rendered valuable service.

—A new position relative to the Supervisor of fish and game permits and claims was created due to the substantial increase in applications. Stream surveys were being initiated.

—There were 350,318 brook trout; 30,200 brown trout; 256,765 smallmouth bass; 47 largemouth bass; 84,140 yellow perch; 186,432 white perch; 306,850 bluegills; 175,355 black crappie; 331,565 horned pout; 20,230 pickerel; 25,000 muskellunge [fry]; 733 “sunfish”; and 12 walleye stocked, as well as 13,300 crayfish and ≈276,000 “tadpoles and shiners”.

—There were 18 ruffed grouse—received by gift from Alberta—liberated on Martha’s Vineyard in December 1929 and a second lot of 21 in February 1930. There appeared to have been “no benefit” from the stocking. Captive-raised quail (15 pair) were liberated on Nantucket, where they have become “extinct”. A few broods were seen. The number of breeding woodcock was on the increase and there was a strong increase in wood duck.

—Eight Kansas jackrabbits were also liberated on Nantucket, where the animal was “somewhat” established from stockings many years ago. A request was received for stocking muskrats on Nantucket, but it was denied due to opposition from cranberry bog owners.

—Gulls and terns were holding their own, although the Penikese colony was thriving.

—Game breeding procedures have advanced³⁹ and bobwhite were successfully bred at all four game farms this year. Experimental work with ruffed grouse breeding was underway at East Sandwich.

—There were also 4041 pheasant, 39 ruffed grouse, 30 quail, 457 cottontails, and 1911 white hare liberated.

—Legislation included a recodification of the inland fish and game laws⁴⁰. Principal changes included an increase in license fees; authorization to acquire public fishing grounds, when monies are so appropriated; requiring a sporting license to fish in any inland waters; requiring hunters to make a written annual report; requiring the registration of all permanent gunning stands; prohibiting the baiting of all wild birds; prohibiting the discharge of firearms within 50 yards of a state highway; and providing for a 7-month dog training period. There was also a law enacted by initiative petition⁴¹ prohibiting the use of any trap not designed to take an animal alive and unharmed, except within 50 yards of a building or cultivated plot of land.

1931⁴²: After 18 years of service, Director Adams resigned from the Division effective July 1, to take a similar position in New York. He was replaced as Director by Chief Warden Raymond Joseph Kenney (1898-1963), a 13-year veteran (Table 2). An unofficial advisory council to the Director was created.

—Due to overcrowding, the Department of Conservation moved to quarters on Somerset Street, owned by the Metropolitan District Commission, thereby requiring the Division to pay an annual rental of \$6095.

—An investigation was being made to find ways and means of charging people who receive special services from the Division. Work continued on stream surveys and the evaluation of game covers. The experimental planting of wild duck foods continued along the Sudbury River.

—An appropriation of \$25,000 was secured for establishing public fishing grounds⁴³ and rights along the Westfield River were secured.

—The trout stocking policy was again amended and brook trout were now to be distributed when a portion reached legal length and a “substantial part” of the remainder reached 4-6 in. length. Brown and rainbow trout continued to follow the previous standard. There were 446,600 brook trout; 100,525 brown trout; 2400 rainbow trout; 43,000 Chinook salmon; 1375 landlocked Sebago salmon (i.e., landlocked Atlantic salmon from Sebago Lake, Me.); 47,720 smallmouth bass; 21 largemouth bass; 222,500 yellow perch; 86,355 white perch; 230,130 bluegills; 14,480 black crappie; 269,150 horned pout; 14,510 pickerel; 250,015 walleye [fry]; 12,500 muskellunge [fry]; 2190 sunfish; 240 shiners; 2750 crayfish; and 284,000 tadpoles distributed.

—Fifteen sharptailed grouse from Alberta were liberated privately in Quissett. Grouse stocking on Martha’s Vineyard was unsuccessful. Game farm quail (n=37) were again liberated on Penikese.



Figure 31. The last Heath Hen, Martha's Vineyard, April or May 1930.

—The last living heath hen “Booming Ben” (Figure 31) was seen occasionally in 1931. The former heath hen reservation was turned over to the Division of Forestry and will be closed to all hunting until it is certain that no heath hen remains alive. Special care will be taken to prevent forest fires on the area.

—Common and roseate terns had a very satisfactory breeding season on Penikese. A constant patrol was needed to warn away visitors who seek to land and recreate on Penikese.

—There were also 6692 pheasant, 2872 quail, 290 cottontails, and 3626 white hare liberated.

—Four Canada lynx were allegedly taken by hunters.

—Legislation included further authorization for the killing of gulls and terns defiling water supplies⁴⁴; an amendment to the “Blue Laws” (c. 136) to allow recreational fishing on Sunday⁴⁵; giving the assent of the Commonwealth to the acquisition of game refuges by the federal government⁴⁶; provision for a reduced-price minor fishing license and free licenses for persons over 70⁴⁷; allowing field trials⁴⁸; authorization for the killing of predatory animals and possession of firearms for that purpose on Sunday⁴⁹; and an omnibus bill⁵⁰ including an authorization to acquire public shooting grounds, provision for certain night hunting, setting the rules and regulations for fishing, and a change in license fees.

1932⁵¹: The work of the Division was divided into seven bureaus for efficiency and economy. No additional land will be purchased until all of the existing four game farms and six hatcheries have been brought to maximum production.

—License receipts for 1932 were down \$20,164, undoubtedly a direct result of the prevailing economic conditions. The new licensing system in effect in 1933 will eliminate sporting licenses and restore separate hunting and fishing licenses.

—The fish and game organizations of the state include only a small portion of the licensed sportsmen but are of great benefit to the Division. During the past year, deer carcasses confiscated from illegal or accidental kills were given to the state welfare boards, which benefitted 110 needy families.

—The Supreme Judicial Court upheld the constitutionality of the “so-called humane trapping act”.

—Much work was done in the hatcheries to sterilize pools and buildings against a recurrence of furunculosis. A process was developed to disinfect brook trout eggs. The stream surveys are well underway in collecting data of a biological and practical nature.



Photo © Edwin P. Simpson

Figure 32. Civilian Conservation Corps camp, Harold Parker State Forest, North Andover, 1933.

—There is a 64-mile strip on the three branches of the Westfield River for public fishing ground. Leases have also been acquired along the Squannacook and Farmington rivers. However, landowners were not conducive to granting significant leases on the Konkapot River.

—There were 938,030 brook trout; 69,150 brown trout; 71,855 rainbow trout; 48,275 Chinook salmon; 39,220 smallmouth bass; 1689 largemouth bass; 383,310 yellow perch; 54,515 white perch; 127,310 bluegills; 42,225 black crappie; 328,590 horned pout; 14,317 pickerel; 225,000 walleye [fry]; 25,000 muskellunge [fry]; 6471 sunfish; 600 suckers; 3000 crayfish; and 53,755 tadpoles distributed.

—Representatives from Massachusetts testified before Congress that the waterfowl regulations of the Bureau of Biological Survey were unsatisfactory to the sportsmen of New England. They were successful in obtaining a revision allowing a 2-month season.

—There were 17,437 pheasants, 5766 quail, 547 cottontails, and 4142 white hare distributed.

—The sole surviving heath hen was last seen on March 11, 1932. There was a private proposal to introduce prairie chickens to Martha’s Vineyard but the request has been denied. The tern breeding season on Penikese was a poor one; however, the herring gull colony was increasing.

—Legislation included an authorization for the hunting of quail in Norfolk County⁵²; an authorization for the Director to regulate open seasons and bag limits for ruffed grouse and quail⁵³; a provision for a year-round dog training season⁵⁴; a prohibition on the hunting or taking of beaver⁵⁵; a provision for a 2-week open season on deer in 4 counties, and one week elsewhere and allowing the use of archery tackle for deer hunting during the firearms season⁵⁶; and a change to the hunting, trapping, and fishing license fees⁵⁷.

1933⁵⁸: The year was “memorable as marking the beginning of a great readjustment era” accompanied by a decrease in the inland fish and game appropriation, making strict economy essential. For the past two years, the Division was level funded. However, the Division received \$100,700 from the U.S. Civil Works Administration to

complete final construction at game farms and hatcheries and development of sanctuaries. Also, the Civilian Conservation Corps has been building fishing ponds on the state forests and working on fish hatching and rearing facilities (Figure 32). Funds were also made available for making large purchases of fish and game from private breeders, thus helping to sustain those businesses.

—The organized sportsmen may seek to have the warden force paid from funds separate from those of the Division for fiscal reasons. The Division reviewed the impact of the new licensing structure in effect in 1933 and will make further recommendations.

—The unofficial advisory council created in 1931 was reorganized by Governor Joseph Buell Ely (1881-1956). It now consists of representatives from the Massachusetts Fish & Game Association, Council of Sportsmen's Clubs, Massachusetts Audubon Society, Federation of Bird Clubs of New England, Massachusetts State Grange, and the Massachusetts Farm Bureau.

—There are 215 sportsmen's clubs, 11 county leagues, and 28,254 members in the state council. However, there are ≈121,250 licensed sportsmen.

—Stream surveys were continuing as intensely as possible. An investigation began as to reasons for the decline of eelgrass⁵⁹, and its effects on brant, along the Massachusetts coast. Disinfection against furunculosis continued at the hatcheries.

—There were 796,365 brook trout; 107,670 brown trout; 45,430 rainbow trout; 17,000 Chinook salmon; 140,180 smallmouth bass; 258,920 yellow perch; 198,905 white perch; 31,680 black crappie; 213,015 horned pout; 8100 pickerel; 500,000 wall-eye [fry]; and 20,000 muskellunge[fry] distributed.

—Blackhead appeared in quail at the Sandwich Game Farm. Deer were increasing on Nantucket and there was considerable damage to gardens and ornamental foliage.

—There were 16,387 pheasants, 5919 quail, 1649 cottontails, and 5251 white hare distributed.

—Leach's storm-petrels were found nesting on Penikese⁶⁰. Substantial work was done on the Boxford Sanctuary in clearing roads and trails and planting shrubs. Rat poisoning continued on Milk Island.

—Legislation included a provision for legal protection for all birds except the English sparrow, grackle, starling, crow, jays, accipiters, and the great horned owl⁶¹, a revision to the trapping law to prohibit all traps except those designed to take an animal alive and unharmed, except by a property owner or designee⁶², and a recodification of the marine fisheries laws⁶³.

1934⁶⁴: A review of the activities of the Division showed a wide range of public services rendered. The original purposes of the agency have gradually been expanded so that it is no longer a single-focus entity simply providing facilities for the sportsman. License revenue should be devoted solely to improving hunting and fishing conditions and other funding received for the "broad and diversified field of services" performed by the Division.

—A program of fish and game development should include leasing, purchase and maintenance of woods and waters, expanded fish and game propagation, increased law enforcement, accelerated research, and extensive field work.

—The Civil Works Administration provided employment to 966 people for Division activities from December 1933 to May 1934.

—Carp and suckers were determined to be detrimental to the more valuable species of fish and permits were given to two businesses to remove these fish from the Housatonic River, Laurel Lake, and several water bodies in northeastern Massachusetts.

—There were 989,815 brook trout; 153,020 brown trout; 107,980 rainbow trout; 48,975 Chinook salmon; 20,550 smallmouth bass; 1317 largemouth bass; 160,470 yellow perch; 142,890 white perch; 205,100 bluegills; 3260 black crappie; 80 rock bass; 396,480 horned pout; 24,200 pickerel; 500,000 walleye [fry]; and 20,000 muskellunge [fry] distributed.

—A cooperative program between the Division and the Massachusetts State College was formulated. One initial project was an experiment in ruffed grouse propagation.

—Importation of white hare from Maine was terminated due to a report of tularemia in that state. Several hundred cottontails were received from Vermont⁶⁵ in the spring of 1934. More were requested but trapping conditions were unsatisfactory. The program of wildlife management on state forests is of great benefit to the sportsman.

—There were also 18,920 pheasants, 5571 quail, and 2010 cottontails distributed.

—Joseph Archibald Hagar (1896-1989)⁶⁶ (Figure 33) was appointed provisionally as the state ornithologist effective November 7, 1934. His first duty will be to study the relationship between waterfowl and the shellfish industry.

—There was a large colony of terns on Ram Island. Terns nested in large numbers on Penikese. Herring gulls were also very abundant and the Bureau of Biological Survey destroyed many nests to limit the hatch.

—Legislation included changes to the minimum length for northern pike and muskellunge⁶⁷, a prohibition on the sale of black bass wherever taken⁶⁸, an amendment to the so-called “Blue Laws” (G.L. c. 136) to allow trap and target shooting on Sunday, with the permission of selectmen⁶⁹, establishment of the state ornithologist in the Division of Fisheries & Game⁷⁰, changes to the season dates and bag limits for rabbit and hare in Dukes and Nantucket counties⁷¹, and a provision for a local option relative to the anti-steel trapping law⁷².

1935⁷³: There are now four bureaus in the Division: Administration, Marine Fisheries, Wildlife Protection, and Hunting & Fishing. The wardens received their first official uniforms on May 16 (Figure 34). The uniforms are to be worn on most occasions to increase respect for the officers and their duties.

There were 12 projects totaling \$13,789 (in state funds) to be submitted to the Works Progress Administration for cooperative funding. The state ornithologist qualified on the civil service examination and was made permanent in July. The financial outlook



Photo © Manomet Observatory for Conservation Sciences

Figure 33. State Ornithologist Joseph A. Hagar.

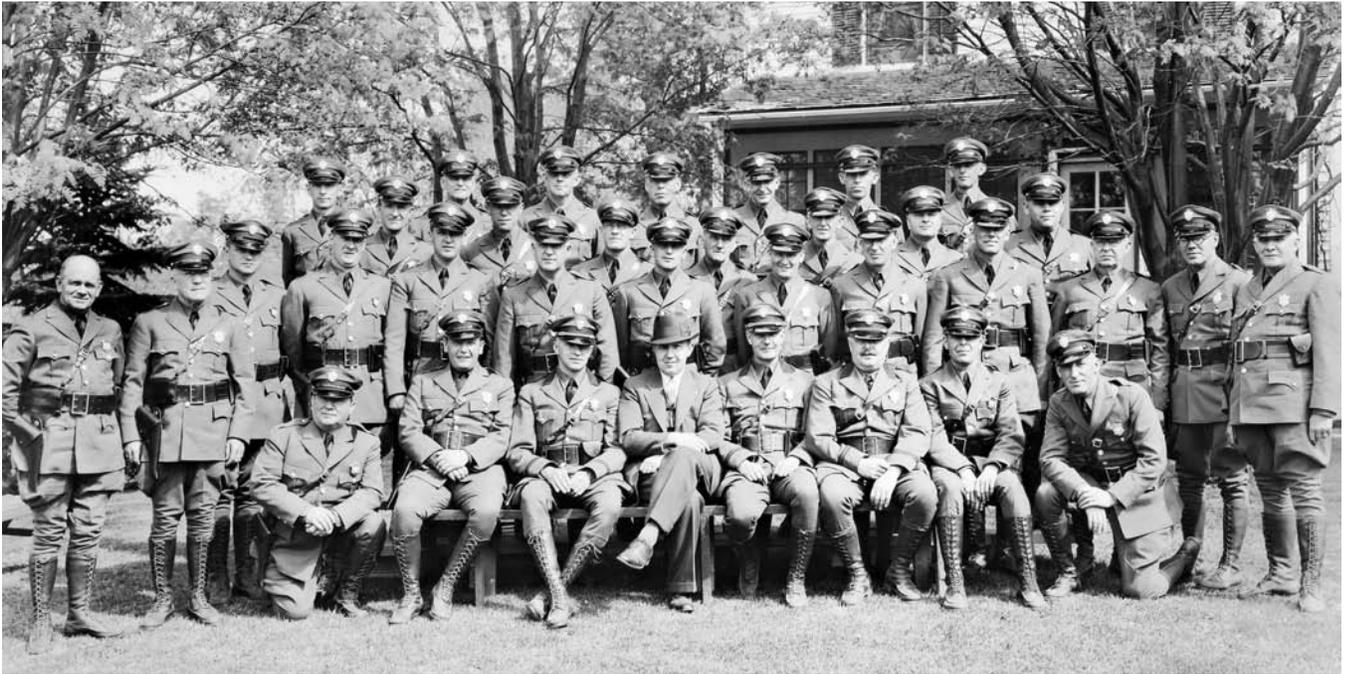


Figure 34. Massachusetts Conservation Officers, 1935.

for the Division was improved by the appropriation of \$18,000 in a supplemental budget.

—A field office was opened at Concord for the use of the stream survey unit, currently focusing on the Merrimack River system. Reference plantings of aquatic plants began at the Sutton Pond system. Experimental fish tagging was being done in Plymouth County. Tag returns have been low due to tag loss and low visibility.

—There were 622,000 brook trout; 203,995 brown trout; 136,410 rainbow trout; 39,000 Chinook salmon; 18,045 smallmouth bass; 56 largemouth bass; 253,010 yellow perch; 383,915 white perch; 54,430 bluegills; 2698 rock bass; 1506 black crappie; 136,310 horned pout; 5204 pickerel; and 250,000 walleye [fry] distributed.

—White hare will now be imported from New Brunswick. Cottontail breeding was underway at the Ayer Game Farm and the Sutton Pond system. The grouse propagation project at Mass. State College produced 115 chicks; however, difficulty was encountered in getting chicks to feed. Disease was also an issue.

—An open season on deer on Nantucket (for the first time) was authorized for February 11-15, 1935^{74,75}. However, the Governor closed the season on the second day due to the substantial harvest on opening day. Two island hunters were apprehended for killing wild turkeys on the island.

—The federal government banned the use of live decoys (Figure 35) and bait for hunting waterfowl⁷⁶.

—There were 22,005 pheasants, 6376 quail, 2223 cottontails, and 707 white hares distributed.

—The ornithologist found that damage to shellfish by sea ducks was slight. However, damage by herring gulls was persistent and severe, especially on Cape Cod, Martha's Vineyard, and Nantucket. The Bureau of Biological Survey continued to destroy gull eggs by pricking. A census of seabird colonies was underway, especially with regard to least terns. The number of least terns appeared to be twice what it was in 1923.



Photo Courtesy of Ernest S. Tucker.

Figure 35. Goose hunting blind with live decoys, Essex County, about 1895.

—Legislation included provision for a 6-day February open season on deer on Nantucket⁷⁷, provision for an open season on quail in Middlesex and Worcester counties⁷⁸, authorization for the use of fish traps with an opening >1 inch for taking bait fish⁷⁹, and an authorization for trapping on Sunday⁸⁰.

1936⁸¹: The Division will now increase the facilities for growing brook trout and will stock as many fish of larger size as hatchery capacity allows. The distribution policy for all three species of trout will be modified to shorten the period when they are in brooks between the time of stocking and the opening of the season. This new policy will require an adjustment period.

—The question of the Division’s finances was referred to a study commission. There are now county leagues in all 14 counties, representing 239 clubs and a total membership of 31,681.

—Game wardens were activated to cooperate with police, the military, and local officials during the flood emergency. The wardens also occupied much time during the severe winter engaging in the emergency feeding of wildlife, distributing 15,000 lbs. of grain and 80 bushels of waste popcorn.

—Requests for [game] propagator’s permits have increased. There were 325 investigations during 1936 alone. A survey of permittees was underway to ascertain compliance with the terms of the permits. There were 130 fish breeder permits.

—The damage to trout fisheries from the spring floods was very apparent and “...several years will have to elapse before natural conditions again prevail”. Stream surveys are underway in Bristol and Worcester counties.

—There were 654,460 brook trout; 209,390 brown trout; 196,170 rainbow trout; 9000 Chinook salmon; 55,025 smallmouth bass; 40 largemouth bass; 94,085 yellow perch; 116,795 white perch; 218,050 black crappie; 96,450 bluegills; 140,350 horned

pout; 9389 pickerel; 119,375 walleye [fry]; 20,000 muskellunge [fry]; 20,070 sunfish; 10,000 shiners and dace; and 750 “banded pickerel” (i.e., redbfin pickerel) distributed.

—Grouse, quail and pheasant numbers were below normal levels (probably due to the severe winter) and the Director cancelled the grouse season prior to its opening. The wild turkey experiment (using pen-reared birds) begun at Beartown State Forest in the fall of 1935 continued during 1936. Student training courses in wildlife management were underway at Stockbridge School of Agriculture at the Massachusetts State College.

—Raccoon breeding began at Ayer Game Farm but there has been little progress so far. Importation of cottontails from the western states has been resumed. Rabbit breeding was also underway at Ayer. The stock included 20 does and 11 bucks of the wild-trapped Vermont stock. The “two sub-species were inimical to one another and with a single exception all attempts to cross-breed them resulted in failure and usually in the death or injury of the doe”⁸².

—Deer damage claims were increasing. The most “aggravated” situation is in the area of the Watuppa Reservation, which is closed to hunting. Deer move out of this sanctuary and cause damage and then return to it.

—There were 20,620 pheasants, 8230 quail, 43 cottontails, and 6354 white hare distributed.

—Billingsgate Island (a “few acres”) was gifted as a wildlife sanctuary. There was little or no money appropriated for management of sanctuaries and some were not even visited in 1936. Carr Island suffered from mouse damage to the planted mulberry and apple trees.

—It was a “banner year” for terns on Penikese with an estimated 7000-8000 adult birds and an estimated 5000 young surviving to flight stage. Other tern colonies were also doing well; that at Plymouth doubled over 1935. The Bureau of Biological Survey continued to puncture herring gull eggs at Penikese as a control measure. There were 30,000 pairs of laughing gulls on Muskeget.

—The ornithologist again attempted to investigate the relationship between sea ducks and shellfish due to the appearance of a large (30-40,000 birds) congregation of scoters and eiders off Chatham. There were 378 mostly oiled birds taken for study or depredation. Public pressure was brought to bear and the federal government revoked the Division’s powers to issue depredation permits.

—Investigations regarding the status of the “duck hawk” are underway. Mount Tom was found to be an outstanding observation place for hawks and eagles.

—Legislation included abolishment of the closed season on skunks (in effect since 1934)⁸³, provision for a maximum of 10 hooks in ice fishing⁸⁴, abolishment of the closed season for deer in Dukes County⁸⁵, and a provision for cooperative agreements regarding fishing in interstate ponds⁸⁶. A legislative resolve provided for a study commission to investigate the administrative functions and finances of the Division⁸⁷.

1937⁸⁸: It is now time for a change in the pheasant stocking policy. Over the 23 years since 1915, >200,000 pheasants, mostly young birds, have been liberated. Hunting returns and field observations show both low natural production and low harvest results from liberating young birds. It was believed that a combination of heavy stocking of birds and liberating mass numbers of young birds would sustain pheas-



Photo © E. C. Ashworth

Figure 36. Wild Turkey with poults, Beartown State Forest, Monterey, June 1936.

ant hunting. This was insufficient. Natural breeding is the most important part of pheasant maintenance and the policy will now reflect substantial liberation of hens for breeding. If the stock is low in the covers, hens will be protected. Experiments with pheasant strains have shown that the pure Chinese strain is the best for Massachusetts and is now the only variety used at the game farms. Vermin numbers were high and re-establishment of pheasant populations must take place in the face of adversity.

—The federal Works Progress Administration has approved ≈\$72,375 of projects for the Division’s facilities, of which the state share is ≈\$17,530.

—The law was amended⁸⁹ so that the appropriation for the Division must include a sum not less than the previous year’s amount received from licenses, fees, and fines, and one-half the amount necessary for law enforcement. This was accomplished through the combined efforts of the sportsmen and every other “outdoors person”.

—The title of the enforcement officers was changed to “Conservation Officer”⁹⁰ and town “wardens” are to be phased out. There are now two enforcement regions with a supervisor in each.

—There was a renewed interest in salmon restoration and a special Salmon Restoration Committee was appointed. The Parker River was selected as a demonstration site and arrangements have been made to obtain eggs from Canada and hatch them at East Sandwich.

—There were 717,590 brook trout; 200,270 brown trout; 96,862 rainbow trout; 34,000 Chinook salmon; 37,175 smallmouth bass; 165 largemouth bass; 82,435 yellow perch; 122,497 white perch; 57,100 black crappie; 10,335 bluegills; 293,500 horned pout; 10,860 pickerel; 500,000 walleye [fry], 20,000 muskellunge [fry]; 6225 “forage fish”; and four rock bass distributed.

—It is anticipated that “...much illegal deer hunting...will be rapidly stamped out with the advent of the so-called buckshot law⁹¹ making it *prima facie* evidence of illegal deer hunting on the part of anyone possessing or hunting with [buckshot, etc., outside

the deer season]”. Mink and otter have become recognized as the “worst enemies” in restocking ponds and streams. This is a matter which must be dealt with. Beaver continued to be a problem and cause damage wherever they appear. The wild turkeys stocked in Berkshire County appeared to be doing well (Figure 36).

—There were also 10,549 pheasants, 8622 quail, 17 wood ducks, and 3237 cotton-tails distributed. There were no white hares available due to a change in Maine state law which now prohibits exportation of these animals.

—Experiments in marsh restoration are underway at Duxbury Marsh. Ram Island had the greatest number of common and roseate terns ever seen there. Many of these birds may have shifted over from Penikese. Federal officials continued to puncture gull eggs at Penikese. The ornithologist continued to study duck hawks and seabird colonies and the census of waterfowl and shorebirds.

—Legislation included a prohibition on hunting on Memorial Day and Veterans Day until 1:00 P.M.⁹², liberalization of the hunting opportunities on certain state lands⁹³, a provision for an open season on quail on Nantucket⁹⁴, a provision for the issuance of complimentary licenses⁹⁵, and an authorization for the Department of Public Works to regulate hunting on the Province Lands⁹⁶.

1938⁹⁷: During 1938, there were 17 construction projects totaling \$130,626 undertaken for the Division through the Works Progress Administration, of which the state expended \$30,504 (including in-kind matches of \$13,895).

—At the Boston Sportsmen’s Show, for the first time, every trout in every exhibit died within 24 hours. This was due to an excess of chlorine in the system. There was a fine replica of an old-time coastal gunning stand erected at the Eastern States Exposition. However, due to flooding on the Agawam River and the subsequent arrival on September 21 of a hurricane, much damage was done to the fairgrounds and the show closed mid-week with little attendance.

—The severe hurricane forced six proclamations by the Governor, the first closing the woodlands on September 29, the second closing all hunting, fishing, and trapping seasons, and the subsequent ones modifying the previous ones, or providing for later alternate seasons. The “...entire work force in the central office had to abandon any idea of routine work to answer telephones”.

—There was severe hurricane damage at Watatic Mountain, Minns, and Penikese wildlife sanctuaries. The rabbits on Penikese suffered from the hard winter and the hurricane.

—Salmon restoration continued with an investigation of conditions in the Parker River. The Director issued rules and regulations prohibiting the possession, taking, or sale of salmon taken from Massachusetts waters.

—Stream surveys were underway in the Quinebaug and Chicopee river systems.

—There were 377,160 brook trout; 256,700 brown trout; 143,280 rainbow trout; 25,500 Chinook salmon; 48,940 smallmouth bass; 612 largemouth bass; 203,575 yellow perch; 115,455 white perch; 147,250 black crappie; 4100 bluegills; 326,425 horned pout; 4800 pickerel; 500,000 walleye [fry]; 50,000 muskellunge [fry]; 247 sun-fish; and 18,825 forage fish distributed.

—There was an extraordinary fall flight of both green-winged and blue-winged teal, the like of which had not been seen for thirty or more years.

—Wild turkey nests at Beartown State Forest increased from three to six between 1937-38. An experimental stocking of five pairs of chukar partridge was made at Beartown and a setting of 11 eggs was received from a donor. Progeny from these eggs will be used to continue the experiment.

—There were also 13,825 pheasants, 19,680 quail, three ruffed grouse, 8270 cottontails, 3429 white hare, and 58 raccoons stocked.

—There were nine Canada lynx reported taken, but this may have been an error as some large “bay lynx” [as in past years] could be mistaken for the Canada lynx (Figure 37). Similarly, a number of persons brought in “extra large wild hunting house cats” in the belief that they are “wild cats”.

—Experimental plantings of widgeon grass were made in the Duxbury Marshes and on Red Brook in East Wareham.

—The state ornithologist began a 5-year study of the Canada goose and black duck, approved under the new Pittman-Robertson Act.

—Legislation included an authorization for cities and towns to appropriate monies for stocking fish and game⁹⁸ and a prohibition on setting of open-air fires except on snow-covered ground⁹⁹. A legislative resolve called for a survey and study of the fish and game laws¹⁰⁰.

1939¹⁰¹: The Department of Conservation was reorganized August 12, 1939, and now consists of the Divisions of Fisheries & Game, Forestry, Marine Fisheries, Parks & Recreation, and Wildlife Research & Management¹⁰². However, in a functional sense, the work will carry on under the former agencies under temporary directors until January 1, 1940. Regulations promulgated during the report period must now be printed in an agency’s Annual Report¹⁰³. The ornithologist was designated Director of the new Division of Wildlife Research and Management.

—Stream surveys continued on the Chicopee, Housatonic and Quinebaug river systems.

—Research work continued on developing certain coastal streams for the Atlantic salmon. A survey of the streams tributary to the Merrimack River was conducted. There were ≈13,360 2-year-old and ≈85,840 fingerlings reared at East Sandwich set aside for stocking in 1940.

—There were 752,050 brook trout; 387,550 brown trout; 135,025 rainbow trout; 5000 Chinook salmon; 55,910 smallmouth bass; 230 largemouth bass; 156,000 yellow perch; 79,300 white perch; 26,490 bluegills; 180,420 black crappie; 852,030 horned



Photo © MassWildlife

Figure 37. “Bay Lynx” (30 lbs.) killed near Taunton Reservation, November 1919.

pout; 3079 pickerel; 500,000 walleye [fry]; 50,000 muskellunge [fry]; 25 sunfish; and 1700 “forage fish” distributed.

—The state assented²¹ to the new Federal Aid in Wildlife Restoration Act and several projects were underway, the first of which pertained to waterfowl¹⁰⁴. Another anticipated project will relate to the development of wildlife areas on state forests. The Commissioner of Conservation opened all state forests to hunting without a permit, except three which have donor restrictions.

—Experiments in cottontail breeding were discontinued as have the attempts with Reeves pheasants. Raccoon breeding suffered a major setback due to an epidemic of a “form of distemper” which killed 68 of 95 animals.

—Ducks and geese appeared to be on the increase. Beaver were expanding their range in Berkshire County. Opossum were now showing up in the game harvest reports and some are being taken throughout the state. Protection will doubtless be extended soon to this animal.

—There were 23,191 pheasants, 10,059 quail, eight Reeves pheasants. 230 cottontails, and 7706 white hare liberated. There were 66 chukar partridge on hand at the Sandwich Game Farm.

—Ram Island was covered with 14 feet of water during the hurricane, but this spread the sand around and the 1939 nesting season was one of the best ever. No owl depredation occurred this year. There was substantial hurricane damage to Penikese and clean-up work continued until spring. The herring gulls took over a certain peninsula formerly used by terns.

—No legislation pertaining to fisheries and game was enacted, other than the recodification.

THE WAR YEARS AND THE AFTERMATH: 1940-1947.

The 1940s were dominated by World War II, the greatest conflict the world has ever known¹, costly in blood and treasure. However, the depressed national economy was boosted as industry geared up to produce war matériel and facilities. Scientists split the atom, leading to the beginning of the nuclear era in 1945. The “ABC” computer (1942) started the advance towards astonishing analytical power. The United Nations² was founded (1945) and the European Recovery Plan (1947) began the reconstruction of Europe. More than 1 million returning American veterans took advantage of the Servicemen’s Readjustment Act (“G.I. Bill”)³. The “baby boom” commenced (1946), accompanied by the rise of the suburbs and the greatest housing boom in U.S. history.

In Massachusetts, hungry workers found employment in the construction and expansion of Camp Edwards, Fort Devens, and other military facilities. The Fore River shipyard (1883-1986) in Quincy gained Navy contracts and boosted employment, producing >36 major combat ships, including the battleship U.S.S. *Massachusetts*. The war also fueled demand for the state’s electrical industries and research facilities focus-

ing on the applied sciences⁴. The Commonwealth also experienced the disastrous Coconut Grove fire in Boston (1942) and the fierce hurricane of 1944 and the “Massachusetts State College” transmuted into the “University of Massachusetts” in 1947.

Adolph Murie’s (1899-1974) meticulous field work on coyotes⁵ contradicted the common view of the animal as an “archpredator”⁶. This study, along with Murie’s later publication on the wolves of Mt. McKinley, caused the National Park Service to terminate predator control at the two parks.

The American Committee for International Wild Life Protection⁷, following Hornaday’s earlier plea for rare species, published *Extinct and Vanishing Mammals of the Western Hemisphere*⁸ in 1942. Although largely focused on large charismatic species, the book also included various bats, mice, and marine mammals. The conservationist and naturalist Ira Noel Gabrielson (1889-1977)⁹ built upon the ideas of his friend Aldo Leopold to encompass a broad ecological frame of mind: “...from the purely biological point of view there are no beneficial and no harmful plants or animals”¹⁰. Gabrielson also emphasized land protection, adding millions of acres to the National Wildlife Refuge system while extolling its purposes and values¹¹.

Writing nearly 350 years after Gosnold’s brief foray into Massachusetts, Aldo Leopold expounded on the values of wildlife in American culture^{12,13}. He identified three cultural values: (1) stimulus of the awareness of American history, (2) renewing an awareness of the soil-plant-animal-human food chain, and (3) recognizing human complicity in the destruction of natural resources, which can only be remedied by extending the human system of ethics to that of “man-earth”. “Wildlife once fed us and shaped our culture. Reaping it by modern mentality would yield us not only pleasure, but wisdom as well”¹².

The professor and essayist Havilah Babcock¹⁴ (1898-1964) and the sportsman Burton Lowell Spiller¹⁵ (1886-1973) both eloquently expressed the satisfaction and joy of spirit surrounding days afield with well-trained bird dogs (Figure 38), grouse bursting from the alders, quail scattering from sandhill coverts, and the crispness of a sunlit fall day. Aldo Leopold, too, used evocative language and imagery¹⁶ to describe his own process of intellectual development. To him, the land ethic and an ecological attitude was both an intellectual and an emotional process¹⁷ which ultimately chose geese and pasque-flowers over technological innovation.

In the post-war immediacy, and following up on Paul Sears’ dire predictions of soil depletion, two more writers despaired of our poor stewardship of the land, casti-



Photo © MassWildlife

Figure 38. Bird hunting at Charlton Depot, Charlton, 1920s.

ing in the post-war immediacy, and following up on Paul Sears’ dire predictions of soil depletion, two more writers despaired of our poor stewardship of the land, casti-

gating people as destroyers and exploiters. The ecologist William Vogt's (1902-1968) provocative and then-influential book *Road to Survival*¹⁸ linked environmental problems with human overpopulation¹⁹. Fairfield Henry Osborn, Jr. (1887-1969), conservationist and long-time President of the New York Zoological Society, also saw people as banes, lambasting "...the accumulated velocity with which [they are] destroying their own life sources". Osborn concluded that "Man must recognize the necessity of cooperating with nature...The time for defiance is at an end"²⁰.

In 1940, Congress enacted the Bald Eagle Protection Act²¹ "whereas the bald eagle is no longer a mere bird of biological interest but a symbol of the American ideals of freedom...[and] is now threatened with extinction". The Act initially protected the eagle only in the 48 states; thus, Alaska continued to bounty bald eagles for 19 years until attainment of statehood in 1959³. The statute was amended in 1962 to include golden eagles. The forward-looking, but largely only urging, Fish and Wildlife Coordination Act of 1934^{22,23} was amended in 1946 to require all new federal water projects to include provisions to prevent or minimize effects on fish and wildlife and to consult with the appropriate state agenc[ies].

The first apparent record of opossum in Massachusetts was ~1899 in Haverhill²⁴. By 1944, they were widespread from Dalton to Falmouth²⁵, although still somewhat uncommon.

1940: The reorganization enacted in 1939 did not become fully effective at the Department level until May 1940. However, the Divisions of Fisheries & Game²⁶ and Wildlife Research & Management^{27,28} had their directors confirmed earlier.

—The Division of Fisheries & Game sold a combined total of 177,551 hunting, fishing, and trapping licenses during calendar 1939.

—Headwaters and feeder streams in 71 areas were being used as nurseries for the hatching of eyed trout eggs.

—There were 75,779 Atlantic salmon reared at the East Sandwich hatchery and stocked in two rivers in Essex and Plymouth counties and five ponds in Berkshire, Essex, and Hampden counties.

—There were [excluding most fry and eggs] 321,450 brook trout; 259,464 brown trout; 198,880 rainbow trout; 61,830 smallmouth bass; 1232 largemouth bass; 182,710 yellow perch; 147,534 white perch; 72,470 black crappie; 3703 bluegills; 284,250 horned pout; 3120 pickerel; 500,000 walleye [fry]; 50,000 muskellunge [fry]; 50 sunfish; and 25 forage fish distributed.

—There were also 28,100 pheasant, 9807 quail, 150 chukar partridge, 200 cottontails, and 5991 white hare distributed.

—The duties of the new Division of Wildlife Research & Management are: (1) to carry out the duties and activities of the ornithologist, (2) administer projects approved under the Federal Aid in Wildlife Restoration Act, and (3) oversee and manage wildlife sanctuaries. Federal Aid projects now underway included waterfowl research, pheasant research, and development of state forest sanctuaries.

—There was no new legislation in 1940 due to implementation of the biennial legislative sessions.

1941²⁹: Stream surveys continued on the Millers and Greenfield systems and part of the Chicopee and Connecticut.

—There were 25 adult Atlantic salmon still remaining at the East Sandwich hatchery.

—There were ≈1,650,000 brook, 1,325,000 brown, and 545,000 rainbow eyed eggs planted for breeding purposes in 82 streams in 10 counties.

—There were 568,370 brook trout; 241,850 brown trout; 235,600 rainbow trout; 94,480 smallmouth bass; 180 largemouth bass; 216,125 yellow perch; 207,110 white perch; 247,120 black crappie; 112 bluegills; 294,080 horned pout; 15,460 pickerel; 500,000 walleye [fry]; 50,000 muskellunge [fry]; 125 rock bass; and 91,980 forage fish distributed.

—There were 32,720 pheasants, 12,190 quail, 65 chukar partridge, 492 cottontails, 920 white hare, and 22 raccoons liberated.

—Legislation included a repeal of the statute requiring Nantucket to appoint a special warden for Muskeget Island³⁰, a prohibition on the taking of fish from Big Homers Pond other than by fly fishing³¹, a prohibition on intoxicated persons carrying firearms in areas where hunting is allowed³², further restrictions on the possession of certain shotguns and cartridges in the nighttime³³, and a recodification of Chapter 131³⁴, and further definitions of “birds” and “mammals”³⁵.

1942³⁶: Some personnel entered military service and 12 conservation officers were transferred to the M.D.C. for two months for special guard duty at reservoirs.

—Two [fish] salvage units were discontinued due to lack of funds.

—Stream surveys were conducted on the Deerfield and Westfield rivers and an experimental creel survey on the Quaboag³⁷. Britton Charles McCabe (1901-1968) completed his dissertation³⁸ on the stream fishes of western Massachusetts, which constituted the first comprehensive fish survey in the state.

—For the first time (due to the recodification) all fishing except black bass opened on April 15. This met with the approval of most sportsmen. Remote ponds and streams saw a decline in usage due to the rationing of tires and gasoline.

—There were ≈2,185, 000 brook, brown, and rainbow trout eyed eggs planted in 117 brooks and streams in 10 counties. There were 24 fingerling and 24 adult Atlantic salmon remaining at the East Sandwich Hatchery.

—There were 577,250 brook trout; 323,730 brown trout; 457,649 rainbow trout; 149,800 smallmouth bass; 599 largemouth bass; 116,440 yellow perch; 48,960 black crappie; 10,000 rock bass; 5350 bluegills; 65,230 horned pout; 21,420 pickerel; 50,000 walleye[fry]; and 5055 forage fish distributed.

—There was a sharp drop in the deer harvest for 1941 (n=1773) as compared to 3067 in 1940. This was attributed to very poor hunting conditions.

—There were 25,946 pheasants, 7419 quail, 33 cottontails, 4732 white hare, and 41 raccoons distributed.

—The Division of Wildlife Research & Management published the first³⁹ in its series of “Research Bulletins”⁴⁰. This Division also conducted a survey of waterfowl and a

study of black duck food habits.

—There was no new legislation due to the biennial sessions of the legislature.

1943⁴¹: Due to entry into military service, reassignments to reservoir guard duty, and a job freeze, there were only 20 conservation officers assigned between February and April 1943, when the guard duty was taken over by another force.

—The winter of 1942-43 was severe with snow and freezing conditions extending late into the spring. The stream surveys were not conducted due to the project leader's entry into the Armed Forces. Feeder streams (breeder areas) were not stocked with trout eggs.

—There were 233,925 brook trout; 85,560 brown trout; 113,220 rainbow trout; 10,675 smallmouth bass; 2970 yellow perch; 4911 white perch; 6350 black crappie; 448 horned pout; and three pickerel distributed.

—There were 17 fingerling and six yearling Atlantic salmon remaining at the East Sandwich Hatchery.

—There were 789 pheasants, 149 quail, and 39 raccoons liberated.

—Legislation included changes to the open seasons and bag limits for raccoons and opossums⁴²; provisions for the sale of heads, hides, and hoofs of deer to certain persons⁴³, provisions for the issuance of free licenses to persons over 70 or under 70 when receiving old age assistance⁴⁴, and provisions for free or reduced-price licenses to persons in the military or naval service⁴⁵.

1943-44⁴⁶: The shortage of conservation officers and the enlargement of districts required temporary concentrations of officers to address particular regional problems.

—The hatcheries and game farms were operating on a skeleton basis. There was no salvage work conducted due to drastic cuts in appropriations. Feeder streams were not stocked.

—The stream survey was resumed in June 1944 and will be reported in the 1945 report. One crew will now be in the field under the supervision of Dr. Britton McCabe.

—Due to gasoline rationing, only those streams easily accessible by public transportation were stocked. Those anglers who did fish reported especially fine trout fishing.

—There were 249,040 brook trout; 137,245 brown trout; 98,555 rainbow trout; 347,655 smallmouth bass; 93,649 yellow perch; 3340 white perch; 10,400 black crappie; 105,565 horned pout; and 16,820 pickerel distributed.

—There were 17 fingerling and five yearling Atlantic salmon at the East Sandwich Hatchery.

—The upland game season was satisfactory from the sportsman's view. There were fewer hunters afield than in the past, but those who did hunt secured larger bags. The fur take was substantially down.

—There were 13,205 pheasants, 3895 quail, 100 cottontails, and 87 raccoons liberated.

—There was no legislation due to the biennial sessions of the legislature.



Photo © MassWildlife

Figure 39. Deer hunters retrieving a buck taken in central Massachusetts.

1944-45⁴⁷: The conservation officers continued to operate on a reduced force of 29. There were 26 deputies employed intermittently between October and December during the peak of the hunting season.

—No additional areas were set aside as trout breeder areas or stocked with eggs.

—Pond surveys were conducted in Worcester County in summer and fall 1944 and a creel census was conducted on five lakes. Additional water bodies in Worcester County are now being surveyed.

—The trout season opened under “...probably the most ideal conditions in the memory of most anglers”. However, snow in May and heavy rains in June resulted in flooding which seriously affected fishing conditions.

—The Sutton Hatchery was not in operation during this fiscal year. There were 493,130 brook trout; 155,365 brown trout; 102,985 rainbow trout; 108,025 small-mouth bass; 10,060 largemouth bass; 112,100 yellow perch; 2,250 white perch; 40,300 black crappie; 274,900 horned pout; and 9,050 pickerel distributed.

—Deer were abundant in all counties open to hunting (Figure 39). Due to the 1938 hurricane, deer appeared to have “migrated east” from the western counties resulting in a more even distribution throughout the state.

—The upland game season was very satisfactory but showed a concentration in the areas nearest to thickly settled localities, due to gasoline rationing

—There were 17,632 pheasants, 4,474 quail, and three raccoons stocked.

—The Robson Wildlife Sanctuary in Westfield and Montgomery was received by gift from Grace A. Robson⁴⁸.

—Legislation included a definition of the term “loaded shotgun or rifle”⁴⁹, a prohibition of the sale to or possession by certain minors of firearms and ammunition⁵⁰, a



Figure 40. Phillips Wildlife Laboratory complex, Upton State Forest, 1945.

research facility⁶¹ (Figure 40). The facility was named the John C. Phillips Wildlife Research Laboratory.

—During the past year, there was an increase of 70,000 sportsmen, necessitating a “well-planned and consistently executed long-range program of conservation...”. The Division inaugurated a long-range program with the goal of stocking 1 million legal-sized trout, 1 million pond fish of “desirable species”, a combined stocking of 50,000 pheasant and quail, and an intensified scientific research program.

—Moving pictures of the Division’s activities were being made in furtherance of its educational activities.

—Stream surveys continued and Worcester County was being completed⁵⁵. Surveys in Middlesex County were underway and a creel census was implemented on the upper Deerfield River.

—[Fish] salvage work resumed with four crews, but started later than desired due to a shortage of equipment.

—The weather was very cold on the opening day of fishing season, and, although the “usual number” of anglers was out, very few fish were taken. May was one of the rainiest months on record, causing streams to remain at near flood level.

—The Sutton Hatchery reopened in April 1946 and some improvements were made. There were 449,725 brook trout; 182,700 brown trout; 838,250 rainbow trout; 2768 smallmouth bass; 313 largemouth bass; 136,050 yellow perch; 152,114 white perch; 38,260 black crappie; 520 bluegills; 286,745 horned pout; 7927 pickerel; 300 sunfish; and 300 forage fish distributed by the hatcheries and pond crews.

—The removal of gasoline rationing resulted in a better distribution of hunters during the upland season.

season closure on wood duck⁵¹, and the provision for a 1-year open season⁵².

1945-46⁵³: The Director planned to establish an Advisory Committee, representing each of the sportsmen’s County Leagues, to meet with him at regular intervals. The conservation officers filled most vacancies, bringing the total to 33 of the 35 authorized.

—The Inland Fisheries and Game Fund was legislatively established⁵⁴ effective July 1, 1945, providing that all revenue received in license fees and miscellaneous revenue be devoted exclusively to fish and game. The starting balance in the fund was \$332,236.29, which increased to \$536,418.86 by June 30, 1946.

—In 1945, the Division of Wildlife Research & Management occupied part of the former C.C.C. Camp SP-25 in Upton for use as a re-

—There was a record deer kill in 1945, totaling 3567 (1912 bucks and 1655 does). The section adjacent to the Quabbin was “especially productive” due to the overflow from the “vast” Quabbin sanctuary.

—There were 19,273 pheasants, 2881 quail, and 493 white hare stocked.

—Legislation (annual sessions were resumed) included a prohibition on the use of artificial bait for most ice fishing⁵⁶, a removal of the restriction in the “Blue Laws” relative to hunting on Veterans’ Day⁵⁷, a prohibition on the use of machine guns for hunting⁵⁸, and the opening of parts of the Quabbin Reservoir to shore fishing⁵⁹.

1946-1947⁶⁰: Pond surveys were underway in Plymouth County. Albert H. Swartz has returned from military service and is now in charge of the survey. Wildlife research projects were pursued under the direction of the Project Leaders now situated at the Phillips Wildlife Laboratory (Figure 41).

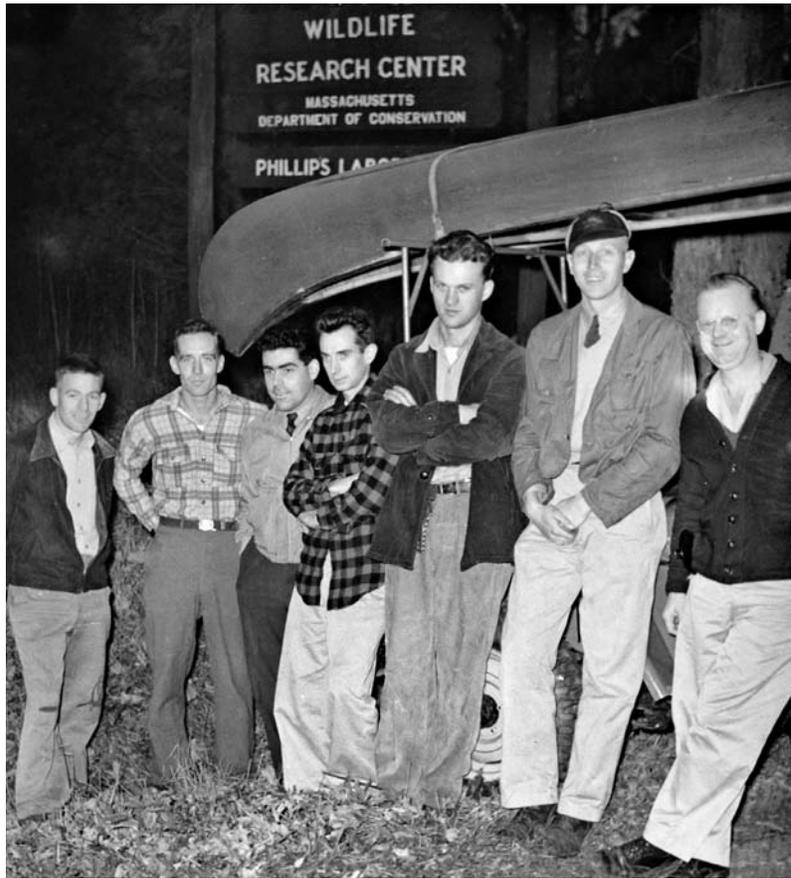


Photo © Mass Wildlife

Figure 41. Phillips Wildlife Laboratory project leaders, 1945. Left to Right: Winston S. Saville, Robert L. Jones, George F. Pushee, Mason Belden, Gordon T. Nightingale, Robert H. Johnson, John Anderson.

—Salvage work continued but the shortage of equipment and personnel required the Division to combine the salvage crews.

—The 1947 fishing season was one of the poorest in years, due to heavy rains and cold weather which ruined the trout fishing. Later, hot, dry weather resulted in low water for the remainder of the year.

—There were 592,315 brook trout; 100,555 brown trout; 222,510 rainbow trout; 60,465 smallmouth bass; 4021 largemouth bass; 240,080 yellow perch; 138,162 white perch; 57,430 black crappie; 800 bluegills; 203,610 horned pout; 8105 pickerel; 30,000 walleye; 45,000 muskellunge [fry]; and 26,660 forage fish distributed.

—Wild turkeys were released in the Quabbin as a restoration experiment. There were also 30,495 pheasants, 3674 quail, 13 wild turkeys, 986 white hare, and 22 cottontails stocked.

—State Ornithologist Joseph Hagar continued his earlier peregrine falcon studies (although with lesser effort) in the post-war period. In 1947, he first found broken eggs at an eyrie⁶² on Rattlesnake Hill in the Quabbin Reservation. This was the first evidence of the eggshell thinning that led to the total extirpation of the east coast peregrine population by 1964⁶³ and the later identification of DDT as the causative agent⁶⁴.

—Legislation included the provision for a process for the Director to revoke certain permits and licenses⁶⁵, provision for a process to provide fishing privileges for patients in veterans' hospitals⁶⁶, and a requirement for the Metropolitan District Commission to issue rules and regulations relative to fishing in the Quabbin Reservoir⁶⁷.

1947-48⁶⁸: Surveys of ponds and lakes continued in Berkshire County. The Division purchased land along the Bungay River in North Attleborough and then conveyed the same to the federal government for use as a fish hatchery.

—There were 403,755 brook trout; 141,785 brown trout; 150,065 rainbow trout; 179,930 sockeye salmon; 1022 smallmouth bass; 500 largemouth bass; 102,875 yellow perch; 5650 white perch; 32,835 black crappie; 249,615 horned pout; and 12,980 pickerel stocked.

—The upland game season was delayed 12 days due to a fire emergency but was extended the same number of days on the closing end.

—There was again a record deer harvest, totaling 3977 (2073 bucks and 1904 does).

—Wild turkeys (n=66) were again stocked in the Quabbin Reservation but were badly affected by the severe winter. There were also 27,300 pheasants and 6012 quail stocked.

—A game cover improvement project was initiated to provide food and cover to game animals, especially pheasants, during the winter and spring months. Nine pheasant release pens and nine food patches were set up in six counties. There was severe winter damage to the pens.

—Legislation included provision for a closed season for most hunting between September 20 and October 19⁶⁹; a requirement for certain information on hunting, fishing, and trapping licenses⁷⁰; a detailed revision of the laws regarding trapping and providing for trap registration⁷¹; and a reorganization of the Department of Conservation and a provision to establish the Board of Fisheries and Game⁷².

THE DIVISION OF FISHERIES & GAME—THE LATER YEARS, 1948-1969:

A SUMMARY

—The Legislature created a 5-member “Fisheries and Game Board” with administrative and regulatory powers, to be appointed by the Governor for 5-year terms, with an initial staggered entry. The Board held its first meeting on October 6, 1948 and elected a Chairman and Secretary.

—The Director of Fisheries and Game (and the Superintendent of the Bureau of Wildlife Research and Management were both appointed by the Board (i.e., not gubernatorial appointments as in past years). The first Director so appointed was Robert H. Johnson (in office 1948-55), succeeded by Charles L. McLaughlin (1955-63), Francis W. Sargent (1963-64), and James M. Shepard (1964-75). Three of these left the Division for more lucrative positions and one (McLaughlin) died in office.

—The Board’s concerns between 1948-1969 included a sustainable and sufficient source of funds, fiscal accountability, maintaining efficient and capable staff, restoration and improvement of facilities, increasing hatchery production, expansion of educational programs, attention to habitat improvement, development of policies based on sound research, deleterious environmental issues, the increasing demand for services from the general public, and the fostering of good relationships with farmers and landowners.

—The Board developed its first formal Policy document and organizational chart in 1957.

—The Division instituted a “District” system in 1950, headed by a “District Manager”, to facilitate contact and familiarity with constituents and to efficiently provide for stocking of fish and to engage in field activities on a local basis. The four Districts were settled in permanent facilities in the Central, Northeast, Southeast, and Western sections of the state by 1954.

—The Department was reorganized as the “Department of Natural Resources”, to include Fisheries & Game, Forests & Parks, Law Enforcement and Marine Fisheries.

—The Director was given regulatory powers to set seasons, dates, [most] methods of take, and like matters after holding a public hearing and with the concurrence of the Board.

—The Inland Fisheries and Game laws (G.L. c. 131) were recodified in 1967, to be effective in 1968.

—A \$1.00 license fee increase in 1966 was designated for the purchase of land but was not matched by the Legislature as was desired.

—New hatcheries were opened at Podick Springs in Sunderland (1952) and in Belchertown (1969, named for the late Director Charles L. McLaughlin). The Marshfield Game Farm closed in 1963 and was sold soon thereafter.

—The Phillips Wildlife Laboratory in Upton was found to be inadequate and in poor repair. In 1955, the Bureau of Wildlife Research and Management moved to an unused building on the grounds of the Lyman School for Boys in Westborough. This facility, renamed the “Field Headquarters”, gradually became unsuitable and attempts to acquire or construct a substitute began in 1969.

—A fish elevator was constructed at the Holyoke Dam in 1955 and began passing shad. Despite initial problems, the facility was passing 15,000 shad by 1955. The multi-state cooperative venture increased and there were 5600 salmon stocked below Holyoke in 1967. The four affected New England directors requested the Federal Power Commission to require the five power project on the Connecticut River to install and maintain functional fishways.

—Massachusetts assented to the Dingell-Johnson federal aid in fisheries program in 1951 and began a study of trout on the Westfield River.

—The detailed lake and pond surveys of the state were completed and the remainder of the 5-volume (1942-1955) series published.

—Sea-run brook trout studies were initiated on Cape Cod and determined that the fishery was small but unique. Staff recommendations were to stock brook trout, purchase the better streams and improve them through habitat management.

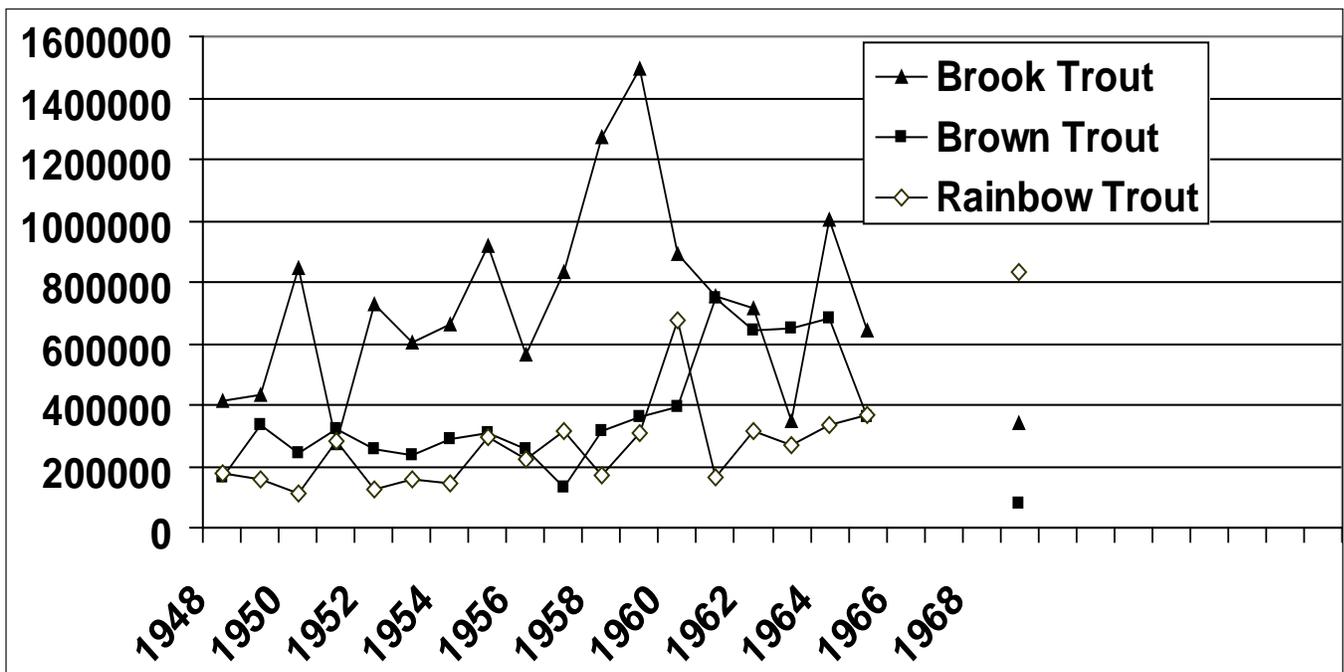


Figure 42. Numbers of Brook, Brown and Rainbow Trout (all age classes) stocked in Massachusetts waters, 1948-1969.

—The Quabbin Reservoir was opened to limited shore fishing in 1947 and to limited boat fishing in 1951. The stocking of lake trout in Quabbin was successful, producing substantial angler interest. Smelt stocking resulted in a huge population which later resulted in blockage of water intake mechanisms and required control. Walleye stocking was unsatisfactory despite repeated attempts. Stocking of landlocked salmon began in 1965.

—Kokanee salmon were stocked in Onota Lake but the experiment ultimately failed. Walleye initially did well in Lake Chauncey but did not successfully establish. Northern pike were successfully introduced to Cheshire Reservoir.

—Salvage units were renamed “pondfish management” units and tasked to undertake pond management as well as the removal or transfer of warmwater fish. Most “sunfish” and bluegills were now destroyed rather than relocated to other water bodies. Larger or more desirable fish, such as black bass or chain pickerel, were (at least initially) transferred to public waters open to fishing.

—Excluding 1966-69—when no breakdowns were given—there were ≈13,746,400 brook, ≈6,561,200 brown, and ≈5,985,400 rainbow trout stocked from the hatcheries (Figure 42).

—In addition to trout, variable (but sometimes substantial) numbers of lake trout, largemouth bass, smallmouth bass, black crappie, yellow perch, white perch, walleye, chain pickerel, horned pout, smelt, and miscellaneous forage fish were reared or salvaged and stocked (variably as adults, fingerlings, or fry).

—Warm-water rearing systems were developed at the Harold Parker pond system in North Andover and the Merrill Pond system at Sutton. Largemouth bass, chain pickerel and some smallmouth bass were reared there and later stocked in suitable waters.

—The experimental deer checking station program was expanded in 1949. By 1963, deer populations were shifting eastward and Worcester County ranked first in the

harvest. Mandatory deer checking was implemented in 1966 and an antlerless deer permit system was put into effect in 1967.

—The first season-regulated black bear season began in 1952. After a highly publicized incident involving illegally-released bears in Berkshire County in 1969, the hunting regulations were changed in 1970 to provide for a permit-only 1-week bear season.

—Beaver management began with the trapping of nuisance beaver and their relocation to more suitable areas. There was a one-time experimental trapping season in 1946 followed by a consistent regulated season commencing in 1948.

—Winter banding (principally black ducks) began in 1966 and summer banding (using an airboat) in 1967. Canada goose transplants to central and western Massachusetts began in 1967.

—Other wildlife studies included ruffed grouse population surveys, pheasant management, wood duck banding and nesting investigations, response of the two cottontail species to habitat management, furbearer investigations, hunter surveys, and mourning dove and quail call surveys. Habitat and facilities management and development also consumed much time by the Districts.

—Experimental stockings of ruffed grouse on Martha's Vineyard and sharptailed grouse on Nantucket were unsuccessful.

—There were $\approx 1,228,000$ pheasants (including club stockings), $\approx 94,500$ bobwhite quail, 991 *Coturnix* quail, and $\approx 41,500$ snowshoe (white) hare liberated.

—A methodology for sexing day-old pheasant chicks was developed at the University of Massachusetts and implemented at the game farms in order to eliminate the cost of raising excess hen pheasants.

—The Massachusetts Cooperative Wildlife Research Unit was formed at the University of Massachusetts in 1948. Graduate students later completed theses (among others) on black duck feeding habits, bobcat, river otter, ruffed grouse, snowshoe hare, wild turkey restoration in Quabbin, woodcock, cover-mapping of the state, posted land surveys, and an economic survey of sportsmen.

—The Massachusetts Cooperative Fisheries Research Unit was formed at the University in 1963 with studies first initiated on white perch and rock bass and a biological survey on the Westfield River.

—The first direct appropriation for Information & Education was made in 1949. The new publicity agent, Bryant R. Chaplin (1926-1992), began the issuance of a semi-monthly newsletter "*Massachusetts Wildlife*". This newsletter began publication in a magazine format in 1955.

—The Information & Education Section developed "Safety Zone" signs (1952) and facilitated their distribution. During the same year, the Section designed the first Division insignia (later modified).

—In cooperation with the U.S. Army and the American Optical Company, the Section initiated a landmark study showing that the visibility of fluorescent orange clothing was superior to that of red as a hunter safety measure.

—The Section presented television programs on "Dateline Boston", "Critter Corner", "R.F.D. #3", from 1957-1967.

—A sport fishing awards program was begun in 1962 with the presentation of pins to anglers taking fish of or larger than a specified size. Starting in 1963, gold pins were presented to the angler taking the largest fish in each category.

—Booklets were published on cottontails, fur facts and trapping, pheasants, trout stream and trout pond management, and wood duck.

—The Massachusetts Junior Conservation Camp opened at Swann State Forest in Monterey in 1949.

—Birch Hill in northern Worcester County was acquired as the first public shooting ground in 1949. This was followed in the 1950s by acquisitions in West Bridgewater, Becket, Sudbury, Phillipston, Falmouth, Peru, and Westborough. Acquisition of large tracts in Essex County began in 1960 and continued. Bond monies allowed the purchase of substantial acreage in Belchertown, Chester, Phillipston, along the Quaboag and Squannacook rivers. The Realty Section was formalized in 1967 and new wildlife management areas acquired in Conway, Lenox, Middleborough, Savoy.

“CONSERVATION IS THE SCIENCE OF MAN’S SUCCESSFUL LIVING
IN RELATION TO NATURE AND HER RESOURCES”¹: 1948-1959

The 1950s² saw the entry of the U.S. into the Korean War (1950-53), the hardening of the Cold War, the unraveling of the structure of DNA by James Dewey Watson and Francis Harry Crick (1953), the increasing popularity of television (29 million by 1954), the development of the poliomyelitis vaccine (1954), the first silicon transistor (1954), the launching of the first earth satellite (1957), and the admission of Alaska into the Union (1959). The U.S. population^{3,4} was 150,697,361 and that of Massachusetts 4,690,541.

Massachusetts experienced the Worcester tornado (1953), the extreme back-to-back hurricanes *Carol* and *Edna* (1954) and the opening of the Massachusetts Turnpike (1957). A devastating forest fire arose in Myles Standish State Forest in May 1957 as a result of three incendiary fires, two of which were suppressed. Despite the efforts of 2500 firefighters, the third ultimately burnt 12,500 acres, stopping only when it reached the Atlantic Ocean. The factory towns continued to decline in the post-World War II slump. A new demand arose for scientists and engineers and the consequent growth in electronics, computer science, and graduate education drove the development of hundreds of new businesses along the Rte. 128 belt⁴. Fast-food chains began to arise and drive-in theaters peaked. Returning veterans working a 40-hour week now built homes, started families, and purchased automobiles, leading to a substantial interest in the Massachusetts state parks and forests⁵. Attendance at those facilities tripled over that of the pre-war period.

The game propagator and biologist Wallace Byron Grange¹ (1906-1987) believed wildlife population cycles to “necessarily” affect game abundance, while also acknowledging the “inevitability” of habitat change. Grange also promoted the use of fire as a management tool and was suspicious of poisons as predator or pest control measures. Durward Leon Allen (1910-1997), a research biologist and professor, promoted

a resource philosophy that people arose from the land and can only survive as a component of it. Resource professionals had an obligation to the future as well as to the present "...resilient, adaptable, and forever searching outward in our environment..."⁶. The ecologist, educator and one-time trapper Paul Lester Errington (1902-1967), one of the founding fathers of The Wildlife Society, strikingly illuminated the dynamic life of marshes and their value to the human psyche: "Greater familiarity with marshes... could give man a truer and more wholesome view of himself in relation to nature"⁷.

Building on the precedent of their previous *Extinct and Vanishing Mammals* (1942), the American Committee for International Wildlife Protection produced a companion volume on *Extinct and Vanishing Birds*⁸. A different approach was taken by the activist Peter Matthiessen (b. 1927) who set forth a detailed history of the extinction and endangerment of the wildlife of North America⁹ as a consequence of human action.

The author, columnist, and big-game hunter Robert Chester Ruark, Jr.'s. (1915-1965) two autobiographical—although fictionalized—books¹⁰ about an "Old Man"¹¹ and a "Boy" yearningly evoked Ruark's coming of age in coastal North Carolina and the value of a kindly mentor to a lonely youth. The humorist and sportsman Corey Ford (1902-1969), a New Hampshire transplant, brought forth memories of a different kind with his risible tales^{12,13} of the "Lower Forty Hunting, Shooting, and Inside Straight Club", which appeared monthly in *Field and Stream* in the 1950s and 1960s.

The first post-war fisheries reference books addressed fish culture, field techniques in stream improvement, and the theoretical concepts of fishing¹⁴. None were well-suited for use as texts. William Edwin Ricker (1908-2001) published a short statistical manual¹⁵ (later expanded¹⁶ and widely used) on methods of estimating fish populations. Karl Frank Lagler (1912-1985), a fisheries professor at the University of Michigan, wrote the first commercially published book¹⁷ written for a course. Soon thereafter, George Armytage Rounsefell (1905-1976) and Watson Harry Everhart (1918-1994) produced the first general text on fishery science¹⁸.

The Massachusetts Cooperative Wildlife Research Unit was formed in 1948 at the University of Massachusetts (Amherst) under the leadership of William Gulliver Sheldon¹⁹ (1912-1987), an explorer, author, and wildlife ecologist. Sheldon led the Unit until his retirement in 1972, advising dozens of graduate students, closely cooperating with the Division of Fisheries & Game on research needs, and publishing a widely respected monograph on American woodcock.

Congress enacted the Federal Aid in Sport Fish Restoration ("Dingell-Johnson") Act²⁰ in 1950, a counterpart to the earlier Pittman-Robertson Act [PR], to provide financial assistance for state fish restoration and management plans and projects. The Act provided for a 10% excise tax on fishing rods, creels, reels, and artificial lures, baits and flies, and 3% on fish finders and electric motors, as well as other revenue sources, which was to be returned proportionately to the states for approved projects. As with PR, the Act required participating states to pass "...laws for the conservation of fish, which shall include a prohibition against the diversion of license fees paid by fishermen for any purpose other than the administration of said State fish and game department". Massachusetts assented to the Act in 1951²¹.

By 1952²², the four administrative national flyway councils and the National Flyway Council were operating as advisory entities to the U.S. Fish and Wildlife Service for setting migratory bird regulations.



Figure 43. Coyote, Quabbin Reservation.

In Massachusetts, white-tailed deer had recovered from the low point in the 1890s, causing the season to be closed between 1898-1909. Some insular or near-insular areas of the state, including the Elizabeth Islands²³, Nantucket²⁴, and the Prescott Peninsula²⁵ in the Quabbin Reservation, were adjudged to be “overpopulated” with deer by the 1940s-1950s.

Hybrid swarms of coyote-like canids began appearing in New Hampshire²⁶ and New York²⁷ in the 1920s-1930s. These were later replaced by larger canids commonly termed “eastern coyotes” (Figure 43). Similar coyotes^{28,29} were first confirmed in Massachusetts in 1957-58³⁰ when specimens were collected in New Salem and Otis.

The animals continued to increase in numbers and distribution and by the 2000s they were found statewide except on Martha’s Vineyard and Nantucket.

1948-49³¹: This was an outstanding year in many respects, including the inception of the Division as a “separate legal entity” under the administration of a 5-man administrative board (Table 3) elected for staggered terms, the incorporation of the former Division of Wildlife Research & Management into the Division as a Bureau, and the separation of the Conservation Officers (and the Coastal Wardens) into a separate Division of Law Enforcement. The Division had 45 permanent employees and 49 temporary employees.

—The Fisheries and Game Board was appointed with “due regard for geographical representation” with no more than one member per county. Additionally, one member must have been actively engaged in farming for three years prior to appointment and one actively interested in the propagation and protection of wild birds and mammals. On October 6, 1948, the Governor appointed Ludlow Griscom (1890-1959) of Cambridge, Matthew T. Coyne of Millbury, James W. Cesan of Agawam, Oscar J. Anderson of Wellesley Hills, and Frederick D. Retallick of Pittsfield to the Board. At their first meeting³², the Board elected Mr. Griscom as Chair and Mr. Coyne as Secretary.

—The Board proposed the following short-term programs: a business approach guaranteeing a dollar in value received for each dollar expended, coordination of all personnel into an efficient smooth-running organization utilizing to the fullest extent all the capabilities of the staff, restoration of hatcheries and game farms to maximum efficiency, investigation of methods of increasing hatchery production, improvement of methods of game stocking and release to minimize stocking losses, and expansion of educational programs. In the long term, the Division must be attentive to programs of field and stream habitat management, develop sound policies based on research, and study serious on-going problems including habitat loss to development, predator control, deforestation, pollution, and deterioration of farmer and landowner relations.

—The sale of hunting and fishing licenses for 1948 was the greatest in the history of the Division, totaling \$611,901 in net receipts. The totals included 121,959 resident citizen fishing, 68,238 resident citizen hunting, and 62,074 resident citizen sporting.

There were 11,846 free licenses of three classes.

—Stocking trips went well and for the first time all fish sent to open waters were weighed. Pumps were installed on two stocking trucks and were so satisfactory and useful that five more will be in operation for next season.

—An office was established at the Conservation Service Building in Stow for a biological and parasitological laboratory.

—Leases were renewed for public fishing grounds on the Farmington, Millers, Squannacook, and Westfield rivers resulting in sections of eight rivers under lease.

—The lake and pond survey continued under Dr. McCabe and Mr. Swartz and the surveys in Plymouth, Berkshire, and Barnstable counties were completed³³.

—The fishing season was ideal over much of the state but the deer kill was below the previous years, perhaps due to the mild winter and lack of tracking snow.

—There were 413,630 brook trout, 166,210 brown trout, 177,380 rainbow trout and 244,692 “pondfish” (smallmouth bass, yellow perch, white perch, black crappie, horned pout, and pickerel) stocked.

—There were also 41,880 pheasant and 5430 quail liberated. The Division continued to cooperate in the “matching program” whereby it matches bird-for-bird those purchased and liberated by sportsmen’s clubs. All liberations were completed so that both pheasants and quail were of proper size and age before stocking. The purchase of proper food was a problem at game farms and it became necessary to develop agency-specific game bird formulas.

—The Bureau of Wildlife Research and Management under Superintendent Robert L. Jones was shifting from research to habitat management and the new Cooperative Wildlife Research Unit at the University of Massachusetts was taking over much research.

—The habitat projects included planting of wildlife shrubs, control of water chestnut on the Sudbury River, and erection of wood duck nesting boxes. Water chestnut was being sprayed with a mixture of 2-4-D and diesel oil. Since 1943, the agency has used federal aid funds to experiment with nesting boxes for wood ducks and during the winter of 1947-48 a program for large-scale erection of boxes on poles statewide was initiated. To date, state personnel have erected 514 boxes. A total of 740 war-surplus ammunition boxes were sent out to cooperators to turn into wood duck boxes.

—The waterfowl survey was investigating waterfowl food habits and an analysis of waterfowl hunting pressure and harvest statistics. The on-going pheasant cover survey was completed with visitations to Martha’s Vineyard and Nantucket.

—A cottontail rabbit trap-and-transfer program was initiated, initially limited to the immediate vicinities of Boston and Ipswich. Beaver management was begun with the trapping of nuisance beaver and their transplant to more remote forested areas. There were nine beaver handled during 1947-48.

—Legislation included changes to the deer hunting laws regarding shooting of deer causing damage³⁴, an authorization for the issuance of fishing licenses to certain resident aliens³⁵, provisions for the identification requirements to obtain hunting <etc.> licenses³⁶, a provision that deer and moose damage will not be paid on posted land³⁷,

and a revision of the suite of laws relating to trapping and providing for beaver trapping³⁸. A legislative resolve called for a study of the organization and administration of the Department of Conservation³⁹.

1949-50⁴⁰: The Board continued to evolve under the staggered-entry process established upon its inception with Matthew T. Coyne elected as the new Chairman.

—The Podick Springs tract in Sunderland was acquired as a future adjunct to the Sunderland Hatchery.

—Production at the fish hatcheries was nearing maximum capacity. However, an increase will come from 50% of the production of the new federal North Attleborough Hatchery and from the future development of Podick Springs.

—The summer drought of 1949 was the warmest and driest in the history of the Division. This affected production at the hatcheries and pumps had to be put in operation for the first time.

—Richard Hamilton Stroud (1918-2006) was appointed as the first [Chief] Aquatic Biologist. The aquatic biologist will work to improve pond fishing by applying the principles of sound pond management. The salvage units will now be called “pondfish management” units as their duties will include management as well as the salvage (removal) of fish from various ponds.

—Sunfish and bluegills will now either be transferred to “kiddie” pools or destroyed. The total poundage destroyed was: suckers, 1903 lbs.; bluegills and sunfish, 1528 lbs.; carp, 320 lbs.; and eels, 90 lbs.

—A creel census of ice fishermen was conducted, with an emphasis on pickerel. A population study of white perch was done, with the results showing a need to remove the minimum legal length and increase the bag limit. Panfish population control was initiated to remove overabundant species.

—There were 10 leased public fishing grounds along eight rivers, totaling 72.2 miles of stream.

—The biological survey of lakes and ponds continued and the results for northeastern⁴¹ and northcentral⁴² Massachusetts were completed.

—There were 433,290 brook trout, 334,080 brown trout, and 156,850 rainbow trout stocked. There were also 44,360 lbs. of miscellaneous pond fish (smallmouth bass, yellow perch, white perch, black crappie, horned pout, and pickerel) salvaged or propagated and liberated.

—Game farm production exceeded last year’s all-time high, although the number of birds liberated was slightly less. The worst outbreak ever of so-called “Quail Disease” was experienced at one of the game farms, necessitating quarantine of the affected or exposed birds. However, the game farms can no longer continue largely on a put-and-take basis. Production costs now result in diminishing returns in the take of birds liberated.

—There were 30,125 pheasants, 7058 quail, and 1999 white hare liberated.

—Birch Hill in northern Worcester County was acquired as the first public shooting ground and wildlife development area. Considerable time was spent finalizing the lease of this 4500-acre tract from the Army Corps of Engineers⁴³.

—There were four large-scale projects underway with the Bureau of Wildlife Research & Management, including the planting of lespedeza for quail, the live-trapping and transplanting of cottontail rabbits, inception of the new Pond Management crew, and the establishment of a demonstration cottontail rabbit habitat management tract at the Upton State Forest.

—General wildlife studies underway included a fall grouse population survey, management of a wildlife shrub nursery, cooperation with sportsmen in controlling snapping turtles (which depredate waterfowl), continued wood duck nesting work (there are now 1358 nesting boxes), water chestnut control, pothole blasting in marshes, pheasant habitat management, beaver harvest monitoring and trap-and-transplant, and the tallying of game harvest data.

—Dukes County was opened to deer hunting for the first time in 1949. The checking station program was expanded in 1949 and 18 stations processed 1200 deer (27% of the total kill). A preliminary study of trapping and furbearers was initiated.

—For the first time, a direct appropriation was made for Information & Education. One of the first programs was the inception of the semi-monthly news bulletin, *Massachusetts Wildlife*, which now has 714 subscribers. There were 12,750 copies printed of 17 issues.

—The Massachusetts Junior Conservation Camp was established at Swann State Forest in Monterey with 81 boys enrolled in the first session.

—The state ornithologist worked primarily on waterfowl, conducting population studies, developing a program of emergency winter feeding, and processing and analyzing previously-collected data. There was heavy winter mortality of black ducks at Ipswich in 1947-48⁴⁴.

—Legislation included the further regulation of trapping^{45,46}, a provision for the issuance of free licenses to blind persons⁴⁷, revisions to the closed season on all birds and mammals⁴⁸, a provision that no license is needed for training hunting dogs if no firearm is carried⁴⁹, and the enactment of various provisions relative to the taking and hunting of certain mammals⁵⁰. A legislative resolve directed the Division of Waterways to conduct a survey of great ponds and the rights of access thereto⁵¹.

1950-51⁵²: There were no changes in administrative personnel and it will be possible to continue those programs which have proved sound and productive and projects now in progress may be completed as planned.

—The district manager plan, inaugurated during the past year, was already proving its worth. Temporary facilities were being used for office space while permanent offices are being acquired or constructed.

—Satisfactory progress was being made at the Podick Springs Trout Rearing Station and at the new federal hatchery in North Attleborough.

—Massachusetts agreed to participate in the new federal Dingell-Johnson program^{21,53}, which provides funds for fisheries studies similar to the existing Pittman-Robertson program for game programs.

—Pond management crews did much to restore many waters of the state to a proper biological balance. The pond management units were also engaged in the removal or trash fish from many ponds and salvaged game fish from various public water supplies

(closed to fishing) and distributed the same to open waters. Nearly 1¼ tons of suckers and bluegills were removed from Billington Sea in Plymouth alone.

—Stream leases for public fishing grounds increased to 80 miles of stream bank with the addition of an area along the Shawsheen River. Areas set aside for fly fishing were being studied because the sportsmen's clubs favor such areas.

—The biological survey of ponds and lakes continued in Franklin, Hampshire, and northern Worcester counties.

—Water chestnut control continued on the Sudbury and Concord rivers and two scattered ponds. The total area infested was reduced from 50 to five acres.

—There were 844,615 brook trout, 242,960 brown trout, 108,865 rainbow trout, and 118,100 miscellaneous pond fish (smallmouth bass, largemouth bass, yellow perch, white perch, black crappie, horned pout, and pickerel) propagated or salvaged and stocked.

—The sportsmen's club rearing program greatly increased total stocking. There were 55,840 pheasants, 7376 quail, and 1898 white hare liberated from all sources.

—Game management included the continuance of trap-and-transfer of cottontails from closed areas to areas open to hunting or to beagle training. The annual ruffed grouse population survey also continued.

—Field crews worked on the experimental cottontail habitat project at Upton and maintained the wildlife shrub nursery at the Worcester State Hospital.

—Native furbearers were being studied as to their status and importance to the state's economy. During 1950-51, fur produced an income of ≈\$264,040 to trappers, of which ≈201,810 (76%) was represented by muskrats.

—The Cooperative Wildlife Research Unit completed a study on bobcat life history, food habits, populations and distribution⁵⁴.

—The state ornithologist continued to develop programs for feeding winter waterfowl and to prepare new studies of waterfowl distribution and the age and sex composition of harvested ducks.

—The Information & Education Section continued with press releases, the *Massachusetts Wildlife* bulletin, and public speaking engagements. Photography is playing an increasingly important role. The Junior Conservation Camp hosted 170 youths.

—Legislation included abolishment of the closed season on wood duck⁵⁵, changes to the season dates for trapping⁵⁶, imposition of penalties for the careless and negligent use of a firearm while hunting and requiring deer hunters to wear red clothing⁵⁷, increases in license fees⁵⁸, a requirement for fur buyers to keep records⁵⁹, and an authorization for the Director, with the consent and advice of the Board, to acquire certain lands "for fish and wildlife management programs or propagation"⁶⁰. A legislative resolve⁶¹ continued the survey of great ponds by the Department of Public Works.

1951-52⁶²: The Division's finances are now sound due to the increase in license fees and depletion of the reserve funds has been avoided. The reserve fund now stands at \$523,432. Ample funds are available for normal operation and the continued progress of the Division.

—Human population growth has reduced the amount of area once open to fishing and hunting. Available areas must be made more productive and cordial relations with landowners must be fostered.

—The new trout rearing station at Podick Springs has been completed and is anticipated to increase the number of stockable trout by $\geq 100,000$.

—The opening of Quabbin Reservoir to boat fishing is a major development with great potentialities. The Division will cooperate with the M.D.C. to introduce large species of game fish.

—The public fishing grounds continued to be popular, with slight additions on the Assabet and Shawsheen rivers during the year.

—The fisheries project completed the survey of lakes and ponds in central, eastern, and western Massachusetts⁶³ and presented recommendations and a discussion of findings.

—A modern fish management policy was formulated to integrate fisheries management and research. The “generally wasteful and harmful” practice of stocking small pan fishes has been curtailed. The program also featured population control “by one method or another”. During the year, $\approx 38,150$ lbs. of black crappie, carp, eels, horned pout, shiners, white perch, yellow perch, snapping turtles, and miscellaneous species were removed from 25 ponds and lake by poisoning or fyke nets. Only the largest fish were salvaged and transferred to fishable waters, including 1544 smallmouth bass, 144 largemouth bass, and 2869 pickerel. A small number of other panfish were stocked in youth fishing ponds.

—There were 272,575 brook trout, 322,770 brown trout, 283,845 rainbow trout, 11,400 smallmouth bass, and 7500 largemouth bass stocked.

—The largest overall pheasant production in the Division’s history was realized. There were 67,463 pheasants (including 18,130 from the sportsmen’s club rearing program), 8773 quail, and 1125 white hare liberated.

—The four wildlife management districts perform field activities that have been developed by the research staff at the Phillips Wildlife Laboratory, including wood duck box work, operation of deer checking stations, furbearer censuses, habitat improvement, water chestnut control, pond management and reclamation (i.e., removal of “undesirable” fish by netting or chemicals and subsequent restocking with game fish), and educational activities.

—The game research staff continued the grouse wing and tail study, the wildlife shrub nursery, the demonstration cottontail habitat management project, wood duck nesting and blood parasite study, and furbearer investigations and beaver management. Substantial work was being done on facility construction, habitat management, and game surveys at the Birch Hill area.

—An intelligently informed public is imperative and the work of the Information & Education personnel is essential. The Information & Education Section has grown to two information specialists and a photographer.

—Another concept of this [I&E] work is now coming on the scene in Massachusetts: “The new idea (new for Massachusetts) is called conservation education”. The Division, in cooperation with “Wildlife Conservation Inc.”, operates a conservation camp.

Several schools (including Newton) are considering conservation programs, and the district managers are being called upon to work with youth groups.

—The ornithologist worked primarily on waterfowl studies, including an intensive banding program in the Newburyport-Plum Island area.

—Legislation included an authorization for the Director to set rules and regulations for archery hunting⁶⁴, an authorization for the Division to purchase the Pantry Brook area in Sudbury⁶⁵, changes to the license fees for trapping licenses⁶⁶, and a provision for pollution control measures and enforcement on marine and inland waters⁶⁷.

1952-53⁶⁸: For the first time in the history of the agency, Division income exceeded \$1 million (\$1,015,990). The reserve stands at \$571,999. The Board has adopted a policy that the reserve will not be allowed to get less than \$250,000. Surplus in excess of \$250,000 may be directed to capital outlay.

—Superintendent Jones resigned in September 1952 and was succeeded by Allan S. Kennedy. Miss Lizzie Rimbach retired in 1953 after nearly 50 years of service (since 1904).

—The Department was reorganized⁶⁹ and is now the “Department of Natural Resources”, including the Divisions of Fisheries & Game, Forests and Parks, Law Enforcement, and Marine Fisheries.

—Regulatory powers were delegated to the Director, who, with the concurrence of the Board, may set rules and regulations for seasons and bag limits for fish and game^{70,71,72,73}, following a public hearing.

—Seven miles of leased stream bank were not renewed by the landowners. Over 10,000 people took advantage of the limited boating facilities at Quabbin Reservoir in 1952.

—The fisheries staff began its first project under the Dingell-Johnson Act with a study of trout in the Westfield River drainage.

—The Sunderland and Montague hatcheries are now rearing lake trout and walleye. The entire production is slated for stocking in the Quabbin Reservoir. In addition, Vermont provided 10,000 lake trout fingerlings, which will also be stocked in the Quabbin.

—There were 728,690 brook trout, 254,530 brown trout, 122,550 rainbow trout, 23,800 smallmouth bass, and 27,500 largemouth bass stocked.

—Trout pond management continued with the thinning of overabundant and “weed” fishes. Salvage and transfer was minimized, with only large fish or those suitable for youth ponds, being saved and transferred to other waters. There were 46,100 lbs. of black crappie, bluegills and pumpkinseeds, carp, chubsuckers, eels, golden shiners, goldfish, horned pout, rock bass, white perch, white suckers, yellow perch and snapping turtles removed and destroyed from 21 water bodies. Some larger smallmouth and largemouth bass and chain pickerel were salvaged and liberated elsewhere.

—The wildlife program continued the grouse wing and tail study, maintenance of the Harold Parker State Forest field trial area, and the shrub nursery. Federal Aid projects included the cottontail habitat demonstration area, wood duck nesting research, deer checking stations, water chestnut control, quail food plantings, testing of cock-only pheasant stocking at Westover Air Force Base, and furbearer investigations and a muskrat census.

—The Cooperative Wildlife Research Unit at the University of Massachusetts has studies underway on woodcock, bobwhite quail, ruffed grouse, snowshoe hare, and an economic survey of Massachusetts sportsmen.

—There were 47,480 pheasants stocked (plus about 18,785 from the sportsmen's club rearing program), 8318 quail, and 1875 white hare.

—The Information & Education specialists continued with their publication of bulletins and flyers, developed and staffed exhibits at seven shows, participated in the Junior Conservation Camp, and handled two special events, including the Podick Springs Hatchery dedication.

—The I&E Section also developed "Safety Zone" signs which were tested successfully in Littleton. More signs will be distributed to district managers for use elsewhere. The Section also developed an insignia for the agency which is reduced on the cover of the [1952-53] Annual Report [it featured a pheasant, which was later replaced by a ruffed grouse]. However, since state administrative policy prohibits non-approved insignias on state vehicles, its current use will be limited.

—The state ornithologist continued with the waterfowl survey work, which resulted in data which are better in quality and greater in quantity than any previously available.

—Legislation included an authorization for the use of dogs to hunt waterfowl on coastal waters during the deer season⁷⁴, a requirement for the display of hunting <etc.> licenses open to view⁷⁵, a requirement for a deer tag on hunting licenses and application of same to harvested deer⁷⁶, protection for salmon in the Connecticut River and its tributaries⁷⁷, and an authorization for the state to enter into a compact with Connecticut for the protection of anadromous fish on the Connecticut River⁷⁸.

1953-54⁷⁹: The Division's financial status is now very satisfactory. Although annual outlay was at an all-time high, income nonetheless exceeded expenditures. The Division's Boston office moved from Ashburton Place to Tremont Street in October 1954.

—The sale of licenses again broke all records. This may be due to the new requirement that sportsmen wear their licenses "open to view". Administrative staff designed a new license form which corrected some of the difficulties encountered when the 1954 license was worn.

—A problem was encountered in distributing pins and license holders to town clerks, based on previous year's license sales. Rather than hire extra help, the materials were packaged by the public fishing grounds personnel and distributed by hatchery and game farm staff and the District Managers.

—Changes in salary grades beginning July 1, 1954 corrected some of the inequities which existed in the pay of Division personnel.

—The four districts are now headquartered at Pittsfield (West), Upton (Central), Acton (Northeast), and Monument Beach (Southeast).

—It is necessary to find new quarters to house the Phillips Wildlife Research Laboratory, now at a old C.C.C. camp in Upton. The present facilities are dilapidated, unsuitable for occupancy, and not worth the monies to repair them.

—Lands at West Meadows in West Bridgewater were being acquired by the Division. Properties in Becket are also under consideration.

—The leased public fishing grounds continued to be popular. However, difficulties were encountered due to a lack of parking, resulting in anglers blocking entryways or parking in unsafe situations.

—The fisheries research staff worked on stream surveys on the Ipswich, Merrimack, and Millers rivers, investigated the salter trout population on the Quashnet River and Scorton Creek on Cape Cod, and began a full-time project on the Quabbin Reservoir to determine fishing pressure and the total annual creel.

—The production of legal-size fish was again exceeded at the fish hatcheries. The demand for larger fish for stocking great ponds taxed the rearing facilities but was met due to a supply of high-quality fish food and the dedication of hatchery personnel.

—Once again, lake trout eggs and fingerlings were received from New York and Vermont for rearing and liberation at the Quabbin. Walleye eggs were also obtained from New York and will be reared in the bass ponds at Palmer for subsequent liberation at Quabbin.

—There were 602,790 brook trout, 235,010 brown trout, and 155,030 rainbow trout stocked. There were also 2800 smallmouth bass, 17,000 largemouth bass and 152,515 walleye reared at Palmer and stocked.

—Ten ponds totaling 248 acres were reclaimed in seven counties. There were 50,025 lbs. of black crappie, bluegills and pumpkinseeds, carp, chubsuckers, eels, golden shiners, horned pout, white perch, white suckers, yellow perch, and snapping turtles removed. There were 7205 lbs. of game fish, pan fish, and forage fish moved to public waters.

—Game projects under federal aid included deer harvest investigations; quail habitat management; furbearer investigations (principally beaver, mink, muskrat, and otter); game surveys at Birch Hill; cock-only pheasant stocking; and cottontail habitat management. The first season-regulated black bear hunting season was opened from October 20 to December 31.

—Game production at the game farms was helped by an early laying season. There was a slight increase in the number of pheasants provided to the club rearing program. There were 62,820 pheasants liberated, plus another 10,135 from the club program. There were also 8600 quail and 2500 white hare liberated.

—The Cooperative Wildlife Research Unit was conducting intensive research on woodcock, ruffed grouse, and white hare. An economic study of hunting and fishing in Massachusetts was completed⁸⁰. The state is being cover-mapped from aerial photographs and the cover types will be overlaid on topographic maps. This will be highly important for long-range game management planning.

—There was substantial activity in the Information & Education Section, much of which derived from the new powers of the Director to set rules and regulations. The staff continued to work with schools to promote conservation education. I&E staff also arranged three special events: (1) the burial of a time capsule with Division material in Hyannis, to be opened in 2053; (2) the presentation of an award from the American Association for Conservation Education to Professor R.E. Trippensee, to be presented by the Governor; and (3) a skunk beauty contest at the Boston Sportsmen's Show.



Photo © MassWildlife

Figure 44. Boulder Cottage, Westborough, first Field Headquarters, about 1959.

The wildlife photographer resigned, thus photo activity is currently reduced to existing materials.

—The ornithologist was finalizing his analyses of the 3-year banding study and the sex and age composition of harvested black ducks. He also prepared a pamphlet⁸¹ on a proposal for more effective waterfowl management in the “Northeastern” Flyway.

—Legislation included a clarification of the circumstances under which a hunting <etc.> license may be revoked⁸², a definition of “coastal waters”⁸³, a provision that trout in coastal waters may be taken only by hook-and-line⁸⁴, and a requirement that minor hunters lacking a previous license must obtain a certificate of competency in the handling of firearms⁸⁵.

1954-55⁸⁶: Finances were such that the Board is drawing up a budget for 1956-57 which will provide for extended future programs.

—The future of good fishing was “particularly promising” due to the effects of sound pond and stream management.

—The findings of a legislative study committee have been reported in Senate Bill 640. This appeared to provide an intelligent and constructive approach to administrative and organizational problems.

—Regulatory powers to fix seasons and bag limits “entrusted to the Director and the Board” increased the harvest and allowed a more intelligent management of wildlife.

—Sportsmen were concerned about the difficulty of gaining access to some of the great ponds. Land access continued to be a problem in finding places to hunt and fish. The Board will continue to urge appropriations for land purchases to take advantage of desirable locations at reasonable cost. . The acquisition of the Pantry Brook area in Sudbury was completed and a tract of 840 acres in Phillipston and Hubbardston was purchased. The Youth Services Board transferred 174 acres of farm and forest in Westborough to the Division.

—The Youth Service Board also gave the Division an old brickwork structure (Figure 44) (the former “Boulder” building) on the grounds of the Lyman School for Boys in Westborough to replace the antiquated Phillips Laboratory in Upton.

—The Central District (“District Two”) moved into the Field Headquarters, and the Southeast District (“District Four”) moved into a new headquarters in Bournedale.

—The Squannacook River received very heavy fishing pressure and emphasis will be placed on obtaining more leased stream bank.

—The fisheries research staff completed stream surveys on the Ipswich, Merrimack, Millers, and Westfield rivers, and begun that on the Taunton River. Stream improvement work continued with experiments on stream bank plantings and current-modifying structures.

—The salter trout study showed an upstream migration of trout from tidal waters during the fall. Stocked trout migrate into salt water and are not confined to brackish areas. During 1954, 60% of harvested brook trout in the sample streams were current hatchery stock and only 10% were native fish.

—In the Quabbin Reservoir, the 1954 season showed 45,450 anglers taking 156,750 fish weighing 53,070 lbs. The walleye stocking seemed to be successful. Ten ponds were reclaimed for trout management and 13 ponds reclaimed for warm-water species. The fish removed were not tallied.

—Lake trout eggs were again obtained from New York and Vermont, and the fingerlings stocked in Quabbin. Walleye eggs were also obtained from New York.

—There are now two locations for warm-water fish rearing: the Merrill Ponds system at Sutton, and the Harold Parker Pond system in North Andover. The Merrill ponds are being used for pickerel and Harold Parker for largemouth bass. Alewives are used as a forage fish.

—There were 665,250 brook trout; 285,700 brown trout; 142,300 rainbow trout; 61,220 lake trout; 3200 smallmouth bass; 8200 largemouth bass; 4.865 million wall-eye fry; and 500 walleye adults stocked.

—A program of sexing day-old chicks was instituted at the game farms to decrease the number of hens reared and provide space for rearing more legal cocks. A new type of shipping rack was developed for stocking trucks. Quail production was reduced by one-third due to suitable populations in the quail habitat. Quail were liberated only in Barnstable, Bristol, Dukes, Nantucket, and Plymouth counties, with a few released experimentally in Norfolk County.

—There were also 76,830 pheasants (including those from the club program), 5899 quail, and 2500 white hare stocked.



Photo © MassWildlife

Figure 45. Massachusetts Fish & Game Board, 1956. Left to Right: Superintendent Allan S. Kennedy, Board Members Powell Cabot, Frederick A. McLaughlin, Matthew T. Coyne (Chairman), James W. Cesan, Director Charles L. McLaughlin.

—The game research projects included white-tailed deer investigations, farm game management projects (54 farms, 6 clubs), wood duck nesting checks, Birch Hill surveys and habitat development, cottontail management, cock-only pheasant stocking trials, and bobwhite quail investigations. The furbearer project was nearly completed.

—The Cooperative Wildlife Research Unit continued with projects on woodcock, ruffed grouse, and statewide cover-mapping. The white hare project was completed and showed that the stocking of imported white hare in locations well occupied by native hare is uneconomical⁸⁷.

—There were 3500 names on the *Massachusetts Wildlife* mailing list, and another 3900 were held back for lack of funds. Two events, “Wildlife Week” and “Hunt Safely Week”, were held and accompanied by proclamations from the Governor. The public fishing area staff again handled the license allotment and distribution with the aid of propagation staff and the districts.

—The emphasis on shows was largely shifted to the District Managers, who are to participate in the smaller shows in their Districts. Twelve booklets and pamphlets were produced and distributed. Two films were completed and two others shot but not produced. The new Division insignia [with grouse] was designed and adopted and an initial supply for vehicles was purchased.

—The ornithologist was analyzing the 1951-54 data set of black duck bandings in Essex County. Experimental trapping and banding of greater scaup at Moon Island was attempted with little success.

—Legislation included a provision that applicants for hunting <etc.> licenses need not personally appear⁸⁸, an authorization for the issuance of fishing license to aliens⁸⁹,

an authorization for the sale of live bait on Sunday⁹⁰, an authorization for the Director to acquire lands in Barre and Phillipston⁹¹, and a provision that persons will not be subjected to a fine for failure to display a license until the third offense⁹². A legislative resolve⁹³ provided for a study relative to hunting and fishing in the state.

1955-56⁹⁴: Charles LeGro McLaughlin (1918-1963), formerly Chief Game Biologist, replaced Robert Holm Johnson (1914-1987) as Director. Mr. Johnson took a position as Assistant Director of the U.S. Fish and Wildlife Service.

—Three of the original five appointees still served on the Fisheries & Game Board (Figure 45), J.W. Cesan, M.T. Coyne (Chair), and F.D. Retallick.

—The transfer of personnel from Upton to the new Field Headquarters in Westborough was completed in late 1955.

—Land along the Quashnet River in Falmouth and Mashpee was purchased, marking the first time property was bought for a public fishing ground. Property was purchased along Trout Brook in Peru, and negotiations are underway for additional acreage. An excellent parcel of land on the Dalton-Pittsfield line was purchased as the future site of the Western District headquarters.

—A fish elevator was constructed and operated at the Holyoke Dam, successfully passing 5000 shad. The lift required intensive hand labor and quickly became obsolete⁹⁵. However, the Holyoke Water and Power Company received the first Conservation Service Award, presented by the Department of the Interior, for successfully installing and operating the first such lift on the Atlantic coast.

—Several large water bodies, previously closed, have been opened to fishing with the cooperation of local water commissions.

—Fisheries stream survey research was nearing completion with work on the North and Taunton drainages.

—The salter trout study now consists of an intensive survey of five occupied trout streams by mark and recapture of stocked fish, creel surveys and electrofishing.

—The Quabbin Reservoir surveys showed 32,300 fishing trips by 27,818 anglers, catching 90,790 fish. Boat fishermen accounted for 60.2%, shore fishermen 26.0%, and night fishermen 13.% of the total participants.

—Bass and pickerel were again raised at the Merrill Pond system in Sutton and at the Harold Parker ponds. The severe August 1955 hurricane “virtually wiped out” the Sutton system, but 10,060 pickerel were salvaged and distributed. Repairs were begun in early 1956. The hurricane also caused severe damage at the Palmer hatchery, where 14 inches of rain were recorded.

—For the first time, the total statewide trout distribution was carried out by Division personnel. Previously, it was a cooperative venture between Conservation Officers and the staff of the Division’s propagation section.

—There were 915,610 brook trout; 310,400 brown trout; 295,550 rainbow trout; 8735 lake trout; 4620 largemouth bass; 13,390 smallmouth bass; and 4.88 million walleye [fry] stocked

—Eight ponds were reclaimed for trout management from which 17,700 lbs. of warm-water fish were removed. There were eight warm-water ponds reclaimed by fyke

net, removing 10,090 lbs. of “weed” and stunted pan fish, and 11 reclaimed by rotenone.

—The Game Research Section undertook 12 federal aid projects during the year, including a white-tailed deer harvest and reproduction study, farm game restoration, wood duck nesting checks, Birch Hill studies, cottontail habitat management, and a cock-only pheasant harvest study. The furbearer project has been completed⁹⁶ and data analysis from the bobwhite quail project is nearing completion.

—There were also 53,430 pheasants (plus 20,030 furnished to the sportsmen’s club program), 5925 quail, and 2500 white hare stocked.

—The Cooperative Wildlife Research Unit continued with long-term studies on woodcock and ruffed grouse. The cover-mapping of the state will be completed during the next fiscal year.

—*Massachusetts Wildlife* was published in magazine format⁹⁷. There were four issues produced during the year. “The value of this magazine as a medium of wildlife information and education cannot be overestimated”.

—The Information & Education Section also issued several news releases and three feature articles, prepared proclamations for the Governor for “Wildlife Week” and for the opening of the upland hunting season, and increased its audio-visual activity, aided by the new darkroom at Westborough. A once-monthly commitment to provide material for a regularly-scheduled animal program on local television was fulfilled, with 12 programs shown.

—Legislation included provisions regulating hunting from watercraft⁹⁸, an authorization for the Director to take land in West Bridgewater by eminent domain⁹⁹, and a provision for commercial permits to net carp and sucker¹⁰⁰. Two legislative resolves^{101,102} revived and expanded the 1955 Resolve relative to a study of hunting and fishing in Massachusetts.

1956-57¹⁰³: The balance in the Inland Fisheries & Game Fund was decreasing at an “alarming rate” due to increased costs and the Division will soon have to curtail present operations or seek further income. The reserve is now \$429,100 and the Board does not wish it to go below \$250,000.

—The Central District has moved to a farmhouse on Rice Lane in Westborough. Each of the four Districts now has a headquarters building on Division lands.

—Realty staff acquired 90 acres at Flint Pond in Tyngsborough to be managed for warm-water fish and 1000 additional acres at Peru.

—Negotiations were underway for 3000 acres which were to have comprised the inland portion of the federal Parker River National Wildlife Refuge. A field trial area for beaglers, the first of its kind in the country, was developed at Westborough.

—The Board authorized the Director to obtain permanent fishing rights on stream by purchase or easement, rather than renewing leases every five years.

—The Fisheries Research Section stepped up its evaluation of reclaimed and rehabilitated ponds, conducting creel surveys on 46 natural and reclaimed ponds. Fyke netting was an inadequate technique for reclaiming larger ponds and should be replaced by rotenone poisoning.

—The creel census at Quabbin continued. Several 6-lb. lake trout were taken and good runs of landlocked smelt were observed.

—Production of fish and game emphasized quality rather than quantity for some years, resulting in higher-grade fish. In the current year, the largest number (n=352,201) ever of 9-inch-plus fish were stocked. The stocking of lake trout in the Quabbin Reservoir was successful and ≥ 1000 fish were taken this year.

—There were 566,310 brook trout, 253,330 brown trout, 219,830 rainbow trout, and 56,895 lake trout stocked.

—The game research staff continued to examine reproductive tracts of harvested and road-killed deer, undertook censuses of white hare, cottontails, and pheasants at Birch Hill, and evaluated the responses of two species of cottontails to habitat management at Upton. Water chestnut control efforts continued along the Assabet, Concord, and Sudbury rivers and at two ponds in Middlesex and Hampshire counties. A marked reduction in chestnut was noted as a result of these efforts.

—Work continued on the wood duck banding and nesting project and a detailed report is expected at some future date. The quail survey and habitat management project was completed¹⁰⁴.

—There were 43,390 pheasants (plus 9880 provided to the sportsmen's club program), 4840 quail, and 2469 white hare liberated. Eastern equine encephalitis affected production at one game farm. Aerial, mist, and power spraying was done at the three eastern game farms under the guidance of the local mosquito control groups.

—The Cooperative Wildlife Research Unit continued woodcock banding and is preparing three scientific articles. The cover-mapping project was completed¹⁰⁵ and reproductions of topographic maps with vegetative overlays are available for distribution to public agencies. Work continued on the ruffed grouse and river otter projects. A study of posted lands was begun in September.

—The Information & Education Section released 97 stories and 25 more were released through the Districts. Special events included the observance of National Wildlife Week and Arbor Day. The Section participated in 16 fifteen-minute television programs. There were 21 flyers and mimeographed handouts produced during the year.

—Legislation included the authorization of yellow clothing (in lieu of red) while hunting deer¹⁰⁶, an authorization for the Director to increase the season length and bag limit for pheasant, quail, and grouse¹⁰⁷, an authorization for the taking of carp and sucker by archery¹⁰⁸, the provision of additional authority for the Director in acquiring public shooting grounds¹⁰⁹, and a provision for the issuance of a permit to possess quail for dog training¹¹⁰.

1957-58¹¹¹: The Board, with the assistance of the Director and his staff, prepared an organizational document and a revised policy manual¹¹² stating in detail the general and specific policies concerning all phases of the Division's activities.

—The balance in the Inland Fisheries & Game Fund continued to decrease, to \$310,150. The Board does not wish it to go below \$200,000 [sic]. The Board and the Director will recommend that the Legislature increase the license fees to a level that will arrest, if not overcome, the decline in receipts.

—The Division now owns seven public shooting grounds >100 acres in size, totaling 5360 acres, plus two small parcels. There are also five leased areas, totaling 22,055 acres. Public fishing grounds were leased on 10 rivers in Berkshire, Essex, Franklin, Hampshire, Middlesex and Worcester counties.

—The fisheries research staff continued an intensive creel census at Quabbin, which showed that the lake trout catch for six months in 1958 was greater than the 12-month creel in 1957. The stocking of 37,000 smelt in 1953 resulted in a huge smelt population. Stocking on 9-12 inch brook, brown, and rainbow trout showed that average first-year weight gains for brown and rainbow trout doubled or tripled, while that for brook trout was negligible.

—The salter brook trout study was completed¹¹³. The salter resource was modest in size, but is unique. Recommendations were to stock brook trout in selected streams, purchase the better streams, and improve the streams by accepted techniques.

—There were 13 trout ponds reclaimed with 72,400 lbs. of fish removed, and 17 warm-water ponds partially or totally reclaimed, with 102,640 lbs. removed.

—Haphazard salvage and stocking of warm-water fish was virtually eliminated under the current Fish Management Policy. There were 665 smallmouth bass, 2789 yellow perch, 1965 horned pout (bullhead), 11 pickerel, and 407 miscellaneous panfish salvaged for stocking in 28 managed waters.

—There was interest in constructing a new fish hatchery near to the Quabbin Reservoir and the Division will shortly recommend this to the Legislature.

—The summer of 1957 reflected one of the lowest rainfalls ever in the state, seriously hindering activities at the hatcheries. Nonetheless, fish production exceeded that of 1956.

—The Division continued to rear largemouth bass and chain pickerel at the pond systems in Sutton and North Andover. There were 833,170 brook trout; 131,090 brown trout; 314,955 rainbow trout; 33,430 lake trout; 24,945 largemouth bass; 1097 pickerel; and 425,000 walleye [fry] stocked.

—Game research continued with deer checking (1470 deer examined) and harvest management, habitat improvement on public shooting grounds, game surveys at Birch Hill, and bobwhite whistle counts.

—Trapping and tagging of cottontails at Upton over eight years showed that 39% of all rabbits survived ≥ 6 months, and that the survival rate for New England cottontails was greater than that for Eastern cottontails.

—Quail propagation was decreased to 2000 birds. All propagation was carried out at the Sandwich Game Farm except for some slight experimental work with *Coturnix* quail at Marshfield.

—Heavy wet snow in March 1958 caused significant damage to the pens at Ayer Game Farm. Over 200,000 ft² of poultry netting was crushed, requiring a considerable expenditure in labor and materials.

—There were 37,265 pheasants (plus 7480 for the club rearing program), 2910 quail, and 2222 white hare liberated.

—The Cooperative Wildlife Research Unit was finalizing studies on river otter, posted land, and the evaluation of forest cover types as game cover.

—One of the most serious problems confronting the Information & Education Section was the need “for increased information going not only to the sportsman but also to the public in general regarding the activities and programs of the Division”.

—*Massachusetts Wildlife* magazine continued in the same format with six issues annually. The circulation increased to 20,200 recipients.

—The Information & Education Section was given the opportunity to present a half-hour weekly television program on “Dateline Boston”. Staff limitations precluded acceptance of this offer; however, a monthly half-hour program was agreed to. Seven programs were shown in Boston and five others later shown in Springfield. This endeavor won a merit award from the American Association for Conservation Education. Section staff also appeared as guests on 13 “Critter Corner” shows on another Boston station.

—The Division also participated in 12 shows and fairs, of which all except the Boston show were handled by the Districts.

—Legislation included extension of legal protection to all except five wild birds¹¹⁴. A legislative resolve provided for a study relative to a new fish hatchery in the Quabbin area¹¹⁵.

1958-59¹¹⁶: The Division’s surplus decreased to \$231,853. However, the Legislature approved the request for a license increase in FY60. Ornithologist Joseph A. Hagar retired in April 1959.

—The purchase of a 1404-acre tract of land in Falmouth was finalized, which also provided access to Ashumet Pond.

—There were 15,000 shad passed at the Holyoke Dam⁹⁵.

—Pond reclamations continued with 12 ponds totaling 238 acres reclaimed for trout and 11 totaling 594 acres for warm-water species. The trout pond management booklet was completed¹¹⁷.

—The lake, brown, and rainbow trout populations in the Quabbin Reservoir were rapidly being enlarged through the development program. Stocking of walleye has unsuccessful. Smelt were extremely abundant and control measures were necessary to protect the water interests of the M.D.C.

—Hatchery personnel produced a record total of 1,886,119 trout, at 27¢ per trout raised. There were 1,271,040 brook trout; 311,490 brown trout; 173,580 rainbow trout; 29,132 largemouth bass; 15,400 smallmouth bass; 4402 pickerel; and 4.9 million walleye [fry] stocked.

—The game program expended much time on statewide development of the public shooting grounds, including land clearing, opening and maintaining trails and parking lots, planting wildlife shrubs, and maintaining wood duck boxes.

—The Division has been attempting to control water chestnut since 1947 using 2-4-D and spraying of fuel oil. The large concentrations were broken up, but small patches persist and need yearly attention.

—The new 150-acre beagle training area at Westborough was being managed intensively and there was a tremendous increase in the rabbit population.

—A new statewide game harvest survey was developed and random postal questionnaires sent to 2600 hunting license holders. Pheasants were the most-hunted species, followed by cottontails, ruffed grouse, and gray squirrels. More than twice as many cottontails were taken than any other species, followed by gray squirrels, pheasants, and black ducks.

—The grouse drumming and quail whistling censuses were run again during the year. Division staff participated in the mid-winter waterfowl census for the U.S. Fish and Wildlife Service.

—An evaluation of pheasant stocking using leg-banding showed that the average return from stocking on public shooting grounds was 62%. Birds raised and released by sportsmen's clubs showed a 21% return.

—The production of wood duck ducklings at Great Meadows in Concord was nearly equal to the 1957 total. However, there was a substantial drop in nesting attempts in other areas of the state.

—The highest harvest of deer ever recorded occurred in 1958 with 4887 shot, of which 36 were by archers. For reasons of economy, deer checking stations were operated only on Monday and Saturday.

—There were 42,330 pheasants (plus 7754 from the club rearing program), 3534 quail, and 1960 white hare stocked.

—The Information & Education Section's greatest need was for youth education. The Section also needs more personnel in the visual-aids and writing fields. Thirty-one television shows for "Dateline Boston" and other shows and 12 TV news strips were produced. The subscription list for *Massachusetts Wildlife* increased to 23,818.

—The Cooperative Wildlife Research Unit continued with long-term woodcock and grouse studies. The posted land study has been completed¹¹⁸. There are >2 million acres of land closed to hunting, of which 600,000 would be opened if the hunters asked permission. David Kenneth Wetherbee (1927-1997) of the Bureau of Sport Fisheries and Wildlife has been hired to assist Dr. Sheldon and will be researching chemical control measures for blackbirds.

—Legislation included a provision for the allowable firearms for night hunting of raccoon and opossum¹¹⁹, an authorization for the possession of certain unprotected mammals without a permit¹²⁰, a requirement for certain measures to prevent the resubmission of bountied bobcats¹²¹, a provision that enforcement officers may kill certain dogs killing deer¹²², an increase in license fees¹²³, and specifications of the circumstances under which landowners may hunt or fish without a license¹²⁴. A legislative resolve provided for a study by the Division of wildlife habitat in the Quabbin watershed¹²⁵.

1959-60¹²⁶: The decrease in the Division's reserve funds was halted due to the license fee increase.

—Land acquisition reached a new high with the purchase of 3300 acres in four towns in Essex County from the federal government. A few smaller parcels were also acquired. Negotiations were underway regarding a large tract of land west of the Connecticut River.

—The fisheries research staff was concerned about fish kills brought about by the indiscriminate use of insecticides. The Field Headquarters was designated by the U.S. Department of Public Health as the “processing and collecting” agency for a study on the impact of pollution on the fish populations of the state.

—The Quabbin Reservoir investigations continued. There is no longer a problem with smelt impacting water production and distribution. There have been several substantiated reports of walleye catches.

—Five trout ponds and six warm-water ponds (were reclaimed. A stream reclamation project is now underway and 75,000 lbs. of “trash fish” were removed from 40 miles of the Deerfield River, which was restocked immediately with fingerling and adult trout.

—Creel surveys were conducted on opening weekend on 27 water bodies throughout the state.

—There were 1,498,220 brook trout; 363,475 brown trout; 308,850 rainbow trout; 45,275 largemouth bass; 12,160 smallmouth bass; 3364 pickerel; and 7.5 million wall-eye [fry] were stocked. In addition, 14,210 alewives, 35,000 fingerling yellow perch, and one-half million “forage minnows” were distributed to state rearing facilities and managed waters.

—The land development program worked on grounds and facilities, graded and maintained roads, planted >10,000 trees and shrubs, and salvaged 40,000 feet of lumber from forest thinnings.

—The Quabbin wildlife survey (c. 78, Resolves of 1959) was completed¹²⁷.

—The Game Research Section continued with a postcard survey of hunters, deer harvest management, grouse drumming counts and wing-and-tail surveys, quail whistle counts and winter waterfowl surveys.

—The wood duck nesting project showed a sharp decline in duckling production and a decline in the resident breeding population of wood ducks. This was attributed to a shortage of young ducks returning to their natal areas.

—Bobwhite quail production was intentionally decreased and half the production was purchased and used for liberation comparisons. Quail reared at Sandwich were superior to those purchased. The rearing of *Coturnix* quail for field trials was continued.

—The stocking of cock pheasants was an all-time record. There were 54,240 pheasants (plus 8468 from the club rearing program), 1776 bobwhite quail, 432 *Coturnix* quail, and 1280 white hare stocked.

—At the Cooperative Wildlife Research Unit, a two-student study on the New England cottontail has been completed by one student¹²⁸ and the second thesis is in progress. A graduate student was also working on an experimental turkey restoration project at the Quabbin Reservation. Eight wild-trapped birds were obtained from West Virginia and released on the Prescott Peninsula. Further releases are planned. A critical aspect will be to get more wild-trapped birds from other states.

—In the Information & Education Section, the highlight of the year’s program was an exhaustive cooperative venture on the merits of fluorescent vs. non-fluorescent clothing as hunter safety measures^{129,130}. This was a cooperative investigation among the Division, the Division of Law Enforcement, the U.S. Army, and the American Optical

Company. The study conclusively showed that non-fluorescent red was relatively ineffective and that fluorescent “Hunter Orange™” color had superior visibility.

—The first Division-wide employee’s conference for in-service training was held at the Field Headquarters for two days in February 1960. Sessions were given on most Division activities.

—There were 12 “Dateline Boston” and 12 “Critter Corner” TV shows presented during the year. There were also a few cooperative ventures with Connecticut on “R.F.D.#3”, which was shown on a Hartford station which reaches the Connecticut River Valley area.

—Legislation included a prohibition on the use of archery or firearms on the Greylock Reservation during certain times¹³¹, authorization for the wearing of orange garments while deer hunting¹³², a repeal of the statutory close season [all hunting] during a certain fall period¹³³, an authorization for the trapping of certain nuisance beavers¹³⁴, further regulating the issuance of alien hunting licenses and firearms permits¹³⁵, and a requirement for the purchase of a stamp for hunting deer during the archery season¹³⁶.

“THE CONTROL OF NATURE IS A PHRASE CONCEIVED IN ARROGANCE”: THE 1960s

The 1960s were a turbulent and violent, yet innovative, decade¹, with the assassinations of President John Fitzgerald Kennedy (1917-1962), Robert Francis Kennedy (1925-1968), and Martin Luther King, Jr. (1929-1968); the launching of the first weather satellite, “Tiros I” (1960); the admission of Hawai’i as the 50th state (1960); the failed Bay of Pigs invasion (1961); the Cuban Missile Crisis (1962)—the only time the U.S.A. ever raised its forces to Defense Condition 2; the Tonkin Gulf Resolution (1964), paving the way for the use of conventional military forces in Vietnam; widespread civil rights marches and demonstrations, and the Civil Rights Act of 1964; the inception of Medicare (1965); the successful deployment of the Advanced Research Projects Agency’s ARPANET (1969); and a spate of violent urban riots and angry student protests. U.S. scientists developed the first pulsed laser (1960) and Apollo 11 landed the first men on the moon (1969).

In Massachusetts, the strong Hurricane *Donna* peaked with 140 mph winds and the Callahan Tunnel (1961) and the University of Massachusetts at Boston (1964) both opened. A raging forest fire in Myles Standish State Forest in May 1964 burnt 5500 acres and 25 structures. Between 1954-56, there were 68 new manufacturing plants built along Rte. 128; by 1963 there were 400 new ones². Urban renewal in Boston caused the city to lose more housing units than it built, while the suburbs gained 89,000.

In the 1950s, cover-mapping from aerial photographs revealed that Massachusetts was 64.7% forested (3.34 million acres)³, with timber production by the 1960s amounting to ≈115 million board feet of lumber and 19,000 cords of pulpwood annually⁴. The state’s forests began to decline soon thereafter due to land clearing for residential, commercial, and industrial development.

In 1960, Congress passed the so-called “Sikes Act”^{5,6} to promote effectual planning, development, maintenance and coordination of wildlife, fish and game conservation and rehabilitation in military reservations. The Department of Defense was charged to coordinate with the U.S. Fish and Wildlife Service in developing integrated conservation management plans for military installations.

The Endangered Species Preservation Act of 1966⁷ marked the beginning of the U.S. government’s efforts to protect rare species. Its primary focus was habitat protection⁸. However, there was no process beyond consultation to determine threat and there were no prohibitions on take. Three years later, the 1966 Act was followed by the Endangered Species Conservation Act of 1969⁹. This statute expanded federal acquisition authority, defined the types of wildlife covered by the Act, and authorized the Secretary of the Interior to develop a list of rare species and to prohibit most importation of these species⁸. Indigenous species—doubtless because of state’s rights concerns—received less legal protection than did foreign ones.

The Wildlife Society’s *Manual of Game Investigational Techniques*¹⁰ (1960) was long-awaited and sorely needed. The importance of wildlife management techniques was recognized by early wildlife professionals and a limited-edition manual¹¹ was in use at the University of Michigan in 1939. However, World War II interrupted the Society’s techniques committee, which was not revived until 1957. The new “Techniques Manual” did not establish standards but sought to report the best procedures known and used at the time¹².

In 1962, the marine biologist and writer Rachel Louise Carson (1907-1964), alarmed by the widespread and increasing use of synthetic pesticides—and their consequent deleterious effects on wildlife¹³—published the impeccably researched and influential *Silent Spring*¹⁴. Bitterly and aggressively attacked by the chemical companies¹⁵, Carson’s book held up under scrutiny, eventually advancing the national environmental movement, the deregistration (in the USA) of DDT and similar organochlorines, and the creation of the Environmental Protection Agency. Soon thereafter, and also highly influential, the politician Stewart Lee Udall (1920-2010) encouraged the enactment of environmental legislation and warned of pollution, misuse of natural resources, and the loss of open space¹⁶.

The pioneering ecologist Victor Ernest Shelford (1877-1968)—mentor of Charles Elton—was a co-developer of the concept of biomes, or ecosystems. Shelford expanded this concept to North America, integrating climatic, edaphic, and other abiotic factors with animal and plant life to describe the continent as it appeared in 1500-1600¹⁷. Raymond Frederic Dasmann (1919-2002), a field biologist who studied under Aldo Leopold’s son Aldo Starker Leopold (1913-1983), also helped shape the environmental movement, promoting biodiversity and the role of indigenous peoples, and rebutting the proposition that community growth was dependent on exploitation of natural resources. His text *Wildlife Biology*¹⁸ reflected these concepts, exposing students to the basic ecological principles against which management practices need be tested.

The preeminent field biologist, conservationist and advocate George Beals Schaller (b. 1933) became highly regarded for his scrupulous observations of the behavior of free-ranging mammals in Africa, Asia, and South America. His initial 2-year study *The Mountain Gorilla*¹⁹, like Adolph Murie’s keen observations of wolves and coyotes, worked to dispel myths about the animal and set standards for later behavioral studies. Paul L. Errington also worked to dispel myths, arguing that predation did not determine the population levels of most prey and that compensatory mechanisms

quickly caused resilient populations to rebound. “Predation...is as natural as anything could be... Predation belongs in the way of Life”²⁰.

The farmer and soil conservationist Eugene Marcel Poirot (1899-1988), writing in a slim volume from a vanity press, heeded Leopold’s admonition that the land is all. Poirot condemned the wasteful and damaging agricultural practices resulting from political ineptitude, bleeding the 40% of dirt farmers living on <\$2000 annually. Poirot called wistfully to the sharp-shinned hawk wafting over his fields “I am the farmer who guides the thread of life into human foods under a set of nature’s laws²¹”.

Kenneth Dixon Carlander’s (1915-2002) extensive, detailed summaries of life histories of freshwater fish²²—a basic source for fisheries biologists—entered its third edition (to be followed in later years by two supplementary volumes).

The Cape Cod National Seashore was created in 1961²³ as a unit of the National Park Service and in 1962 the Commonwealth transferred the Province Lands State Park²⁴ to the United States as a component of the Seashore.

1960-61²⁵: The West Meadows property was finally nearing acquisition of all the desired parcels. Local officials were visited by land acquisition staff to enlighten them as to why the Division is also interested in acquiring the “vast” Hockomock Swamp. More funds must be allocated for the purchase of open lands and the Board sought to maximize opportunities for the prudent purchase of suitable lands. The majority (59%) of hunters still utilized private lands.

—The fisheries program prepared a comprehensive trout stream management bulletin²⁶.

—The walleye stocking program at Quabbin was discontinued as the water was too infertile and too acidic for this species. However, 900 final walleyes were nonetheless transferred from a Massachusetts lake to Quabbin.

—The Quabbin Reservoir project continued with an evaluation of trout stocking, observations of spring smelt runs, and creel censuses at the three boat launching areas.

—There were nine ponds totaling 929 acres reclaimed for trout fishing and five totaling 197 acres for warm-water fishing. There were parts of several streams in Worcester County reclaimed and restocked for trout management.

—There was an increase in the total poundage of fish raised at the six hatcheries and stocked into open waters. There were 891,840 brook trout; 390,400 brown trout; 674,725 rainbow trout; 8570 largemouth bass; 1788 smallmouth bass; 2557 chain pickerel; and 8000 yellow perch stocked.

—The statewide development program required a majority of the time spent by the districts. All work was conducted on state-controlled lands, enhancing public access and providing the best game covers. Over 500 acres of new land was cleared, ≈400 acres of food patches were planted or maintained, and ≈11,000 trees and shrubs were planted. Control measures on water chestnut seem to have checked its spread, and no spraying was conducted this year.

—The 1960 hunting season was the best in many years, due to liberalized open seasons, a naturally high population of indigenous species, and a record release of 57,910 cock pheasants.

—The Game Research Section continued with the postcard game harvest tally, an analysis of the statewide deer harvest, quail and mourning dove call counts, winter waterfowl surveys, an evaluation of wood duck nesting success, and observations of the experimental turkey stocking in Quabbin. Five more wild-trapped West Virginia turkeys were released in April 1961.

—Bobwhite quail production was increased to provide for liberation on public hunting grounds. *Coturnix* quail production for field trials continued the same as for the previous year. An open-pen rearing program for pheasants will be tried at one game farm.

—There were 67,620 pheasants (plus 7320 for the club program), 3362 quail, and 2500 white hare liberated.

—Seventy-six cottontails were trapped in the Central District and released at Birth Hill in order to establish an eastern cottontail population in an areas where only New England cottontails now exist.

—Damage complaints, especially beaver, occupied much district time. Beaver complaints were handled by live-trapping, dynamiting of dams, and issuance of kill permits.

—At Otis Air Force Base, Southeast District personnel issued permits for civilians to hunt deer. Nine ruffed grouse were live-trapped and transferred to Martha's Vineyard.

—Progress was made in attaining permanent Civil Service status for the Information & Education staff. The I&E Chief has just attained permanent status after 12 years as a temporary employee. The first wildlife journalist position was approved and filled.

—*Massachusetts Wildlife* now has a subscription list of 32,657 subscribers. The magazine received honorable mention for excellence in a field of 11 entries at the 1961 conference of the American Association for Conservation Information [AACI].

—There were 21 "Dateline Boston", 12 "Critter Corner", seven "RFD-3", and two special TV shows developed and presented. There were 514 bookings of the Division's films, viewed by ~41,120 people. The film "Be Seen" also received an honorable award in international competition. A booklet on the cottontail in Massachusetts was published²⁷ and won second place in the international awards program of the AACI.

—The Junior Conservation Camp conducted its final session at the Swann Forest site, with 148 youths attending. Camp planning and administration was done by I&E since the former private administrative group, "Wildlife Conservation, Inc.", had disbanded.

—Dr. Reuben E. Trippensee retired from the University of Massachusetts. The New England cottontail study was continued. Dr. Sheldon and an assistant were preparing a manuscript on the long-term woodcock study.

—Legislation included a clarification of the method of marking bountied animals²⁸, an authorization for enforcement officers to kill certain dogs killing deer in Franklin County²⁹, an authorization for the Director to grant easements for electrical power lines across certain properties in Essex County³⁰, and authorizing the federal government and the Division to acquire certain properties in Concord and Sudbury for migratory bird conservation³¹. A legislative resolve provided for a special commission to investigate the authority of the Division to acquire certain lands³².

1961-62³³: The Board considered the most pressing problem facing the Division to be its insufficient revenue stream and the consequent decline in the reserve monies in the Inland Fisheries & Game Fund. The reserve now stands at less than \$169,500 and the Board believed it necessary to have at least \$200,000 to provide for emergencies.

—The Board also noted that the agency's salaries are insufficient to retain key personnel: "Over the years, a number of top personnel with several year's experience in Massachusetts have left for better income". Massachusetts must realize that it is competing with the rest of the country and place itself in position to attract and retain the best personnel possible.

—A sizeable new area in Chester, Huntington, and Worthington was added to the Division's public hunting grounds. Smaller parcels were acquired or are in the process of acquisition in the Northeast and Central Districts.

—The second major river reclamation project was conducted this year on 13 miles of the Squannacook River. The evaluation phase of the Deerfield River reclamation was completed and the endeavor was deemed a success. The project produced better fishing, better quality fish, and a larger creel. A new technique was developed and is now in use providing for the selective poisoning of certain species of fish in unbalanced ponds. Four ponds totaling 193 acres were treated with rotenone as the first step towards warmwater management. of these water bodies.

—The U.S. Public Health Service gave the Division a 3-year \$12,000 grant to operate a pesticides laboratory at the Field Headquarters to determine pesticide and herbicide levels in terrestrial and aquatic animals.

—The Board established a split season for the fishing season, with stream fishing opening before that for ponds.

—The creel census at Chauncey Pond showed that the experimental stocking of wall-eye there was a "definite success".

—The Sunderland Hatchery was converted to a yearling-only production schedule in a effort to control a recurring disease issue. The number of raccoons and predatory birds increased this year with noticeable losses of trout at all hatcheries.

—There were 756,840 brook trout; 748,815 brown trout; 161,080 rainbow trout; 58,931 largemouth bass; and 3866 chain pickerel stocked.

—Habitat development work at public hunting grounds in 17 towns continued and the usage of these areas increased 19% over the past year. There were 50,000 board feet of lumber produced as a result of selected thinning and made available for use in Division installations.

—Analyses of the deer harvest showed that the protected Quabbin herd has little effect on the surrounding towns, in which the harvest fluctuated consistently with the statewide kill.

—The postcard game harvest showed that there were fewer waterfowl hunters than in 1960 but that those few took more waterfowl. Estimated usage of all public hunting grounds was 47,000 hunter trips, with most hunters traveling ≤ 20 miles to the site.

—Quabbin turkeys were transplanted to Mount Washington and October Mountain State Forests and there was a private release of 16 birds in Otis.

—A study of imported white hare was undertaken in which some hare were released immediately and others were held and fed for 17-46 days. No immediate conclusions were drawn.

—There was again a record production of cock pheasants at the game farms. There were 49,000 pheasants (plus 8150 from the club program), 2556 bobwhite quail, 387 *Coturnix* quail, and 2500 white hare liberated.

—The Cooperative Wildlife Research Unit continued with evaluation of the turkey stocking, a New England cottontail study on an island in the Quabbin³⁴, and experiments in clearing open areas in the Cadwell Forest.

—The circulation of *Massachusetts Wildlife* has increased to 36,676. If each magazine was read by an average of three persons, the estimated readership is ≈110,000.

—The Junior Conservation Camp came under the Division's full supervision during the year and was put in operation at the new site in Spencer. The new camp is quite superior to the former location in Swann Forest. It will have an expanded staff, increased campers, better equipment, and will see the inception of achievement tests in 1962.

—The Information & Education Section prepared 19 "Dateline Boston", 12 "Critter Corner", and two "RFD-3" television programs. The "Dateline Boston" series received a first place award from the American Association for Conservation Education for a program on stream pollution.

—There were eight "Show Me" public events conducted for the press and prominent individuals.

—Legislation included an increase in the penalty for illegal killing of wild turkeys³⁵, a requirement for hunters to wear fluorescent red or orange clothing when hunting deer with a firearm³⁶, an amendment to the "Blue Laws" to allow hunting on all legal holidays³⁷, an authorization for the Director to acquire properties in Petersham³⁸ and Peru³⁹, an authorization for the Director to permit shooting preserves in three counties⁴⁰, an act establishing the Public Access Board and providing funding to the Division (and others) from gasoline tax monies⁴¹, and an authorization for the granting of easements for electrical power lines in Newbury, Rowley, and Wilbraham⁴². A legislative resolve provided for an investigation and study by the Division relative to the granting of certain free licenses⁴³.

1962-63⁴⁴: Director Charles L. McLaughlin was killed in an automobile accident in January 1963. Francis William Sargent⁴⁵ (1915-1998), a former commissioner of natural resources and director of marine fisheries, was appointed to succeed him.

—The Board advised that all citizens benefit from the Division's activities, yet the financial burden is borne almost entirely by sportsmen. There are certain fundamental problems in the agency's operation. The possible solutions include a management analysis of the licensing program (recently completed) and the results are being scrutinized.

—The statutes should be changed so as to allow for license sales outlets other than city and town clerks, as is done in other states. The 14 current license forms will be reduced to two basic forms. This will be a cost-saving measure.

—Secondly, the Division's salaries are below the national average for similar states

and “extremely” far below those for federal service; and, thirdly, there is a pressing need for substantial additional funding for land acquisition.

—The Marshfield Game Farm is antiquated, was designed for rearing waterfowl rather than pheasants, and has limited land area. The property should be disposed of and its current production absorbed at other facilities.

—Leases for public fishing grounds continued on the Farmington, Squannacook, and Westfield Rivers. Acreage was added to the Peru, Phillipston, and West Meadows Wildlife Management Areas. Two other large parcels are under option.

—There were eight ponds and one stretch of river reclaimed for trout management and six ponds reclaimed for warm-water fish.

—The U.S. Public Health Service has increased its grant for pesticide analyses to \$15,000 annually and the Massachusetts Audubon Society donated a gas chromatographer to the Division.

—There were 715,930 brook trout; 639,800 brown trout; 311,975 rainbow trout; 34,700 largemouth bass; and 2700 chain pickerel stocked. In addition, 200,000 lake trout eggs were received from New York and reared at the Montague and Sunderland hatcheries and the resulting fry stocked in Quabbin.

—Statewide development activities on wildlife management areas absorb ≈60% of the Districts’ time.

—The Game Research Section continued with the postcard survey of game harvest; deer harvest and herd composition analyses; quail, dove, and waterfowl censuses; studies of wood duck nesting success and brood survival; and hunter utilization surveys of wildlife management areas.

—Tag returns of liberated white hare were evaluated. The returns showed that 56% of released hare moved ≥ 2 mile from the release site. Holding and pre-release conditioning of hare was an added expense and has not proven beneficial to survival.

—There were 69,145 pheasants (plus 7528 in the club program), 3575 bobwhite quail, 497 *Coturnix* quail, and 2500 white hare liberated.

—The new Natural Resources building at the University of Massachusetts has been completed. The Cooperative Wildlife Research Unit continued the evaluation of turkey stocking, the Cadwell Forest project, and a study of the effects of DDT on migratory passerine birds. Results of the long-term woodcock study were in the second draft.

—Evaluations of the wild turkey restoration project at Quabbin continued under a graduate student. The transplant to Mount Washington was still being evaluated, while turkey numbers at October Mountain State Forest have substantially declined. The private release in Otis failed.

—The mailing list for *Massachusetts Wildlife* continued to grow about 900 names per new issue and is now ≈42,120.

—There were 16 “Dateline Boston”, 30 “Critter Corner”, and four special television programs conducted. There were 22 “show-me” events for the press and the public conducted by the Districts.

—The I&E Section instituted the Massachusetts Freshwater Sportfish Awards pro-

gram “last spring”. Anglers catching an eligible fish of a certain size received a bronze pin. There are plans to award a special gold pin for the top fish in each award category.

—Legislation included a prohibition on loaded firearms in motor boats except for the hunting of waterfowl⁴⁶, expansion of the authority of enforcement officers to shoot dogs killing deer⁴⁷, a prohibition on most usages of poison for killing birds and mammals⁴⁸, a provision that permits for commercial shooting preserves shall expire annually⁴⁹, and a charge directing the Director to prepare plans for a new fishery hatchery at the Quabbin⁵⁰.

1963-64⁵¹: Director Sargent resigned in December 1963 and was replaced in January 1964 by James Mortimer Shepard (1924-2004), a career employee of the Division and District Manager of the Northeast District. Allan S. Kennedy resigned as Superintendent of the Bureau of Wildlife Research and Management on June 30, 1964. John Starrett of the Division successfully swam the English Channel and was written up in the media.

—The Board decided to sponsor and encourage a greatly accelerated program of land acquisition. The intent was to establish a continuing dedicated fund for this purpose, half of the monies for which will come from license fees and half from the General Fund. Legislation to this effect will be filed in FY65.

—The Division has received title to the Squannacook River property, purchased by the Middlesex County League of Sportsmen via donations. There are options to buy three parcels on the Swift River.

—The Marshfield game farm was closed at the end of the 1963 rearing season and will be sold⁵².

—Long-range plans were completed for both the fisheries and game programs, qualifying the Division for federal recreation funds. It was a very dry year and the Division assisted firefighters by providing District staff and hatchery trucks equipped as tankers.

—The fisheries research program continued the Quabbin investigations, which showed that lake trout were reproducing in the reservoir.

—Ten trout ponds totaling 484 acres were reclaimed and one pond of 203 acres was partially reclaimed.

—There were 346,830 brook trout, 646,975 brown trout, 265,810 rainbow trout, and 42,452 lake trout fingerlings stocked.

—The statewide development program continued work on the district facilities and management areas, including maintenance of roads and trails, postings of signs and boundary markers, planting of trees and shrubs, control of noxious plants, maintenance of nesting structures, and similar tasks.

—For the first time, the Worcester County deer harvest ranked #1 in the state. However, the kill in Barnstable County was 50% below the 11-year average.

—The wood duck project (Figures 46a. and 46b.) continued with an emphasis on Great Meadows National Wildlife Refuge using nest box checks and banding traps. Only 24% of tagged ducklings were traced to flight stage, suggesting poor brood survival. A majority of the young birds trapped were not web-tagged and must have originated from natural cavities.



Photo © Daniel Grice (Great Meadows)

Figure 46a. Wood Duck project at Great Meadows National Wildlife Refuge, Concord.

Figure 46b. Banded Wood Duck.

—Eggs (n=212) of five species (83% wood ducks) from sites in Middlesex and Worcester counties were analyzed for DDT. Over 90% of the 27 black duck eggs from the Sudbury-Concord valley were positive and contained three times as much DDT as the wood duck eggs from Great Meadows.

—There were 63,155 pheasants (plus 6750 from the club program), 4035 bobwhite quail, 24 *Coturnix* quail, and 2483 white hare liberated, of which 1136 were tagged. Tag returns showed that only 19 of the tagged white hare were taken by hunters.

—The Information & Education Section provided 161 news stories, processed 1118 news clippings, and 28 TV clips. *Massachusetts Wildlife* subscriptions reached 48,344. There were 18 “Dateline Boston”, 14 “Critter Corner”, and five “Western Massachusetts Highlights” programs presented.

—A bulletin on the pheasant in Massachusetts⁵³ and a updated wildlife management area guide were printed.

—The I&E Section reviewed the distribution process for the plastic license holders and found that a requirement for the town clerks to ask for a specific number of holders (rather than DFW making an estimate) resulted in a cost savings.

—The first full year of the Sport Fishing Awards program (1963) was completed and the winners of the top fish in each category (n=14) were presented gold pins.

—The Cooperative Wildlife Research Unit continued with the graduate work on the wild turkey restoration project with emphasis at Quabbin. Experimental winter feeding was begun and 60% of the known fall population survived the winter. A mourning



Photo © Bill Byrne (Banded Wood Duck)

dove banding and distribution study was completed. A new technique for live-capture of woodcock in mist nets was developed.

—The new Massachusetts Cooperative Fisheries Research Unit instituted in 1963 under James McCann was conducting studies on the life history of the white perch and rock bass, as well as a biological and physical survey of the Connecticut River.

—Legislation included a prohibition on the altering of licenses⁵⁴, provision for regulating the taking of shad in the Palmer River⁵⁵, an authorization for the issuance of permits for taking nuisance birds⁵⁶, and an authorization for the Director and his agents to control nuisance beavers⁵⁷. Legislative resolves provided for a special commission to study the inland conservation laws⁵⁸ and a study of the hunting of deer and the poisoning of feeder streams on the Quabbin⁵⁹.

1964-65⁶⁰: The Division celebrated its 100th anniversary, which was restricted to special events worked into existing activities and a series of articles in *Massachusetts Wildlife*⁶¹.

—Land acquisition included parcels in Groton, Northborough, Phillipston and Peterham, and Sunderland as well as addition to the Birch Hill and Northeast area. Transactions were completed for a 650-acre tract along the Quaboag River.

—The Quabbin Reservoir study continued into its 11th year. During the current year, there were 10,066 anglers interviewed, representing 53,498 angler trips, and 40,259 lbs. of fish harvested. The three most heavily harvested fish were brown bullheads, white perch, and yellow perch. The lake trout fishery was established, thriving, and expanding. Lake trout eggs were again received from New York and incubated and 40,000 fingerlings were reared and stocked in Quabbin in 1964-65. Since the lake trout is now clearly established, there will be no further stockings at Quabbin. There is an ecological niche available for landlocked salmon and 14,420 fingerlings from a Maine hatchery were stocked in Quabbin in April 1965.

—The U.S. Department of Public Health gave the Division a 3-year \$20,000 grant to establish a statewide stream monitoring program for pesticide pollution.

—Three trout ponds totaling 178 acres and two warmwater ponds totaling 108 acres were reclaimed. The Harold Parker State Forest ponds and the Merrill Pond system continued to produce warm-water bass and pickerel for stocking. There were 2235 lbs. of largemouth bass, 550 lbs. of chain pickerel, and a small amount of smallmouth bass obtained from the rearing ponds and stocked.

—The Division will take over operation of the federal Hartsville hatchery in the Berkshires on July 1, 1965.

—There were 1,005,240 brook trout, 679,040 brown trout, and 336,880 rainbow trout stocked from the Division's hatcheries.

—The statewide development program continued on its maintenance activities, with land clearing (634 man-days), plantings (371 man-days), and road maintenance (272 man-days) occupying the most time.

—The Game Research Section continued the postcard survey of hunters; deer harvest tallies, range surveys, and analyses of hunting pressure; winter waterfowl survey; and quail and dove call count censuses. Wood duck nesting success and brood sur-

vival continued and there still appears to be diminished recruitment of young birds into the resident breeding population.

—There were 60,735 pheasants (plus 7840 for the club program), 3020 quail, and 2500 white hare liberated.

—The Cooperative Wildlife Research Unit continued with the long-term evaluation of the wild turkey restoration at Quabbin with occasional transplants elsewhere. The summer to fall poult survival was the lowest ever, but the over-winter survival was the highest. The Unit also has begun a study of black duck productivity on beaver ponds. The manuscript from the long-term woodcock study was sent to a publisher.

—The Information & Education Section continued to refine the mailing list for *Massachusetts Wildlife*. There are more people desirous of the magazine than can be accommodated. A process will be instituted next year for persons to return a renewal coupon and those not returning it will be dropped from the list.

—There were 14 “Dateline Boston”, nine “Critter Corner” TV shows and five radio programs presented or participated in. There were 12 “Show Me” events for public groups and 10 press tours conducted.

—Legislation included a further authorization for fishing by means of archery⁶², an authorization for the Commonwealth to grant easements for electrical power in Groveland and Georgetown⁶³, and a provision that commercial shooting preserves may be licensed statewide⁶⁴. A legislative resolve revived and continued the special commission to investigate the inland conservation laws⁶⁵.

1965-66⁶⁶: There is still an increasing public demand for additional services, higher costs for existing services, and a narrowing financial base. The time has come, and is past due, for sizeable amounts of General Fund monies to be allocated to support the Division.

—The sportsmen accepted a \$1.00 license increase to support land acquisition with the understanding that there would be a matching appropriation from the General Fund. This has not happened. The Division will support its pledge to spend the \$1.00 increase only on land acquisition, necessarily subject to appropriation.

—The Division’s office moved to the new State Office building at 100 Cambridge Street.

—The Division now has about 675 acres of management area along the Quaboag River. Additional parcels were purchased or acquired in Huntington, Plymouth, Royalston, and Templeton as well as tracts adjoining the West Meadows area.

—The Fisheries Research Section continued with the long-term Quabbin study. There were 10,118 landlocked salmon released in [fall] 1964. Another 56,448 fry were received from Quebec and will be reared at Sutton and stocked in Quabbin in the fall of 1965.

—Eleven ponds comprising 225 acres were reclaimed for warm-water fish and one for trout.

—The Connecticut River studies focused on the segment between Turners Falls and Holyoke. Anglers were counted and interviewed once weekly, and fish populations were sampled by netting and electrofishing.

—Six thousand landlocked alewives were stocked in the Congamond Lakes to establish this forage species.

—The Division's two warm-water rearing pond systems produced 2085 lbs. of largemouth bass, 357 lbs. of smallmouth bass, and 290 lbs. of chain pickerel for stocking public waters.

—There were 643,025 brook trout, 357,490 brown trout, and 364,590 rainbow trout stocked.

—The Cooperative Fisheries Research Unit continued their aspect of the Connecticut River study as well as life history studies of white perch and rock bass at Quabbin. New studies included a study of feeding habits of game fish in the Connecticut River and an investigation of shad ecology.

—The statewide development project continued its normal maintenance duties and crews worked extensively on Myles Standish Forest during the winter months with the aid of game farm staff. Nearly 40,000 board feet of lumber was obtained from cuttings at Birch Hill.

—Mandatory deer checking was implemented in the 1966 season.

—Wood duck live-trapping and banding studies continued at Great Meadows. There was poor survival and stunted growth. A comparison area is being established in Carlisle. A monograph presenting results of the long-term wood duck study was completed⁶⁷.

—Winter banding of black ducks began at the request of the U.S. Fish and Wildlife Service. During 1965-66, there were 1658 black ducks, 97 mallards, and 69 mallard-black hybrids banded with walk-in traps and a cannon net.

—During the past two winters, 28 ruffed grouse were live-trapped and transferred to Martha's Vineyard.

—There were 57,960 pheasants (plus 9882 for the club program), 3324 quail, and 2500 white hare liberated.

—The Cooperative Wildlife Research Unit continued with the wild turkey study. The wild turkey restoration project continued slowly at Quabbin. There was high nesting success in 1965, but substantial poult mortality. The overwinter survival was ≥ 39 turkeys.

—The Unit developed a sex-linked stock of pheasants which produces hen chicks of a pale color, which will be used by the Division to prevent rearing of excess hen pheasants. There was also a preliminary study of pheasant movements and hunter success at Birch Hill using telemetry.

—The Information & Education Section has purged the mailing list of undeliverable subscriptions and will now add new names only on request. There were 21 "Dateline Boston" and four "Critter Corner" TV shows. There were five tours conducted for the press, legislators, and sportsmen. The Section received a first-place award from the American Association for Conservation Information for its program to promote fluorescent orange for deer hunting.

—Legislation included enactment of the coastal wetlands protection act⁶⁸, an increase in license fees⁶⁹, an extension of the allowable time period for hunting on Greylock Reservation⁷⁰, an authorization for the Division to acquire lands in Belchertown

and Ware^{71,72}, and a provision for a capital outlay program for land acquisition and for building a new hatchery in Belchertown⁷³. A legislative resolve provided for an investigation and study of the inland wetlands of the Commonwealth⁷⁴.

1966-67⁷⁵: The Board reemphasized the need for an alternative funding source to support its multiple-use programs.

—Construction of the Quabbin hatchery was delayed because all bids came in over the \$1.2 million allocated by the bond issue. A request for additional funds was submitted.

—In October, the Central District relocated from Rice Lane in Westborough to a 1.2-acre parcel in Boylston (mailing address in West Boylston) leased from the Metropolitan District Commission.

—The bond issue of \$800,000 for land acquisition was nearly expended by the purchase of parcels in Belchertown, Chester and Phillipston, and along the Little, Quaboag, Millers, Squannacook, and Westfield rivers. Two larger parcels in central Berkshire and Worcester counties were acquired or are nearing completion.

—The Quabbin creel census indicated that 64,802 anglers took 59,612 fish during the 1966 open season at Quabbin. An increase in the harvest of lake trout and landlocked salmon was noted, with 10,800 additional landlocks stocked during the year.

—Seven ponds totaling >480 acres were reclaimed for trout. The final segment of the three-year harvest and population study on the Connecticut River was completed.

—The Division's pesticide laboratory continued its analyses for the U.S. Public Health Service, as well as on 60 trout from the hatcheries and 120 lake trout from Quabbin.

—A cooperative effort was initiated between the Division, three other states, the U.S. Fish and Wildlife Service, the University of Massachusetts, and Northeast Utilities to increase the shad population (and hopefully, salmon) on the Connecticut River. Over 1 million shad eggs were transferred from Connecticut to just below the Vernon Dam.

—The Division's two warm-water pond systems yielded 2700 lbs. of largemouth bass, 339 lbs. of smallmouth bass, and 886 lbs. of chain pickerel for stocking in open waters. There were 1,348,710 brook, brown and rainbow hatchery trout stocked.

—The wild turkey appeared to be "firmly established" in the Quabbin area, while the success of transplants is not yet certain.

—Survival and recruitment of wood duck ducklings at Great Meadows remained poor. A special coastal black duck season was authorized for the current season. Black duck banding continued with 1578 black ducks banded.

—Nesting studies of Canada geese began and transplants to other areas are likely to begin soon.

—There were 91 sharptailed grouse from South Dakota liberated on Nantucket, and 97 ruffed grouse were transplanted from mainland Massachusetts to Martha's Vineyard.

—The sex-linked strain of pheasant chicks proved effective⁷⁶ and will be used at the game farms. Research is now underway to develop a strain of pheasant which will be adapted to submarginal and pole-stage woodlands.

—There were 63,890 pheasants (plus 4960 for the club program), 3532 quail, and 2153 white hare liberated.

—The Information & Education Section was cooperating with the Department of Commerce & Development to produce a comprehensive guide to outdoor recreation in Massachusetts. Staff also participated in 19 “Dateline Boston” television shows.

—Massachusetts participated in a New England-wide resolution of fish and game directors, giving their joint position on firearms laws which was published in the *Congressional Record*.

—Legislation included a designation of the new Quabbin-area hatchery as the “Charles L. McLaughlin” hatchery⁷⁷, an authorization for the Director to apply for federal grants to assist funding of the new hatchery⁷⁸, an authorization for the Director to acquire lands without the consent of town officials⁷⁹, and an authorization for the Director to allow outside agents to sell hunting <etc.> licenses⁸⁰.

1967-68⁸¹: The benefits from proper management of fish and wildlife resources accrue to the public as well as to sportsmen. Sportsmen now contribute \$110,000,000⁸² annually to the Massachusetts economy through direct purchases and via the state sales tax. License revenue alone cannot support the agency. It is logical that the sales tax should be a source of help. It is also logical that other funds be used as well, since the general public enjoys using wildlife management areas almost year-round.

—Chapter 131 of the General Laws was recodified with an effective date of December 21, 1967^{83,84,85}.

—During this first year of the Realty Section’s formal existence there were six new areas acquired in Berkshire and Worcester counties and additions were made to six others. A 70-acre potential warm-water hatchery was acquired in Rochester.

—The Quabbin creel census showed that 59,000 anglers harvested 49,680 fish. However, decreases in lake trout and landlocked salmon were noted and attributed to a scarcity of suitable forage fish. With the permission of the M.D.C., 100,000 gravid adult smelt and 50 million smelt eggs were planted in the reservoir and tributary streams. An additional stocking of 25,000 landlocked salmon was carried out.

—Four ponds in the Southeast District totaling 228 acres were reclaimed for trout. In addition, much of the Squannacook River and its tributaries and impoundments were treated with rotenone and restocked with trout.

—The landlocked alewives transplanted to the Congamond Lakes were successfully established.

—The cooperative venture on the Connecticut River continued and intensified. There were 5600 Atlantic salmon stocked below the Holyoke Dam. A shad tagging study was instituted on the Connecticut River and >2.8 million shad eggs were stocked above the Turners Falls Dam. There was a 70% hatch estimated from the 1967 stocking and juvenile shad up to seven inches in length have been collected.

—The two warm-water pond systems produced 1550 lbs. of largemouth bass, 248 lbs. of smallmouth bass, and 482 lbs. of chain pickerel for stocking. The fish hatcheries produced 1,676,995 brook, brown, and rainbow trout for stocking open waters.

—The game program developed an experimental strain of pheasants which may survive in marginal habitats and 100 such hybrids have been reared.

—The introduction of sharptailed grouse to Nantucket remained experimental. Limited reproduction has been noted.

—Major changes were made in the deer hunting regulations, including the provision that an “antlerless” permit was needed to harvest does or males with antlers less than three inches.

—Survival of wood duck ducklings at Great Meadows remained poor and the study area was expanded to nine other areas in central Massachusetts.

—There were 2217 black ducks banded during the winter banding program. An airboat was acquired to facilitate waterfowl capture during summer and 800 ducks of five species were captured and banded.

—Canada goose nesting studies were conducted on the Sudbury Reservoir system and 110 geese transplanted to central and western Massachusetts over the past two years.

—The Cooperative Wildlife Research Unit completed its long-term evaluation of the Quabbin turkey restoration⁸⁶ and turned the program over to the Division. Studies are underway on the ecology of Muskeget Island and its gull colony. Dr. Sheldon’s book on his long-term woodcock study was published⁸⁷. Dr. Joseph S. Larson joined the Unit as Assistant Leader.

—Subscriptions to *Massachusetts Wildlife* now stand at 38,554. An attempt to change subscriptions to a fee basis failed in the Legislature. There were 15 guest appearances on television and several press tours or public events.

—Legislation included a provision that persons may carry firearms for target shooting on Sunday⁸⁸, a statute protecting the inland wetlands of the Commonwealth⁸⁹, an authorization for the issuance of free fishing licenses or certificates to mentally retarded individuals⁹⁰ or groups⁹¹, an authorization for the sale of the Sutton Fish Hatchery⁹², a provision for the issuance of free licenses to persons in the military or naval service through 1970⁹³, a provision for a \$1 million bond issue for land acquisition⁹⁴, and an authorization for the Director to issue a so-called “rifle ban” in certain counties⁹⁵.

1968-69⁹⁶: New wildlife management areas were established in Conway, Lenox and Savoy. There were additions to six other areas and an option for 1700 acres in Middleborough is now being pursued.

—The Quabbin Reservoir investigations continued with the creel census. Decreases in lake trout harvest were again noted and attributed to a scarcity of suitable forage fish. The landlocked salmon harvest increased slightly and was attributed to influx from the 1967 stocking. There were 50,000 gravid smelt and 1 million viable smelt eggs planted or stocked, as well as 3200 landlocked salmon and 20,000 9-inch-plus rainbow trout.

—The cooperative Connecticut River venture continued and ≈10,320 Atlantic salmon smolts were stocked below the Holyoke Dam. Shad tagging studies continued on the Connecticut River and ≈3 million shad eggs obtained below Holyoke were planted in the Merrimack River and coastal streams.

—Ten ponds totaling 358 acres were reclaimed for trout and warm-water fisheries management.

—The Westborough pesticides laboratory found an increase in DDT residues in its 1968-69 samples over those from 1967-68.

—The Division's warm-water pond systems produced 1190 lbs. of largemouth bass, 290 lbs. of smallmouth bass, and 231 lbs. of chain pickerel.

—The McLaughlin trout hatchery was completed and is being brought on line. It is expected to produce ≈200,000 lbs. of trout annually. The Hartsville Hatchery will soon be returned to the U.S. Fish and Wildlife Service after brief use by the Division. The hatcheries produced 1,623,249 brook, brown and rainbow trout for stocking in open waters.

—The Game Research Section initiated a mourning dove banding project in conjunction with the Massachusetts Audubon Society. A total of 2101 doves were banded at 11 sites.

—The forest pheasant project continued and a large starter population is now available. Some of the chicks produced will be placed on an island test site.

—The Quabbin wild turkey restoration project continued and the bird is considered established there, although at a low level (n=50). A transplant from Quabbin to Douglas was undertaken.

—Canada goose studies in the Sudbury Reservoir system continued and goslings were transplanted to Berkshire, Franklin, and Worcester counties. Four tagged goslings transplanted to Templeton in 1967 returned there this year.

—There were 1558 ducks (1300 black ducks) banded in winter and 650 ducks of seven species banded pre-season with the airboat. There was a special scaup season during the 1968 hunting season, but no significant hunter participation.

—The Cooperative Wildlife Research Unit has a Canada goose study underway in Manitoba, a food utilization study by ruffed grouse, a black duck food habits study on Cape Cod, waterfowl investigations on the Connecticut River, and a sparrow hawk nesting study. Dr. Wetherbee prepared a manuscript on Muskeget Island, which will be published in book format⁹⁷. Dr. Larson developed a technique to sex beaver by examination of blood smears⁹⁸. A study on waterfowl usage of interstate highway impoundments was completed⁹⁹.

—The Information & Education Section continued with its usual activities regarding *Massachusetts Wildlife*, press releases, film loans, exhibits, and the Junior Conservation Camp.

—Legislation included a requirement for persons hunting deer with a firearm to wear 400 in² of hunter orange¹⁰⁰, an authorization for the Division to acquire land and construct a fishing pier¹⁰¹ and to provide a sport fishing program¹⁰² at Cook Pond in Fall River, and a provision exempting paraplegics from paying a fee for hunting <etc.> licenses¹⁰³.

1969-70¹⁰⁴: The Board emphasized that the greatest threat to wildlife is habitat destruction. Inland and coastal wetlands are, at present, the most valuable lands that we have. They are vital to wildlife and to water-based outdoor recreation. There

was pending legislation that would allow the Division to acquire valuable wetlands by eminent domain. The bill failed but has been amended and resubmitted.

—Every dollar from the 1966 license increase and more has gone into land acquisition. The largest acquisition of 1970 was the 1540-acre Rocky Gutter purchase. Long-range plans for the Swift River property were being developed. A major acquisition was the 90-acre “Robin Farms” campground in Belchertown. The existing lodge may be renovated for the headquarters of the anticipated new District. Additions were also made to properties in Berkshire, Bristol, Hampden, Hampshire, Middlesex, and Worcester counties.

—After 15 years, the Division has outgrown its Field Headquarters in Westborough. The Division has received a tract of land and two buildings adjoining the Westborough WMA¹⁰⁵. However, these buildings are decrepit and it is more feasible to tear them down and start anew. Initial plans have been drafted.

—The federal grant for pesticide monitoring expired in January 1970. However, the Division received a \$132,000 grant from the Division of Water Pollution Control to continue and expand the monitoring program on the major watersheds.

—The Quabbin Reservoir investigations tallied 373 landlocked salmon harvested but a satisfactory sport fishery has not yet been established. Most (77%) of the harvest derived from the 1967 stocking. Lake trout numbers continued to decline, with a creel of 1275 fish.

—Efforts to establish a cold-water fishery in Littleville Reservoir failed due to its apparent “contamination” by warm-water fish.

—The Kokanee salmon project at Onota Lake continued for the third year with the release of 101,000 fingerlings. Landlocked smelt are now firmly established in the Congamond Lakes.

—Ten walleye were taken in Lake Chauncey but there was no evidence of reproduction from the 1966-68 year classes. Northern pike appear to have become established in Cheshire Reservoir but not in Brimfield.

—There were 65,000 shad lifted over the Holyoke Dam¹⁰⁶. About 3 million shad eggs were stripped from shad taken below Holyoke Dam and planted in the Nemasket and Merrimack rivers.

—Salmon smolts (n=54,000) were stocked below the Holyoke Dam for the third year as part of the cooperative Connecticut River venture. The four affected New England states wrote to the Secretary of the Interior, requesting that he direct the Federal Power Commission to require fishways at the five power projects on the Connecticut River.

—The new McLaughlin Hatchery (Figure 47) was dedicated in April 1970 and attained its production goal of 200,000 lbs. The Palmer Hatchery will be converted into an experimental salmon hatching and rearing station.

—The two warm-water pond systems produced 830 lbs. of largemouth bass, 540 lbs. of smallmouth bass, and 205 lbs. of chain pickerel.

—There were 341,485 brook trout, 77,265 brown trout, and 835,990 rainbow trout stocked from the hatcheries.

—The deer herd rapidly expanded after two years under the antlerless permit sys-

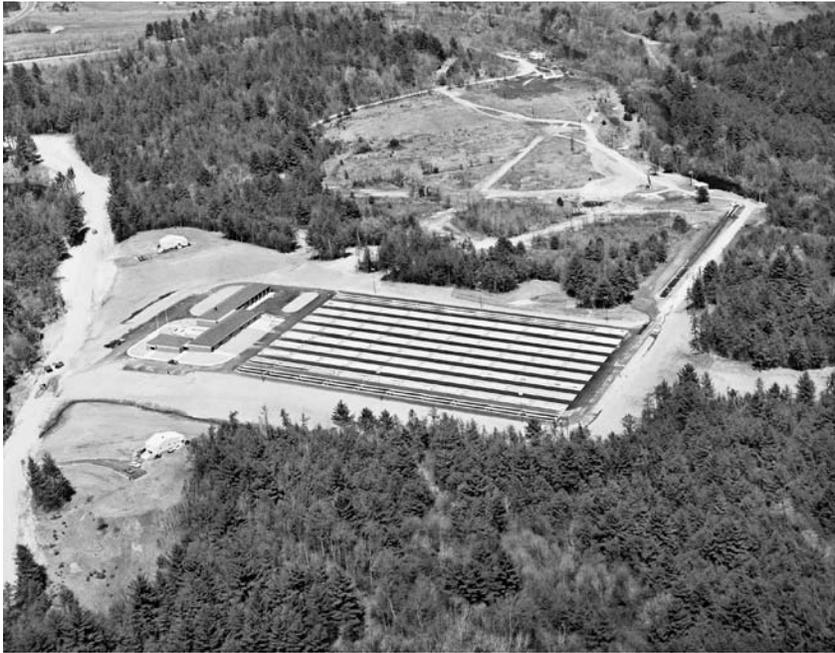


Figure 47. Aerial view of McLaughlin Trout Hatchery, Belchertown, 1969.

tem. The number of general permits increased from 2000 to 4000. Computers play a vital but simple role in the processing of the permits.

—Two black bears were found gamboling about in northern Berkshire County in October 1969¹⁰⁷. The consequent public attention drew attention to the alleged scarcity of the animal.

—The “forest pheasant” program continued and ≈200 adult brooders were released in the Quabbin Reservation, on Martha’s Vineyard and in southern Berkshire County.

—The wild turkey restoration project at the Quabbin and elsewhere is still showing slow growth.

—Division staff conducted summer banding of woodcock broods, taking seven broods of 21 chicks. Over 1900 mourning doves were banded at seven sites.

—An evaluation of “starling-proof” wood duck nesting boxes has begun.

—Canada goose trapping operations resulted in two adults and 24 goslings which were transported to three sites. Fifty other geese were banded and released at the capture site.

—Winter banding yielded 2119 ducks (91% black ducks) while there were 491 ducks of eight species and 25 other birds of five species taken in pre-season banding.

—There were 57,250 pheasants (plus 5535 for the club program), 3635 quail, and 2500 white hare stocked.

—The Cooperative Wildlife Research Unit has studies underway on the growth and survival of wood ducks, black duck feeding in Nauset Marsh, ruffed grouse habitat and bobcat populations on the Connecticut River.

—The Information & Education Section continued to publish and promote *Massachusetts Wildlife*, sponsor the Junior Conservation Camp, issue press releases, staff exhibits, and hold speaking engagements. The Section also oversees the Division’s museum, begun in 1968.

—Legislation included a provision that the Division of Water Pollution Control is to investigate fish kills when requested by the Director¹⁰⁸, a change in the amount of hunter orange clothing required for deer hunting¹⁰⁹, a provision allowing certain fishing in Silver Lake¹¹⁰, a provision for reimbursement to the Division for the value of fish killed by pollution¹¹¹, and an authorization for paraplegics to hunt from non-moving motor vehicles and recreational vehicles¹¹².

THE DIVISION OF FISHERIES AND WILDLIFE, 1970-2012: A SUMMARY

The “Division of Fisheries & Game” was renamed the “Division of Fisheries & Wildlife” in 1974. At the same time, the Board was increased from five members to seven. The two new members were to be appointed at-large and were to have a particular interest in nongame and endangered species, and one of whom must be a wildlife biologist. The five “traditional” members were to be appointed respectively from the Division’s five wildlife districts.

—The new Connecticut Valley Wildlife District began operation at the Swift River Wildlife Management Area in 1972 with a one-person staff.

—Finances continued to be a concern with license increases going into effect in 1972, 1980, and 1996. The Commissioner of Administration & Finance was given authority to set fees by regulation in 1980, somewhat reducing the challenges in revising license fees. New stamps for waterfowl hunting (1974), wildlands acquisition (1991), and hunting with primitive firearms (1996) were created.

—The Inland Fisheries & Game Fund was eliminated in 1975 and again in 2003 but was soon reinstated in both instances with the strong support of the sportsmen and other environmental groups.

—The Division’s Directors included James M. Shepard (1964-1975), Colton H. Bridges (1975-1976), Matthew B. Connolly, Jr. (1976-1979), Richard Cronin (1979-1988), and Wayne F. MacCallum (1988 to date). Three of those Directors left the Division for other employment and one (Cronin) died in office.

—The Field Headquarters (FHQ) moved from its previous location to another building (the former “Overlook” cottage) on the Lyman School grounds in 1976. In September 2012, the FHQ moved to temporary quarters in West Boylston pending the construction of a new “green” energy-efficient building at the Westborough location.

—The Wilbraham (1985), Sandwich (1988) and Ayer (1999) Game Farms were closed and the staff transferred to other installations. Pheasants (and occasionally quail) were subsequently purchased from commercial vendors.

—The Podick Springs section of the Sunderland Hatchery was transferred in 1983 to the U.S. Fish & Wildlife Service for a salmon rearing station.

—Bond monies to acquire and protect key wetlands became available in 1972, leading to the purchase of the substantial Hockomock Swamp area. As the years progressed, additional land monies became available from bond issues, wildlands stamp funds, Natural Heritage & Endangered Species funds, and the \$1.00 license fee increase. By FY12, the Division held ≈160,450 acres in fee.

—In subsequent years, the use of Conservation Easements (CE) became a valuable tool in protecting important habitats. By 2012, the Division held CE’s on ≈35,600 acres.

- Contract realty agents were first used in 1972 on a provisional basis.
- The Division participated in a strategic planning effort between 1975-1982, but eventually withdrew from the highly structured federal program.
- The Board established new regulations on falconry (1976), wildlife rehabilitation (1989), problem animal control (1989), a domestic animal list (1990), aquaculture (1995), and ferrets (1996).
- There were 4119 returning Atlantic salmon recorded at the Holyoke fish lift between 1955-2011. The U.S. Fish & Wildlife Service ceased Atlantic Salmon propagation (and hence restoration) in July 2012.
- There were 15,000 American shad recorded at Holyoke in 1960, 66,000 in 1970, 380,000 in 1980, 360,000 in 1990, 225,000 in 2000, and 164,000 in 2010. There were 490,431 lifted in 2012, 247% of the previous 10-year mean.
- There were \approx 137.6 million Atlantic salmon fry and \approx 5.4 million smolts stocked in the Connecticut River watershed between 1967 to 2011.
- The stocking of walleye in Assawompsett Lake, Lake Chauncey and elsewhere failed due to lack of reproduction. Kokanee salmon in Onota Lake and elsewhere were also unsuccessful.
- Quabbin Reservoir developed an excellent lake trout fishery. Landlocked salmon, rainbow trout, and smallmouth bass also became highly popular there, the first two sustained by stocking. Lake trout reached Wachusett Reservoir through the Quabbin Aqueduct and became established there.
- Northern pike and tiger muskellunge (1980-2006) were stocked in several water bodies statewide but were sustained only through donations of surplus fish from other states.
- The first catch-and-release fishing areas were set up in 1973.
- A year-round fishing season was established in 1976.
- An “urban angler” program began in 1978.
- Trout pond reclamation and the liming of ponds as a buffer against acidification were phased out.
- The hatcheries produced >7,423,000 brook, >7,421,000 brown, and >17,019,000 rainbow trout (Figure 48). In addition, the hatcheries periodically produced or raised Atlantic, coho, and Kokanee salmon, tiger trout, sea-run brown trout, lake trout, northern pike, and tiger muskellunge.
- The first deer hunting season for paraplegics was held in 1972.
- The first “primitive firearms” deer hunting season was held for three days in 1973. Allowable firearms were gradually liberalized as technology advanced. Archery was allowed during the primitive firearms season in 1998. The season was gradually increased to extend from the Monday after the close of the “shotgun-only” season to December 30 or 31.
- The archery season was gradually increased to six weeks.

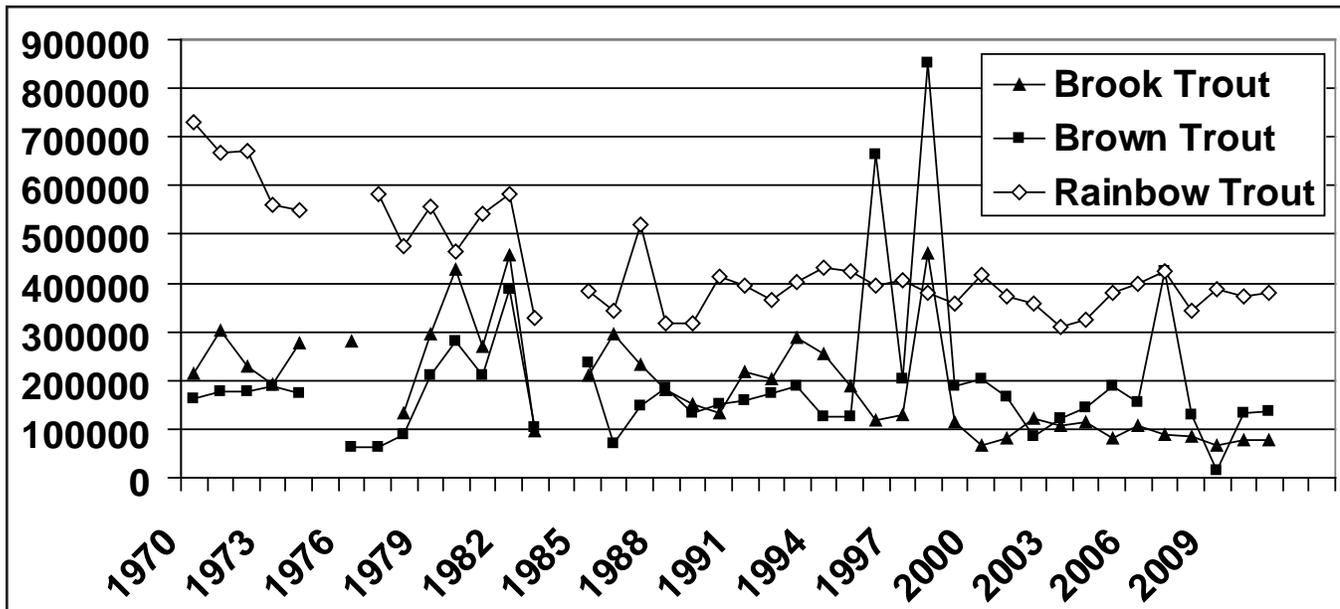


Figure 48. Numbers of Brook, Brown and Rainbow Trout (all age classes) stocked in Massachusetts waters, 1970-2011.

—The antlerless deer permit zones were revised to consist of 10 county based zones in 1974 and 14 ecologically based zones in 1983 (Zone 4 later split in two). Permit quotas were set on the basis of deer population density goals within each zone. Hunters were then able to obtain a variable number of permits, depending on the zone for which they applied.

—Special controlled deer hunts were held at Crane’s Beach in Ipswich and in the Quabbin Reservation. The Crane hunt achieved its objective and was terminated. The Quabbin hunt continued in a maintenance mode.

—A special February deer hunt on Nantucket in 2005 was cancelled after one year due to public resistance.

—The black bear hunting season was reduced to six days in 1970 but gradually increased to 35 days in 2006. Bears continued to increase in numbers and distribution with breeding animals present into Middlesex County and vagrants in northeastern and southeastern Massachusetts.

—A fisher trapping season was initiated in 1972. The animal rapidly expanded its range across the state and was found statewide (except on the offshore islands) by 2005.

—A coyote hunting season was initiated in 1980. Coyotes continued to expand their range across the state to include all areas except Martha’s Vineyard and Nantucket.

—Raccoon rabies entered the state in 1992, gradually spreading through all main-land counties.

—The wild turkey was successfully restored to Massachusetts in 1972-73 and the first spring hunt initiated in 1980 and the first fall hunt in 1990. In-state trap-and-transplant of 561 turkeys between 1979-1996 resulted in the establishment of turkeys statewide (except Nantucket). By 2012, turkeys were hunted in all occupied counties in both spring and fall.

—A 3-zone duck hunting season was implemented, reducing the conflicts between

early and late and eastern vs. western hunters. The Canada goose season was also zoned and special early and late goose seasons established.

—Non-toxic shot was required for all waterfowl hunting in 1988.

—The Division’s forestry program began with the hiring of a wildlife biologist with expertise in forest management and later expanded to include other foresters and habitat management specialists overseeing several forest and open land initiatives.

—The Division and the Division of Law Enforcement jointly implemented a large animal response team to address hazardous situations involving black bear and moose.

—The Hunter Education Program was administratively transferred from the Division of Law Enforcement to the Division in 2000.

—Leghold traps were prohibited in most circumstances in 1975 and prohibited outright by referendum in 1996. The referendum also restricted body-gripping traps to permit-only use in certain nuisance situations and the beaver population ballooned. In addition, the referendum banned the hunting of bear and bobcat with hounds or bait and removed the qualification that Board members must have held a sporting license for five years.

—The Division received regulatory authority over reptiles and amphibians in 1979.

—The first statutorily authorized Massachusetts list of endangered <etc.> species was approved in 1980, comprising the federal list and a few other species.

—An *ad hoc* Nongame Advisory Committee was set up in 1981.

—The bald eagle restoration program began in 1982 with the hacking of two eaglets from Michigan at a release tower in the Quabbin Reservation.

—A “Nongame” bill was passed in 1983 which formalized the Advisory Committee, established an income tax checkoff and the Nongame Wildlife Fund, and expanded the Division’s authority for nongame.

—The Natural Heritage Program was transferred from the Department of Environmental Management to the Division in 1984.

—A comprehensive Massachusetts Endangered Species Act was passed in December 1990, providing for a formalized list of endangered, threatened and special concern species and a process for the designation of significant habitats, penalties, and enforcement. The implementing regulations were approved in January 1992. In 1996, the statute was amended to allow for issuance of “conservation permits” to provide for offsetting the degradation of rare species habitat.

—An active Biodiversity Initiative was begun in 1996 to restore altered habitats and describe, project, and plan for conservation of diverse natural communities. The BioMap (2001), Living Waters (2003), and BioMap2 (2010) documents and maps were constructed as a guide to preserving the state’s biodiversity.

—The Division partnered with the Massachusetts Audubon Society in 1985 to implement Project WILD, a national wildlife curriculum for educators.

—*Massachusetts Wildlife* magazine was published with a full-color cover in 1973 and put on a subscription basis in 1986.

—On-line hunting <etc.> license sales began in 2006 (jointly with traditional paper licenses) and commencing in 2012 all licenses were issued only by electronic means.

“A NATIONAL TEACH-IN ON THE CRISIS OF THE ENVIRONMENT”¹: THE 1970s

The 1970s² saw the creation of the Environmental Protection Agency and the first Earth Day (1970), the Watergate affair (1972) and the consequent resignation in 1974 of President Richard Milhous Nixon (1913-1994), the terrorist attack at the Munich Olympics (1972), the end of the Vietnam War in 1973 and the subsequent fall of South Vietnam (1975), worldwide inflation and the Arab oil embargo (1973-74), the U.S. bicentennial (1976), the withdrawal of the United States from the Panama Canal Zone (1977), the *Amoco Cadiz* oil spill in France (1978), and the Three Mile Island nuclear accident (1979).

Massachusetts experienced the second great Chelsea fire (1973), the completion of the W.E.B. DuBois Library at the University of Massachusetts (1974), the beginning of the Boston busing crisis (1974-1988), the *Argo Merchant* oil spill (1976) and the massive Blizzard of 1978.

The 1970s saw the inception of a host of ground-breaking environmental laws. The National Environmental Policy Act (NEPA)³, signed into law on January 1, 1970, delineated U.S. national environmental policy and set forth a procedure for coordinating federal environmental actions. NEPA’s most basic thrust was to create a requirement for all federal agencies to prepare Environmental Assessments and Environmental Impact Statements, setting forth the effects of an agency’s action on the environment. The Clean Air Act of 1963⁴ was enacted to protect the public from airborne pollutants hazardous to human health. In 1970, a significant extension expanded the federal mandate for industrial and mobile pollutant sources, increased enforcement authority, and addressed acid rain, ozone depletion and airborne toxicants. The Clean Water Act⁵ of 1970 set goals to control the release of toxic substances into water, ensure that surface water met recreational standards by 1983, and to minimize additional pollution by 1985.

The Marine Mammal Protection Act^{6,7} (1972) was enacted to replace a diversity of inadequate and contradictory laws with a single concise framework. It set in place a moratorium of indefinite length on the importation of marine mammals or parts, and prohibited—with few exceptions—the taking of such mammals by anyone subject to U.S. authority. The Act also designated population “stocks” which were treated equally with a species.

Also in 1972, Congress passed a Joint Resolution⁸ asking President Nixon to declare a “National Hunting and Fishing Day”. The President complied, urging “...all citizens to join with outdoor sportsmen in the wise use of our natural resources and in insuring their proper management for the benefit of future generations.”

Building on the previous 1966 and 1968 Acts, Congress in 1973 passed the comprehensive Endangered Species Act of 1973^{6,9}. The Act sought to protect such species “...from extinction as a consequence of economic growth and development untended by adequate concern and conservation”. It recognized that endangered species of wild-

life and wild plants “...are of esthetic, ecological, educational, historical, recreational, and scientific value to the Nation and its people” and declared that all federal entities must seek to conserve such species and to utilize their authority in furtherance of the Act. The Act further set forth and defined the categories of “threatened” and “endangered”, explicitly provided that any member of the plant or animal kingdoms was eligible for listing and protection under the Act, created a listing process, and provided a mechanism for protecting the “critical habitats” of these organisms.

The Convention on International Trade in Endangered Species of Flora and Fauna (CITES)^{6,10} is a multilateral treaty opened for signature by consenting nations in 1973 and which entered into force on July 1, 1975, after 10 signatures. The treaty’s purpose was to ensure that international trade did not threaten the survival of wild plants and animals by setting up three “Appendices” with varying degrees of protection according to the organism’s status. CITES did not preempt national law, but provided a framework for nations to follow in seeking compliance. As of 2012, 178 of 193 member nations of the U.N. were participants, but only about one-half had adopted fully compliant laws.

Two decisions of the U.S. Supreme Court addressed the authority of states to regulate and manage wildlife. In *Kleppe*¹¹, the Court held that Congress has “complete power” over the public lands, which “necessarily includes the power to regulate and protect the wildlife living there”. However, in the *Baldwin*¹² case, the Court affirmed the right of the State of Montana to issue differential hunting licenses for residents and non-residents.

The fisher (Figure 49) was suspected to be “...still of rare occurrence in the Hoosac Range” in 1869¹³ but was certainly extirpated from Massachusetts well before 1900. Road kills and non-target captures began occurring in northern Worcester County about 1970 and a trapping season was opened in 1972^{14,15}.



Photo © Bill Byrne

Figure 49. Fisher on stone wall, Shelburne.

The 1970s saw a sharp increase and radicalization of animal rights activism and consequent challenges for fish and wildlife agencies. Growing out of a Victorian adjustment to the cultural shocks of industrialism, urbanization and Darwinism¹⁶, the anti-hunting, anti-trapping *Weltanschauung* reflected a philosophy disparate from that of sportsmen, with profoundly diametric views of “humaneness”, the right to pursue a sporting heritage, and the management of wildlife^{17,18}.

The philosopher Peter Albert David Singer (b. 1946) argued that the ethical principle on which human equality rests compels us to “...extend equal consideration to animals too”¹⁹. The theologian, medical missionary and philosopher Albert Schweitzer (1875-1965) had his epiphany in 1915 when, while viewing a herd of hippopotamus, the phrase “Reverence for Life” flashed through his mind²⁰. Yet, Schweitzer would sometimes kill genuinely dangerous animals and would not impose his value system on others²¹. He believed that each person must make up their mind about the relative importance to them of different creatures—to keep alive a nestling, one must find worms—but nothing must be arbitrary or irresponsible. The Spanish philosopher José Ortega y Gasset (1883-1955) also supported the concept that life was the basic reality with which people must contend. However, in his exploration of hunting²², Ortega y Gasset posited that “Life is a terrible conflict...Hunting submerges man deliberately in that formidable mystery...in which homage is paid to what is divine, transcendent, in the laws of Nature”. The writer and environmentalist Paul Howe Shepard, Jr. (1925-1996) also interwove people and nature, advocating the role of sustained contact with nature in fostering healthy human psychological development. He proposed that humans evolved with other species and thus cannot be separated from them—“the hunt makes us human”²³.

By the 1970s, The Wildlife Society—heeding complaints from employers—recognized the need for training wildlife students and professionals in public relations²⁴. Douglas Lee Gilbert’s (1923-1980) text²⁵, directed at professional conservationists, reminded them that natural resource managers must keep knowledge of their constituents “...at or at a higher level as knowledge of natural resource management”. A few years later, the Society’s Elementary Education Committee published an informative teacher’s guide²⁶ setting forth the concepts of wildlife management in a youth-oriented format. The Wildlife Society also recognized that many of the classic or basic writings about wildlife conservation were rare, out of print or appeared only in scientific journals. This historical perspective was addressed in an omnibus volume of *Readings in Wildlife Conservation*^{27,28}.

Wildlife disease was once thought to be ecologically unimportant—“...doubtful if [disease] means much...in a suitable normal environment”—but which can present itself in stressed or weather-impacted populations²⁹. Detailed reference texts on infectious³⁰ and parasitic³¹ diseases of wild mammals and birds³² first appeared in the 1970s, recognizing that “Disease is an important ecologic factor affecting wildlife populations” and accelerating the need for their integration into wildlife conservation programs.

James Byron Trefethen, Jr’s (1916-1976) definitive history of wildlife conservation in North America³³—building on his earlier *Crusade for Wildlife* (1961)—documented past tragedies and later successes. Conservationists, preservationists, and exploiters were depicted in context³⁴ and in conflict along the path to modern wildlife law and practice.

The population ecologist Graeme James Caughley (1937-1994) sought to explain why a population was declining and how to arrest the decline. His text on vertebrate

population analysis³⁵ strikingly clarified and condensed complex material previously scattered among abstruse journal articles. Caughley deliberately selected those procedures most relevant to field applications and simplest to understand, believing that field biologists would apply what laboratory scientists sought to explain.

1970-71³⁶: The Board was “increasingly alarmed at the growing anti-hunting hysteria presently sweeping the country”. The Division continued to show interest in constructing a new Field Headquarters adjacent to Lake Chauncey.

—The Realty Committee decided that there would be an “all-out” effort to add acreage to existing wildlife management areas, particularly privately owned “inholdings”. Acreage was added to eight areas and three riverfront properties.

—There were 24,380 Atlantic salmon planted in the Connecticut River by the four abutting states, of which 4450 were smolts produced at the Palmer Hatchery. There were still fish passage issues at the Holyoke, Turners Falls, Vernon, Bellows Falls, and Wilder dams.

—Shad fishing became an important recreational fishery with 17,558 anglers catching 14,522 shad at Holyoke during the spring run. There were 300,000 fertilized shad eggs stocked in the Agawam River. Fifty-four adult shad were stocked in the Mattapoissett River. The North River saw a creel of 456 shad and a state record fish of 8½ pounds.

—Quabbin Reservoir saw a 16% increase in anglers over 1969-70 and a 30% increase in the number of creeled fish. The harvest of landlocked salmon increased to 887, lake trout to 1454, and rainbow trout to 4424. The smelt population continued to expand and limited control was necessary due to clogging in the water distribution system.

—Warm-water fish were reestablished in Littleville Reservoir and anglers took 9347 trout and 1301 warm-water fish. The plan was to manage Littleville as a two-story fishery.

—There were 94,200 fingerling Kokanee salmon previously stocked in Onota Lake. However, during 1971 only three were caught by anglers. Interspecific competition with smelt was suggested to be the limiting factor in establishment of Kokanee in Onota.

—Lake Chauncey showed a further decline in the walleye population, with only three fish taken during sampling. This was thought to be evidence of the folly of stocking fry on top of an existing fish population.

—The northern pike population in Cheshire Reservoir increased, with the ice fishery doubling from 317 lbs. in 1970 to 636 in 1971.

—Four ponds in southeastern Massachusetts totaling 329 acres were reclaimed for trout management³⁷.

—Interstate cooperation in February between Rhode Island and Massachusetts resulted in the spreading of 350 tons of lime on Wallum Lake as a buffer against acidification³⁸.

—The Cooperative Fisheries Research Unit was conducting two studies on shad and one on blueback herring.

—There were 213,500 brook trout, 161,790 brown trout, and 731,733 rainbow trout

stocked from the hatcheries.

—The Board amended the black bear hunting regulations to provide for a 1-week November season and mandatory tagging. Permits were issued to 214 individuals in 1970, none of whom harvested a bear. Two additional tame, publicly-visible bears in the Town of Florida in October 1970 were found to be released animals. The owner of the released bears was apprehended and convicted.

—Management of nuisance beaver continued to be an expensive and time-consuming job for Division personnel.

—Turkeys in the Quabbin area and the transplant sites seemed to be holding their own. Most of a tame flock in the Town of Washington were drugged and removed from the wild.

—There were 1421 adult “forest pheasants” released in the Quabbin Reservation and on Martha’s Vineyard. Survival and reproduction was noted on the Vineyard but not in Quabbin. Efforts were made to integrate more copper pheasant lineage into the hybrid bloodline.

—There were 2040 mourning doves and 83 adult woodcock banded as part of the we-bless migratory bird banding program.

—Winter waterfowl banding yielded 2303 ducks (62% black ducks) on coastal areas and inland parks. There were 980 ducks of nine species, nine marsh birds of five species, and 50 Canada geese banded during pre-season banding.

—Wood duck production on the Sudbury area sites dropped 17% from the previous year.

—A theft at the East Sandwich Game Farm caused the loss of >400 bobwhite quail and >1700 pheasants.

—There were 47,076 pheasants (plus 6942 for the club program), 3390 quail, and 1101 white hare released (exclusive of field trial releases).

—The Information & Education Section issued 27 major news releases, including an exposé of the distorted “Say Goodbye” NBC-TV program on vanishing species.

—An all-out publicity campaign was mounted in support of the pending “Permanent Protection Wetlands Bill”. Substantial efforts were also made in support of the proposed acquisition of the Hockomock Swamp property.

—The Section recognized “anti-hunting sentiment as the second greatest threat to the sportsman’s future” and directed substantial efforts to the education of non-hunting conservationists.

—*Massachusetts Wildlife* is now incorporating articles of general interest to all conservationists, not just sportsmen. One issue of the magazine (July-August 1970) was devoted entirely to youth.

—Legislation included an authorization for minors aged 12-14 to hunt or trap without a license when accompanied by a licensed adult and one firearm and bag limit³⁹ and a provision that municipalities may regulate motorboats on great ponds⁴⁰.

1971-72⁴¹: Recognizing the need for additional finances to sustain existing programs and services, the Board voted to propose a license fee increase. Regional meetings were held with sportsmen to develop a process that would be satisfactory to all. The Division plans to advocate pheasant and trout stamps.

—Legislation was secured for a \$5 million bond issue to purchase and protect key wetlands. The Pauchaug Brook wildlife management area on the Connecticut River was acquired. Properties were also acquired in Belchertown, Groton, Mashpee, Northfield, and Sturbridge, among others. Work started on the significant Hockomock Swamp acquisition which will ultimately amount to 5000-6000 acres. As of July 1972, the Division owned 25,000 acres in total.

—The Division has now hired consultant land agents to handle title examinations and appraisals since the existing small staff cannot practically do so. The process must be simplified so that the hiring of consultants be approved within weeks rather than months.

—There was an important settlement with the Holyoke Water Power Company whereby the company agreed to enlarge their facilities in two stages to lift 1 million shad and 40,000 Atlantic salmon⁴². The Palmer Hatchery produced 8300 salmon smolts for the Connecticut River program.

—The cold, wet spring adversely affected the shad fishery at Holyoke, reducing it to about one-half of the previous year's levels. Only ≈25,500 shad were passed over the fish lift. The shad fisheries on the North and Palmer rivers were also down by one-half.

—The Quabbin coldwater fisheries continued to excite anglers, with participation increasing to 70,665 anglers who took 94,205 fish. However, the harvest of landlocked salmon and lake trout dropped considerably, with the rainbow and brown trout harvest stable. There were 100,000 lake trout, 26,000 landlocked salmon, and 9200 rainbow trout stocked in Quabbin during the past year. The smelt population continued to grow and 50,00 adult smelt and 30 million eggs were shipped to three bordering states.

—Littleville Reservoir continued to be managed as a two-story fishery. The unauthorized establishment of smelt at Littleville precluded any attempt to establish Kokanee salmon there. The effort to establish these salmon at Onota Lake is now beginning to show promise.

—The northern pike fishery in Cheshire Reservoir was still expanding, with a 36% increase over the previous year.

—The Board approved two experimental fly-fishing-only areas, one each on the Nis-sitissit and Swift Rivers.

—Polychlorinated biphenyls (PCBs) were found in 14 rivers as compared to nine the previous year. These pollutants are expected to increase further.

—Studies on the environmental impact of the Northfield Pumped Storage Project on the Connecticut River and the Bear Swamp Project on the upper Deerfield were under-way.

—There were 304,300 brook trout, 178,450 brown trout, and 666,400 rainbow trout stocked, as well as 65,200 coho salmon, 40,000 Kokanee salmon, 8600 Atlantic salmon, 10,600 landlocked salmon, and 49,850 lake trout.

—The antlerless deer permit system entered its fifth year, with permits available for farmer-landowners, Martha's Vineyard, Nantucket, and mainland Massachusetts.

—The archery deer season was extended from two to three weeks. However, a muzzle-loading season was rejected due to a concern over smoothbore versus rifled muzzleloaders. A special deer hunt for paraplegics was approved but had to be canceled for lack of a suitable area.

—The survivability and lack of inherent wildness in the Quabbin-strain wild turkeys demanded that the Division change its emphasis if turkey restoration is to succeed. In 1972, seven wild-trapped birds from western New York were released in Beartown State Forest and more will follow next year, if possible.

—The Board approved a 4-month fisher trapping season. The Board also voted to remove bobcat and red and gray fox from the "unprotected" list and recategorize them as game animals with a shortened open season.

—The Board also voted to approve the staff proposal for an experimental 3-year zoned waterfowl season.

—The waterfowl biologist was pursuing a project to "imprint" black ducks to above-ground nesting structures to reduce predation on ground-nesting birds.

—Three transplants totaling 59 goslings were made from the Southborough-Framingham area to central and western Massachusetts.

—Winter black duck banding yielded 619 ducks (77% black ducks) of three species while the park mallard project produced 807 ducks (76% mallards) of six species. There were 1211 waterfowl (28% wood ducks) and marsh birds banded by seven techniques (41% by airboat).

—There were 2163 mourning doves and 97 woodcock banded for the webless migratory bird project.

—The wood duck nesting project showed that wood duck production is slowly increasing statewide and increasing greatly in southeastern Massachusetts.

—Due to the lack of good release sites and rearing facilities, as well as budgetary problems, the forest pheasant program was discontinued.

—The culprit who stole >1500 game birds from the Sandwich Game Farm was apprehended; however, vandalism occurred at all Division game farms.

—There were 48,283 pheasants (plus 6712 for the club program), 3368 quail, and 2500 white hare released, exclusive of field trial releases.

—The Information & Education Section hosted open-house events to celebrate National Hunting & Fishing Day, produced visual and print items to promote wetlands conservation, and continued to refine *Massachusetts Wildlife* as an all-public magazine.

—The Section gained two highly qualified wildlife photographers, Jack Swedberg and Bill Byrne.

—Legislation included a provision for the protection of certain endangered species^{43,44}, an exemption for certain zoos from Division authority⁴⁵, an authorization for hunting on

commercial shooting preserves on Sundays⁴⁶, procedures strengthening importation permits for fish and wildlife⁴⁷, restrictions further regulating the discharge for firearms near buildings⁴⁸, a designation of the Montague Fish Hatchery as the “Bitzer” Hatchery⁴⁹, provisions for a deer hunt for paraplegic sportsmen⁵⁰, and strengthened protections for birds of prey⁵¹.

1972-73⁵²: A much-needed license fee increase went into effect on October 11 [1972]. Due to an oversight, the failure to stipulate an effective date resulted in the increase becoming effective 90 days after passage (i.e., not on January 1), even though no [new] licenses were available.

—The license printer also failed to deliver the 1973 licenses in time for Christmas sales and the licenses were not actually delivered until the second week of January. A system was worked out with the Division of Law Enforcement to allow sportsmen to pursue their activity but later to provide proof of license purchase. Every effort was made to inform sportsmen of the change.

—In August 1972, game manager Peter R. Pekkala (1932-1992) was assigned to the new Connecticut Valley Wildlife District in Belchertown. Eventually, a permanent District Manager and full crew will work out of this facility.

—Lands were acquired in Charlton (by gift) and Chesterfield, as well as access sites in Orleans, Winchendon, and along the Nissitissit and Squannacook rivers. The Hockomock project required the drafting of a large-scale map assembling by ownership all parcels anticipated for purchase.

—“One of the most important bills in the history of the Division”, the “Permanent Protection Wetlands Bill” was enacted in July^{53,54,55}. The “...development among the general public of an environmental conscience; the “Land Ethic”...has at last begun to surface in our society as a reality”.

—Due to an abnormally wet and cold spring and the cancellation of the annual shad derby, the shad fishery at Holyoke produced a sharp drop in shad harvest. The Holyoke fish lift also passed only 22,459 fish, one-third of that during the record year of 1970. About 4 million shad eggs were transported from the Connecticut River to the Charles, Merrimack, and Nemasket rivers.

—There were 11,000 Atlantic salmon smolts released at Tarkill Brook in Agawam.

—Smallmouth bass dominated the Quabbin harvest by species numbers, but salmonids were the most numerous by weight. Both lake trout and landlocked salmon catches increased significantly over the previous year.

—The harvest of Kokanee salmon at Onota Lake was disappointing. However, the northern pike fishery (Figure 50) at Cheshire Reservoir continued to excel with a winter harvest of 988 lbs. almost double that of 1971-72. Pike will be stocked in Brimfield Reservoir when the fish become available.

—Experimental tire reef units were emplaced in Lake Chauncey.

—There were 227,179 brook trout; 176,483 brown trout; 669,576 rainbow trout; 66,380 coho salmon; 112,223 Kokanee salmon; 1200 Atlantic salmon; and 19,850 landlocked salmon stocked from hatcheries.

—The Board established a 3-day “primitive weapons [sic] deer season” in December



Photo Courtesy of Jake Burke

Figure 50. Jake Burke with Northern Pike, Onota Lake, Pittsfield, 2013.

1973, but could not allow rifled firearms or impose a special fee due to legislative constraints. Seven deer were taken during this first season.

—The first actual paraplegic deer season was a success in terms of enthusiasm and participation although no deer were taken. The archery season harvest of 77 was a significant milestone, nearly doubling that of the previous year.

—The wild turkey restoration project continued with the transplant of 10 additional wild-trapped New York birds to Beartown State Forest.

—Black bear (Figure 51) hunting continued to increase in popularity and in 1972 the first bear legally harvested since the change to a 1-week season was taken in Savoy.

—For the first time ever, the opening of the sea duck hunting season was delayed, due to the red tide. The season eventually opened with the regular duck season.

—Twenty-six more Canada goose goslings were trapped and transplanted to western Massachusetts and broods have been observed⁵⁶.

—There were 955 ducks (82% black ducks) taken at 22 locations during winter black

duck banding and park mallard banding. This was the worst banding season in several years.

—There were 1393 waterfowl (38% mallards) and marsh birds taken by six methods during preseason banding (a record 60% by airboat).

—Evaluation of the black duck imprinting program and the starling-proof wood duck cylinders⁵⁷ continued. Both black ducks and wood ducks are using the nesting structures.

—Pheasant mortalities at the game farms were high due to an outbreak of eastern equine encephalitis.

—There were 48,645 pheasants (plus 7145 for the club program), 3097 quail, and 1591 white hare liberated, exclusive of field trial releases.

—The Information & Education program devoted much time seeking out and informing sportsmen of the abrupt license fee increase and the postponement of the opening of the sea duck season.

—Staff also had to correct an issue in the national news resulting from a writer who thought the dog restraining order allowing enforcement officers to shoot domestic dogs which were killing deer referred to a shoot-to-kill order on coyotes. The Section oversaw the ceremony honoring the naming of the Bitzer Hatchery.

—The Division still sought to produce *Massachusetts Wildlife* as a all-color magazine, although a color cover appeared in the first issue for 1973.

—Legislation included an increase in fees for propagators' permits⁵⁸, a transfer of the so-called "Warren Colony" property in Westborough to the Division⁵⁹, a provision for a general license fee increase⁶⁰, and a revision of the procedures for hunting by minors aged 12-14⁶¹.



Photo © Bill Byrne

Figure 51. Black Bear digging for ants, Heath.

1973-74^{62,63}: The Board heard a proposal to adopt a nongame wildlife program.

—Ground-breaking began in July for a fishing pier at Cook Pond in Fall River. The Executive Office of Environmental Affairs assisted in title searches relative to the Hockomock acquisition. There were 1078 acres acquired in the Hockomock, as well as 477 acres in Newbury which belonged to the author John Phillips Marquand (1893-1960). Substantial properties in Athol, Halifax, Lenox, and Royalston were also acquired. Gifts included Shepard's Island in the Connecticut River; 267 acres in Chester, which contained old emery mines serving as winter hibernacula for bats; and 157 acres along the west bank of the West River in Mendon, Northbridge, and Uxbridge.

—The first phase of the shad and salmon restoration on the Connecticut River was completed with modifications to the Holyoke fishway and the capture of the first live Atlantic salmon at that facility. There were 114,132 adult shad tallied at the entry to the Holyoke pool, 75% above that over the previous record in 1970. The Board adopted emergency regulations allowing the legal harvest of Atlantic salmon in the Connecticut River, with a daily creel of two fish ≥ 12 inches.

—The Quabbin Reservoir continued to attract a large following of anglers despite a decline in landlocked salmon. The lake trout and bass fisheries are stable and attractive to anglers. Yearling brown trout were stocked in Quabbin in lieu of the salmon.

—Attempts to establish Kokanee salmon in Onota Lake were not highly successful and the fishery was sustained by stocking of fingerlings.

—Creel censuses of ice fishermen at Cheshire Reservoir revealed a sharp drop in fishing pressure and harvest. There was an "alarming" drop in the number of sublegal pike. This was attributed to the chemical control of weeds during the summer of 1972, which likely caused heavy losses among young pike.

—The first catch-and-release fishing programs were adopted at four ponds.

—There were 190,000 brook trout, 186,500 brown trout, and 559,000 rainbow trout produced at the hatcheries and stocked.

—The Attorney General ruled that the wording and requirements of the Division's antlerless deer permit system were lawful⁶⁴. The antlerless permit system was rezoned into eight mainland (and 2 island) zones. There were 5000 antlerless permits available for 1973.

—Fourteen participating paraplegic hunters took a total of two deer in the first successful paraplegic-only deer hunt, which was held on Martha's Vineyard.

—There were 20 additional New York wild turkeys released in Beartown State Forest in the fall of 1973, bringing the total to 37⁶⁵. Reproduction was noted and there are high hopes for this endeavor.

—A trap study committee was appointed by Director Shepard to investigate problems with and alternatives to the leghold trap. The Board voted to allow night hunting of raccoons on wildlife management areas not stocked with pheasant, as well as on two stocked areas on a trial basis.

—The Board discussed proposals for falconry regulations, consistent with the new law allowing such a practice.

—A Massachusetts waterfowl stamp was adopted, with all waterfowlers required to purchase the \$1.25 stamp, 80¢ of which is to go to land acquisition in Canada in cooperation with Ducks Unlimited, Inc.

—There were 57 Canada goose goslings trapped and transplanted to four sites in central and western Massachusetts. Preseason waterfowl banding was curtailed due to the breakdown of the airboat. Bait trapping at natural sites with floating traps yielded 262 ducks, while park mallard trapping produced 163. The winter black duck banding program resulted in 524 ducks (78% black ducks) and the park mallard project resulted in 1387 (86% mallards).

—The black duck imprinting project was terminated. Initial nesting and hatching was successful but the ducks failed to return to nest in the elevated structures. The starling-proof wood duck nesting structures did successfully keep starlings from nesting. However, there was no greater tendency for wood ducks to nest in the cylinders than in conventional wooden boxes.

—There were 49,236 pheasants (plus 6035 for the club program), 1960 quail, and 109 white hare liberated, exclusive of field trial releases.

—The Information & Education Section continued with news releases, exhibits, fishing awards program, and the preparation and dissemination of *Massachusetts Wildlife*.

—The Section gave wide publicity to the apprehension and conviction of vandals who wantonly killed display trout at the McLaughlin Hatchery.

—The Section also implemented the process for selecting the artwork and winner of the waterfowl stamp contest. Two prime-time films on the beaver and the wild turkey were shown on New Bedford Channel 6.

—Legislation included an authorization to implement a falconry program⁶⁶, a provision that the State Treasurer hold certain funds for the Division⁶⁷, further regulating propagators' permits and providing for an "exemption" list of animals not requiring permits⁶⁸, and a provision for a waterfowl hunting stamp⁶⁹. A legislative resolve provided for a study by the Division relative to the implementation of a nongame wildlife program⁷⁰.

1974-75^{62,63}: The environmental agencies were reorganized under an Executive Office of Environmental Affairs⁷¹. The Division of Fisheries and Game was renamed the "Division of Fisheries and Wildlife" and became a component of the Department of Fisheries, Wildlife and Recreational Vehicles, along with the Divisions of "Marine Fisheries" and "Marine and Recreational Vehicles" and the Public Access Board. The Fisheries and Wildlife Board retained its administrative and regulatory powers. However (effective July 1, 1975)⁷², it increased by two members at-large interested in nongame and endangered species, one of whom must be a wildlife biologist (Figure 52). The five others were each to represent one of the Division's five management districts.

—The Board expressed substantial concern that state budgetary cuts may promote attempts to "raid" the Inland Fisheries and Game Fund.

—The Realty Section continued with the acquisition of 1499 acres in the Hockomock Swamp and additions to the Crane Pond, Northeast, and Swift River wildlife management areas, and other properties.



Photo © MassWildlife

Figure 52. First seven-member Fisheries & Wildlife Board, 1975. Left to Right: Henry Russell, Kenneth Burns, James Baird, Bradlee Gage, Roger Williams, Martin Burns, Philip Stanton.

—The Quabbin Reservoir continued to attract anglers despite a “significant” decline in landlocked salmon. Angling pressure is being sustained by lake trout and large-mouth and smallmouth bass.

—Kokanee salmon were maintained by stocking in Onota Lake and appear to have become established in Laurel Lake.

—There was still concern regarding the “alarming” drop in sublegal pike in Cheshire Reservoir, apparently due to mortality from chemical weed control. About 3000 yearlings from Minnesota were stocked in the reservoir in December 1973 with the hope that they will spawn in 1975.

—Emergency regulations were invoked to close Brimfield Reservoir and adjacent waters to the taking of [recently introduced] northern pike via ice fishing.

—Twenty coastal streams were evaluated as to their ability to support sea-run populations of brown and brook trout. Eleven were found to have the ability to support trout for extended periods of time.

—There were 278,000 brook trout, 172,000 brown trout, and 547,800 rainbow trout produced and stocked from the hatcheries.

—Survival and reproduction from the wild turkey stocking in Beartown State Forest was under evaluation. Some birds appeared to have dispersed east and west of the release site.

—A study was underway to investigate the length and popularity of the gray squirrel hunting season.

—Forty-two Canada goose goslings were trapped and transplanted. There were 354 waterfowl banded at natural sites and 402 at parks in pre-season banding in summer 1974. During the 1975 winter banding, there were 2247 waterfowl banded at 32 sites, including 1120 during black duck banding (81% black ducks) and 1127 at parks (85% mallards).

—There were 55,080 pheasants (plus 5543 for the club program), 2880 quail, and 1110 white hare liberated, exclusive of field trial stockings.

—The Cooperative Wildlife Research Unit completed a graduate study of bobcat on the Quabbin Reservation⁷³.

—The Information & Education Section continued with news releases, preparation of exhibits, oversight of the Junior Conservation Camp, development of slide presentations, and preparation of *Massachusetts Wildlife*.

—Legislation included a provision for the quarantine of diseased vertebrates⁷⁴, a prohibition on leghold traps in most situations⁷⁵, further protections for wetlands⁷⁶, further penalties for the illegal taking of deer⁷⁷, a further definition of “loaded shotgun or rifle”⁷⁸, and a provision for the acceptance of hunter education certificates from certain other states⁷⁹.

1975-76^{80,81}: Director James Shepard resigned in 1975 to take a position with Ducks Unlimited. The Board appointed Superintendent Colton Hunt “Rocky” Bridges (1932-1990) to be the new Director and Information & Education Chief Richard Cronin as the new Superintendent.

—Virtually all dedicated funds—including the Inland Fisheries & Game Fund—were eliminated during the closing days of the legislative session. However, last-minute efforts restored the Fund and a “functional” operating budget.

—The Division committed to initiate a strategic planning effort, a Senior Planner was hired, and staff members developed tactical approaches⁸² to the plan.

—The Division also participated in the Statewide Comprehensive Outdoor Recreation Plan to unify and guide all major aspects of outdoor recreation. As part of this activity, the Division completed an inventory of the state’s terrestrial and freshwater vertebrates⁸³ and began an inventory of fish and wildlife habitats. There are >3.6 million acres of fish and wildlife habitat in the state, 80% of which is in some form of private ownership. The final plan will also examine the traditional and new ways in which fish and wildlife meet peoples’ needs and interests.

—There were >2225 acres acquired by the Realty Section, including 1121 acres of the Hockomock, 515 acres (by gift) at the new Chalet site, and 358 acres at Fisk Meadows.

—A record number of shad (n=346,725) were passed over the Holyoke fish lift. A remnant shad run still existed in the lower Merrimack River. Evaluations are underway to ascertain whether suitable spawning and nursery habitat exists in New Hampshire waters.

—About 9000 Atlantic salmon were released from the imprinting pools on Tarkill Brook in Agawam. Two returning adult salmon were noted at the Holyoke lift. About 2200 Atlantic salmon pre-smolts were reared in floating pens in the Artichoke River in Newburyport.

—Fishing pressure at Quabbin remained high, despite a decline in lake trout harvest to 962 fish.

—Winter creel censuses showed a sustained interest in the northern pike fishery at Brimfield Reservoir; the minimum length was increased to 28 inches and the daily creel limit was dropped to two fish.

—A group of 6500 select sea-run brown trout smolts were released on the Mashpee River as part of the experiment in defining their migration patterns.

—Catch-and-release programs were examined at the four experimental ponds previously selected. The practice is effective where the regulations are followed and can provide for recycling of a large number of trout in the fishery.

—A “year-round” fishing season was inaugurated.

—The four older hatcheries saw much-needed improvements during the past two years. There was no information provided in the [1975-76] Annual Report relative to the number of fish produced and stocked.

—Wild turkeys continued to show a dispersal throughout southern Berkshire County, with some reports from the northern Berkshires and from Franklin County.

—Interest in bear hunting continued to grow and three bear were taken by 483 permittees during the 1975 season.

—New regulations required that all otter and fisher trappers must bring the pelts of harvested animals to a checking station for tagging, with a voluntary turn-in of carcasses for age and reproductive tract analyses.

—A zoned gray squirrel season was implemented and the allowable firearms for squirrel hunting in each zone were specified.

—The Board implemented new regulations on falconry, after an earlier public hearing. Eighteen falconers, including three master falconers, were issued permits.

—There were 43 goslings transplanted to two sites. Goose flocks in the Sudbury-Framingham area declined from 191 in 1973 to 110 in 1976.

—The airboat was back in operation and pre-season banding yielded 1513 waterfowl and marsh birds, including 160 at park sites.

—In 1975-76, there were 2247 waterfowl (primarily black ducks and mallards) taken during winter trapping at 32 locations using bait traps (n=1120) and cannon nets (n=1127).

—There were 61,630 pheasant, 2750 quail, and 192 white hare released, exclusive of field trial stockings.

—*Massachusetts Wildlife* was published with both a 2-color interior and full color cover. There were only five issues published in 1976 due to a hiatus between the resignation of one Wildlife Journalist, the hiring of a replacement, and funding issues.

—Substantial time was spent on enlarging the photo exhibit material and film. The Section sponsored an art contest for the waterfowl stamp. Artwork for the archery stamp was provided by a commissioned artist.

—Legislation included a revision of the process for paying deer and moose damage^{84,85}, a reorganization of the Executive Office of Environmental Affairs (including the Fisheries and Game Board)⁸⁶, and a provision for the issuance of complimentary licenses to certain paraplegics⁸⁷.

1976-77^{80,81}: The transition to the new Department organization went smoothly and there was close cooperation between the Division and the Department. In July



Figure 53. Overlook Cottage, Westborough, second Field Headquarters, 2012.

1976, the Field Headquarters moved within the Lyman School grounds to the newly renovated “Overlook” building (Figure 53).

—In the fall, both Director Bridges and Deputy Director Arthur W. Neill resigned to take positions with Ducks Unlimited. Lewis C. Schlotterbeck, the Southeast District Manager, was appointed as Deputy Director (and acting Director). After an extensive search, the Board then appointed Matthew B. Connolly, Jr., a former director of Coastal Zone Management, as the new Director.

—The Senior Planner completed the portion of the state’s plan which addressed human needs and interests.

—The Division was actively involved in the *Argo Merchant* oil spill⁸⁸ and sent a biologist to Nantucket to oversee the oiled bird survey and recovery.

—Western Massachusetts Electric Company signed a settlement agreement regarding the financing and scheduling for the construction and operation of three fishways for upstream fish passage at Turners Falls⁸⁹.

—About 203,000 shad were passed over the Holyoke Dam. Anglers harvested 8300 shad below the dam. The Lawrence fishway on the Merrimack River was monitored but no shad passed the entire length. About 1.7 million shad eggs and 32,000 Atlantic salmon smolts were placed in the Merrimack above Lowell.

—About 114,500 pre-smolt Atlantic salmon were released into the Connecticut River, including 29,000 near the Holyoke Dam.

—Angling pressure remained constant at Quabbin; however, the overall catch rate and total harvest weight both declined. The lake trout harvest increased to nearly the 1974 level. Smallmouth bass investigations indicated very little mixing of the populations in the open fishing and non-fishing areas.

—Angling interest remained high at Brimfield Reservoir despite the taking of only ≈31 legal pike.

—Work began on a final report summarizing eight years of rainbow and brown trout vs. alewife interactions at two ponds on Cape Cod. Smelt were reintroduced to the ponds.

—The progeny of wild-selected sea-run brown trout on Cape Cod were growing and surviving better than their hatchery-raised counterparts.

—There was no information provided in the [1976-77] Annual Report relative to the numbers of fish produced and stocked.

—Post-operational investigations at the Northfield and Bear Swamp pumped storage projects were completed and final recommendations are being written.

—There were an estimated 66,684±4.7% deer hunters in Massachusetts in 1975 (98% of whom hunted in the shotgun season). The 1976 deer harvest (all seasons) was 2712 (2534 by shotgun).

—There were 20 goslings and two adult Canada geese transplanted.

—There were 1502 birds (502 wood ducks) banded during pre-season banding, including 169 ducks taken during the final year of park waterfowl banding.

—The winter of 1976-77 was extremely cold, facilitating bait-trapping efforts. There were 1905 ducks (77% black ducks) banded.

—Preliminary data on dump nesting in wood ducks indicated that dumping hens eventually establish a nest of their own. About 60 wood duck ducklings were raised in the Ayer Game Farm duck pen for eventual release on beaver ponds in the Quabbin.

—There were 61,630 pheasants, 2750 quail, and 192 white hare stocked, excluding field trial stockings. A fire at the Ayer Game Farm destroyed part of the old farmhouse.

—The Information & Education Section continued with news releases, magazine preparation, exhibits, audio-visual needs, and preparation of publications. Eleanor C. Horwitz replaced Richard Cronin as Chief of Information & Education in May 1977.

—The Realty Section acquired ≈4420 acres, including large acquisitions at Birch Hill, Bolton Flats, Hinsdale Flats, Hockomock, Mill Creek, and Windsor, and smaller acquisitions at 11 other sites.

—Legislation included an adjustment in the fee for antlerless deer permits⁹⁰, further provisions for licensing and regulation of falconry⁹¹, an amendment to the cruelty laws (G.L. c. 272) relative to animals used as lures or bait⁹², further regulating field trials⁹³, an authorization to issue permits for the commercial harvest of eels⁹⁴, and a provision for the issuance of reduced-price licenses to persons aged 65-69⁹⁵.

1977-78⁹⁶: The Board set its priorities as: (1) concern with the salaries of Division professional staff as compared to those of the federal government and neighboring states, (2) concern with the status of aging Division equipment, and (3) the implementation of nongame management.

—The Board also showed interest in the expenditures of waterfowl stamp funds in eastern Canada, long-range planning for changes in *Massachusetts Wildlife*, the implementation of the federal CETA and YACC programs, and the proposed Northeast Regional Firearms Educational Marksmanship facility.



Figure 54. Atlantic Salmon being passed through the Holyoke fish lift.

—Two assistant planners were hired to assist the Senior Planner in developing a complete and continuing long-range comprehensive planning effort.

—At least 88 Atlantic salmon returned to the Connecticut River, including 23 at the Holyoke fish lift (Figure 54).

—The shad run at Holyoke in 1978 was 144,700 fish (estimated at 35-45% of the run entering the river). Plans were almost completed for the Essex Dam fishway on the Merrimack and plans for passage at Lowell were in progress. There were 750 adult shad and 780,000 shad eggs released into the Hooksett Pool. Also, 25,800 salmon smolts were released at Lowell.

—Quabbin Reservoir continued to lead the state in salmonid harvest with ≈ 2268 lake trout taken. Good numbers of rainbow trout were taken from Ashumet Pond, Johns Pond, Lake Mattawa, Onota Lake, and Wachusett Reservoir.

—Angling for northern pike, especially through the ice, was attracting many fishermen to Brimfield Reservoir and Quaboag Pond. Growth rates of these pike are some of the best in North America.

—Adult sea-run brown trout from coastal Cape Cod were showing excellent growth rates. Access and cover on the Quashnet River was enhanced with help from Trout Unlimited.

—There were 280,820 brook trout, 64,050 brown trout, 582,083 rainbow trout, and 30,269 coho salmon produced at the hatcheries.

—The deer herd appeared to be growing; 70% of the harvest came from the four western counties.

—The cottontail and snowshoe hare seasons were revised and zoned, and the jack-rabbit season was shortened.

—The early squirrel season appeared to have increased hunter effort without adversely affecting squirrel recruitment.

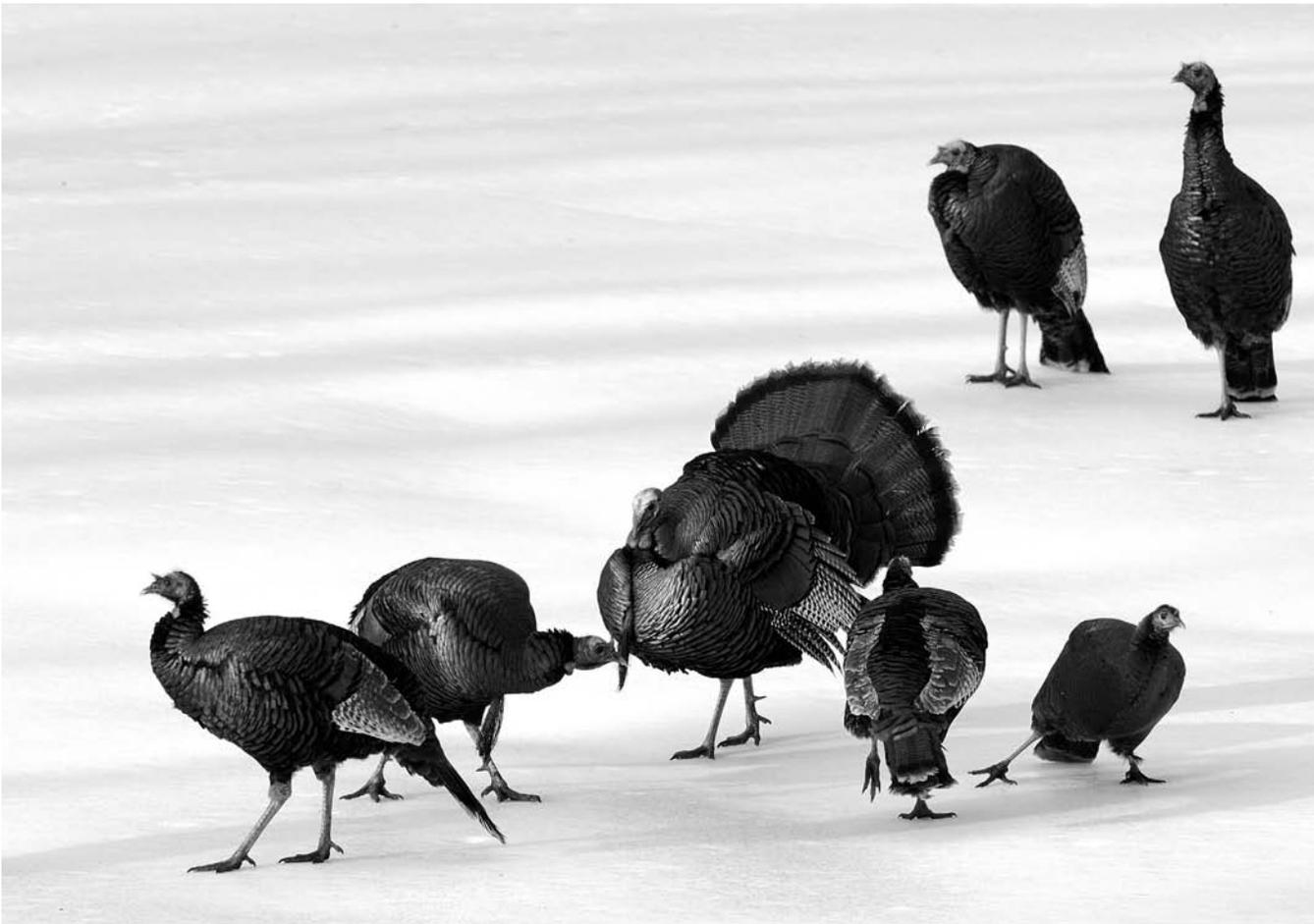


Photo © Bill Byrne

Figure 55. Wild Turkeys on snow, Framingham.

—The harvest of 1666 beaver was the second highest recorded. The bobcat hunting season and the bobcat and fisher trapping seasons were shortened in response to rising fur prices and increased pressure. A 50-cat seasonal quota and mandatory pelt tagging was also implemented for bobcat.

—The wild turkey population (Figure 55) was growing in numbers and distribution and thought should be given to a future open season.

—A heavy May snowstorm resulted in nest desertion by many Canada geese in the metro-West area.

—There were 858 wild-caught waterfowl and marsh birds (274 wood ducks) banded during pre-season banding by airboat, bait trapping, and netting. A cooperater banded 142 shorebirds. There were 693 ducks (80% black ducks) banded during winter banding. There were 53 immature hand-reared wood ducks released on Nantucket.

—The five-year park mallard census showed 11,952 mallards and 1690 black ducks, compared to 1973 with 9671 mallards and 1888 black ducks.

—A survey of alleged Canada goose depredations on shellfish was unable to sustain such claims⁹⁷.

—There were 63,572 pheasant, 3000 quail, and 840 white hare liberated, exclusive of field trial stockings.

—The Cooperative Wildlife Research Unit completed studies on snowshoe hare⁹⁸ and animal damage identification⁹⁹.

—The first professional ornithologist since the retirement of Joseph A. Hagar in 1959—Bradford G. Blodget—was hired in July 1977. His first principal task was to prepare, monitor and promote legislation regarding a comprehensive “nongame” bill. He also worked on inventory and management of the state’s tern colonies, an “exotic animal” task force, and the cooperative Breeding Bird Atlas venture with the Massachusetts Audubon Society. An advisory list of “Species of Special Consideration in Massachusetts” was prepared.

—The Information & Education Section noted that the mailing list for *Massachusetts Wildlife* has grown to >30,000. The staff also prepared and printed several publications, participated in four major sportsmen’s shows, sponsored the artwork contest for the waterfowl stamp, worked on two feature-length films, coordinated in-house and inter-agency meetings, and played an active role in the Junior Conservation Camp.

—The Realty Section oversaw acquisition of major parcels in the Hockomock Swamp, and at Birch Hill, Hinsdale Flats, Peru, Rocky Gutter, and Windsor (Moran area). The federal government transferred to the Division a small parcel on Naushon Island which was then designated a wildlife sanctuary. There are still a few leased fishing areas which will be retained through 1983.

—Legislation included revisions of the procedures for issuance and display of licenses¹⁰⁰, revisions to the procedures for the revocation of licenses¹⁰¹ and a provision for issuance of non-criminal citations for violations of certain fish and wildlife laws¹⁰².

1978-79¹⁰³: Director Matthew B. Connolly, Jr., resigned from the Division in June 1979. The Board set in motion a process to replace him (see 1979-80).

—Martin Burns did not seek reappointment to the Board and was replaced by Nancy Begin from Essex County, the first woman to serve on the Board.

—The Board continued to be concerned about low pay for Division professionals and the growing amount of antiquated equipment.

—In September 1977, the Division committed to the federally-assisted program of “Comprehensive Wildlife Planning” to provide sound data and a range of alternatives upon which management decisions will be based.

—Anadromous fish efforts focused on the Charles, Connecticut, and Merrimack rivers. Shad (n=256,000) and salmon (n=19) passage on the Connecticut were the second highest on record.

—Two salmon were creelied below the Essex Dam on the Merrimack. A small shad fishery also exists there with some anglers taking 10-20 fish per day. Fish passage facilities at the Essex and Pawtucket Dams on the Merrimack will soon be operational. The transplantation of 1100 shad from the Connecticut to the Charles River was sufficient to yield young shad in the Newton-Needham area.

—The Palmer Hatchery finally began Atlantic salmon production and will be capable of producing ≈60,000 smolts per year. The East Sandwich Hatchery is being renovated for the joint coho salmon project with the Division of Marine Fisheries.

—The Fisheries Section surveyed 509 lakes (10 in each district) to update their physical and biological characteristics. Detailed maps were produced. Concurrent with the lake fisheries program, stream survey crews have been actively assessing all stocked trout waters.

—The Division received additional supplies of northern pike from Minnesota, which were stocked at the East Brimfield Reservoir and in Quaboag Pond. Transplants from these waters have been made to nine water bodies in all five districts. There are plans to obtain young tiger muskellunge from Pennsylvania in 1980.

—Experimental catch-and-release regulations have been implemented on a stretch of the upper Deerfield River.

—The Section began an “Urban Angler” program, with the assistance of a volunteer, to draw attention to inner city fisheries resources.

—There were 133,297 brook trout, 87,300 brown trout, 477,049 rainbow trout and 46,436 coho salmon produced at the hatcheries.

—The Board reviewed the primitive firearms deer season and subsequently voted to keep the original intent of only primitive-type muzzleloaders and ammunition. The dates of the paraplegic deer season were shifted to avoid conflict with the opening of the archery season.

—A record number (n=574) of bear permit applications and a record harvest (n=5) of bear was tallied.

—The trap-and-transplant of wild turkeys from the Berkshire to other locations began in March 1979 when nine birds were moved to Worcester County. The statewide population is now estimated at 750 birds.

—The crow hunting season was brought into compliance with federal requirements that the season does not exceed 124 days and does not include the peak nesting season. Within the open periods, crows may now be hunted only on Fridays, Saturdays, and Mondays.

—A final report on the gosling transplant program was completed, with 427 geese transplanted to 12 sites in central and western Massachusetts. Released geese nested on six of these sites and at least five nearby non-release sites.

—There were 999 wild-caught waterbirds of 12 species banded during pre-season banding. A cooperater banded 47 shorebirds of six species.

—Winter banding yielded 1438 ducks (84% black ducks). There were 5783 mallards banded at 19 sites during the 1970-76 park mallard banding project.

—The waterfowl hearings were contentious due to conflicts between early-late season and coastal-inland hunters.

—Wildlife management area regulations were revised so as to provide for reduced (sunrise-sunset) hunting hours only on pheasant or quail stocked areas and then only for the duration of the pheasant/quail seasons.

—There were 54,794 pheasants, 3000 quail, and 825 white hare liberated, exclusive of field trial and youth hunt stockings.

—The Cooperative Wildlife Research Unit completed a major investigation of beaver in the Quabbin Reservation¹⁰⁴.

—The state ornithologist continued with legislative work, applications for a federal endangered species Section 6 cooperative agreement, the bald eagle survey, peregrine

falcon work, Plymouth red-bellied turtle investigations and listing, tern management, exotic animal task force meetings, and great blue heron rookery surveys.

—The Information & Education Section produced various flyers and brochures, prepared six issues of *Massachusetts Wildlife*, completed work on films on Massachusetts wildlife and Division activities, participated in nine TV shows, and designed and produced a substantial exhibit on beavers which was the highlight of four major sportsmen's shows.

—The reduction in funds hampered the activities of the Realty Section. However, 1097 acres of lands were acquired affecting nine existing wildlife management areas, particularly Birch Hill, Chalet, Quaboag, and Rocky Gutter.

—Legislation included amendments to the laws relating to aquaculture¹⁰⁵ and a provision for the transfer of certain lands in Gardner¹⁰⁶.

1979-80^{107,108}: In July 1980, the Board selected Superintendent Richard Cronin (1926-1988) (Figure 56) to succeed Matthew Connolly as Director. Carl S. Prescott was appointed Superintendent, and ornithologist Bradford Blodget was appointed to the new position of Assistant Director for Nongame and Endangered Species.

—The Division's finances continued to be a concern. Funding for the new nongame program will also be needed as license fee monies cannot be expected to carry out both game and nongame activities in a meaningful way.



Photo © Bill Byrne

Figure 56. Director Richard Cronin.



Photo © Bill Byrne

Figure 57. Bobcat on stump, Townsend.

—The Planning team set forth a goal “...to perpetuate and enhance the wildlife resources of the Commonwealth...by the intelligent application of sound management techniques”. This goal was adopted by the Senior Staff. The planners also solicited public review and comment on its proposed program structure.

—The Turners Falls fishway on the Connecticut River was dedicated in 1980. The fishway lifted $\approx 390,000$ shad and 120 adult salmon.

—The Holyoke fish lift passed 400,000 blueback herring, 375,000 shad, 53,000 lamprey, 400 striped bass, and 310 salmon. There were 77,000 salmon smolts stocked on the Connecticut River and 100,000 on the Merrimack.

—Additional progress was made on the Merrimack River, where the hydroelectric project at the Essex Dam is nearing completion. The angling regulations on the lower Merrimack were changed to allow harvest of one salmon per day with a minimum length of 15 inches.

—The lake and pond survey prompted changes in the minimum legal lengths for black bass and chain pickerel. Fifty additional lakes were surveyed during the year.

—Smelt were stocked in four lakes in Barnstable, Franklin, and Worcester counties. Landlocked alewives were transplanted from Congamond to Singletary Lake.

—There were 10,000 tiger muskellunge fingerlings received from Pennsylvania in September 1980. An additional 10,000 were received the following spring. These will be reared at the Roger Reed (Palmer) Hatchery.

—The Quabbin fishery enjoyed the best year on record for lake trout and smallmouth bass. Quabbin produced ≥ 8300 legal lake trout, including a new state record (20 lbs., 12 oz.). However, this and other water bodies are showing signs of acidification and must be carefully watched.

—A total of 186 streams were surveyed in 1980-81. Brood stock collection for sea-run brown trout was average for both years. Restrictions were placed on five sea-run streams to provide closure for certain periods and to reduce the creel limit.

—The “Urban Angler” program continued to grow, with 22 fishing clinics held and information provided to >800 inner city residents.

—There were 294,522 brook trout, 209,025 brown trout, 557,704 rainbow trout, 17,920 landlocked salmon, and 11,000 coho salmon produced at the hatcheries.

—The 1980 deer season resulted in the largest harvest ($n=3494$) since the inception of the antlerless deer permit system. The archery harvest was also a record ($n=239$). The primitive firearms season was again discussed, with the Board rejecting the use of breech-loading firearms, converter plugs, and smokeless powder.

—Animal activists elicited substantial controversy^{109,110} regarding the bobcat (Figure 57) due to the animal’s listing on Appendix II of the CITES treaty.

—The Board set regulations for the first (since 1850-51) wild turkey (“spring gobbler”) hunting season in May 1980. The season was opened only in Berkshire and Franklin counties. There were 1250 permits allotted and 72 bearded turkeys were taken.

—The Board addressed steel shot requirements relative to waterfowl hunting, in accordance with a federal mandate. By June 1980, 2342 waterfowl gizzards had been checked manually for lead shot. A sample was also fluoroscoped to determine a



Photo © Bill Byrne

Figure 58. Eastern Box Turtle, found in Hopkinton (photographed in Westborough).

correction factor (35%). Ingestion rates were <2% in Barnstable and Bristol counties, which were then eliminated from the proposed steel shot zones.

—There were 799 ducks (324 mallards, 270 wood ducks) taken during pre-season banding in 1980. The winter of 1979-80 was mild but Division staff successfully banded 668 black ducks.

—There were 58,186 pheasants, 3000 quail, and 594 white hare liberated, exclusive of field trial stockings.

—The Cooperative Wildlife Research Unit completed a lengthy study of the annual activity patterns of beaver¹¹¹.

—Legal authority was granted to the Division to regulate reptiles (Figure 58) and amphibians and rules and regulations to that effect were promulgated.

—The Division also promulgated a list of endangered and threatened species, which included the federal list plus the Plymouth red-bellied turtle and the small whorled pogonia (both were candidates for federal listing).

—An endangered species cooperative agreement between the Division and the U.S. Fish and Wildlife Service was signed and adopted¹¹². The Natural Heritage Program's records (then located in the Department of Environmental Management) were excluded from the state's public records law.

—The Board also established regulations and procedures for the possession and propagation of wildlife. The so-called "exemption list", relative to the possession of certain animals without a permit, was similarly revised.

—A hacking program to restore peregrine falcons to the state was disrupted when six peregrines disappeared from Mt. Tom under suspicious circumstances. The 14 historic eyries were surveyed for nesting activity, with negative results.

—Surveys of mines and caves were initiated to ascertain wintering bat populations and the status of the endangered Indiana bat.

—Surveys of nesting great blue herons and ospreys were also conducted and a program of osprey pole erection was initiated.

—Tern management continued and a major gull control effort was initiated by the U.S. Fish & Wildlife Service at Monomoy Island.

—The Information & Education Section continued with news releases, preparation and distribution of literature, publication of *Massachusetts Wildlife*, additions to the photographic library, public speaking engagements, exhibits, and promotional endeavors.

—Division staff also photographed 91 of 93 (2 were missing) of the original Louis Agassiz Fuertes (1874-1927) paintings of birds, on file at the State House. Prints were later made of four of these, with the cooperation of the Massachusetts Audubon Society.

—The Realty Section acquired 999 acres during 1979-80, principally including 735 acres in Phillipston and Petersham.

—Legislation included a provision for the Division to regulate turkey hunting¹¹³, to

regulate reptiles and amphibians¹¹⁴, and to formulate a list of endangered and threatened species¹¹⁵, increases in license fees¹¹⁶, further provisions regarding trap registration¹¹⁷, a provision that the Director must approve municipal restrictions on access to great ponds¹¹⁸, and a provision that the Natural Heritage database was exempt from state public records laws¹¹⁹.

“THE DIVISION [HAS] A CLEAR MANDATE¹ TO OPERATE A NONGAME² PROGRAM”: THE 1980s

The 1980s³ saw the attempted assassination of President Ronald Wilson Reagan (1911-2004)(1981), the first IBM personal computer (1981), the U.S. invasion of Grenada (1983), the “Able Archer” military exercise (1983), which brought the world closer to nuclear war than any time since the Cuban Missile Crisis, the shootdown of Korean Airlines Flight 007 (1983), the loss of the space shuttle *Challenger* (1986), the Chernobyl nuclear disaster in the Ukraine (1986), the harsh Drought of 1988, the *Exxon Valdez* oil spill in Alaska (1989), and the fall of the Berlin Wall (1989), forecasting the end of the Cold War.

Massachusetts experienced the “Massachusetts Miracle” of the 1980s, a substantial period of economic growth deriving largely from the technology firms along Rte. 128. During this period, unemployment in the Commonwealth dropped from 12% to less than 3%. In 1987, Massachusetts was ranked first in the nation in numbers of scientific graduate students⁴.

The Fish and Wildlife Conservation Act (“Nongame Act”)⁵ of 1980 provided for financial and technical assistance to the states for development, revision and implementation of plans and programs for conserving nongame fish and wildlife. There were several amendments, including an 1988 change relating to migratory nongame birds.

The 1984 Federal Aid in Sport Fish Restoration Act⁶ created the Aquatic Resources Trust Fund, including the Sport Fish Restoration Account and the Boating Safety Account. The Act also expanded the list of taxable fishing tackle and imposed a new 3% tax on fish finders and electric trolling motors. The so-called “Wallop-Breaux” amendments provided that the state must use $\leq 10\%$ of the funds for boating access and aquatic resource education.

The U.S. Secretary of the Interior and the Canadian Minister of the Environment signed an agreement in May 1986 (Mexico joined in 1994) to implement a strategy to restore depleted waterfowl through a North American Waterfowl Management Plan⁷ incorporating biologically based habitat protection, restoration and management. Although international in scope, the plan functioned at the regional level through partnerships termed “joint ventures”.

The Society for Conservation Biology⁸ was incorporated in 1986 to promote “conservation biology”⁹ as the “science and practice of conserving Earth’s biological diversity”. Michael Ellman Soulé—a founding member and key advocate—argued that “... scientists can and must play an important role in preventing the erasure of the planet’s biological print”¹⁰. The Society’s journal *Conservation Biology* later ranked second among 33 journals that focused on biodiversity conservation.

In 1982, mammalogists Joseph Alan Chapman and George Alan Feldhamer edited a comprehensive reference on the wild mammals of North America¹¹. This thorough volume included up-to-date information on the biology, management, and economic status of 57 mammals or groups of mammals. Furbearing mammals received an even more extensive treatment in 1987 with the publication of *Wild Furbearer Management and Conservation in North America*¹² by the Ontario Ministry of Natural Resources, examining all aspects of the history, biology and management of furbearers.

The American Fisheries Society published an initial reference manual on *Fisheries Techniques*¹³ setting forth capture and sampling methods, marking procedures, analytical techniques, and other fisheries science practices.

1980-81^{14,15}: The Board saw the at-large members James Baird and Philip B. Stanton replaced by Richard Thomas Kleber (1927-2002) and Colton H. Bridges.

—The dedication of the fish lift at the New England Power Company Dam in Vernon, Vt. in 1981 meant that shad and salmon would have complete access to their historic spawning and nursery grounds on the Connecticut.

—Tiger muskellunge were being reared at the Roger Reed (Palmer) Hatchery and will be stocked in 22 water bodies by 1982. There were 106 streams surveyed in 1981.

—The Division oversaw its first commercial eel season in 1981 with 15 licenses issued.

—There were 428,971 brook trout, 280,567 brown trout, 463,037 rainbow trout, 3570 coho salmon, 1200 Atlantic salmon, and 236 Kokanee salmon produced at the hatcheries.

—The Board held two public hearings regarding a controversial open season on coyotes. The limited season also included requirements for mandatory pelt checking and carcass surrender.

—The beaver, otter, and fisher seasons were revised to include changes to open zones and season dates.

—There was a record number of permit applicants (n=1103) and a record harvest (n=10) of black bears in 1981.

—The second spring gobbler season was held for a 2-week period in May 1981. There were 131 bearded birds taken in Berkshire County and five in Franklin, including two banded 8-year-old birds.

—The waterfowl season hearing was again contentious due to the diverse opinions of regional waterfowl hunters and the proposed implementation of steel shot-only zones.

—There were 534 ducks (274 wood ducks, 167 mallards) banded during the summer 1980 pre-season banding. A cooperater banded 227 shorebirds.

—The winter of 1980-81 was extremely cold and ducks readily came to bait. An emergency waterfowl feeding program was initiated. Starvation losses were minimal due to the program and a weather break in February. There were 1773 black ducks banded.

—Duck gizzards were collected only from Essex and Plymouth counties in 1980-81. The lead shot ingestion rate for the Wareham area was 12.3% and consequently that

area remained zoned for steel shot only. However, the Plymouth Bay area was below the federal threshold. The total ingestion rate for Essex County was 5.6% with the highest rate on the Parker River National Wildlife Refuge.

—There were 53,255 pheasants, 4200 quail, and 572 white hare liberated, exclusive of field trial stockings.

—The Nongame Wildlife program continued to pursue funding options for the program.

—Investigations on the Plymouth red-bellied turtle began in cooperation with Dr. Terry E. Graham of Worcester State College.

—The Fish and Wildlife Service discontinued the overall gull control program at Monomoy, opting to control gulls only in the immediate vicinity of the ternery. The Massachusetts Audubon Society planned to experiment with gull harassment techniques at Muskeget Island.

—All known great blue heron rookeries were checked again in 1981. Seven rookeries were active with 97 nests producing an estimated 276 young.

—Osprey management continued in cooperation with individuals at Westport and on Martha's Vineyard.

—Unsuccessful searches were made for bog turtles in Berkshire County.

—The Information & Education Section continued with news releases, preparation and distribution of literature, publication of *Massachusetts Wildlife*, additions to the photographic library, public speaking engagements, exhibits, and promotional endeavors.

—Due to a scarcity of funds, the Realty Section was able to acquire only ≈175 acres affecting seven properties.

—Legislation included an authorization for the Commissioner of Administration to set fees¹⁶.

1981-82¹⁷: Bradlee Gage did not seek reappointment to the Board and George L. Darey was elected Chairman (Table 4).

—The Board continued to review its existing (1957) policy document.

—Two of the planning staff left the Division in 1982 and a new “planning committee” was designated. The first draft of the strategic comprehensive plan was completed.

—The spring 1982 run of salmon on the Connecticut River reflected the reduced stocking of smolts in 1980. There were 67 adults captured at Holyoke. The release of 225,000 “high quality” smolts throughout the river basin was expected to show returns in 1984. There were ≈295,000 shad and 587,000 blueback herring passed at Holyoke.

—The hydroelectric facility at the Essex Dam on the Merrimack River went into operation in September. However, delays in construction and design prohibited the operation of the fish lift during the spring 1982 run. An estimated 25 salmon were seen in the pool below the lift. The facility at the Pawtucket Dam in Lowell is hoped to be operational by 1985.

—A year-round fishing season for Atlantic salmon was established in those waters where taking of salmon is allowed.

—The Quabbin Reservoir continued to provide excellent lake trout, smallmouth bass, and bullhead fishing. Landlocked salmon were also showing up in good numbers, due to a release in 1980.

—The fly-fishing-only stretch of the Swift River will be converted to a fly-fishing-only, catch-and-release area, and another section will become catch-and-release, artificial lures-only.

—The fisheries crews collected and spawned 56 adult sea-run brown trout which produced 70,000 fertile eggs. Young fish will be released in selected coastal streams in 1983.

—Numerous pike were showing up in the fishery from the last stocking in 1979, possibly including some at Brimfield Reservoir. Tiger muskellunge fry from Pennsylvania were reared to produce 22,000 fingerlings, which were stocked in selected ponds across the state. The first legal size tiger muskie was caught in Lake Cochituate in the summer of 1982.

—Division staff finished the job of stocking adult smallmouth bass into reclaimed ponds and have reared young walleye at Assawompsett Lake in the hope to establish a source of brood stock.

—Landlocked alewives from Congamond Lake were transported to three other water bodies to establish new populations.

—The district fisheries crews sampled 151 stations along 115 priority-1 stocked trout streams. A Division aquatic biologist began work on a dissertation on stream classification in Massachusetts.

—District personnel limed 695 acres on 12 ponds “critically” threatened by acid rain.

—The Podick Springs section of the Sunderland Fish Hatchery will soon be deeded to the U.S. Fish and Wildlife Service to use as an Atlantic salmon holding facility. There were 268,967 brook trout; 210,045 brown trout; 542,722 rainbow trout; 70,147 coho salmon; 41,415 Atlantic salmon; 20,250 Kokanee salmon; and 10,050 tiger muskellunge produced at the hatcheries.

—The Board tightened the requirements for farmer and landowner antlerless deer permits, providing that farmers must make $\geq 50\%$ of their income from their land, and landowners must have ≥ 300 acres. A graduate student at the Cooperative Wildlife Research Unit completed a dissertation on the ecological basis for deer management zones¹⁸.

—There were concerns with the existing bear season due to increasing numbers of bears and the late timing of the season, which does not adequately address crop depredation.

—The first coyote hunting season in 1981-82 yielded a harvest of 18 coyotes taken by 14 hunters. The bobcat harvest of 34 animals remained well below the seasonal quota of 50.

—The woodcock season saw a reduction in bag limit from five to two woodcock, due to a 37% decline in the Massachusetts breeding population as a result of an April snowstorm.

—A proposal for a mourning dove season (closed since 1905) was considered and voted down by the Board.

—The 1981-82 waterfowl season experimented with a zoned season with splits in each zone. This system met with widespread acceptance.

—There were 731 ducks (293 mallards and 285 wood ducks) and four marsh birds banded during pre-season banding. A cooperater banded 590 shorebirds. During winter banding, the staff banded 1121 black ducks.

—A bulletin on wood duck research during 1970-80 was published¹⁹. A three-year study of a comparison between actual spring-summer production and winter nest box checks (of eggshells) showed a very close comparison (<1%) but did not take into account boxes which were not checked during both periods. Winter box checks will require a 5-10% upwards adjustment to determine actual usage rates.

—The April snowstorm and the previous 3-week cold spell also badly affected pheasant production at the Ayer and Wilbraham game farms by chilling >50,000 eggs and killing several hundred eggs.

—There were 53,052 pheasants, 4675 quail, and 800 white hare liberated, exclusive of field trial stockings.

—The Director appointed a 7-member *ad hoc* Nongame Advisory Committee in September 1981 (Table 5).

—An effort to establish a voluntary income tax check-off system for funding the Non-game program was passed by the Legislature but vetoed by the Governor.

—Two eaglets were obtained from Michigan and flown to a hack site on the Prescott Peninsula as a start to the Division's bald eagle restoration project.

—Efforts continued with Plymouth redbellied turtle research, great blue heron surveys, osprey pole erection, and tern management. Division personnel also participated in a statewide survey for mole salamanders.

—A widely-publicized special event heralded the arrival of two eaglets at the Quabbin for the restoration project.

—The Information & Education Section was substantially involved in preparing press releases, publications (including pond maps), displays, and films, as well as participating in the Junior Conservation Camp and the Sport Fishing Awards.

—Due to funding, only 243 acres (38.4 by gift) affecting five areas were acquired by the Realty Section.

—Legislation included an authorization for hunting with the use of primitive firearms with rifled bores²⁰, establishment of the Connecticut River Atlantic Salmon Commission²¹, a provision for the transfer of the Podick Springs Hatchery to the U.S. Fish and Wildlife Service²², a provision for an increase in license fees retained by town clerks²³, and a provision that persons confined to a wheelchair may use a mechanical bow release²⁴.

1982-83²⁵: Chet M. McCord, the Assistant Director for Wildlife, resigned and the position has not yet been filled.

—The Connecticut River Atlantic Salmon Commission was ratified by Congress. Passage at Holyoke during 1982-83 totaled 530,000 shad, 450,000 herring, 29,000 lamprey, 346 striped bass and 25 Atlantic salmon. Fish passage at Turners Falls was improved due to modifications of the Cabot station pools. About 12,705 shad passed through this facility.

—The Essex fishway in Lowell became operational in the fall of 1982 and 16 Atlantic salmon were recovered. Despite mechanical problems, during the spring of 1983 the lift passed 5508 shad, 4797 herring, 2835 lamprey, 91 salmon and 50 striped bass. An additional 2000 adult shad were transported from the Connecticut River to the upper Merrimack.

—Quabbin continued to be a premier site for lake trout and smallmouth bass anglers. There were 17,300 landlocked salmon yearlings released in Quabbin in May 1983.

—The introduction of tiger muskellunge was greatly curtailed by the deliberate poisoning of 11,000 fish at the Roger Reed (Palmer) Hatchery. The 4000 surviving fish were stocked at three locations.

—A limited stocking of 34,000 fingerling walleye took place at Assawompsett Lake.

—There was substantial discussion regarding the so-called “white amur”²⁶ (or “grass carp”), which was promoted as an alternative to chemical control of aquatic weeds. The Board did not take action on the request to allow introduction of this fish.

—A daily limit of two brown trout was adopted for all lakes and ponds and 20 streams added to the list of those with a 6-trout limit.

—The fisheries staff continued with stream surveys, assessing 113 stations on 80 streams. The crews also evaluated fish populations at 35 lakes and ponds. These surveys provided the basis for the introduction of landlocked smelt and alewives into five ponds.

—There were 75 fishing instructors certified in the Urban Angler program. Eight fishing clinics reached 240 novice anglers.

—There were 458,493 brook trout; 385,844 brown trout; 583,891 rainbow trout; 33,260 landlocked salmon; 26,140 Atlantic salmon; and 3200 tiger muskellunge produced by the hatcheries.

—Ecologically-based deer management zones¹⁷ were adopted to replace the county-based system currently in place. Antlerless permits will be issued on the basis of the new zones for the 1983 deer season. A 2-deer limit (1 antlerless) was adopted statewide, except for Barnstable, Dukes, and Nantucket counties.

—The Board revised the bear season, providing for a 1-week season in September (dogs allowed) and a 1-week season in November (no dogs). There were 13 bears (a record) taken, all during the 1-week September segment.

—The opening date for the beaver season was changed and the zoning replaced with a statewide season.

—There were 85 turkeys captured and processed during winter trapping, 58 of which were transplanted to three new release areas.

—The Board voted to reduce the woodcock bag limit from five to two birds, (as in 1982) due to two April snowstorms.

—There were 905 ducks (404 wood ducks, 255 mallards) banded during the 1982 pre-season banding. The winter banding was the poorest on record, due to very mild weather, with only 77 ducks (34 black ducks) captured.

—There were 16,732 (77% mallards) counted at 140 locations during the 1983 park mallard count, 3.6% higher than the previous 5-year tally in 1978.

—There were 36,941 pheasants, 2820 quail, and 800 white hare liberated, exclusive of field trial stockings.

—The Cooperative Wildlife Research Unit was conducting studies on black bear, bobcat, and wild turkey. A dissertation on raccoon population dynamics and home range was completed²⁷.

—The Nongame Program continued with efforts to secure funding, bald eagle hacking and winter surveys, Plymouth red-bellied turtle investigations, great blue heron rookery surveys, tern and piping plover inventory and management, bat surveys, and osprey nesting pole erection. A record 60 pairs of osprey nested in Massachusetts in 1983, producing 123 young.

—The Information & Education Section increased the number of news releases, arranged six special events, participated in four major sportsmen's shows, and three continuing programs. *Massachusetts Wildlife* was reduced to a single issue in March 1983, due to financial constraints.

—The Realty Section was able to acquire 307 acres, 117 of which added to the Hinsdale Flats wildlife management area.

—There was no pertinent wildlife legislation enacted between July 1, 1982 and June 30, 1983. The revised Forest Cutting Practices Act (c. 592, St. 1982) amended G.L. c. 132 and implemented revised standards for timber harvesting.

1983-84²⁸: The Board was elated at the passage of the so-called "Nongame" bill which provided for a dedicated "nongame wildlife fund" to receive monies from a state income tax check-off and donations and grants; established a formal advisory committee; and expanded nongame authority²⁹.

—Wayne F. MacCallum was hired in August 1983 as the new Assistant Director for Wildlife. Assistant Director for Nongame and Endangered Species Bradford Blodgett chose to return to the position of State Ornithologist in April 1984 and was replaced by Dr. Thomas W. French (the first PhD. hired by the Division).

—The Board expressed concern regarding the weak status of *Massachusetts Wildlife* and requested the Director to pursue a subscription system and the establishment of a dedicated magazine fund.

—The Board approved the release of the draft strategic plan in October 1983 through news releases, the *Environmental Monitor*, and other sources. The U.S. Fish and Wildlife Service reviewed the entire plan and had only minor comments, except for wildlife, which lacked measureable objectives (such as population size or harvest numbers). Federal aid funding was allowed to continue on a project basis for the present.

—The Board set a 1-year moratorium on the taking of Atlantic salmon from the Con-

necticut and Merrimack rivers. The dedication of the Bellows Falls Fishway in Vermont opened the Connecticut River to a significant part of their historic spawning grounds. There were 4300 shad and two salmon passed at the Holyoke Dam and 66 removed as brood stock. There were 410,000 salmon released along the Connecticut River, including 30,000 reared and stocked in Massachusetts.

—Although mechanical problems continued, there were 5488 adult shad and 100 salmon passed at the Lawrence Fishway on the Merrimack.

—Smelt were observed spawning in six of 10 monitored streams in the Quabbin. Catch rates for smallmouth bass indicated good survival of the 1980-81 year classes and reflected a conscious effort by anglers to limit their creel. However, rainbow trout demonstrated poorer survival, with only 679 taken. For the second year, landlocked salmon (n=23,150) were stocked in 1983 with expectations for a good harvest in 1984.

—Heavy May rains caused the unscheduled release of 33,000 brown trout and display trout from the McLaughlin Hatchery into Quabbin.

—Intense assessments of the northern pike and tiger muskellunge stockings will be undertaken in 1985.

—Smelt eggs were transported from Lake Quinsigamond and Wachusett Reservoir to four locations.

—Fisheries Section staff completed assessments on 30 lakes and ponds. Since 1979, 300 of the most heavily fished lakes in the state have been surveyed.

—Three ponds in the Southeast District were limed to offset increasing acidity. The Division was notified that it would have to complete an Environmental Impact Statement to continue this activity.

—The Urban Angler program instructed >350 students at fishing clinics in seven urban and suburban locations.

—There were 97,350 brook trout; 102,075 brown trout; 326,576 rainbow trout; 2785 sea-run brown trout; 7150 coho salmon; 4075 Atlantic salmon; 3300 landlocked salmon; and 65 tiger muskellunge produced at the hatcheries.

—The wild turkey season was opened in all areas west of the Connecticut River, with a record number of 3818 permits allotted and a record harvest of 208.

—There were 834 ducks (57% wood ducks) banded during pre-season banding. There were 279 ducks (80% black ducks) banded during winter banding.

—Blood smears were taken from 493 ducks; showing that blood parasite infection was 89% in 1982 compared to 79% in 1980.

—The waterfowl season was modified to split the inland zone into central and western zones (i.e., 3 zones in total). Black duck harvest restrictions were also put in place. The Board also dealt with goose hunting along the Danvers River, which was leading to complaints from nearby residents.

—In 1983-84, all game farms experienced a highly contagious rotavirus infection requiring strict sanitary measures and the destruction of all broodstock. In 1984, the virus was not detected.

—There were 45,549 pheasants and 4170 quail liberated from the game farms. No white hare were acquired due to poor trapping conditions in New Brunswick.

—The Cooperative Wildlife Research Unit completed a graduate study on black bear³⁰.

—Ten eaglets were received from Manitoba (n=4) and Nova Scotia (n=6) in FY84 for release in 1984-85, nine of which successfully fledged. A film “Home Free” was produced about the restoration project.

—Other Nongame projects included the installation of loon nesting rafts, peregrine falcon surveys, Plymouth red-bellied turtle studies, tern census and inventory, and bat surveys. A colonial waterbird survey was conducted in 1984 in cooperation with the U.S. Fish and Wildlife Service. Three bog turtles were discovered in Berkshire County, the first confirmation of a population of this reptile in the state.

—The second edition of “Nongame Wildlife for Special Consideration in Massachusetts” was published.

—The Information & Education program hosted 10 special events, issued 22 news release packets, participated in a series of shows and fairs, expanded the library of still and film footage, participated in the Junior Conservation Camp, and oversaw the stamp contest programs. A major effort was devoted to publicizing the first Nongame Income Tax Checkoff.

—There again was only a single issue of *Massachusetts Wildlife*, which was devoted to the Nongame Program.

—The Realty Section was able to acquire 498 acres affecting seven wildlife management areas. A small—but significant—acquisition protected the water supply to the Bitzer Hatchery.

—Legislation included an increase in the surety bond for license vendors who were not state employees³¹ and a directive for Massachusetts to enter into the Connecticut River Atlantic Salmon Compact³².

1984-85³³: The Board discussed the option of closing two of three game farms as an economy measure. Division staff ascertained that the greatest savings would come by closing only the Wilbraham farm and increasing production at the other two to maintain current production. This proposal elicited substantial public comment. However, it was adopted nevertheless and the Wilbraham staff were transferred to other installations or retired.

—The Board advocated action to establish a self-sustaining process for *Massachusetts Wildlife* and a proposal to improve forest management on Division lands. As a result, the Division was able to hire a graduate wildlife biologist with expertise in forest wildlife management.

—The Board also completed their revision of the Division’s policy document³⁴ and the initial 5-year plan for the Nongame Program. Both documents were approved.

—In 1985, the Holyoke fishway passed 630,000 blueback herring, >480,000 shad, 40,000 lampreys, 369 striped bass, and 285 Atlantic salmon. The Turners Falls fishway passed 3855 shad, 1809 lampreys, 301 blueback herring, and three Atlantic salmon. Both lifts were staffed by personnel from the Cooperative Fisheries Research Unit.

—The Connecticut River Atlantic Salmon Commission adopted salmon fishing rules and regulations for the mainstem of the river. These regulations are to be incorporated into the fisheries regulations of the participating states.

—There were >320,000 salmon smolts released throughout the Connecticut River basin, including 107,000 at Turners Falls, 17,300 in the Deerfield River, and 17,300 in the Millers River. An additional 64,000 fry were stocked in the Bear and South rivers.

—There were ≈23,000 herring, 18,000 lamprey, 13,000 shad, 202 Atlantic salmon, and 110 striped bass observed at the Lawrence fishway. Most of the 212 returning salmon were transferred to the Nashua [N.H.] Hatchery; 43% were from previous fry stockings and 57% from smolts.

—The 30-year water quality database for the Quabbin was analyzed. There were significant trends in alkalinity, pH, water level, and fish production. There were 34,480 landlocked salmon stocked. Those salmon stocked in 1983-84 provided anglers with >1500 legal-size fish.

—Significant improvements were made to the pike and tiger muskellunge facilities at the Roger Reed Hatchery in Palmer. New rearing tanks were installed and placed in a different location to deter vandals. There were ≈10,000 pike fry and ≈10,000 tiger muskie yearlings to be reared and released.

—The attempt to establish a spawning population of walleye at Assawompsett Lake appeared to be partially successful. There were 124 walleye (17 females) caught at the lake during fisheries surveys.

—Broodstock collection of sea-run brown trout on Cape Cod was less than expected (n=30) but the collection of 44,000 eggs was greater than expected.

—The Fisheries Section surveyed 162 sites on previously unsampled stream and completed field surveys at 18 lakes.

—Acid rain investigations continued in cooperation with the Water Resources Center at the University of Massachusetts. Initial data indicated that 40% of inland waters are suffering from acidification.

—The hatcheries produced 1,087,600 fish. There was no breakdown by species given in the [1984-85] Annual Report.

—The Board heard testimony from The Trustees of Reservations regarding their proposal to reduce the overpopulation of deer on the Crane Reservation in Ipswich. Many written comments were later received by the Board, and, after reviewing them, the Board voted to permit the Trustees to engage in the herd reduction program³⁵.

—There were 1049 ducks (567 wood ducks, 249 mallards) taken in the 1984 pre-season banding, with the use of a new, more powerful airboat. There were 990 ducks (81% black ducks) taken during winter banding.

—The Board continued to address goose hunting on the Danvers River, voting to advise hunters to cease shooting within 500 feet of a channel marker near Kernwood Point and to later prohibit such hunting if the Town of Beverly would ban waterfowl feeding in the area.

—The forest management program continued with field surveys of forest products, volume and variety of understory, and the specific locations of various forest stands.

—There were 50,443 pheasants, 3600 quail, and 800 white hare liberated.

—The Cooperative Wildlife Research Unit continued with studies on wild turkey population dynamics, black bear reproductive success, bobcat ecology and status, and piping plover habitat and population dynamics.

—During its first year, the Nongame Wildlife Fund received donations totaling ≈\$380,000³⁶ through a voluntary state income tax checkoff.

—A peregrine falcon hack site was established at the McCormick building in Boston and six young peregrines were released, of which one was injured and returned to the Peregrine Fund, and two were killed in accidents. This was the first new project initiated with contributions from the Nongame Wildlife Fund.

—Six young eagles were released from the hack tower in Quabbin in July 1984. Eight more birds from Nova Scotia were received in June 1985 for release later than year.

—The annual tern inventory continued with the most notable change being the near-collapse of the North Monomoy Island colony. There were only 290 pairs of common terns at this site, down from 3400 in 1980.

—There was again an osprey nesting record, with 103 nests producing 145 fledged young.

—The common loon project monitored six pairs of loons at Quabbin and one at Wachusett Reservoir. Eggs were laid by three of the Quabbin birds, with one chick hatched.

—The Information & Education Section hosted special events on bald eagle and peregrine restoration, the results of the first “Nongame Checkoff”, National Hunting and Fishing Day, Acid Rain Awareness Week, the opening of the federal Massasoit redbellied turtle refuge, and operated a deer season “hotline”. Once again, there was only a single issue of *Massachusetts Wildlife*, which was devoted to the issue of acid rain. The staff also participated in several exhibits and shows.

—The Division also committed the funds to become a partner in Project WILD in conjunction with the Massachusetts Audubon Society.

—The Nongame Program consultant prepared posters, brochures, exhibits and articles on the Fund and the program.

—The Realty program benefitted from additional funding, acquiring 1318 acres, including the 748 acre Fox Den property in Worthington and the reversion of 36½ acres in North Attleborough from the U.S. Fish and Wildlife Service to the Division.

—Legislation included provision for a turkey hunting season on parts of the Mt. Greylock Reservation³⁷, further regulating commercial shooting preserves³⁸, an authorization for the shooting of wounded migratory birds from a powered boat³⁹, an authorization to reproduce the Fuertes bird paintings⁴⁰ and the FY86 budget (see the authorizations for the Division)⁴¹.

1985-86⁴²: The Board addressed the issues with funding for *Massachusetts Wildlife*, the federal mandate for non-toxic shot for waterfowl hunting, the continuing demand for the “white amur” (a hybrid form of grass carp) for aquatic weed control, the PCB contamination along the Housatonic River, the Division’s low salary scale and

consequent inability to retain staff, and the proposed establishment by the U.S. Air Force of microwave towers adjacent to Hawley State Forest.

—The Board also set the frequency and funding for the newly authorized *Massachusetts Wildlife* and voted to oppose the Hawley towers as well as any legislation proposing to establish a mourning dove hunting season.

—The Division's long-range plan was completed and published in January 1985. Federal funding for planning was terminated in April 1985 and further planning efforts are on hold.

—Fish passage at the Holyoke Dam in 1986 yielded 632,225 blueback herring, 481,668 shad, 40,308 lampreys, 369 striped bass and 285 Atlantic salmon.

—Fish passage at Turners Falls improved but is still an impediment between Cabot Station and the spillway and gatehouse fishways. Passage upriver from Turners Falls amounted to only 3855 shad (12% of those tallied below).

—There were 32,800 salmon parr reared at the Roger Reed Hatchery in Palmer, tagged, and released into the Millers and Deerfield rivers.

—There were 13,086 shad passed at the Essex Dam on the Merrimack. There were also 23,112 herring, 18,403 lamprey, 212 Atlantic salmon, and 110 striped bass passed.

—Smelt surveys at 21 tributaries in the Quabbin indicated that egg deposition was light except at one site. Angling activity, fishing pressure, and harvest at Quabbin were all down from the previous year, attributable to poor spring weather and a drop in reservoir water level.

—Forty mature walleye were captured in sampling at Assawompsett Lake.

—The fisheries crews conducted biological surveys on 23 lakes and 64 streams during the year.

—Poor hatchery survival of sea-run brown trout young prevented the sea-run program from achieving its goals of 6% adult return from the release of 25,000 smolts.

—The Division received a \$500,000 grant from the U.S. Fish and Wildlife Service to determine the costs and advantages of dosing flowing wetlands with lime. Whetstone Brook in the Wendell State Forest was selected as the study site.

—In April 1986, the Division completed its application for federal funds for angler education under the Wallop-Breaux amendments. The present plans are to fund the Urban Angler program and the aquatic segment of Project WILD from these funds.

—There were 210,183 brook trout; 236,381 brown trout; 383,442 rainbow trout; 3051 Quabbin rainbows; 61,419 coho salmon; 1533 sea-run cohos; 32,500 landlocked salmon; 9878 tiger muskellunge; and 3400 northern pike produced at the hatcheries.

—The long-range plans for the deer season included (1) a conceptual management model incorporating habitat, people and deer; (2) establishment of databases that track these components over time; (3) the development of a reconstruction deer population model for the past 15 years; (4) the development of deer carrying capacity guidelines for each management zone and (5) the identification of research needs to supplement development of the model.

—The Division entered into an agreement with the Division of Law Enforcement regarding an animal response team for bear and moose control⁴³.

—The Board voted down proposals to allow coyote hunting during the shotgun deer season, to allow coyote trapping and to change harvest regulations for beaver and muskrat.

—There were 1363 ducks (559 wood ducks, 444 mallards) and marsh birds captured in pre-season banding, mostly by airboat nightlighting. The winter of 1985-86 was the third mild winter in a row and only 266 ducks (66% black ducks) were banded.

—During the 1985-86 zoned waterfowl season, the statewide harvest was down 2.6% from the 2-zone average and 29% below the pre-zone average. Major declines were noted in wood ducks and black ducks, in large part due to harvest restrictions on black ducks. Massachusetts achieved a 27% black duck reduction in 1983 and a 30% reduction in 1984, below the federal mandate of 25%.

—The wildlife forestry program will build an inventory database for each wildlife management area, design and carry out commercial forestry operations which improve wildlife habitat, and determine the regional response of wildlife populations (especially breeding songbirds) to forest management.

—There were 43,723 pheasants (plus 4416 for the club program) and 4200 quail liberated, exclusive of field trial stockings.

—The Cooperative Wildlife Research Unit is initiating a study on fawn mortality in western Massachusetts.

—The Division entered into a Limited Authority Section 6 Endangered Species Act Agreement with the U.S. Fish and Wildlife Service for the protection of endangered and threatened wild plants⁴⁴.

—Eight eaglets received from Nova Scotia were released from the hack tower at Quabbin in August. An additional rehabilitated bird was released at the same time. Eight more Nova Scotia eagles were received in June 1986 for release later that year.

—The East Coast population of the piping plover was federally listed as “threatened” in January 1986. An inventory of Massachusetts sites documented 139 breeding pairs at 51 sites. All except nine pairs were south of Boston and 50% were on Cape Cod.

—Additional studies were underway on short-eared owl, rare grassland birds, osprey, common loon, and rare plants and plant communities. Many new records of rare plants and plant communities were being added to the Natural Heritage database.

—The Information & Education Section hosted eight special events, issued 151 press releases, participated in five large and several smaller fairs and shows, initiated participation in Project WILD, and investigated the marketing of the Fuertes bird prints.

—Recent legislative approval will allow *Massachusetts Wildlife* to be put on a subscription basis in 1986.

—A special budgetary allocation for open space (c. 723, St. 1983) allowed the Realty Section to acquire 1156 acres for the Division during 1985-86, including larger parcels in Gardner, Lancaster, Peru, and Phillipston.

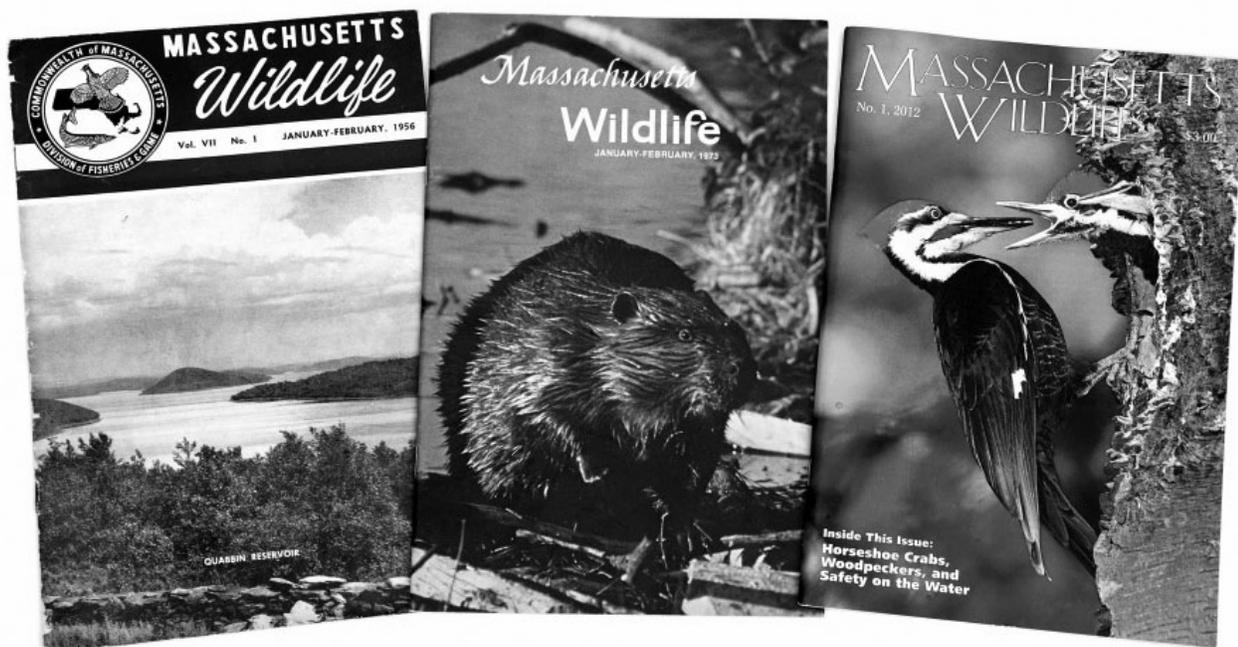


Photo © Bill Byrne

Figure 59. Massachusetts Wildlife magazines, 1956-2012.

—Legislation included an authorization for the Division to use the Nongame Wildlife Fund to acquire other than fee interest in certain lands⁴⁵, and an exemption for veterinarians from civil liability when rendering emergency aid to non-domestic animals⁴⁶.

1986-87⁴⁷: The Board was excited by the expanded and subscription-based status of *Massachusetts Wildlife* (Figure 59). The Board also appreciated the newly-designed license with attached permit applications, which saved money on printing and distribution. The “Abstracts” were also enlarged with funds saved from the license redesign.

—The Board also discussed the raising of rents on Division-owned buildings, a review of employee status and pay, a review of the computer acquisition program, a detailed cost breakdown of the pheasant rearing programs, and ongoing issues with the Field Headquarters telephone system.

—The Board also continued discussions on the use of non-toxic shot for waterfowl hunting and the repeat proposal to introduce the so-called “white amur”, a hybrid form of grass carp.

—Fish passage at Holyoke totaled 231,079 shad and 202 Atlantic salmon, while the Turners Falls fishway successfully passed 18,959 shad and 12 salmon. Shad still have difficulty negotiating the gatehouse flow at Turners Falls. There were 80,000 salmon fry and 9000 parr released into tributaries of the Deerfield and Westfield rivers.

—Fishing pressure and harvest for the Quabbin remained stable. White perch were becoming a significant portion of the total catch. Strategies were explored to mitigate the mercury pollution and low pH that are affecting the smelt and lake trout populations.

—There were 30,000 landlocked salmon smolts stocked in the Quabbin and 3700 northern pike and tiger muskellunge provided for release in selected lakes and ponds.

—Several thousand landlocked salmon fry released into the Quinapoxet River in 1984 were beginning to provide a modest fishery in Wachusett Reservoir.

- “Témiscamie”⁴⁸ hybrid brook trout were stocked in Higgins Pond on Cape Cod.
- Six lakes in Berkshire, Berkshire, Franklin, Plymouth and Worcester counties were limed to combat acidification.
- The “Urban Angler” program was renamed the “Aquatic Resources Education” program. Federal funding is now available through Wallop-Breaux funds.
- There were 294,280 brook trout, 68,984 brown trout, 342,527 rainbow trout, 728 Atlantic salmon, and 440 landlocked salmon produced and stocked from the hatcheries.
- The wild turkey hunting season was expanded to the four western counties and a portion of Worcester County. The 3-week season included a 1-week first segment and a 2-week second segment, with hunters required to choose only one segment.
- There were 367 ducks (213 wood ducks, 109 mallards) and marsh birds captured during the 1986 pre-season banding. Winter conditions were normal and 782 ducks (72% black ducks) were captured and banded.
- The 247 nest starts and 212 successful wood duck nests were the highest in the eight years during which 50 study areas have been checked. The increase likely reflects a reduced harvest resulting from the 1-bird bag in 1982 and a delay in the start of the opening day.
- Measurements of geese taken by hunters indicated that 69% of geese were so-called “Giant” Canada geese. When comparing this with the percentage of “giants” in the Massachusetts population, about 80% of the goose harvest was locally produced.
- The Cooperative Wildlife Research Unit is conducting studies on the Division’s hunter survey methodology, movements and mortality of white-tailed deer fawns, wild turkey population dynamics, and black bear reproductive success.
- There were 47,249 pheasants (plus 4800 for the club program), 3315 quail, and 731 white hare liberated.
- The forestry program continued with boundary marking, commercial forestry operations, and censuses of ruffed grouse and songbirds.
- The Wetlands Protection Act (“WPA”) was amended⁴⁹ to include wildlife habitat as a protected interest under the Act. The Division is working with the Department of Environmental Quality Engineering (“DEQE”) to develop regulations to implement this change. The Nongame and Endangered Species Section also agreed to provide certification for vernal pool habitats under the WPA.
- The income from the nongame tax checkoff continued to decline. The Section acquired much-needed additional space at the Boston office.
- In August, the Board approved the addition of 85 invertebrates (Figure 60) to the list of threatened and endangered species.
- Section staff also continued with peregrine falcon and bald eagle restoration, Plymouth red-bellied turtle studies, piping plover research and surveys, tern inventory and management, osprey nesting, short-eared owl nesting and habitat use, common loon management, bluebird and purple martin nest box erection, and bat hibernacula surveys.



Photo ©Michael W. Nelson



Ebony Boghaunter (*Williamsonia fletcheri*), male

Photo by M.W. Nelson

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Figure 60. Ebony Boghaunter, male.

—A captive-born male peregrine falcon released in downtown Boston in 1984 paired with a captive-born female released in Toronto, Ont., the same year. The female laid eggs in an ornamental gutter in the McCormick Post Office and Courthouse building in Boston. A first clutch failed, so a second clutch was removed and two captive-born chicks added, which were successfully raised. This pair produced the first peregrine eggs laid in Massachusetts in 41 years.

—The Information & Education Section worked on license and “Abstract” redesign, participated in five major shows, produced two exhibits for display, implemented the subscription process for *Massachusetts Wildlife* (now a 40-page quarterly with eight color pages), produced various small publications, began a process to acquire uniforms for Division staff, began implementation of Project WILD, assisted in organizing the Northeast Fish & Wildlife Conference, and cooperated in fishing award presentations and stamp contests.

—The Realty Section was excited to have substantial monies allocated from the 1983 open space bond issue, acquiring 3336 acres through 34 acquisitions, including the nucleus of new wildlife management areas in Northfield, Royalston, Tyringham, and West Brookfield/Brookfield.

Legislation included a prohibition on the counterfeiting of Division seals and tags⁵⁰, a prohibition on the importation of certain of reptiles and amphibians⁵¹, and

the revision of procedures for the Nongame tax checkoff and the renaming of the Non-game Wildlife Fund⁵².

1987-88⁵³: John “Jack” Buckley, former Fisheries Chief for Washington, D.C., was hired as Deputy Director for Administration. Culturist John A. Prouty (b. 1915) retired after 50 years of experience. The Board devoted considerable time to the “Agenda 90 Environmental Challenge” report of the Executive Office of Environmental Affairs.

—There were 343,363 blueback herring, 294,157 shad, 15,912 lampreys, 256 striped bass and 74 Atlantic salmon tallied at the Holyoke fishway. Upstream passage at Turners Falls continued to be problematic with only 15,787 successfully migrating into the Turners Falls pool. There were again mechanical difficulties at the Lowell fishway, which passed only 1289 shad (but 56,739 blueback herring, a record).

—Elevated levels of mercury prompted the Department of Public Health to issue a health advisory regarding the consumption of lake trout from Quabbin. Catches of lake trout, smallmouth bass, and landlocked salmon were slightly above the previous year, while the white perch harvest doubled.

—The EPA appeared to have “grossly underestimated” the threat of acidification to Massachusetts waters. The lime dispenser on Whetstone Brook was expected to begin operation in the fall of 1988.

—The Aquatic Resources Education program now has 128 certified instructors. More than 4000 students participated in 1-day fishing events and 126 students graduated from the 4-day intensive clinics.

—There were 231,640 brook trout; 145,740 brown trout; 520,545 rainbow trout; 14,825 sea-run brown trout; 111,750 landlocked salmon; 29,735 Atlantic salmon (including brood stock); 8300 tiger muskellunge; and 6445 northern pike produced at the hatcheries.

—The Board changed the deer bag limit to two in Zones 12-14 (for compatibility with the rest of the state). There were ≈37,000 applications for 10,333 antlerless deer permits. A hunter survey showed that deer hunters contributed ≈\$35 million to the state’s economy.

—The Board also prohibited the use of most permanent tree stands and decided to continue the two-segment bear season at least until 1988.

—The Board further voted to require non-toxic shot⁵⁴ for waterfowl hunting in five counties in 1987-88 and to require it statewide in 1988-89 (ahead of the federal mandate for 1991). Woodcock are showing a good recovery and the Board continued the 3-bird bag limit which has been in effect since 1985.

—There were 298 ducks (235 wood ducks) banded during pre-season banding. The wrecked airboat was not replaced but an additional 94 ducks were banded at Great Meadows National Wildlife Refuge using a federal airboat. There were 535 ducks (72% black ducks) banded during winter trapping.

—A five-year study of wood duck nesting in both plastic buckets and wooden boxes showed a higher (26% usage) of wooden boxes vs. buckets (12%)⁵⁵. Wooden boxes were also more cost-effective than buckets, which were cheaper initially but required more frequent replacement.

—There were 674 Canada geese banded during pre-season drive trapping. There were an estimated 6000 pairs of nesting geese statewide. An experimental late goose season was initiated and 3482 sportsmen received permits, of whom 51% actually hunted of whom 749 took one or more geese.

—The forestry program continued with commercial cuts on the Hiram Fox area and the Bitzer Hatchery grounds. The drumming grouse and breeding bird surveys were continued.

—Following a full review of game farm operations, costs, and production, the Board voted to close the Sandwich Game Farm on an experimental basis. There were 40,906 pheasants (plus 5258 for the club program), 3566 quail, and 600 white hare liberated.

—The Cooperative Wildlife Research Unit continued with studies on deer fawn mortality and movements, and black bear reproductive success. Additional studies were initiated on river otter habitat use and movements and otter population dynamics and contaminant analysis.

—Five of the Natural Heritage Program staff, who were formerly employees of The Nature Conservancy, became state employees in April 1988.

—The newly-designated Natural Heritage and Endangered Species Section continued investigations on piping plover, terns, peregrine falcon, bald eagle, short-eared owl, common loon, grassland birds, bluebirds, Plymouth red-bellied turtle, bog turtle, dragonflies, and several rare plants and natural communities.

—Two peregrine chicks were hatched from a nest box (Figure 61) on the Customs House Tower in Boston. At least two territorial eagles built nests in the Quabbin Reservation.

—An 11-member Right Whale Advisory Group was established within the Department. The group assisted in drafting a response to the Massachusetts legislature regarding the status of the right whale, and review of a proposal to prohibit operation of vessels within 500 yards of a right whale.



Photo © Bill Byrne

Figure 61. Peregrine Falcon feeding young in nesting tray, Springfield.

—The Information & Education Section produced the annual iterations of various publications and stamps, put on five large live-animal displays, published four issues of the enlarged *Massachusetts Wildlife*, engaged in the Junior Conservation Camp and Project WILD and Aquatic WILD, and participated in various awards programs.

—A new bond issue (c. 564, St. 1987) granted the Division \$30 million for lands along rivers and streams, additions to existing areas, and rare species habitat. However, those funds did not materialize in 1987-88. Six consultant land agents were hired to facilitate expenditure of the remaining previous bond funds and to target areas for further purchase. There were 2989 acres acquired, including two new wildlife management areas in the Western District. —Legislation included the designation of the Division's Field Headquarters building as the "Richard Cronin" building⁵⁶.

1988-89⁵⁷: The Board expressed great sadness at the death of Director Richard Cronin (1926-1988). Assistant Director for Wildlife Wayne F. MacCallum, who was Acting Director from July 1988 to April 1989, was appointed as Director.

—The Board adopted new regulations regarding wildlife rehabilitation⁵⁸ and problem animal control⁵⁹.

—The Holyoke fish lift passed ≈350,000 shad and saw a return of 108 Atlantic salmon. There were >130,000 juvenile salmon released in the Westfield River.

—There were only 7875 shad passed at the Lawrence fishway. However, 89 adult Atlantic salmon were captured there.

—There were 30,000 8-inch landlocked salmon yearlings stocked in Quabbin in May 1989. More releases are planned for 1990. Additional fish advisories were issued for Quabbin setting forth consumption limits for some fish and prohibiting any consumption of others.

—The acid rain monitoring program showed that 5.5% of Massachusetts waters are acidified, 16.7% critical, and 62% with slight buffering capacity. The lime dispenser on Whetstone Brook has been completed and liming commenced in March 1989. Assessments will be conducted during the next three years.

—A fisheries graduate student (and Division biologist) completed a dissertation on the Massachusetts stream classification system⁶⁰.

—There were 178,951 brook trout; 184,301 brown trout; 315,525 rainbow trout; 65,515 landlocked salmon and fry; 19,800 sea-run brown trout; 3500 northern pike; and 120 Atlantic salmon produced at the hatcheries.

—Deer management goals were established for all 14 management zones. These goals were developed to control deer populations at levels compatible with human desires and interests, as well as the ecological conditions within each zone.

—The Board approved a regulatory change allowing the use of rifled caplock muzzle-loaders during the primitive firearms deer season and set procedures for the salvage of road-killed deer.

—The Board also changed the opening date of the September segment of the bear season to begin on the second Monday of the month, instituted a detachable bear tag, and changed the transport and display requirement to be consistent with that for deer.

—The practice of relocating nuisance beaver was discontinued as beaver now occupy all suitable habitat in the state. A brochure was prepared to explain options to landowners experiencing beaver damage.

—A six-day fall turkey season—the first in modern times—was approved for the area west of the Connecticut River, to commence in 1990.

—Following the acquisition of a new airboat, there were 374 ducks (291 wood ducks) banded. Winter banding was discontinued.

—There were 1289 Canada geese banded at 17 sites during the summer to evaluate the effectiveness of the experimental late goose season.

—Wood duck nesting studies showed that double back-to-back boxes averaged 82% usage and 75% success, compared to 78% use and 69% success for single boxes.

—The forestry program worked on forest inventories, boundary marking, renovation of old orchard sites, wildlife population censuses, and oversight of commercial cuts. The first prescribed burn carried out on Division property was implemented on three acres of the Hiram Fox wildlife management area.

—The Cooperative Wildlife Research Unit continued with studies on fawn mortality, black bear behavior, and river otter habitat use and contaminant analysis.

—The Assistant Director for Natural Heritage and Endangered Species testified on March 15, 1988 before the House Subcommittee on Fisheries and Wildlife Conservation and the Environment in support of funding for the federal Fish and Wildlife Conservation Act of 1980 (the “Nongame Act”). The committee chair was Massachusetts Representative Gerry Eastman Studds (1937-2006).

—Recent legislation provided for the first time that state income tax filers could add a donation for rare species to their taxes rather than only having it deducted from their refund.

—The Natural Heritage and Endangered Species Section continued to be very active in reviewing the impacts of hundreds of proposed projects on rare species and their habitats. The Section also responded to the first year of its new responsibilities under the revised Wetlands Protection Act by making extensive revisions to the Estimated Habitat maps and providing them to 143 municipal conservation commissions. The Department of Environmental Management advised that it would consult the maps when reviewing all forest cutting plans.

—Studies continued on peregrine falcon, piping plover, terns, great blue heron, and Plymouth red-bellied turtle. A new investigation was begun on the American burying beetle (a candidate for federal listing), apparently extirpated from Massachusetts.

—There were four territorial pairs of bald eagles, three at Quabbin and one on the Connecticut River. Two of the Quabbin pairs laid eggs, with three chicks hatched, the first successful nesting in Massachusetts in 84 years (since 1905).

—The Information & Education Section hosted three special press events, participated in four major shows, and continued with Project WILD and the Aquatic Resources Education programs.

—Subscriptions to *Massachusetts Wildlife* declined from 21,000 in 1986 to 17,500 in 1989, probably due to the lack of an effective recruitment process. The Section also

participated in the first Massachusetts Envirothon and hosted the national Project WILD coordinators conference.

—The Realty Section acquired 3649 acres, including substantial acquisitions in Ashby, Brookfield, Hancock, Mashpee, Montague, Plymouth, and Warwick.

—Legislation included a provision establishing a procedure for the disposal of road-killed deer⁶¹ and an authorization for the Director to regulate certain BB shot for waterfowl hunting⁶².

1989-90⁶³: Peter Henry Oatis (1943-1990), Assistant Director for Fisheries, was shot and killed at the Field Headquarters in February 1990 by aquatic biologist John Ganson Lindenberg. Lindenberg was subsequently convicted of second degree murder and sentenced to 15 years without parole. Dr. Mark S. Tisa was promoted to the Assistant Director's position.

—There were 363,725 shad and 392,157 blueback herring passed through the Holyoke fishway. There were 198 Atlantic salmon counted and 18 allowed to pass upriver. Lamprey, striped bass and gizzard shad were also observed to pass.

—There were 27,908 shad passed at Turners Falls; however, this is well below the restoration goal of 50% (of the passage at Holyoke). The stocking of Atlantic salmon fry was increased to 333,000, including 273,500 into the Westfield river basin and 32,000 into that of the Deerfield.

—There were 6023 shad and 254,242 blueback herring passed at the Essex Dam fishway in Lowell, and 243 Atlantic salmon trapped for spawning.

—There were 75 Quabbin lake trout which qualified for Sportfish Award pins. There were 28,600 landlocked salmon fingerlings released in Quabbin in May to sustain the put-and-take fishery. An additional 15,000 eggs from two sources were received for hatching and stocking in 1991.

—There were 152,511 brook trout; 133,515 brown trout; 317,417 rainbow trout; 6500 sea-run brown trout; 50,250 landlocked salmon; 7970 Atlantic salmon brood-stock and smolts; 11,600 northern pike; and 1900 tiger muskellunge produced at the hatcheries.

—The deer herd was estimated at ≈50,000 animals. During 1990, ≈70,000 hunters harvested 6901 deer.

—The Board reviewed the trapping regulations and held a public hearing, allowed a lengthy comment period, and held a special Board meeting. Following these actions, and a ruling by the Supreme Judicial Court⁶⁴, the Board allowed certain uses of “padded leghold” traps on lands, required mandatory trapper education, established a coyote trapping season and discontinued carcass surrender, required mandatory sealing of fox pelts, required all pelts required to be sealed to be so done within four working days of take, and provided a process for reporting lost or stolen traps.

—The Wildlife Section completed the first full season of airboat nightlighting in four years, taking waterfowl (473 wood ducks) and marsh birds of 12 species. The summer Canada goose banding took 2050 geese from 33 sites.

—Wood duck nesting studies showed that the cold, wet May might have reduced hatching and brood survival.



Photo © Bill Byrne

Figure 62. Bald Eagles at nest, Merrimack River, Essex County.

—There were 38,461 pheasants (plus 6106 for the club program) in 1989 and 41,332 (plus 6722 for the club program) in 1990 produced (at Ayer Game Farm) or purchased for liberation. There was no information given in the [1989-90] Annual Report on quail or white hare, if any.

—The forestry program completed a major commercial cut on the Hiram Fox area, awarded a contract for a new cut on the Quacumquasit area, marked boundaries on six areas, and continued with grouse and songbird censuses.

—The Cooperative Wildlife Research Unit continued with studies on the response of black bears to habitat and land use changes and furbearer population models. The fawn mortality study was nearing completion and a study on river otter movements, habitat, and populations was completed⁶⁵.

—The Board established a domestic animal list⁶⁶ to specify those animals which were excluded from the Division's authority.

—Legislation approved the addition of a donation line on the corporate income tax form⁶⁷; however, by the end of the fiscal year no corporation had done so. There was also legislation which set a process for establishing a statewide system of nature preserves⁶⁸. A comprehensive "nongame" bill was still pending.

—The U.S. Fish and Wildlife Service listed two Massachusetts species—the American burying beetle and the dwarf wedge mussel—as endangered.

—The population of the endangered roseate tern dropped to 1576 pairs, nearly all at Bird Island in Marion. A graduate student at the University of Massachusetts completed a population dynamics study of piping plover⁶⁹.

—The bald eagle program began a new phase with the cessation of hacking and the onset of wild nesting (Figure 62).

—Three 30-second Public Service announcements promoting the tax checkoff and featuring Massachusetts celebrities were produced and distributed.

—The Information & Education Section prepared 26 press packets, organized three special events, conducted two stamp programs, prepared and distributed *Massachusetts Wildlife*, acquired additional uniform items for staff, and participated in Project WILD, the Aquatic Resources Education program, the Envirothon, and the cooperative Merrimack River Watershed Education program.

—The Realty Section had a slow start due to delayed funding for acquisition and consultants. Most acquisitions were closings on agreements made during FY89. However, 20 new acquisitions totaling 1735 acres were later accomplished, including the transfer of 413 acres initially acquired by the Town of Wendell.

—Legislation included an increase in non-criminal and criminal fines and penalties and a provision for restitution to the Division for illegal taking of certain wildlife⁷⁰.

LESSONS ABLY FORMULATED AND IMPLEMENTED AS A CONSERVATION DOCTRINE: THE 1990s.

The 1990s¹—overall a period of prosperity in the United States—saw the launch of the Hubble Telescope (1991), the “Desert Storm” war against Saddam Hussein (1991), the dissolution of the U.S.S.R. (1991), the public debut of the World Wide Web (1991), the North American Free Trade Agreement (1994), a fully operational Global Positioning System (1994), and the adoption (but not by the U.S.A.) of the Kyoto Protocol (1997).

Democratic Governor Michael Stanley Dukakis (b. 1933)—the 65th and 67th and longest serving (12 years) Governor in Massachusetts history—was succeeded in 1991 by a series of four Republicans (1991-2007). The Category 2 Hurricane *Bob*, one of the smallest in area yet most intense since 1938, struck the state in August 1991. *Bob* was followed by the unnamed nor’easter-turned-hurricane, later termed the “Perfect Storm”. “NoName” slammed the coast around Hallowe’en and sank the Gloucester-based F/V *Andrea Gail*, later memorialized in book² and film.

The Massachusetts forest, comprising 64% of the state, was still quite extensive and was principally industrial timberland, mostly privately owned and largely unmanaged³. Future forest management was projected to require public awareness, active ecosystem management, energetic partnerships, and a formulated strategy for the utilization of forest products³.

The North American Model of Wildlife Conservation was formally enunciated in the 1990s, articulating the "...lessons...absorbed by the watchful mind of a congressman destined to become President, Theodore Roosevelt, [which] were ably formulated and implemented as a conservation doctrine"⁴. This management paradigm was based on: (1) wildlife as a public trust resource, (2) elimination of game markets, (3) lawful allocation of wildlife to the public, (4) killing only for legitimate purposes, (5) wildlife as an international resource, (6) wildlife policy as discharged through science, and (7) hunting as an integral and democratic facet of the policy^{4,5,6}. However, the components did not arise simultaneously nor were they consistently applied to all entities. The model is challengeable and alteration is inevitable⁷. Lack of broad inclusivity and educational outreach, shortfalls in funding, climatic and attitudinal change, globalization, commercialization and privatization of wildlife, and other emerging threats will force wildlife professionals to broaden the model's relevance to a urbanizing populace often detached from nature⁷.

While other groups and factions indeed fostered and promoted land and wildlife conservation⁸, hunters—hunting—were fundamental to the development of the model. It still is so, despite no longer being an indicator of high social status⁹ and sharp criticisms of the "hunting hypothesis"¹⁰. The anthropologist Matt Cartmill⁹ argued that the erosion of the animal-human interface both threatened the moral difference between the two as well as undermining hunting's conceptual basis. The historian Daniel J. Herman¹¹ described early American hunters as settlers and farmers who hunted for subsistence, with the "hunting tradition"¹² only a facile construct of latecomer promotionalists. Hunting once affirmed the democratic ideals of independence, self-reliance and personal responsibility but sportsmen are now keenly aware that hunting lacks a bright future¹³. Nevertheless, hunting still sustains an active participation in nature and an appreciation for the duality of humans and wildlife and so is crucial to the fate of wildlife¹³.

1990-91¹⁴: There were 152 Atlantic salmon recorded at the Holyoke fish lift (15 passed upriver) as well as 523,153 shad. There were 54,656 shad (the highest number yet) passed at Turners Fall, but still below the 50% (of those passing Holyoke) restoration goal.

—There were 332 salmon, 16,000 shad, and 379,588 blueback herring counted at the Essex Dam on the Merrimack.

—Seventy-five Quabbin lake trout qualified for Sportfish Award pins, the largest exceeding 21 lbs. In early May, 15,000 landlocked salmon yearlings were stocked in Quabbin and another 15,000 from Maine and New Hampshire will be reared at the Roger Reed (Palmer) Hatchery for release in 1992.

—There were 47 fish kills in ponds and streams with \approx 16,800 fish killed. Nearly half (45%) of those killed were caused by pollution, principally (78%) pesticides.

—The Whetstone Brook lime dispenser was operating correctly and liming goals have been met. The stream pH has returned to safe levels and toxic concentrations of aluminum were reduced.

—There were 132,866 brook trout; 150,611 brown trout; 411,309 rainbow trout; 1740 Atlantic salmon adults and 500,245 fry; 27,500 landlocked salmon fry and adults; 11,000 northern pike; and 1700 tiger muskellunge produced at the hatcheries.

—The Board allowed so-called “maxi-balls”, grunt tubes, and natural or artificial scent for deer hunting, but prohibited baiting or the use of decoys.

—After the passage of enabling legislation¹⁵, a special controlled (and controversial) deer hunt^{16,17}, jointly developed by the Division and the Metropolitan District Commission (“MDC”), was held in the Quabbin Reservation to reduce the deer overpopulation which was degrading ecosystem health and affecting the MDC’s water supply mission.

—The Board set differential regulations regarding hunting with and training of bear hounds both for residents and for non-residents.

—The Board also entered into a cooperative agreement with the National Wild Turkey Federation. There were 329 turkeys¹⁸ taken during the initial 6-day fall season, open west of the Connecticut River.

—The furbearer program has responsibility for 14 species, with program goals designed to control problem animals, reduce habitat degradation, provide recreational and economic opportunity, reduce competition among animal populations, and alleviate crop and property damage.

—There were 1039 ducks (639 wood ducks) banded during pre-season banding in 1990.

—The first early-season Canada goose season was held in the Berkshire waterfowl zone in September 1990, with 496 hunters (843 permittees) taking 688 geese. The special late season (early 1991) resulted in 1013 hunters (1957 permittees) taking an estimated 1480 geese.

—There were 45,064 pheasants (plus 6562 from the club program) stocked.

—The forestry program began to digitize forest cover maps for use with Arc/Info GIS. A major forest cutting operation was completed on the Quacumquasit area in Brookfield. A new contract was initiated on the Peru wildlife management area.

—The Cooperative Wildlife Research Unit completed a study on the movements and mortality of white-tailed deer fawns¹⁹. Studies on black bear response to habitat changes and furbearer population models were being finalized.

—After five years, the Massachusetts Endangered Species Act²⁰ was enacted in December 1990. This bold and comprehensive legislation inserted a new Chapter 131A in the General Laws. The statute provided for a 9-member technical committee to assist in the formulation of regulations to implement the statute, which was to provide for a list of endangered, threatened, and special concern species²¹ and set a process for the designation of significant habitats, and related matters. Another statute²² changed the name of the “Nongame Wildlife Fund” to “Natural Heritage and Endangered Species Fund” and provided that interest on the fund’s principal was to be returned to the fund.

—The Natural Heritage Program used Geographic Information System methodology to produce a set (the “1991 Atlas”) of estimated habitats for rare wetlands wildlife. A map was also produced for a marine estimated habitat for the northern right whale in Cape Cod Bay.

—Promotional activities for the Fund were conducted using television spots, subway advertising placards, highway billboards, color posters, radio public service announcements, and newspaper advertisements.

—Five territorial pairs of bald eagles were located, three of which laid eggs, hatching four chicks.

—The Springfield peregrines—the second pair in the state—nested in an tray on the Monarch Place building with live television coverage of the birds provided by a dedicated channel on Continental Cablevision.

—The northeastern beach tiger beetle and the Puritan tiger beetle were listed as threatened by the U.S. Fish and Wildlife Service.

—The new Nature Preserves Council, first established in April 1990, continued to work on draft regulations for a system of nature preserves.

—In addition to its traditional annual activities, the Information & Education Section held 30 WILD workshops (including 14 Aquatic WILD), seven instructor training workshops were held for Aquatic Resource Education volunteers, and the Merrimack River Watershed Education project began its first year of active teacher participation.

—No land acquisition funds were available in FY91 except for joint watershed protection monies between the Department and the M.D.C. Other acquisitions, including a large area in Sturbridge, were obtained using FY90 bond funds which had already been committed.

—Land stamp legislation²³ required the purchase of a \$5.00 land stamp with each annual initial license and set up a dedicated wildlands account. Monies from this account will hopefully be available in FY92.

—Additional legislation included provisions and authorizations for the Director to revoke hunting licenses in certain circumstances²⁴ and a directive for the commissioner of administration to set the fee for a waterfowl stamp²⁵.

1991-92²⁶: Dr. Steven A. Williams, Assistant Director of Wildlife, resigned to take a position with the Pennsylvania Game Commission and later became Director of the U.S. Fish and Wildlife Service. After a nationwide search, the Board appointed Dr. Robert D. Deblinger as the new Assistant Director.

—There were a record 368 Atlantic salmon (36 passed upriver, of which 14 navigated the Turners Falls gatehouse) and 720,000 shad (60,000 at Turners Falls). There were ≈450,000 fry released into Connecticut River tributaries.

—There were 20,801 shad passed at the Lawrence fishway. Salmon returns (n=197) were down from the previous year and all were captured for brood stock.

—Quabbin produced many large lake trout, largemouth and smallmouth bass, brown bullhead, black crappie and white perch. About 15,500 landlocked salmon yearlings were stocked in May 1992.

—The Fisheries Section established a 5-year plan to evaluate the status of warm and cool water fisheries across the state and to determine the impact of management regulations, stocking practices and angling pressure on those fisheries. The black bass aspect of the plan included a statewide bass population survey, a statewide creel survey, population modeling and an assessment of black bass management alternatives.

—The Whetstone Brook project was completed and has met all liming goals. Increases in the population size, survival and health of brook trout and brown trout were also evident.

—There were 60 freshwater fish kills in FY92, involving ≈215,900 fish. The most extensive involved 200,000 alewives killed by mechanical injury and suffocation during the pumping of a cranberry bog.

—There were 218,101 brook trout; 160,039 brown trout; 393,575 rainbow trout; 210 adult Atlantic salmon and 435,800 fry; 15,425 landlocked salmon; and 11,000 tiger muskellunge produced at the hatcheries.

—On New Year's Eve, the Ayer Game Farm was hit by arson, destroying a number of buildings. In August, Hurricane *Bob* damaged facilities at the Southeast District and the Sandwich Fish Hatchery.

—There were 724 deer harvested in the Quabbin special hunt (nearly 100% of them were physically examined by the Division).

—Raccoon rabies²⁷, which was spreading northward along the eastern seaboard since 1977, has reached New York and Connecticut and is poised to enter Massachusetts. The Division prepared an action plan to set forth administrative and regulatory responses to this incipient epizootic.

—The cottontail rabbit survey, conducted every 10 years, yielded 497 (95%) Eastern cottontails from 13 counties and 24 (5%) New England cottontails from four counties.

—There were 891 ducks (498 wood ducks) and seven marsh birds captured during pre-season banding.

—The Wildlife Section began its participation in a 6-year flyway-wide mark-recapture study of resident Canada geese by marking geese with large individually-coded neck collars and later making visual observations. A total of 3091 geese were captured of which 1200 were neck-collared.

—The second early Berkshire zone Canada goose hunt was held, but only 394 permits (843 in 1990) were issued and 390 geese taken. The fifth late Canada goose season was expanded into the Central zone, increasing interest. However, only 1490 hunters actually participated, taking 2925 geese between the two zones.

—There were 36,730 pheasants (plus 7315 for the club program) stocked.

—The forestry program digitized 2470 acres on three wildlife management areas in Chester and Worthington. Other parcels will soon be digitized. A commercial timber harvest in Peru was completed in September 1991. Two contracts at the McLaughlin Fish Hatchery were completed in February 1992 and a second in April.

—The Cooperative Wildlife Research Unit began a new study on wetland bird populations and habitat, continued a study on fisher population dynamics and was nearing completion of a black bear habitat and land use study.

—The Board reviewed the draft [new] endangered species regulations and held two public hearings to solicit public comment. The Board then voted to accept the regulations with minor adjustments. The regulations were then sent to the legislative Committee on Natural Resources for the [in this case] 60-day review. Following that, the Board voted to approve the regulations and to replace the existing list with the new one. The regulations were then formally promulgated in January 1992.

—The Natural Heritage Program printed reduced-size topographic maps for the 1992 Atlas of Estimated Habitats. There were also 102 new Estimated Habitat town maps prepared and sent to the appropriate towns.

—A new state law (G.L. c. 29, § 5D) assessed indirect costs to each dedicated fund, resulting in an additional charge against the Natural Heritage and Endangered Species Fund.

—After two seasons of reclamation, the nesting gull population on Ram Island was reduced $\geq 80\%$ and growth of the cormorant colony arrested and has perhaps been reversed.

—The final Recovery Plan for the northern right whale was published in December. The Recovery Team urged that Cape Cod Bay and the Great South Channel be designated as Critical Habitat.

—The Information & Education Section developed a spreadsheet to track the Section's financial operations, especially for printing.

—At present, the wildlands stamp is embossed on the reverse of hunting and sporting licenses. However, there is a desire to provide an actual gummed color stamp for collectors, which would be accompanied by a print. A contract was signed with artist Randy Julius to facilitate this endeavor.

—The Realty Section acquired only six tracts (1056 acres) in FY92, since bond monies were not available until late in the fiscal year. Efforts to acquire properties using the new wildlands stamp monies are underway.

—Legislation included a provision that the Division assume all game biology needs and jurisdiction on M.D.C. properties²⁸, prohibiting hunter harassment²⁹, and designation of the wild turkey as the official state game bird³⁰.

1992-93³¹: The reclassification plan to address job classifications within the agency was completed and implemented. The 1993 hunting license was printed on very light-colored paper, possibly creating a safety problem, and the Board voted to enter into a Memorandum of Understanding with the Division of Law Enforcement to not enforce license display for 1993.

—There were only 167 Atlantic salmon counted at the Holyoke lift in spring and summer 1993. The numbers of shad were also disappointing. The number of shad counted at Lawrence was also lower (n=8599) than the previous year. There were about 970,000 salmon fry stocked in the Deerfield and Westfield river basins.

—The full-time creel census at the Quabbin was discontinued after about 30 years of consistent patterns in usage and angling pressure. The current Quabbin research and management plans provide for an assessment of rainbow smelt egg deposition, survival and egg production in feeder streams and to develop a bioenergetics model for lake trout and landlocked salmon. There were 15,425 yearling landlocked salmon stocked in Quabbin.

—The Board voted to: reduce the daily limit on brook and rainbow trout to three in ponds and major rivers and eight in other rivers and brooks; increase the brown trout pond limit to three; and implement special regulations for seven "special brown trout" ponds, allowing for one fish daily with a minimum length of 15 inches.

—The management plan for hatchery-raised esocids (pike and tiger muskie) provided for a statewide population survey, a statewide creel survey and the development of a consistent stocking protocol. There were 7500 surplus northern pike from Virginia stocked. Pennsylvania held the Division's allotment of tiger muskellunge until fall, allowing for the release of larger fish.

—The main well at the Sandwich Fish Hatchery failed, causing the loss of 49,000 fish. The Board voted to accept the Division's recommendations to repair and upgrade the facility rather than close it.

—There were 201,761 brook trout; 173,877 brown trout; 363,893 rainbow trout; 9600 sea-run brown trout; 22,180 landlocked salmon; 981,453 Atlantic salmon fry; 3900 northern pike; and 2750 tiger muskellunge produced at the hatcheries.

—The special deer hunting regulations in effect at Crane Beach in Ipswich since 1985 were rescinded because the project's goal has been accomplished. New regulations addressing the Quabbin controlled hunt were approved.

—Beaver damage has been increasing steadily over the past five years and there are now 225-300 complaints annually. Public education, technical advice, regulated harvest and installation of water-flow devices are components of beaver management.

—Raccoon rabies was first documented in Massachusetts on September 16, 1992. Since then, 251 raccoons and 23 other mammals of five species have tested positive for rabies. Eighty-five towns (25% of the total) have experienced at least one rabid animal.

—The Board heard recommendations from the previously-appointed turkey hunter safety committee and subsequently adopted regulations to require the application of a "Be Safe" sticker to the turkey hunter's shotgun, allow only shot sizes #4-#6 to be used for turkey hunting, and extend the spring hunting hours until noon. In addition, the Board approved spring hunting throughout the five western and central counties.

—Pre-season waterfowl banding yielded 824 ducks (522 wood ducks) and marsh birds.

—The second year of the Canada goose collaring project netted 2579 geese at 120 sites, of which 788 were collared.

—The park waterfowl census yielded 20,659 mallards, 2504 black ducks, 5100 Canada geese and a few ducks of other species at 224 sites in 126 towns.

—There were 43,936 pheasants (plus 7010 from the club program) stocked.

—Two timber sales were conducted in Belchertown and a second prescribed burn was done on the Hiram Fox area in Chester.

—The Cooperative Wildlife Research Unit completed a study on black bear response to changes in land use³² and initiated another on the impacts of food on black bear reproductive success and behavior.

—Piping plover showed encouraging increases in abundance and productivity with 213 breeding pairs and an average of 2.0 chicks per pair.

—Gull production at Ram Island was completely suppressed for three years and cormorants for two. Increased human presence on the island now serves to discourage gulls. Common terns nested on Ram Island for the first time in 20 years.

—The 1992 season was a record for bald eagles with 7 known nests. Ospreys have become so abundant that production cannot be censused annually. The 243 nests in 1992 was a record.

—For the third year, captive-raised American burying beetles were released on Penikese Island (a historic site). The population seems to have persisted but is not yet definitively established.

—The first collector's wildland stamp and print—a ruffed grouse—was launched at the State House in January 1993.

—Project WILD held 52 workshops for 883 educators and 9400 students participated in 34 Aquatic Resource Education events.

—The Realty Section recorded more acquisitions in FY 93 than in any other year except FY75 when the Hockomock project was at its height. Land stamp monies accounted for 1760 of the 4550-acre total, which included the new Leadmine, Muddy Brook, Thayer Pond, Wales, and Westfield wildlife management areas.

—Legislation included a provision that fines or penalties on account of Chapter 131A be credited to the Natural Heritage and Endangered Species Fund³³.

1993-94³⁴: The Board voted to endorse an extension of the waiver relative to license display for 1994 because legislation to remove the mandatory display requirement is pending.

—There was a substantial decline in shad and blueback herring lifted over the Holyoke Dam. There were 256 salmon counted (25 passed upriver). All future hatchery production will consist of fry, with the entire Connecticut River basin to receive ≈4.5 million in 1994, subsequently increasing to 9-10 million.

—Low numbers of shad were also recorded at the Lawrence fish lift; however, herring numbers increased to ≈90,000. Only 17 Atlantic salmon were counted.

—New fisheries regulations reduced the minimum length for brood salmon to 15 inches, closed Merrimack River below Essex Dam to the taking of brood salmon and the Merrimack above Essex to the taking of Atlantic salmon.

—There were emergency regulations approved regarding the taking of striped bass in fresh water, needed for compatibility with Marine Fisheries regulations.

—The Quabbin fisheries and water quality data since the early 1980s showed a reduction in productivity, loss of stream spawning access, more stable water levels, a significant expansion of lake trout and white perch, and a surge in smelt coupled with a surge in *Asellus* sp. (an isopod crustacean). Landlocked salmon stocking was cut to 10,000 to allow rebound of their forage base and to adjust stocking levels to reflect wild production. There were also 7800 fry released into the East Branch of the Swift River to assess their growth potential in this large tributary.

—Lake trout previously entered Wachusett Reservoir through the Quabbin Aqueduct and have now established a self-sustaining population utilizing smelt as forage.

—There were 27,500 northern pike received from New Jersey and Pennsylvania.

—There was an increase in fish kills (n=55) in FY94 over the previous year (n=37), probably due to near-record low flow conditions during summer 1993 followed by a

harsh winter with prolonged ice.

—There were 288,823 brook trout; 186,796 brown trout; 402,899 rainbow trout; 602 adult Atlantic salmon and 783,000 fry; 31,570 landlocked salmon; 5200 northern pike; and 5000 tiger muskellunge produced at the hatcheries.

—The Board voted to increase the length of the shotgun deer season from nine to 12 days (i.e., 2 weeks) in Zones 1-11, effective with the 1993 season (despite the contradiction with the 1993 “Abstracts”). After much discussion, the Board also voted to allow the use of so-called “inline” ignition systems in muzzleloaders and to allow mechanical releases to be used by archers.

—Canine distemper affected gray foxes and raccoons. Sarcoptic mange caused local die-offs of red foxes and affected some coyotes.

—The spring turkey season was open in five counties with a harvest of 1006 birds (the 3rd straight year over 1000).

—The Board reviewed the upland game regulations and voted for a common opening day (the Saturday after Columbus Day) for pheasant, quail, ruffed grouse, cottontail, snowshoe hare and gray squirrel, except for gray squirrel in the western zone and rabbit and hare in Dukes and Nantucket counties. Also, the grouse and pheasant closing dates were consolidated and the daily quail bag was reduced to four.

—Pre-season banding was hampered by low water levels hindering access to airboating sites. There were 747 ducks (610 wood ducks) and marsh birds banded.

—Canada goose collaring was hampered by an inadequate supply of collars and 1862 geese were banded and 468 collared at 93 sites during summer 1993. This was the third and final year of goose collaring.

—There were 40,388 pheasants (plus 7102 for the club program) liberated.

—Aggressive management and restoration of Bird Island was designed to restore it as a ternery. Common terns nested in 1992 after 20 years and increased to 98 pairs in 1993. Two pairs of roseate terns (1 nest) were confirmed in 1994. Complete restoration of the ternery is dependent on suppressing gull predation.

—A study of spotted turtle demographics and habitat use began.

—The population of northeastern beach tiger beetles on Martha’s Vineyard decreased, probably due to larval mortality and severe erosion resulting from Hurricane *Bob*.

—The nature preserves regulations were finalized and published in the *Massachusetts Register* in March 1993. Candidate areas are being evaluated.

—The Information & Education Section initiated a facsimile distribution system for news releases and an anglers’ hotline for information about fishing areas and activity.

—A new booklet on the snakes of Massachusetts³⁵ was published by the Massachusetts Cooperative Extension Service. A furbearer poster was also published.

—The Division’s museum was transferred to the Commonwealth Museum in Boston due to the need for additional office space at Westborough.

—The Department established a Fisheries and Wildlife Lands Committee in FY94 to identify and target valuable properties and coordinate acquisitions and perspectives

among Department agencies. There were 23 acquisitions made during the year, notably Facing Rock in Ludlow, Jug End in Egremont (joint with DEM), Three Mile Pond in Sheffield, and Walnut Hill in Middlefield. Hyannis Ponds in Barnstable, a rare taking by eminent domain, was purchased for \$5 million (the highest of 3 appraisals). However, the owner sued in Land Court and was awarded \$12 million.

—Legislation included provisions for increasing fines and restitutions for illegal acts involving fish and game³⁶, authorization for the Board to establish rules and regulations for archery³⁷, and requiring that the State Treasurer deposit revenues from the Inland Fisheries & Game Fund in a manner ensuring the highest rate of interest and providing that the Board may establish license classes³⁸.

1994-95³⁹: The Division's finances are in dire straits after 14 years without a license increase and DFW now must either cut programs or increase revenues. The Division recommended, and the Board approved, options to submit a non-resident license increase; or both license and stamp increases; or creation of [resident] big game and small game licenses; or an across-the-board increase of \$12.50. Five informational hearings were held across the state. There was willingness among the sportsmen to accept a license increase in lieu of program cuts. However, sportsmen did not want an increase in license fees for minors.

—The number of shad passed at Holyoke declined to 181,000 and those of blueback herring to 32,000. These declines mirror those in many other east coast rivers and may be related to changes in the ocean. Shad also declined in the Merrimack River, but herring numbers were up slightly.

—Atlantic salmon were found spawning in the Westfield River in November 1994, the first documented spawning during the modern restoration period.

—Fisheries management at Quabbin was improved by regulations lowering the size limit on salmon from 18 to 15 inches, eliminating the aggregate salmonid limit, limiting the brown trout daily creel to one fish with a minimum length of 15 inches, and increasing the daily creek of lake trout to three. There were 10,000 landlocked salmon smolts stocked in Quabbin and 7400 "advanced fry" released in the East Branch of the Swift River.

—The landlocked salmon population at Wachusett Reservoir is self-sustaining. Wild production in the Stillwater River increased from ≈900 in 1990 to 4600 in 1992 and has stabilized at ≈4200.

—Six lakes across the state were selected for tiger muskellunge management and will receive consistent annual stockings and regular monitoring to assess the establishment of multiple year classes.

—The Board approved new aquaculture regulations⁴⁰, as well as regulations relative to baitfish. However, after a request by a wholesaler, the Board amended them to allow the propagation and sale of bluntnose and fathead minnows and then added those minnows to the so-called "exemption list" of species which may be possessed and sold without a permit.

—Trout production at the hatcheries set a recent record, with 252,907 brook trout, 123,759 brown trout, and 432,647 rainbow trout produced. There were also 568 adult Atlantic salmon and 756,800 fry, 27,410 landlocked salmon, and 16,700 northern pike produced.

—The Board split deer management Zone 4 into two parts and required that hunters in Zone 2 obtain an antlerless permit during the primitive firearm season.

—The Board also approved regulations extending the opossum, raccoon and skunk trapping season, extending the time for using body-gripping traps within the existing season, and restricting trapping within 10 feet of a beaver dam or lodge.

—Raccoon-strain rabies has now spread into 293 (83%) of the state's 351 towns. Eleven species, including 1396 raccoons and 223 skunks, have tested positive.

—There were 1151 ducks (702 wood ducks) and marsh birds banded during pre-season banding.

—The annual waterfowl breeding plot survey, now in its third year, surveyed 1467 plots (92 in Massachusetts) producing an estimate of 404,177±15% pairs of mallards, 32,650±35% pairs of black ducks, and 172,622±19% pairs of wood ducks.

—There were 36,000 pheasants (plus 7000 for the club program) liberated.

—The Board approved changes to the problem animal control regulations regarding allowable species, recertification, initialing of annual reports by Environmental Police, and allowing certain municipal officers to destroy sickly rabies-vector mammals. Revisions to the wildlife propagation and importation regulations and the "exemption list" were also approved by the Board.

—Timber sales were completed in Belchertown and Phillipston and timber marked for sale in Ludlow, Palmer, and Worthington.

—There were 352 breeding pairs of piping plovers at 77 sites in 1994. This was the highest count since surveys began in 1995.

—Common terns increased to 325 pairs and roseate terns to 124 on Ram Island in 1994 (Figure 63). Arctic terns have declined statewide to only five pairs.

—There were 11 territorial loon pairs and seven active nest in 1994, with four successful nests producing seven chicks. Artificial nesting rafts fabricated from PVC pipe will be tested in the 1996 season.

—The Massachusetts population of the Puritan tiger beetle remained precarious despite efforts to protect and improve habitat for larvae and adults.

—Management research on the federally endangered sandplain gerardia involving burning and soil scarification began at the Waquoit Bay National Estuarine Research Reserve and on Nantucket.

—The Division's museum was opened to public view at its new location at the State Archives building on Columbia Point.

—The Division joined with the U.S. Fish and Wildlife Service in participating in the Junior Duck Stamp program. There were 563 youths involved during this first year.

—There were 47 land acquisitions during FY95, including major additions to Fox Den, Merrill Pond, Palmer, Peru, Three Mile Pond, Walnut Hill wildlife management areas and the new East Mountain, Leyden, Mulpus Brook, and Quissett areas.

—Legislation included the transfer of 467 acres from the Department of Mental Health to the Division⁴¹.



Photo © Bill Byrne

Figure 63. Roseate and Common Terns, Ram Island, Marion.

1995-96⁴²: After several informational meetings, the Board held a public hearing and voted to recommend to the Commissioner of Administration and Finance that license fees (but not those for stamps) be increased and that separate archery and primitive firearms stamps be created.

—Low water conditions facilitated the upstream migration of fish on the Connecticut River and there were 190,000 shad, but only 150 salmon, counted at Holyoke. Gizzard shad became naturally established in the river and 2065 were passed on the lift.

—There was a suspected breach in the canal wall at Turners Falls which required the draining of two fish ladders and the loss of some fish. Nevertheless, 18,369 shad and 2957 blueback herring were passed.

—There were 883,900 salmon fry stocked in the Westfield River, 620,900 in the Deerfield, and 376,900 in four other rivers.

—The Essex Dam fish lift on the Merrimack passed 13,825 shad, 33,415 herring and 1648 striped bass but only 33 salmon.

—Research at Quabbin indicated that it lacks suitable habitat and smolt production to provide a self-sustaining landlocked salmon fishery and that Quabbin will need annual smolt stocking to sustain a landlock fishery. The lake trout population was estimated at 41,600 adults, or 1.6 fish per acre.

—The hatcheries continued to produce high quality trout, which now includes “tiger trout” (a brown X brook trout hybrid). The goal of producing at least 50% of the trout to be ≥ 12 inches in length was met in FY96. There were also >7000 two-year-old brook trout produced. In all, there were 187,692 brook trout; 126,590 brown trout; 425,000 rainbow trout; 1200 tiger trout; 568 adult Atlantic salmon and 985,280 fry; 31,300 landlocked salmon; and 8600 northern pike produced.

—Rabies is now present in raccoon populations statewide except Barnstable and Dukes counties (raccoons are absent from Nantucket).

—There was substantial discussion regarding the use of the “soft-catch” trap and the Division’s regulations permitting the same, following a state Supreme Judicial Court decision⁴³ upholding the Division’s regulations.

—There was an acerbic controversy regarding hunting on Flint Pond in Chelmsford. Following a public hearing, the Board voted to require a permit for hunting there.

—The Board also held a public hearing and adopted new regulations regarding the possession, sale, and use of ferrets⁴⁴. As a result, for the first time, ferrets became legal as a pet in Massachusetts.

—The regulations regarding the use of toxicants were revised to bring them into concert with those of the Massachusetts Pesticide Board.

—Trap-and-transplant of wild turkeys was completed⁴⁵ in 1996 with 655 turkeys captured, of which 561 were released at 26 sites in 10 counties.

—Pre-season waterfowl banding was hampered by the third driest season on record and only 771 ducks (488 wood ducks) and marsh birds were banded.

—The September Canada goose season was opened statewide (no permit required) with an estimated 3500-4000 geese harvested.

—The late Canada goose season was closed in the Coastal Zone because the percentage of migrant geese exceeded the 20% federal guideline.

—Wood duck production in nest boxes was substantially lower than in 1994. This was attributed to an increase in season length to 50 days and to increased nest predation, possibly by mink.

—There were 41,000 pheasants (plus 7000 for the club program) liberated.

—The Cooperative Wildlife Research Unit completed a study on fisher population dynamics⁴⁶.

—The Massachusetts Endangered Species Act was amended⁴⁷ to allow for the issuance of “conservation permits” of which four were issued in FY96.

—A bog turtle study is now underway and 65 turtles were captured of which 30 were radio-tracked.

—The 1994-95 Atlantic Coast Colonial Waterbird Survey among 20 coastal states was completed with 173 Massachusetts nesting stations surveyed of which 136 contained 57,460 pairs of nesting birds of 17 species. This represented a decrease from 1984, probably attributable to a 51% decline in nesting herring gulls. Herring gulls, great black-backed gulls, common terns, and double-crested cormorants were the predominant species (57% of all birds counted).

—Tern colonies on Cape Cod collapsed or became unproductive due to predation by great horned owls and red fox. Due to intensive effort, the ternery on Ram Island was successfully reestablished; however, this recovery will continue to be linked to human attention to the island.

—Captive-reared (n=130) and wild-caught (n=16) American burying beetles were released on Nantucket in 1994-95.

—The Metropolitan District Commission nominated Poutwater Pond in Worcester County as a nature preserve.

—The Division established a website with an agency overview, press releases, a list of publications, and a list of stocked trout waters. This site will continue to evolve.

—The Junior Conservation Camp moved from Spencer to Camp Child in Plymouth.

—The Realty Section completed 22 acquisitions totaling 4533 acres, including 2860 acres in Cheshire, Dalton and Windsor.

—Outside sections on the FY95 budget⁴⁷ repealed provisions for payment of deer damage, amended the Massachusetts Endangered Species Act to allow sale of certain artifacts, and designated the Swift River area as the Herman Covey wildlife management area. The Environmental and Protection Bill⁴⁸ provided up to \$15 million for acquisition and habitat management and restoration and also provided for near-mandatory hunter education and set forth the “presumption of openness” for allowing hunting, fishing, and trapping on environmental agency lands.

1996-97⁴⁹: The Holyoke fish lift operated intermittently due to high water. The number of shad (n=276,000) and Atlantic salmon (202) increased over the previous year. Blueback herring continued to decrease. Some shortnose sturgeon were isolated in the pool below the lift and were successfully returned to the river.

—The Turners Falls lift continued to see low passage of shad, well below the goal of 50% of those passed at Holyoke. There were 1,970,000 Atlantic salmon fry released into tributaries of the Connecticut River, mostly in the Deerfield and Westfield Rivers.

—The Essex Dam at Lawrence passed 11,449 shad, 61 salmon, and virtually no (n=51) river herring.

—In June 1997, there were 10,770 landlocked salmon yearlings stocked at four locations at the north end of the Quabbin. Lake trout studies showed that 64% of the lakera caught were legal-size fish but that >9% of the trout taken in net samples were trophy fish (i.e., >21 inches).

—The landlocked salmon resource in Wachusett Reservoir continued to entice anglers in size and abundance, with fry production in the tributaries increasing to 10,000.

—The warmwater program continued to focus on black bass and esocids. Sampling for tiger muskellunge in stocked waters failed to locate any of these fish; however,

few were stocked and the fish elusive. There were 22,000 northern pike stocked in two waters. Tiger muskellunge from Pennsylvania were stocked in waters which had produced trophy fish in past years.

—There were 119,438 brook trout; 664,525 brown trout; 393,375 rainbow trout; 532 adult Atlantic salmon and 1,0274,943 fry; 28,270 landlocked salmon; and 17,698 tiger muskellunge produced or reared by the hatcheries. The hatcheries produced outstanding fish with the McLaughlin Hatchery rearing >212,000 rainbow trout >14 inches in length and Sunderland >3330 brown trout >18 inches.

—In response to public concerns regarding deer damage and the incidence of Lyme disease, the Board held its first public hearing on Nantucket. The Board then voted to increase the shotgun season there to 12 days and to allow the issuance of a functionally unlimited number of antlerless permits.

—The Board expended considerable time reviewing the proposed regulations necessary to comply with the successful “Question One” ballot referendum^{50,51}. After a public hearing, the Board approved new regulations relative to the use of certain traps⁵², and the associated necessary amendments to the trapping and problem animal control regulations.

—The Board also revised the turkey hunting regulations to extend the spring season eastward to include Essex and Middlesex counties, to increase the season to four weeks (split), and to extend the fall season to include the four western counties and a portion of Worcester County.

—Pre-season waterfowl banding was delayed due to repairs to the airboat, with 902 ducks (705 wood ducks) and marsh birds eventually banded.

—June and July 1996 saw the completion of the 6-year study of resident Canada geese. There were 25 goslings and 386 adults neck-collared during this period. Based on collar observations, the estimated August 1996 population size was 36,000.

—The late Canada goose season was reopened in the North Coastal Zone, with a high harvest (n=3434) in the Central Zone due to good hunting conditions and a high goose population.

—There were 39,396 pheasants (plus 7000 for the club program) liberated.

—The commercial shooting preserve regulations⁵³ were revised, including a division into Class A (commercial) and Class B (club) preserves.

—The Cooperative Wildlife Research Unit began a deer population ecology study to develop precise and accurate estimates of deer densities in various habitats.

—The Biodiversity Initiative was established in 1996 to promote and implement a land stewardship program to maintain and restore the native diversity of flora and fauna through active land management and restoration based on sound science. Initial activities involved the management of upland habitat and the restoration of key natural communities.

—Great blue heron rookeries were surveyed for the first time since 1991, with 63 active ones with 716 nest platforms located (37 with 402 platforms in 1991).

—Common terns increased for the fourth consecutive year to 11,221 pairs. The Nauset-Eastham colony collapsed, probably due to the site’s reconnection to the main-

land and consequent mammalian predation. A controversial gull control program using the avicide DRC-1339 on Monomoy Island effectively removed 1911 gulls and probably effectuated the return of terns.

—Roseate terns also increased from 1480 pairs in 1995 to 1743 in 1996, nearly attaining pre-Hurricane *Bob* levels. On Ram Island—a DFW sanctuary—roseates ballooned from 197 pairs to 719.

—Massachusetts obtained a comprehensive endangered species cooperative agreement⁵⁴ with the National Marine Fisheries Service.

—The Information & Education Section conducted a review of its media services including hard copy releases, press packets, and electronic communications. The majority of respondents were very satisfied with the material received but desired that it be sent more rapidly.

—The Division's Wildlife Viewing Guide⁵⁵ was published by Falcon Press, providing an overview of 67 areas where visitors were likely to see wildlife.

—The venue for the Junior Conservation Camp was changed to Camp Cachalot in Plymouth.

—The Realty Section acquired 4491 acres in FY97 including the new Bullocks Ledge, Farmington River, Haskell Swamp and Wolf Swamp wildlife management areas.

—Legislation included outside sections to the annual budget⁵⁶ revising the commercial shooting permit process, prohibiting hunting on the Flint Pond area, and requiring that all state agencies allowing hunting on the properties post signs to that effect. Additional statutes authorized the Director to allow hunting with shotguns which have rifled bores⁵⁷ and to remove the mandatory license display requirement when the Division has implemented an electronic licensing system⁵⁸.

1997-98⁵⁹: The continuing decline in American shad and blueback herring on the Connecticut River was believed due to the increase in striped bass. There were 2,145,700 Atlantic salmon fry stocked in the Deerfield and Westfield rivers and seven lesser rivers. The Cooperative Fisheries Research Unit decided to cease their operation of the fish lifts on the Connecticut River and the activity was taken over by Division seasonal employees.

—The Essex Dam fish lift on the Merrimack passed the greatest number ever of shad (n=22,000) and striped bass (n=2200). Atlantic salmon were stable (n=67) but herring (n=362) were low, undoubtedly due to the proliferation of striped bass.

—Changes were approved in the fisheries regulations regarding lake trout in Quabbin; landlocked salmon statewide; special brown trout waters; and daily trout creel limits on ponds, lakes and major rivers.

—There appeared to be a slow downward trend in angling and lake trout harvest on the Quabbin, perhaps influenced by a shift in angling to coastal striped bass fishing. The landlocked salmon fishery was responding favorably to the low-density stocking program.

—The Wachusett Reservoir landlock fishery was impressive with an estimated 28,100 fry and parr produced in the Stillwater River and Gates Brook.

—There were 130,467 brook trout; 203,060 brown trout; 407,254 rainbow trout;

1840 tiger trout; 456 adult Atlantic salmon and 980,295 fry; and 11,500 landlocked salmon produced at the hatcheries.

—The Board approved several changes to the deer hunting regulations, including allowing archery during the primitive firearms season provided that the hunter obtained a primitive stamp; eliminating the 1-deer-per-day requirement; increasing the seasonal bag limit in Zone 10 to three; and administrative changes to the special Quabbin hunt. The Board also approved a tribal proposal for special season dates and bag limits for archery hunting on Wampanoag tribal lands in Aquinnah.

—There was a near-record harvest of 10,286 deer, exceeded only by 11,059 in 1995. The Massachusetts deer herd is now in excellent condition and has reached density goals in most areas and exceeded them in others.

—Publications on the beaver in Massachusetts⁶⁰ and the use of water flow devices for controlling beaver damage⁶¹ were produced.

—Pre-season waterfowl banding was hampered by low water levels, with 898 ducks (568 wood ducks) and marsh birds banded.

—The periodic (every 5 years) park waterfowl survey recorded 17,302 mallards, 1716 black ducks and 6296 Canada geese at 253 sites in 123 municipalities. Mallards have declined and Canada geese have increased since the last survey.

—Massachusetts began participating in the new federal HIP (Migratory Bird Harvest Information Program) in January 1998. This will replace the former survey involving purchasers of federal duck stamps.

—There were 40,550 pheasants (plus 7000 for the club program) liberated.

—Two foresters were hired to pursue aspects of the Division's Biodiversity Initiative, particularly forest habitat management on wildlife management areas. Previous to this hiring, limited forestry work had been done with the assistance of foresters from the Department of Environmental Management.

—The 483 breeding pairs of piping plover at 97 sites was the highest since comprehensive surveys began in 1983.

—Terns did extraordinarily well in 1997 with broad increases in common and least terns. However, roseate terns dropped back to 1454 pairs due to serious great horned owl predation at Ram Island. The Division began planning for a five-year program to restore the Penikese Island tern colony.

—Work on the federally endangered sandplain gerardia continued with experiments on soil scarification and burning as habitat measures. The Martha's Vineyard and Sandwich sites showed little change but plants at the Falmouth site tripled in numbers.

—The protection plan for Poutwater Pond in Holden and Princeton was reviewed and its nomination as a Nature Preserve approved.

—The Cooperative Wildlife Research Unit completed a study of spotted turtle home range and movements⁶².

—The Information & Education Section celebrated 25 years of the waterfowl stamp art competition with a reception and a marketing strategy to sell complete sets of stamps to collectors.

—The popular publication “*A Homeowner’s Guide to Bats*”⁶³ was revised and republished.

—Project WILD facilitators held 35 workshops and a full facilitator training weekend. The Aquatic Resource Education Program worked with 150 volunteers statewide and set up 12 events as freshwater fishing festivals. Nine basic fishing classes trained 250 students.

—The recently initiated “Becoming an Outdoorswoman” program was expanded to include a series of one-day programs in addition to the weekend workshop.

—The Realty Section acquired 4921 acres including major additions to Chalet, Haskell Swamp, Satan’s Kingdom, and Wolf Swamp and the new Coy Hill wildlife management area. A Conservation Restriction on Camp Cachalot in Plymouth was purchased jointly between the Division and the Department of Environmental Management.

—Legislation included provisions for the use of a crossbow for hunting by paraplegics or persons with cerebral palsy⁶⁴ and procedures for the disposition of the closed Wilbraham Game Farm⁶⁵.

1998-99⁶⁶: The Board reviewed the operational and labor costs of the pheasant program, the state’s competitive bidding processes, and outside vendor experience and reliability. After doing so, the Board accepted staff recommendations to close the Ayer Game Farm, transfer its personnel to other installations, and purchase pheasants from outside vendors through a bidding process.

—The Birch Hill satellite office in the Central District was destroyed by fire in March 1999.

—The Legislature, without Division input, established a \$5.00 one-day Quabbin-only fishing license. After receiving public comment, the Board voted to make the license available at the M.D.C. Quabbin office and the Division’s Connecticut Valley District office and to put the entire \$5.00 fee into the Wildlands account.

—The revised strategic plan⁶⁷ for the restoration of Atlantic salmon to the Connecticut River called for increasing hatchery production capability to 10 million fry and 100,000 smolts; managing sea-run returns to perpetuate the Connecticut River stock; facilitating natural in-stream production, education, and research; improved downstream passage; and the beginning of tributary-specific stocks.

—The fish lift at Holyoke was shut down for three periods due to high water flow. Shad passage increased slightly (n=315,722) but is still well below the highs of the 1980s and early 1990s. A record number of sea lamprey (n=97,277) was passed.

—The Turners Falls facility passed only 10,527 shad (3.3% of those passed at Holyoke). There were 2,100,000 Atlantic salmon fry stocked into the Deerfield and Westfield watersheds and seven lesser rivers. Fall electrofishing showed that salmon were found in all waters which were stocked in spring and some second-year survival was noted.

—The Essex Dam was also shut down periodically due to high water, passing 123 Atlantic salmon and 28,000 shad.

—For the fourth year, angler participation declined at Quabbin. Fisheries staff continued to evaluate the liberalized lake trout “slot limit” and conducted the stocking of 13,500 landlocked salmon yearlings in June.

—Creel surveys at Wachusett Reservoir showed the dominant catch to be lake trout, sunfish, yellow perch, and smallmouth bass.

—The Board did not approve a proposal from a local Trout Unlimited chapter to extend the seasonal catch-and-release area on the Swift River to year-round.

—Spot Pond in Stoneham—a former water supply reservoir—will be opened to fishing in July 1999. A fisheries survey (the first since the 1930s) found only bluegill, pumpkinseed and yellow perch there, many of the latter trophy-size.

—There were 461,142 brook trout; 851,148 brown trout; 380,238 rainbow trout; 13,289 tiger trout; 905 adult Atlantic salmon and 9,400,000 fry; 13,500 landlocked salmon; and 5000 northern pike produced at the hatcheries.

—Several deer hunting regulations were approved by the Board, effective in 1999, including an extension of the archery season from two to three weeks in Zones 9-14, allowing the use of muzzleloaders during the “shotgun” season, providing that open or peep sights are the only lawful sights during the primitive firearms season, an extension of the period between harvesting and checking a deer from 24 to 48 hours, the prohibition of devices that propel an arrow by means other than the flexing of a bow-string, deletion of the maximum allowable width of a broadhead, and authorization for archery hunters to leave a firearm or dog in their vehicle while deer hunting.

—Upon the completion of the present graduate student’s dissertation⁶⁸, the black bear field study was transferred to Division responsibility. There are presently eight radio-collared sows being monitored.

—The Board also voted to expand the spring turkey season into Barnstable, Bristol, Norfolk and Plymouth counties for two weeks, expand the fall season to Dukes County, eliminate the split season (allowing hunters the full 2 or 4 weeks, depending on zone), and change the bag limit to allow either two spring birds (1 per day) and no fall bird, or, one each in spring and fall. The spring 1999 turkey season saw a record 13,712 permit applicants and a record harvest of 2363.

—Waterfowl pre-season banding resulted in 1080 ducks (596 wood ducks) and marsh birds captured and banded (93% by airboat). An experimental endeavor to capture and band eiders in Boston Harbor yielded 11 birds.

—The regular Canada goose season was reopened in the Central and Coastal zones after a 3-year closure due to the identification of a previously undiscovered North Atlantic Population of Canada geese in Labrador and the Maritime Provinces, which has not declined as has the Quebec population.

—There were 47,000 pheasants (including 7000 for the club program) purchased and stocked.

—The biodiversity initiative continued the clearing of upland habitat, with 96.5 acres cleared at the Crane and 86 at the Moran wildlife management areas.

—The annual tern inventory showed >13,000 nesting pairs of common tern, an increase of 11% over the previous year. The largest colonies are at Plymouth Beach, South Monomoy Island, Bird Island, and Ram Island.

—American burying beetles were released on Nantucket for the fifth year. However, when checked 10 days later, only four of the 25 pairs were successfully raising larvae.

—The biodiversity report “*Our Irreplaceable Heritage*”⁶⁹ was published.

—The Information & Education Section produced an outdoor recreation map showing all lands held or managed by the Division, as well as state forests and parks and public access boating facilities.

—The “Becoming an Outdoorswoman” program hosted two full weekends and three “Beyond BOW” events.

—The Realty Section acquired 3344 acres, including the 1490-acre Montague Plains parcel. Other substantial acquisitions included the Lanesborough, Orange and Tekoa Mountain sites.

—The only legislation provided for a one-day Quabbin fishing license⁷⁰.

1999-2000⁷¹: The Division, the Department and the Division of Law Enforcement entered into an agreement in 2000 to transfer the operational aspects of the Hunter Education program to the Division⁷².

—The Division hired 15 seasonal employees to assist in smolt assessment on the Connecticut River tributaries and to stock salmon fry and operate fishways on the Connecticut and Merrimack rivers. The numbers of shad, blueback herring and salmon all decreased at Holyoke and Turners Falls. There were ≈2,071,000 Atlantic salmon smolts released in the Westfield and Deerfield river systems and a few smaller tributaries of the Connecticut.

—Salmon numbers increased to 192 at the Essex Dam but were still below the highs of the early 1990s. However, shad doubled in numbers over 1998 and herring increased by 450%.

—Angling at the Quabbin Reservoir was down 5.9% from 1998, despite the new 1-day license. There were 14,500 yearling and parr landlocked salmon released in the Quabbin system in FY00. Creel censuses indicated that the lake trout “slot limit” was changing the size structure of the Quabbin laker population. A survey of boat fishermen showed that 50% of the lake trout caught fell within the slot.

—Beavers colonized most of the Stillwater River, hindering salmon production and subsequent harvest in Wachusett Reservoir. The M.D.C. removed much of the silt curtain which blocked passage to Gates Brook. The Division also transported 46 spawning salmon to high quality areas above the dam and stocked 2400 yearlings in the Quinapoxet River.

—There were 113,405 brook trout; 186,292 brown trout; 357,372 rainbow trout; 5170 tiger trout; 3756 adult Atlantic salmon and 1.1 million fry; and 17,500 landlocked salmon produced at the hatcheries.

—After staff review and substantial public comments, the Board voted to revise the September segment of the bear season to begin on the Tuesday after Labor Day and end on the third Saturday thereafter. The 6-day November segment was not changed. The number of radio-collared female black bears was increased to 11 through the use of barrel traps and incidental methods.

—Pre-season banding of waterfowl was again hindered by low water. There were 872 ducks (421 wood ducks) and marsh birds banded (842 by airboat).

A second attempt was made to capture and band eiders in Boston Harbor. Only 11 birds were captured and the endeavor will not be repeated.

—There were 40,000 pheasants (plus 7000 for the club program) and 3500 quail purchased and liberated. Game farm personnel were transferred to the Central and Northeast Districts.

—There were ≈3409 pairs of least terns counted (a record) with the largest colony (n=1420) at Kalmus in Hyannis.

—The Worcester County population of the small whorled pogonia had an all-time high of 122 plants. One Essex County colony increased from 9-10 plants to 30 but a second site may have disappeared.

—The Information & Education Section continued to refine the website, including the posting of weekly trout stocking information.

—The Section coordinated with the state Office of Travel & Tourism to promote outdoor recreational activities in Massachusetts. The “Abstracts” were made available at three visitors’ centers.

—The Board voted to bring the waterfowl art program to an end once the electronic licensing system went into effect.

—The Realty Section benefitted from the use of Conservation Restrictions (CRs), acquiring in fee or by CRs ≈8953 acres. The Southeast District gained 3191 acres along the Taunton River (3187 in fee) to be jointly managed by the Division and the Department of Environmental Management. The so-called “Hawes” property (≈3800 acres) in Fall River was acquired partly in fee and partly by CR and will also be jointly managed.

—There was no relevant legislation in FY2000.

“THE INTRINSIC VALUE OF BIOLOGICAL DIVERSITY AND [ITS] IMPORTANCE FOR EVOLUTION AND FOR MAINTAINING LIFE SUSTAINING SYSTEMS OF THE BIOSPHERE”¹: THE 2000s

The 2000s were dominated by the rise in international terrorism and associated conflicts and the global economic recession which commenced in 2007. Society also saw great increases in the use of communications technology, including broadband and wireless internet, file-sharing systems, “smart” mobile telephones, text messaging, digital cameras and high-definition television. Many of these technologies became integrated into the research and management activities of fish and wildlife agencies. The United States was also affected² by the September 2001 attacks on the World Trade Center and the Pentagon, and the crash of the fourth hijacked aircraft at Shanksville, Pa., the invasion of Afghanistan (beginning in 2001), the Second Gulf War (2003-2011), the anthrax attacks (2001), the devastating Hurricanes *Katrina* and *Rita* on the Gulf Coast (2005), and the H1N1 swine flu pandemic (2009). The destructive Hurricane (later Tropical Storm) *Irene* in August 2011 caused widespread flooding and road erosion in western New England. This storm nearly demolished the White River National Fish Hatchery in Bethel, Vermont, which sustained the Atlantic salmon restoration

program for the Connecticut River basin. The population of the U.S.A. in 2010 was 308,745,538³.

The decade also saw an increase in the expansion and adaptability of wildlife, and human-wildlife interactions, especially in newly-developed once-rural areas. Suburbanites accustomed to city living often found themselves dwelling—with awe and trepidation—in close proximity to Canada geese, wild turkeys, beavers, black bear, fisher, white-tailed deer, and moose.

Land managers and biologists also displayed increasing concern over the chronic decline of young forest, shrubland and grassland-dependent species, particularly in the northeastern U.S.A. A recent assessment of the forest resources of Massachusetts⁴ found that, while Massachusetts was still 63% forested, there were imminent threats. There is still a lack of young forest and shrubland habitat due to human alterations of the environment, including fire control, flooding, and selective cutting practices. Global climate change, decreasing supplies of fossil fuels, and an increasing human population will mean that existing forest resources will be insufficient to our needs in about 10-20 years. Public concern has not risen to levels sufficient to counteract the pressures for forest conversion. Careful coordination and integration of the diversity of existing programs and dedicated service and leadership are key to such endeavors.

The United Nations General Assembly designated 2010 as the “International Year of Biodiversity”⁵ to celebrate biodiversity and to raise awareness of its importance. Eighteen years earlier, the United Nations had brought forward the “Convention on Biological Diversity”^{1,6}, with the goals of conserving biodiversity, providing for sustained use of its components, and providing for equitable sharing of the benefits arising from genetic resources. The Convention entered into force in December 1993 when it was ratified by 30 states and had 168 parties and 193 signatories adherent to it by 2012⁷. The effective conservation of biodiversity is essential for both human survival and the maintenance of ecosystem processes⁸. Biodiversity conservation must be recognized as a global public beneficence, broadly integrated into policies and decision frameworks and focusing on wide institutional and societal changes for the implementation of such actions⁸.

In Massachusetts, the biodiversity agenda among the state’s environmental agencies⁹ included a landscape-level systems approach to habitat management and restoration, a private forest lands initiative, development of a network of forest reserves, investment in the development of landscape-level management tools (e.g., geographic information systems), a comprehensive education program, an aggressive land acquisition program, and community preservation. The Division began its Biodiversity Initiative in 1996, initially focusing on early successional habitats and the first Massachusetts “Biodiversity Day”, initiated by Peter Alden, was held in 2000. The agency’s Natural Heritage & Endangered Species Section soon produced the “BioMap”¹⁰ and “Living Waters”¹¹ comprehensive biodiversity conservation plans. BioMap was updated¹² in 2010 to update and broaden the scope of the original plans in the face of rapid and uncertain climate change.

Congress enacted legislation¹³ in 2001 (effective in 2002) providing for State Wildlife Grants to fund planning and implementation of programs which benefitted wildlife and their habitats, including species not hunted or fished. Participating entities must have completed an approved Comprehensive Wildlife Conservation Strategy (“Action Plan”) by October 1, 2005, in order to be eligible.



Figure 64. District Fisheries Biologist Mark Brideau stocking trout in central Massachusetts.

2000-01¹⁴: The Division's Boston Office moved from the Saltonstall Building on 100 Commonwealth Avenue to 251 Causeway Street.

—The number of shad and blueback herring lifted at Holyoke increased but were still below the levels seen in the 1980s and early 1990s. The number of shad passed at Turners Falls was only 2590 (1% of those passed at Holyoke). Stocking of hatchery-produced salmon fry continued on the Westfield, Deerfield and smaller rivers. The estimated spring 2000 smolt production among the Connecticut River tributaries was 51,482.

—The passage of shad and river herring at the Essex fish lift increased substantially from the past year, but Atlantic salmon numbers were significantly down (n=85).

—Angling pressure at Quabbin increased slightly. The lake trout slot limit seemed to be effective for protecting the larger, older fish. Anglers were targeting landlocked salmon and the 2000 catch of 444 exceeded that of 1999.

—Esocid management continued to be refined. Lake Mascopic and Hampton Ponds were beginning to produce legal-size tiger muskellunge. Lake Pontoosuc produced a new state record 27 lb. tiger muskie.

—The Fisheries Section began development of target fish communities with a process to identify waters considered to be cold water fishery resources.

—The Board approved the regulatory changes to prohibit the use of lead sinkers in the Quabbin and Wachusett Reservoirs, redefine the term "broodstock salmon", and setting creel and size limits for striped bass in inland waters.

—There were 65,751 brook trout; 204,354 brown trout; 416,690 rainbow trout; 3575 tiger trout; 502 adult Atlantic salmon and 1.1 million fry; and 15,600 landlocked salmon produced at the hatcheries. The 1994 goal to grow and stock large trout has been met (Figure 64). In spring 2001, 71% of the stocked trout were >12 inches in length with an average weight of 0.70 pounds (0.35 in 1983).

—The Board approved regulations adjusting the boundaries between Management Zones 9 and 10, allowing hunters to have two unsealed deer in possession in Zones 9-14, and allowing near-unlimited issuance of antlerless permits in certain eastern zones.

—The Legislature appropriated \$185,000 for the Division to provide technical assistance for beaver management problems and new regulations were adopted to place the

focus of the permitting process on municipal entities.

—Raccoon rabies continued to be widespread in Massachusetts with 3155 animals (1984 raccoons, 936 skunks) of 16 species testing positive between 1992-2001.

—Mechanical problems with the airboat hindered pre-season banding and only 590 ducks (250 wood ducks) and marsh birds were banded.

—The state permit for the early Canada goose season was dropped due to the implementation of the H.I.P. survey. There were 1225 Canada geese trapped and banded at 67 sites in 59 towns.

—There were 40,000 pheasants (plus 7000 for the club program) and 3500 quail purchased and liberated. There was a court injunction prohibiting the stocking of pheasants on the Cape Cod National Seashore, requiring an Environmental Impact Statement which was completed in 2006-07.

—The forestry program completed a landcover/forest condition mapping of wildlife management areas (~89,000 acres), with a ½-mile buffer around the areas (>400,000 acres of GIS mapping). This endeavor was a component of DFW's landscape-level orientation and the utilization of remote-sensing technology (including color-infrared photography), global positioning systems, and the application of geographic information systems analysis.

—The Natural Heritage & Endangered Species Section produced the highly regarded "Biomap"¹⁰ for guiding land conservation and protecting biodiversity.

—Predation by red foxes, skunks, crows and great horned owls affected tern production at several sites.

—The number of territorial common loons increased to 22, the highest number since nesting loons reappeared in Massachusetts in 1975.

—Post-release surveys of American burying beetles on Nantucket and Penikese Island located one untagged wild beetle at each site.

—Deer browsing appeared to be affecting the populations of small whorled pogonia in Essex and Worcester counties.

—In April 2003, the tank barge *Bouchard 120* struck an obstacle in Buzzards Bay, spilling ~98,000 gallons of No. 6 fuel oil, impacting >95 miles of coastline. The spill threatened several coastal waterbird colonies, including the federally listed roseate tern and piping plover, which were placed at risk both by the spill and the cleanup efforts. Hundreds of volunteers assisted with the tallies of dead birds and the retrieval of living oiled birds (some of which were successfully rehabilitated).

—The Information & Education Section continued the many varied outreach and educational programs, revised administrative processes, and developed a new database for the Junior Conservation Camp.

—A children's guide to "Critters of Massachusetts" was published to enhance public awareness of wildlife during the Executive Office's "Biodiversity Days".

—The Realty Section was excited to make ~70 acquisitions totaling 12,105 acres, many of which comprised Conservation Restrictions. The "North Quabbin" project protected large parcels in the Tully Mountain area of Orange while two CR's in Berkshire

County protected ≈3350 acres. Other substantial acquisitions included the Agawam Lake, Lily Pond, Mine Brook, Red Brook, Salisbury Salt Marsh, and Whately Great Swamp areas.

—Legislation included an amendment to the trapping laws by modifying the restrictions and permitting process for the use of certain traps to alleviate beaver and muskrat damage¹⁵.

2001-02¹⁶: The Board continued to express its concerns regarding staffing levels, finances, prohibition of out-of-state travel, off-road vehicles, and reorganization of the Environmental Police.

—The Holyoke fish lift saw a decrease in Atlantic salmon (n=25). Shad were slightly up and herring remained stable. Turners Falls passed a meager 1540 shad (0.6% of those at Holyoke). A research project is underway to determine means of increasing passage through the Cabot fish ladder.

—The Essex Dam fish lift on the Merrimack passed a record (n=76,717) shad but only 78 Atlantic salmon.

—The Fisheries Section began monitoring black bass fishing tournaments to establish a long-term database of catch rates and average fish size. Tournaments which utilize a Public Access Board facility must obtain a Special Use permit. In 2001, 171 creel sheets were received from tournament officials, showing a mean of 40 participating anglers, a catch rate of ≈1 bass/3 hrs., and a mean bass weight of 1 lb. 4 oz.

—Work continued on the development of the Target Fish Community project. The Ipswich River project was completed and planning is now underway for the Charles and Housatonic river. The statewide fisheries inventory continued and conducted sampling of 238 sites in 16 rivers and streams.

—There were 82,988 brook trout; 166,927 brown trout; 371,728 rainbow trout; 6750 tiger trout; 425 adult Atlantic salmon and 1.1 million fry; and 13,800 landlocked salmon produced at the hatcheries.

—The Board approved sweeping changes to the deer hunting regulations, to take effect in 2002, including changing the Zone 12 boundary to the Cape Cod Canal; removing the “pre-1865 design” for muzzleloaders and allowing closed ignition systems, sabotaged projectiles and telescopic sights; requiring an antlerless deer permit to take deer in any season; increasing the archery deer season to six weeks; and extending the primitive firearms season to end on December 31.

—The Board also voted to impose an immediate moratorium on the importation of all live cervids into Massachusetts, and to amend the importation regulations accordingly.

—There was a record (n=2914) archery harvest of deer in 2001. Archers are becoming effective in targeting antlerless deer when there are incentives and opportunities.

—The state’s beaver population tripled between 1996-2000 which resulted in a significant increase in flooding complaints. The new process for the issuance of emergency permits by municipalities is now being implemented.

—Airboating was hampered by breakdowns and accidents, resulting in only 516 birds (343 wood ducks) captured and banded.

—There were 1031 Canada geese captured and banded as part of the Atlantic Flyway Resident Goose Banding Program.

—There were 40,000 pheasants (plus 7000 for the club program) and 3500 quail purchased and liberated.

—There are now 23 territorial pairs of common loons on eight Massachusetts water bodies. However, only 11 pairs actually laid eggs.

—The first territorial pair of peregrine falcons on a historic nesting site since 1955 was found at Farley Cliffs in Erving.

—Surveys of 22 sites for the banded bog hunter (a dragonfly) located three new breeding sites, bringing the state's total to 30.

—During the 2001 field season, ≈100 sites in 10 counties were surveyed for butterflies and moths, yielding 515 species including 24 endangered, threatened, or special concern.

—A graduate student at the Cooperative Wildlife Research Unit completed her dissertation on bog turtle ecology¹⁷.

—The Junior Conservation Camp was cancelled for 2002 because Camp Cachalot was unavailable and there was no substitute venue.

—The Information & Education Section emplaced wildlife viewing signs (linked to the "Massachusetts Wildlife Viewing Guide") around the state.

—Staff devised a promotional plan to further increase subscriptions to *Massachusetts Wildlife*.

—The National Envirothon ("Canon Envirothon") was held in Massachusetts bringing in 250 students from almost all states.

—The Hunter Education Program offered courses for Basic Hunters, Bowhunters, Black Powder Hunters, Trappers, Map and Compass, and Waterfowl Identification.

—The Realty Section completed 78 acquisitions protecting 10,764 acres. Alford Springs, Ludlow Reservoir, North Quabbin, and Santuit Pond reflected high-priority conservation easements or restrictions. There was a 780-acre tract added to the Challet wildlife management area. There was also an extensive 1638-acre acquisition from Northland Cranberry in Hanson and Halifax. This property later became the Burrage Pond Wildlife Management Area.

—Legislation included a change in all statutory references from "Nongame" to "Natural Heritage and Endangered Species"¹⁸ and an Act defining the management, ownership and oversight of the Massachusetts Military Reservation¹⁹.

2002-03²⁰: In 2003, the Division was faced with one of the most difficult challenges in its history when legislation²¹ eliminated the Inland Fisheries & Game Fund, the Natural Heritage & Endangered Species Fund, and associated accounts (but see 2003-04). In addition, the Natural Heritage & Endangered Species program was zero-funded. The budget for the remainder of the Division was cut by >\$850,000 from the previous year. The Department was renamed the "Department of Fish and Game".

—The City of Holyoke purchased the Holyoke Hydroelectric Project from Northeast Utilities. There are on-going discussions to finalize the federal licensing for the project. The Holyoke fish lift passed slightly more Atlantic salmon and shad than in 2001; however, herring numbers were down.

—The shad passage at Turners Falls remained dismally low (n=2870) and a solution has not yet been reached.

—The fish lift at the Essex Dam was periodically closed due to high water or operational reasons. Salmon, shad and herring numbers were all down but striped bass increased substantially.

—Five water bodies were currently producing a tiger muskellunge fishery; two other stocked waters have failed to do so. There were 45,468 surplus northern pike from New Jersey, Pennsylvania and Virginia stocked into three water bodies in Berkshire and Worcester counties.

—The Board also adopted regulations regarding two new catch-and-release fishing areas on the Housatonic River. The concept of the changes is to create an exceptional brown trout fishery.

—The statewide fisheries inventory again received funds from the Massachusetts Watershed Initiative and was able to purchase much-needed equipment.

—There were 120,517 brook trout; 85,112 brown trout; 357,006 rainbow trout; 5032 tiger trout; 406 adult Atlantic salmon and 1 million fry; and 13,200 landlocked salmon produced at the hatcheries.

—The statewide white-tailed deer population was estimated at 85-95,000 at densities ranging from 10-12 deer/mi² to >50/mi². There are now ≈45-50,000 active deer hunters. Massachusetts continued to participate in the regional chronic wasting disease surveillance program and has collected 87 of the desired 238 samples.

—The Deputy Director for Field Operations, Dr. Robert Deblinger, presented the Board with an update on handling problem black bears and discussed the recently-updated Memorandum of Understanding with the Environmental Police.

—A record total of 2646 bear hunting permits yielded a near-record harvest of 116 bears, including one in Worcester County.

—There were 183 cottontail specimens received during 2001-03, all of which were eastern cottontails. However, New England cottontails were located in Barnstable and Berkshire counties by a cooperator conducting another project.

—The Board voted to approve changes to the turkey hunting regulations to extend the fall season throughout Worcester County, adjust the hunting boundary to coincide with the revised Deer Management Zones, and to allow spring hunting on Martha's Vineyard.

—The problem animal control regulations were revised to change requirements for cage traps, remove the necessity for an officer to initial PAC report books and remove the Massachusetts residency requirement.

—Recent legislation provided that persons permanently disabled in a manner that prevents them from using conventional archery equipment could obtain a lifetime permit to use a crossbow. The archery regulations were so amended.

—Due to continuing airboat problems and low water, there were only 578 birds (399 wood ducks) captured and banded during pre-season banding.

—The periodic (every 5 years) park waterfowl survey yielded 15,244 mallards, 1583 black ducks, and 3361 Canada geese at 193 sites in 120 municipalities. The number of mallards has been declining due to the increase in Canada geese, as well as to local bylaws prohibiting waterfowl feeding.

—There were 1000 Canada geese captured and banded at 70 sites in 62 towns during the annual goose “roundup”.

—Pheasant and quail are purchased on contract and the numbers are no longer included in Annual Reports.

—The state’s three land-managing environmental agencies entered into a contract with Scientific Certification Systems to conduct a review of state-owned forest lands. In May 2003, the review was completed and the Division’s forest management practices were determined to meet the criteria for sustainable management as set by the Forest Stewardship Council.

—Roseate terns declined to 1460 pairs in 2002, probably due to predation at Bird Island. Common terns declined only slightly but productivity was poor due to predation and chick starvation. Least terns dropped to 2796 pairs, including the collapse of the Dunbar Point (Kalmus) colony from predation.

—The Lepidoptera survey yielded rediscoveries of the *Persius* duskywing and the precious underwing moth, and a clarification of the taxonomy of two Tiger moths.

—The Information & Education Section inaugurated the electronic “MassWildlife News”, redesigned the Division website, began work on an electronic image library, and engaged with Amherst College to initiate a survey of “Becoming An Outdoorswoman” participants.

—The Realty Section had a disappointing year due to funding cuts, acquiring only 2563 acres, including the remainder of the North Quabbin acreage. The Division received a transfer of 122 acres in Provincetown from the Division of Capital Asset Management.

—Legislation included the establishment of the Southeastern Massachusetts bioreserve²² and authorizing the use of crossbows by certain handicapped persons²³.

2003-04²⁴: The Board rejoiced that with the strong assistance of a great many sportsmen’s and environmental groups, the Inland Fisheries & Game Fund, the Natural Heritage & Endangered Species Fund, and associated accounts were restored²⁵ on October 30, 2003, retroactive to June 30. The Board thereupon rescinded its earlier vote to close the Montague and Sunderland hatcheries and directed that vacant core positions be filled as soon as possible.

—The Atlantic salmon, shad, blueback herring, and gizzard shad passage at Holyoke once again all declined. Herring passage (n=2665) was only 0.4% of the maximum passage (1985). Fish passage issues continued at the Cabot and Gatehouse fishways at Turners Falls.

—There were 15,000 tiger muskellunge from New Jersey and Pennsylvania stocked into five waters and ≈114,000 three-inch fry stocked into two Worcester County waters.

A sportsman's club donated 1000 (18-in.-plus) northern pike which were stocked in Quaboag pond.

—The Board adopted regulations revising the sea-run brown trout regulations; providing for Red Brook to be a catch-and-release, artificial lures only area; extending catch-and-release regulations for the entire length of the Quashnet River; and removing catch-and-release regulations on Higgins Pond.

—The Board also voted to add herring to the list of allowable bait fish (only in the Connecticut and Merrimack rivers and certain coastal streams) and to clarify that commercially preserved baitfish may be sold.

—The Director was requested by the Board to enter into a Memorandum of Understanding with Marine Fisheries to the effect that the Division's striped bass regulations would mirror those of Marine Fisheries.

—There were 108,794 brook trout; 122,174 brown trout; 310,582 rainbow trout; 4696 tiger trout; 286 adult Atlantic salmon and \approx 1,489,000 fry; and 14,170 landlocked salmon produced at the hatcheries.

—The 2003 deer harvest was the second highest on record, including record harvests for archery (n=3045) and primitive firearms (n=1869).

—Moose reports continued to increase. There were 165 moose-vehicle accidents between 1980-2003. There are now an estimated 500-700 moose in the state.

—There were a record 3104 black bear hunting permits issued and a record harvest of 153 bears taken, 142 in September and 11 in November.

—The 2003 pre-season banding was the poorest on record due to low numbers of waterfowl (probably due to a cold, wet spring) and an inexperienced crew. Only 466 birds (322 wood ducks) were banded. There were 1138 Canada geese rounded up and banded at 65 sites in 64 towns.

—The Board endorsed a pilot program to allow sportsmen's groups to purchase pheasants, stock them on a specific wildlife management area, by permit, and then hunt them for one day in January through March. The pilot was successful and subsequently continued on an annual basis.

—There were 15 territorial pairs of bald eagles in 2003, of which eight pairs successfully raised young. Since 1989, a total of 154 young have fledged from Massachusetts nests.

—There are now nine territorial pairs of peregrine falcons in Bristol, Essex, Franklin, Hampden, Hampshire, Norfolk, and Suffolk counties.

—The Information & Education Section hosted six special events, continued with school-based, informal-type education, and skills-based programs. The Massachusetts Junior Conservation Camp held its first session at the Chesterfield Boy Scout Reservation, which abuts the Division's Fisk Meadows wildlife management area.

—The Realty Section once again had a disappointing year due to a shortage of funds. There were 4275 acres acquired, most of which represented conservation easements.

—There was no pertinent legislation other than that which restored the Division's dedicated funds.

2004-05²⁶: The Board was overjoyed that the Division's funding was restored in 2003, that the Natural Heritage & Endangered Species Fund monies have been placed in a trust and not subject to appropriation, and that the Governor waived the indirect costs for the trust. All back-logged core positions have been filled and there is an optimistic forecast for the FY06 budget, allowing a return to normal operations. Thomas K. O'Shea, the former Southeast District Supervisor, was hired as the Assistant Director for Wildlife, which had been vacant for two years.

—The Holyoke fish lift continued to pass low numbers of fish as did the two fish ladders at Turners Falls.

—The Essex Dam at Lawrence recorded 131 Atlantic salmon but also low numbers of shad and herring.

—There were ≈147,000 tiger muskellunge released into nine waters and 74,000 northern pike (including 1000 purchased by sportsmen) stocked into four waters.

—Target Fish Community models continued to be developed, currently focusing on the Charles River. The Target Fish Community project illustrates what a river fish population in southern New England should be and so sets a measureable goal for restoration.

—There were 112,768 brook trout; 144,599 brown trout; 326,182 rainbow trout; 3276 tiger trout; 260 adult Atlantic salmon and ≈783,170 fry; and 20,420 landlocked salmon produced at the hatcheries.

—The revisions to the antlerless deer permit system which required hunters in all seasons to have a permit to take antlerless deer has increased hunter opportunity and facilitated harvest regulations, Deer densities have increased in four zones, decreased in eight, and been maintained in four.

—The Board held a public hearing on Nantucket in response to a request from the Selectmen to make changes in the island's deer hunting season. The Selectmen had requested a 12-day February season in 2005. However, in response to local concerns, the Board approved only a 6-day season. Participants were required to purchase an *en-bloc* permit for \$25 with five antlerless deer permits and one special antlered permit. The hunt went as planned resulting in a strong harvest of 246 deer during an unusually snowy period. Citizen concerns and changes in the Board of Selectmen prompted a request to cancel the 2006 hunt, which the Board will address later in 2005.

—The Board voted to adjust all boundaries for county-based harvest zones to conform to those of the Deer Zones, and to rename the zones "Wildlife Management" Zones.

—Wildlife staff reviewed ruffed grouse status and hunting season dates at the request of the Board and several sportsmen. The staff recommended that the existing season framework be maintained and the Board voted to accept the recommendation.

—Pre-season waterfowl banding was again hampered by low waterfowl numbers, a drawdown at Great Meadows, and a poorly-functioning airboat. Only 569 birds (322 wood ducks) were captured in 14 trips.

—The annual goose banding operation yielded 1140 geese, including 148 which received special bands.

—The 20-year (1986-2005) forest bird population survey²⁷ on the Hiram Fox area in Chester showed that four of 36 commonly detected species had increasing trends, 10

declining, and 22 stable or without significant trend. Changes in species abundance were most readily explained by intra-site habitat changes.

—The Landowner Incentive Program (LIP) was initiated using monies from a competitive federal program. The program was designed to aid landowners interested in restoring and maintaining wildlife habitat by providing them with financial and technical support. During the first year there were 72 applications of which 32 were funded.

—There were 16 territorial pairs of bald eagles (15 laid eggs) and 11 pairs of peregrine falcons (9 fledged chicks).

—There were substantial changes to the Endangered Species Act regulations, particularly with regard to the delineation of priority habitat and timelines for reviewing proposed activities and projects within such habitat. The Division was also successful in obtaining the much-needed administrative authority to charge fees for conducting environmental reviews.

—The Information & Education Section dealt with contacts from 73 media representatives and aided Division presence at 20 shows and similar venues. Project WILD, the Junior Duck Stamp program, the Massachusetts Envirothon, and the Angler Education Program all received strong attention.

—The Realty Section benefitted from end-of-year funds, acquiring 2956 acres, including substantial parcels in Otis, Rochester and Worthington.

—There was no pertinent legislation other than an Act allowing land transfer between the Division and the Town of Clinton.

2005-06²⁸: The draft Comprehensive Wildlife Conservation Strategy was released for review, comments were received and addressed, and the final document²⁹ approved by the Board in August 2005. The document was then sent to the National Review Team for acceptance in order to qualify for further State Grant funding.

—The Holyoke fish lift was rebuilt in 2004-05 to include improvement to lift components, spillways, flume, shad and salmon traps and counting rooms and windows. The number of Atlantic salmon increased to 131 and shad to \approx 116,525. However, herring numbers were still very low. The two Turners Falls lifts continued to pass low numbers of fish.

—Fish passage at Essex Dam was disappointing due to the very wet spring which caused high river flows and prevented fish from finding the entry to the fishway. Only 31 salmon were counted along with 6456 shad.

—There were 50,417 northern pike from out-of-state stocked into four water bodies and \approx 55,500 surplus tiger muskellunge from Pennsylvania stocked into four water bodies.

—The statewide fisheries inventory sampled 291 sites in 20 watershed in FY06, primarily in the Deerfield, Chicopee, Parker and Westfield watersheds.

—There were 82,887 brook trout; 187,706 brown trout; 379,417 rainbow trout; 5204 tiger trout; 238 adult Atlantic salmon and 855,000 fry; and 14,030 landlocked salmon produced at the hatcheries.

—The 2005 deer season again saw record archery (n=3162) and primitive firearms (n=2325) harvests.

—The Board voted to rescind the regulations providing for a special February deer hunt on Nantucket, at the request of the Selectmen and following a contentious public hearing. The Board also voted to extend the shotgun deer season on Martha’s Vineyard from six to 12 days, with strong support from local residents.

—Following an occurrence of chronic wasting disease in New York, the Board implemented emergency regulations (later made permanent) to prevent the importation of deer parts except deboned meat, antlers, and cleaned hides and skullcaps.

—The Wildlife Section and Senior Staff recommended that the Board approve a regulatory change to allow black bear hunting during the 12-day shotgun deer season and to adjust the open area to extend through Zone 9. The Board accepted the zone change but substituted two additional weeks in November (beginning on the first Monday in November) in lieu of hunting during the deer season.

—Water conditions, low waterfowl numbers and lack of access to Great Meadows hindered airboat pre-season banding. Only 647 ducks (402 wood ducks) were captured in 14 trips.

—The summer mute swan breeding survey, conducted every three years, found 1046 swans (787 adults and 259 cygnets) in 100 broods. This count was 10.5% higher than in 2002.

—The pheasant program was reviewed and the Board approved staff recommendations to stock quality sites, increase stocking frequency and manage upland habitats, with a focus on improving the overall pheasant hunting experience by increasing the likelihood of flushing a pheasant while also reducing safety issues from crowding.

—The Cooperative Wildlife Research Unit began a study using GPS collars to obtain fine-scale evaluations of moose movements and habitat use.

—The Natural Heritage & Endangered Species Section began a multiyear project to delineate the habitat footprints associated with all current observations of 442 rare plants and animals.

—The Information & Education Section issued eight special event advisories, set up four television interviews, posted four new pages to the website, and facilitated Division presence at 20 shows or other venues.

—The Realty Program experienced a frustrating year due to initial landowner reluctance followed by a surge at the end of the fiscal year. There were ≈2900 acres acquired including an 826-acre CR/CE in Sturbridge. There were also notable parcels acquired in Bernardston-Leyden, Freetown, and Hanson-Halifax.

—Legislation included clarification of the definition of “loaded shotgun and rifle”³⁰, including muzzleloaders.

2006-07³¹: The Board expressed concern as to the lack of permanent funding for the Natural Heritage & Endangered Species Section which receives the majority of its monies from environmental review fees and from the relatively small income tax checkoff.

—There was significant concern regarding the potential risk from the avian influenza virus subtype H5N1. A presentation was given to the Board and significant time and monies later expended sampling migratory birds, particularly waterfowl and shorebirds.

—On-line license sales began and are proceeding smoothly. However, the Board expressed concern that the Division would no longer be able to recover the \$2.00 handling fee for processing credit cards. The Board sent a letter to the Commissioner of Administration & Finance expressing these concerns.

—The improved fish lift at Holyoke functioned as intended; however, fish passage remained well below previous levels.

—The fish passage facilities at Turners Falls were monitored by videotape during daylight hours due to staff limitations. Fish passage remained below desired levels.

—The Essex fish lift also showed disappointing results, in part due to the record rainfall which prevented clean-out of the spillway. Forty-nine salmon were counted but shad and river herring were scarce.

—The Board voted to remove the so-called “slot limit” provision from the Quabbin lake trout regulations and to return to the two-fish, 18-inch, daily creel limit.

—There were 16,512 surplus northern pike from New Jersey stocked into three water bodies. No tiger muskellunge were available for stocking in 2006-07.

—The statewide fisheries inventory sampled 431 sites in 22 watersheds, principally the Chicopee, Deerfield, Nashua and Westfield.

—The Target Fish Community project in the Charles River was completed.

—The hatcheries were able to make long-overdue improvements due to the unexpected availability of year-end capital funds. The hatcheries are successfully using avian nets to prevent or reduce predation by piscivorous birds. There were 108,767 brook trout; 153,202 brown trout; 398,045 rainbow trout; 8175 tiger trout; 275 adult Atlantic salmon and 761,300 fry; and 13,570 landlocked salmon produced at the hatcheries.

—During the newly-expanded 35-day black bear season, there were a record 5789 permits issued and a near-record harvest of 148. There were 125 bears taken in September and 23 in November.

—There were a record 14,413 permits issued and a record harvest of 2481 turkeys during the spring 2007 turkey season.

—There were 1013 Canada geese banded at 68 sites in 61 towns. The Wildlife Section received a new airboat which ran well but had some initial mechanical problems. There were 459 birds (307 wood ducks) banded.

—The Division and the Cooperative Wildlife Research Unit have begun a study to evaluate moose movements and habitat use in Massachusetts.

—The Natural Heritage & Endangered Species Section completed a multi-year project to revise the footprints around current observations of 442 rare species. These data were used to refine the Section’s estimated habitat and priority maps and a new Atlas was made available in September 2007.

—There were 1111 pairs of roseate terns at Bird Island in 2006 (680 in 2005) reflecting a decline from 724 pairs to 463 at Ram Island caused by great horned owl predation.

—A complete census of the two largest populations of small whorled pogonia revealed only 68 plants at the Leominster site (118 in 2003) and 29 in Manchester (none in adjacent subpopulations). Management intervention will probably be required.

—A new *Guide to Invasive Plants*³² was published.

—The Information & Education Section worked with an interdisciplinary team to redesign the Division's website. There were seven news advisories sent out and eight radio or television interviews conducted.

—The Division has a licensing system utilizing Internet and over-counter hard copy sales. A few license types can only be obtained over the counter because of a requirement to display supporting documentation. Efforts are proceeding towards an all-electronic system.

—There were ≈4000 acres acquired by the Realty Section in FY07. Conservation easements accounted for about one-third of the acquisitions. Large parcels acquired in fee included 400 acres in Leyden, 223 in Chesterfield and Middlefield and 90 in Salisbury.

—Legislation included a provision that possession of a firearms identification card will no longer be accepted as a substitute for a hunter education certificate³³.

2007-08³⁴: The Division received a request from Nestlé Waters regarding a possible source of water on the Bitzer Hatchery aquifer. The Board approved an initial examination of the site but then voted to disallow any further consideration of any such water extraction.

—After substantial discussion and public input, the Board voted to create a new Youth Sporting License and to recommend that the Commissioner of Administration & Finance set a fee of \$18.00 for such license.

—The passage of Atlantic salmon, shad and blueback herring at Holyoke and Turners Falls on the Connecticut River, and at the two sites on the Merrimack River remains low.

—There were 346 sites sampled in 17 watersheds during the statewide fisheries survey, principally including the Chicopee, Connecticut, Deerfield, and Westfield watersheds. A stream habitat restoration project is under consideration on Hamant Brook in Sturbridge.

—There were 87,232 brook trout; 137,946 brown trout; 422,472 rainbow trout; 5400 tiger trout; 223 adult Atlantic salmon and 854,200 fry; and 8940 landlocked salmon produced at the hatcheries.

—A comprehensive coyote review was undertaken. The Board held two public hearings, drawing substantial attention and controversy. The Board approved regulations extending the hunting season by five weeks, allowing the use of additional shot cartridges, rescinding the so-called "rifle ban" in certain counties, and clarifying the permissible use of night vision devices. A certification program for certified problem animal control agents was put in place to allow an enhanced response to those coyotes posing a substantive threat to public safety or property damage.

—The waterfowl project again had a poor year for pre-season waterfowl banding but banded 691 birds (526 wood ducks). There were 972 Canada geese banded at 72 sites in 63 municipalities.

—The periodic park waterfowl census yielded 12,672 mallards, 422 black ducks, 1768 Canada geese, and 465 ducks of other species on 160 sites in 93 municipalities. The number of mallards counted has declined since the peak year in 1993.

—The upland habitat project conducted reclamations totaling 244.5 acres on eight properties.

—The Board approved emergency amendments to the Endangered Species Act regulations to address public health concerns regarding an outbreak of eastern equine encephalitis.

—The Natural Heritage & Endangered Species Section coordinated the second year of a 2-year project surveying all coastal waterbird colonies. The target species included gulls, terns, cormorants, egrets, night-herons, and glossy ibis.

—A severe early spring storm over-washed Ram Island and caused significant damage to the substrate. Nevertheless, tern numbers there were up slightly. Common tern pairs on Penikese increased to 889 and roseates to 102 pairs with a high productivity of 1.54 fledglings per pair.

—Sandhill cranes were found breeding in Berkshire County in 2007. This was the first documented breeding of this bird in the state.

—The Information & Education Section sent out four special news advisories, coordinated 19 shows and exhibits, and vigorously engaged in its continuing educational programs.

—The Realty Section increased its acquisitions due to allotments from capital bond funds. There were 54 acquisitions (45 in central and western Massachusetts) totaling 6205 acres, with Conservation Easements comprising a major portion. Other major parcels were acquired in Southwick, Whately, and Williamsburg.

—Legislation included authorizations for the conveyance of conservation easements and a prohibition on Internet hunting³⁵.

2008-09³⁶: Certain activists expressed outrage over forest cutting practices on state lands and some advocated a complete cessation of all timber harvesting. Staff of the Division's forestry program responded by scheduling a series of public site visits to the targeted areas and by providing press releases and informational packets.

—No major malfunctions occurred at the fish lifts on the Connecticut or Merrimack rivers. The number of fish passed at all facilities remained low.

—For the first time in nearly 40 years, no northern pike were stocked in Massachusetts waters. No tiger muskellunge have been available since 2006.

—The final report³⁷ of the Target Fish Community project was published.

—There were 84,947 brook trout; 128,938 brown trout; 343,175 rainbow trout; 3373 tiger trout; 175 adult Atlantic salmon and 1,138,500 fry; and 11,600 landlocked salmon produced at the hatcheries.

—The Board approved changes to the deer hunting regulations to allow a 2-week "shot-gun" season in Zone 12 (consistent with all other zones) and to change the ending date of the archery season to the Saturday before Thanksgiving. The Board heard a discussion on further liberalizations to the primitive firearms season but voted to table the matter.

—The black bear field studies were enhanced by the deployment of three GPS collars on bears in the Connecticut Valley area.

—Raccoon rabies crossed the Cape Cod Canal in 2004 and is now present statewide except on the offshore islands. A total of 4933 mammals (excluding bats) of 25 species tested positive for rabies between 1985 and June 2009.

—The Board voted in 2008 to approve a recommendation to provide for a Youth Turkey Hunt to be offered with the participation of the Massachusetts Chapter of the National Wild Turkey Federation and volunteer sportsmen's clubs. Youths who completed a pre-hunt training session obtained a special youth permit allowing them to hunt under the oversight of a mentor on a special pre-season youth hunt day. The first hunt in 2009 saw 96 youths complete the training program, of whom 90 participated and 45 harvested a turkey.

—Proposals to restrict the use of lead-based fishing tackle and to extend the spring turkey hunting season in Zones 11 and 12 will be heard later in 2009.

—The airboat continued to suffer breakdowns. There were only 14 banding trips in 2008 yielding 540 waterfowl and marsh birds (351 wood ducks). Goose drive-trapping yielded 1008 geese at 64 sites in 55 municipalities.

—The Division compiled a habitat management database which tracks all active habitat management actions from the agency's several habitat management programs. The forestry program completed its initial five-year certification and is awaiting results of the certification audit.

—Bats which hibernate in mines and caves are being killed by "white-nose syndrome", a fungal infection. This highly lethal disease has now spread rapidly through the Northeast and has affected bats wintering in three large Massachusetts hibernacula.

—Plymouth Beach regained its status as an important ternery (~4000 pairs) after being abandoned in 1999. Common tern numbers dropped somewhat on Bird Island. The rain pools dried out slowly, rendering them unsuitable for nesting and illustrating the need for habitat restoration. Contact has been made with the Army Corps of Engineers to obtain permission for this activity. The Penikese common tern colony grew substantially to 1130 pairs.

—A 2-year marsh bird survey began in 2008 in the Housatonic watershed to ascertain the distribution and abundance of nine species of marsh birds. Seven species were represented at one or more sites; two others were not found.

—The Information & Education Section continued to support the website, distributed four news advisories, participated in 20 shows and exhibits, facilitated or conducted eight educational programs, and instituted a promotional and marketing campaign.

—The Realty Section had a successful year with 10,281 acres acquired. Conservation easements accounted for 12 of the 56 projects but >75% of the acreage, including 4300 acres (jointly with DCR) in Fall River and 1875 in the Fitchburg area.

—The Northeast District moves to a new office facility in Ayer and the Western District to one in Dalton.

—Legislation was limited to an authorization to obtain a conservation restriction from the City of Fitchburg.

2009-10³⁸: The Department's electronic licensing system is proceeding on schedule and a vendor will soon be chosen. The electronic system will streamline licensing by allowing the electronic purchase of licenses, hunting permits and stamps. The system will also allow electronic game checking, with a few specialized exceptions. Paper licenses, permits and stamps will be eliminated and individuals will be able to print out their own materials or have this done at an approved point-of-sale vendor.

—There is significant interest in the “National Archery in the Schools Program” and the Board instructed the staff to get the program underway in Massachusetts.

—The Board heard a presentation on the number and ecological implications of dams. There are ≈3000 dams in Massachusetts sited on ≈60% of the state's waters, ranging from 76% in the Central District to 21% in the Southeast. There were several recent changes³⁹ to the Dam Safety statute which changed the responsibilities of dam owners. The Division may need to address inspection, repair or removal of some of the dams which it owns.

—The Holyoke, Turners Falls, and Merrimack River fish lifts operated satisfactorily but continued to pass fish numbers below those of the previous 10-year means.

—For the second year in a row, the Division was unable to obtain surplus northern pike and tiger muskellunge from other states and rejected an excessive bid for pike from a private propagator.

—A preliminary assessment of the factors influencing riverine fish communities was published⁴⁰.

—The Board heard a presentation on the effects of lead on common loons in New England. Lead ingestion was the major cause of adult loon mortality. Sinkers and jigs accounted for 79% of lead objects found in dead loons. The staff recommended, and the Board approved, a regulatory change to prohibit the use of lead sinkers and jigs <1 ounce in weight in all inland waters, effective January 1, 2012.

—There were 66,044 brook trout; 13,754 brown trout; 387,410 rainbow trout; 6363 tiger trout; 315 adult Atlantic salmon and ≈995,500 fry; and 12,000 landlocked salmon produced at the hatcheries.

—The muzzleloader deer hunting regulations were again reviewed and the characteristics of modern vs. antique firearms described. The staff recommended a regulatory change to allow so-called “break-open breech” muzzleloaders and the Board agreed to a public hearing later in the year.

—There were 439 deer heads collected statewide during the eighth year of chronic wasting disease (CWD) surveillance. CWD has not yet been detected in Massachusetts.

—There were 34 moose captured between 2006-09, of which 21 were equipped with GPS collars. Data on movements and habitat use are now being evaluated.

—The Board heard a presentation on the history and management of black bear in Massachusetts. Bears have expanded their numbers, distribution and extent of human interaction dramatically since the bear study began in 1970⁴¹. Increased research and management endeavors have been implemented and the bear is a priority species in the Comprehensive Wildlife Conservation Strategy.

—The staff also proposed the removal of the 50-animal bobcat quota which has been in place since 1978. Bobcats are doing well in Massachusetts and the provision is no longer needed. The Board voted to approve the regulation change.

—Surveys are underway to ascertain the distribution of the New England cottontail and to evaluate and prioritize sites on public land where habitat management will take place.

—The Board also voted to extend the spring turkey hunting season in Zones 11 and 12 for consistency with the remainder of the state. There were 10 participating clubs in the Youth Pheasant Hunt program and 11 in the Youth Turkey Hunt.

—There were a scant 57 turkeys taken in the fall 2009 season.

—The Board approved the continuation of the permit-only winter pheasant hunt and to allow the stocking and hunting of bobwhite quail.

—There were 819 birds (589 wood ducks) handled during pre-season banding, the greatest number since 1999. There were 1033 Canada geese rounded up and banded at 73 sites in 63 municipalities.

—Following the conclusion of the “Forest Futures Vision Process and Final Recommendations” for the management of forest resources on state forests and parks, Secretary of Energy and Environmental Affairs Ian Bowles announced the Commonwealth Forest Heritage Plan on April 21, 2010. Secretary Bowles directed the Department of Conservation and Recreation’s (DCR) Division of Water Supply Protection and DFW to review their forest management practices in light of the year-long Forest Futures “Visioning” process held by DCR, with the goal of coordinating and integrating forest stewardship across state agencies. Specifically, for the DFW wildlife management areas (WMAs), DFW was directed to review its habitat management guidelines and practices “...in the context of the 2006 State Wildlife Action Plan, and as part of a larger review of its statewide land protection and habitat management. DFG/DFW will conduct a public process on recommendations to update the Guidelines in the context of a review of overall land protection and habitat management effectiveness. One goal of the process will be to align, coordinate and integrate forest stewardship on all state lands.” The Board then held public informational meetings on the habitat management goals and practices on WMAs and received broad public support for them.

—The Division completed two Major Corrective Action Requests from the Forest Stewardship Council’s recertification audit and has requested confirmation that the preconditions for recertification have been met.

—The Natural Heritage & Endangered Species Section entered into a cooperative agreement with the Department of Transportation to incorporate long-term conservation objectives for rare species into transportation planning.

—Common tern numbers at Ram Island increased to 3961 pairs (the greatest ever), probably as dispersers from Monomoy Island which experienced a substantial drop in numbers. Common terns at Penikese remained essentially stable but roseates dropped to 43 pairs.

—There were 27 known territorial pairs of bald eagles in 2009 of which 22 laid eggs and 21 fledged chicks. There were at least 337 eagle chicks fledged during the past 20 years.

—The Information & Education Section identified a method of tracking media requests to the Division and documented 277 inquiries which were routed through the Executive Office of Environmental Affairs. New display components were developed and put into use with highly favorable results. There were 28 public events which DFW sponsored or participated in.

—The first Division photo contest was held and the winners were featured in the third issue (2010) of *Massachusetts Wildlife*.

—The former “Abstracts” of the fish and wildlife laws were replaced in 2010 with a magazine-type color “Fish and Wildlife Guide” published by a commercial vendor.

—Despite economic challenges, the Realty Section conserved 6164 acres including large conservation easements in Mount Washington and New Bedford. Large fee acquisitions were made in Ashfield-Hawley, Newbury, Peru, and Sturbridge. The Century Bog addition to the Red Brook wildlife management area now protects the entire length of Red Brook.

—There was no significant wildlife-related legislation during 2010.

2010-11⁴²: Due to staffing issues at the licensing vendor, “Active Outdoors”, the electronic licensing system will be delayed. The current mix of hard-copy and on-line licenses and stamps will continue in 2011. The electronic licensing system will also include a process for selection of antlerless deer permits and for the electronic reporting of game, increasing hunter convenience, facilitating law enforcement, providing quick and efficient data collection, and reducing staff time.

—Department Counsel provided a review of the new Massachusetts Off-Highway Vehicle Law⁴³ which addressed some of the concerns regarding misuse of these vehicles. However, more attention should be given to fines, seizure of improperly used vehicles, safety courses, and landowner responsibility.

—Ten schools in Berkshire, Bristol, Essex, Hampshire, Middlesex, Plymouth and Worcester counties are now participating in the National Archery in the Schools Program (NASP), which was established and promoted by DFW. The Board views NASP as an incentive for hunter recruitment and promotion of the shooting sports.

—The Holyoke, Turners Falls and Merrimack River fish passage facilities operated satisfactorily but continued to count or pass limited numbers of fish. Studies of American eel continued at Holyoke (a record 991 eels collected) and Essex Dam (~78,000 eelers passed).

—There were 77,018 brook trout; 131,937 brown trout; 372,870 rainbow trout; 6226 tiger trout; 315 adult Atlantic salmon and ~1,343,000 fry; and 10,050 landlocked salmon produced at the hatcheries.

—The Board voted to approve staff recommendations allowing the use of “break-open breech” muzzleloaders during the primitive firearms deer season.

—The 2010 archery deer harvest (n=3778) was a record.

—The black bear field study deployed five GPS collars in 2010 and nine in 2011 in furtherance of the pilot study on bear habitat use.

—The Board also heard a proposal from the Massachusetts Trappers Association relative to the fisher season. Division staff recommended against the date change and the Board so voted.

—The New England cottontail is now a “candidate species” for federal threatened status. Regionally significant areas and site-specific focal areas for New England cottontail were identified using habitat-based GIS models. Winter surveys and habitat management continued to identify cottontail presence and resurrect early successional habitat.

—The staff recommended changes to the Youth Turkey Hunt to allow the permit/tag to be used during the regular spring season and to provide two tags to youths aged 12-14 (for consistency with older youths). The Board will address these proposals at a public hearing later in 2011.

—The pre-season waterfowl banding saw the greatest number of ducks (n=1158) captured since 1994 and the third greatest in 38 years. Summer goose banding yielded 0123 Canada geese at 82 sites in 75 municipalities.

—The Board also heard several proposals for changes in the falconry regulations to comply with federal regulations and to clarify and liberalize certain provisions.

—The cooperative moose project continued with data analysis after termination of major capture efforts in 2010. The graduate student defended his thesis⁴⁴ and will continue further analyses for his dissertation.

—White-nose syndrome caused catastrophic mortality of nearly 1 million bats in the Northeast⁴⁵. The disease is spreading and there is no known treatment or solution. Little brown bat numbers in Massachusetts hibernacula dropped >99%.

—A record 3200 northeastern beach tiger beetles were found during a 2010 survey.

—The Natural Heritage & Endangered Species Section completed a federally funded project for the conservation of 38 globally imperiled and vulnerable plants in Massachusetts. Field surveys discovered or rediscovered populations of three rare plants.

—The Section completed the collaborative “BioMap2” biodiversity plan¹¹.

—The Information & Education Section saw the retirement of longtime Chief Eleanor C. Horwitz, who was instrumental in developing or facilitating several exciting Division programs.

—Promotional activities were separated from “Outreach” and designed to establish or reinforce the Division’s reputation as a professional science-based agency.

—The stamp contests were closed down due to the advent of the electronic licensing system in 2011 (but see 2011-12).

—The Realty Section had another successful year completing 46 projects covering 3037 acres. Most projects involved additions to existing areas. However, five new wild-life management areas and six new conservation easements were added.

There was no significant wildlife-related legislation in 2011.

2011-12⁴⁶: The Division began to undertake a review of compensation for its technical and scientific positions. The Division is two to three pay grades behind the

U.S. Fish and Wildlife Service and the Massachusetts Department of Environmental Protection. Later in the year, the Division's Technician II employees were reclassified to Technician III but the biologists were still behind most others in the country.

—Dr. Andrew C. Vitz was hired as State Ornithologist after the position had been vacant for 10 years.

—DFW reached a major milestone as electronic licensing went on-line in 2012 with a complete and successful transition to the issuance of all licenses, stamps, and associated permits available only through the "MassFishHunt" system from the Division or a participating vendor. For the first time, deer hunters could apply electronically for antlerless deer permits at any time after the purchase of their hunting license and could then purchase the permits instantly after the application deadline.

—The Legislature created a free fishing license⁴⁷ for persons under the age of 18.

—The fish passage facilities at Holyoke, Turners Falls and on the Merrimack River continued to pass modest numbers of Atlantic salmon, shad, and herring. A conceptual plan for the upstream passage of American eel at Holyoke was drafted. There were 9734 eels (a near-record) collected at Holyoke.

—The previously-approved prohibition on the use in inland waters of lead sinkers and jigs weighing <1 ounce went into effect on January 1, 2012.

—The Board also approved a staff proposal to allow harvest of [only] tagged salmon on the Merrimack River and only upstream of the Essex Dam.

—The Division met with the Massachusetts Cooperative Fisheries Research Unit in regard to a proposed study on the effects of pond and lake drawdowns on aquatic life.

—The Hamant Brook restoration project was awarded an \$800,000 grant. The Division will retain oversight and will work with "American Rivers" and the Board voted to approve the Memorandum of Understanding.

—There were 75,669 brook trout; 135,144 brown trout; 378,937 rainbow trout; 5090 tiger trout; 319 adult Atlantic salmon and 1,573,400 fry; and 12,100 landlocked salmon produced at the hatcheries.

—The Board heard a staff proposal to increase the possession limit of unsealed deer from two to four in Zones 13 and 14 in order to increase harvest and success rates and allow hunters more time afield.

—A black bear review was conducted and recommended no change to the open season but that a comprehensive plan be developed after the current research project is completed.

—A young male bear crossed the Cape Cod Canal in May and wandered to Provincetown and back to Wellfleet where it was darted and then translocated off-Cape. The bear then moved into Brookline, was again darted and transported to western Massachusetts.

—The collection of cottontail specimens during 2011-12 yielded >800 specimens including >40 New England cottontails. However, all New England cottontail records occurred within areas where the animal was already known.



Image: © Architerra, Inc.

Figure 65. Rendering of new [third] Field Headquarters at Westborough.

—The Board approved the changes to the Youth Turkey Hunt (see 2010-11) and heard a proposal to expand the fall turkey season to Zones 10-12, increase the fall season length to two weeks, and allow shot size #7.

—Pre-season waterfowl banding was hampered by stormy weather and mechanical problems but 706 waterfowl and marsh birds (510 wood ducks) were captured in 19 trips. The Division reduced its goose banding quota to 800 and captured and banded 816 birds at 62 sites.

—Post-season banding of black ducks in bait traps continued for the third year. However, mild conditions reduced success and only 313 birds (240 black ducks) were captured.

—The Board also heard some additional recommendations regarding the proposed falconry regulations (see 2010-11) and then voted to approve the regulatory package exclusive of the “let-lay” accidental kill (of protected birds) provision.

—Common tern numbers at Penikese Island were the highest since the 1950s but productivity was low due to predation from gulls and northern harriers. Habitat restoration involving controlled burning and herbiciding will be conducted on Penikese in 2011-12.

—The number of peregrine falcon pairs increased to 24 in 2011 of which 12 successfully fledged 34 chicks.

—Multiple turtle surveys are underway for Blanding’s, bog, eastern box, and wood turtles.

—Marion E. Larson was selected as the new Chief of Information & Education, succeeding Eleanor Horwitz. A new recruitment and retention position was created and filled to direct and focus efforts to foster hunting and fishing license sales.

—There were 33 shows, exhibits and special events held in 2011-12. The “Becoming An Outdoorswoman” program will have to cut back to five events due to staff changes.

—The Realty Section was able to conserve parcels in 45 projects totaling 5629 acres. The bulk of the funding continued to be provided from bond capital administered through the Department. Conservation restrictions comprised the majority of the acreage due to the 3688-acre W.D. Cowls, Inc., project in Leverett and Sunderland. Important fee acquisitions included properties in Chesterfield, East Bridgewater, West Brookfield and Winchendon.

—There was no significant legislation other than the provision for the free minor fishing license.

July to December 2012: The Board voted to approve the changes to the fall turkey hunting season and to increase the untagged deer possession limit (see above). The on-line game check aspect of the electronic licensing system was delayed until the spring 2013 turkey season due to implementation challenges on the part of the vendor.

There were 4119 returning Atlantic salmon recorded at the Holyoke fish lift between 1955-2011⁴⁸ and ≈137.6 million Atlantic salmon fry and ≈5.4 million smolts stocked in the Connecticut River watershed between 1967 to 2011⁴⁹. The U.S. Fish & Wildlife Service ceased Atlantic Salmon propagation at the White River National Fish Hatchery in July 2012 due to extensive damage from Hurricane *Irene*. The Service has also begun an evaluation of the restoration effort on the Merrimack River, which may lead to cessation of the Service's involvement in that river basin. Massachusetts will cease stocking of Atlantic salmon fry in the Connecticut River basin in spring 2013⁵⁰.

There were 15,000 American shad recorded at Holyoke in 1960, 66,000 in 1970, 380,000 in 1980, 360,000 in 1990, 225,000 in 2000, and 164,000 in 2010⁴⁸. There were 490,431 shad lifted in 2012, 247% of the previous 10-year mean.

The Division's goals for wildlife habitat now call for 20-25% of uplands in open habitats and 70-80% in a full canopy forest condition (including 10-15% in forest reserves)⁵¹. Active management on 2041 acres of Division lands since 1996⁵¹ has since restored grasslands, shrublands, aspen stands, and abandoned orchards, regenerated young forests, and converted sterile Norway spruce plantations.

The contract for the new Field Headquarters building was let and the existing "Richard Cronin Building" was scheduled for demolition. During the summer of 2012, field headquarters staff packed up those records, supplies and equipment to be transferred to a temporary office or to the Districts or slated for disposal. By September 7, all staff had relocated to 100 Hartwell Street in West Boylston. The old facility was then demolished and ground-breaking for the new "green" Field Headquarters (Figure 65) was held on December 19, 2012.

IN SUMMARY: THE ESSENCE OF WILDLIFE MANAGEMENT¹

"History gives us a kind of a chart, and we dare not surrender even a small rushlight in the darkness. The hasty reformer who does not remember the past will find himself condemned to repeat it"— John Buchan (1923)²

The Commissioners of Fisheries were not a spontaneous creation, arisen from the ashes of the Civil War as a Legislative epiphany and charged with the sudden and striking knowledge that riverine dams forbid the passage of fish. Europeans had interacted with the woodlands, waters and wildlife of Massachusetts since 1600 (and before). Their habitations and agricultural plots, their hunting, fishing, and timbering practices and their trade networks were simply cultural variations of those erected or practiced by the Native Americans who came before.

Indeed, the Massachusetts landscape and those on it were then different from what it had become by 1866—and what it would become in 2012— but it was hardly unchanged, certainly not unchanging. Yet, in looking backward, we should not indulge in presentism—we should not anachronistically project present day ideas and perspectives into the past.

Nature is inconstant³, and so is human society. The Commonwealth builder John Winthrop, the Pynchons, settlers and traders, the patriot John Adams, the botanist George Emerson, the advocate William Apess, the essayist Ralph Waldo Emerson, the fish culturist Theodore Lyman, the administrator William Adams, the ornithologist Joseph Hagar, the educator Reuben Trippensee, the naturalist John Phillips, the scientist William Sheldon, and the Director Richard Cronin and their fellows were all subsumed within their temporal environments. Their accomplishments were several, their failures occasional. They were all affected, directly and indirectly, by the social, political, economic, educational, cultural, literary, scientific, and religious perspectives of their generations, the temper of their times⁴. They sought, as all settled peoples do, to derive food and shelter for their families, create a governing structure to organize their society, and to engage in economic and cultural practices appropriate to the sustenance of their needs and desires. In their own unique ways, they also sought comprehension of the world around them and to carry that world into the future, not only for utilitarian reasons but to carry forward a framework of ideas and beliefs—the *Weltanschauung* by which we the people interpret and interact with the world. The Commissioners of Fisheries, and their successors, colleagues, and constituents, are the propagators, beneficiaries, and stewards of those evolved and evolving ideas and beliefs.

“Time present and time past

Are both perhaps present in time future.

And time future contained in time past.”— T.S. Eliot (1943)⁵

In 1866, the two male Commissioners of Fisheries had themselves, an office, one statute and \$7000 (provided from general appropriations) to carry out the duties charged to them by law^{6,7}. Nearly 150 years later, their successor entity, the Division of Fisheries & Wildlife, employed 146 full-time employees⁸ and 15 contractors led by a professionally trained Director (Figure 66) under the oversight of a seven-person citizen’s board and grouped into six sections comprising administration, fisheries, information and education, natural heritage and endangered species, realty, and wildlife.

In May 1977, the Division hired its first woman for a professional position. By 2013, women comprised 36% of the agency’s staff, the majority in scientific or technical positions⁹. The Division now administers or operates under the authority of two



Figure 66. Director Wayne MacCallum (left) and Board Chairman George Darey (right), 2012.

chapters of the General Laws¹⁰, comprising 132 sections, and an extensive Code of Regulations¹⁰, comprising 11 chapters. Its facilities include an administrative suite in Boston, a temporary Field Headquarters in West Boylston (pending construction of a new state-of-the-art building in Westborough), five District offices in northeastern, southeastern, central, Connecticut Valley, and western Massachusetts, and five fish hatcheries in the southeastern and Connecticut Valley regions. In 2012, the Division held in fee 160,456 acres of wildlife management areas and other properties and 35,614 acres in conservation easements¹¹. The revenue accrued to the Inland Fisheries & Game Fund¹² in FY12 was \$14,111,080 from departmental revenues (55%, primarily licenses and permits), federal aid reimbursements (38%), tax apportionments (6%) and reimbursements and miscellaneous (1%). The Natural Heritage & Endangered Species Fund¹² received \$2,132,946 in revenues from State Wildlife Grants (35%), other grants and contracts (32%), fees (22%), and the “Endangered Species” income tax checkoff and direct donations (11%). Both Funds operate in the black.

The Division’s mission has changed, as has its successes and its challenges, as it draws near to its sesquicentennial. The essential powers and authorities which now allow it to pursue and accomplish that mission include: (1) authority—subject to any federal powers—over all (including exotics) mammals, birds, reptiles and amphibians, fish¹³ and certain categories of invertebrates and wild plants; (2) a strong administrative and regulatory citizen’s Board with the power to make appointments, set policy, enact regulations and sustain a long-term approach; (3) the authority to quickly set seasons, bag limits, methods of take, and other regulatory measures¹⁴ affecting the Division’s activities, following a transparent public hearing process; (4) dedicated funds for holding and dispersing the Division’s receipts, which by law cannot be diverted to expenditures other than those of the Division; (5) a strong and continuing process of wildlands acquisition, protecting and conserving key facets of the state’s biotic diver-

sity; and (6) a highly educated and skilled professional work force working in concert with each other and with colleagues, cooperators, and constituents.

If, then, the essence of wildlife management is indeed the management of wildlife-related impacts¹—those effects or events involving people and wildlife, management interventions, or stakeholders—what changes and challenges will face the Division in accomplishing its mission in the remainder of the 21st century?

“If you do not think about the future, you cannot have one”—John Galsworthy (1928)¹⁵

The Division—like most, and probably all, fish and wildlife agencies—has progressed through the Leopoldian sequence of “game” management and game policy administration¹⁶ with frequent advances and accomplishments and occasional digressions (Table 6). Emergent and unexpected challenges are now at hand¹⁷, including:

1. Rapid global climate change exacerbated by human enrichment of atmospheric carbon is a profound reality^{18,19}. Sportsmen and other outdoor enthusiasts are not immune and new realizations, commitments, coalitions, approaches, and funding mechanisms will be required²⁰. The Division^{21,22} and the Department²³ are working in concert with other entities to understand the effects of climate change on fish, wildlife and their habitats and to develop adaptive management strategies to buffer and mitigate the inevitable alterations to the environment and human lifestyles.

2. Energy production and extraction drives a sharp dichotomy between those favoring energy independence or new renewable energy sources and those who argue that the environmental or social costs of those energies are too high. Hydraulic fracturing^{24,25}, natural gas pipelines²⁶ and wind energy facilities^{27,28} all have their partisans and their antagonists. Wind energy, in particular, has been proposed on Berkshire mountaintops as well as in coastal Sounds and will continue to challenge the Division to balance society’s needs and desires against those of fish and wildlife.

3. Emergent and resurgent wildlife diseases pose a dramatic challenge to fish and wildlife populations as well as to people^{29,30}. Many wildlife diseases are endemic density-dependent population-regulation mechanisms, historically given scant attention by wildlife conservation entities³¹. Yet, when a translocated or mutated pathogen is introduced to a naïve population, catastrophic mortality may result (as with bats and white-nose syndrome). Emerging infectious diseases (1940-2004) are dominated (60%) by zoonoses, of which 72% originated in wildlife³². These represent the most significant, growing threat to human health of all emerging infectious diseases. Wildlife disease surveillance and management³¹ must be integral to wildlife conservation and human health.

4. Adverse interactions between humans and wildlife are nothing new, provoking bounties, predator control, exclusion devices and an angry or frightened citizenry. “Nuisance” wildlife—often in the eye of the beholder—has elicited both a nationwide business in animal damage control and a growth in wildlife damage management as a science³³. Conservation—and outright protection—can have consequences, often unintended. Locally abundant wildlife can challenge an agency and the public to choose conflict or coexistence^{34,35}. Suburbanites schooled on “Animal Planet” often have different views of nature and make different choices than do rural dwellers with hands-on life experiences^{36,37}. The former often view the land as a site on which to build



Figure 67. Children admiring a youthful angler and his catch.

large structures and open space as manicured lawns with bordering beds of bright exotic blossoms. They fear the dark forests and murky waters and would see Old Ben reduced to a few chattering squirrels³⁸. Multi-faceted programs which promote stable wildlife populations³⁹ and an enlightened suburban land ethic⁴⁰ have the potential to lessen such conflicts and controversies.

5. Leopold⁴¹ urged that progressive “game administration” must include “starting to encourage private management. Regulating private management in the public interest”. Simply put, this is participatory wildlife management. The state does not own wildlife, nor does the individual, except when lawfully reduced to possession through a licensing process. Wildlife is a public trust and the collective owners have a right to hold the trustees to their duty. The integration of ecology and human dimensions⁴², vigorous, effective and accurate education programs and timely communications⁴³, and informed stakeholder acceptance^{44,45} are unquestionable necessities in modern-day resource conservation.

6. Funding will continue to drive the extent and direction of fish and wildlife conservation. License fees and federal aid grants and reimbursements have been the backbone of the state agencies’ funds⁴⁶. However, changing demographics have caused participation in traditional sporting activities to dwindle and thus the funding source. An alternative model encompassing all nature enthusiasts⁴⁷ is sorely needed but slow in coming. In the interim, agencies must seek to diversify their funding base with the aggressive pursuit of directed grants, fees, donations, and general taxation.

7. Politics is the art of the possible⁴⁸. State and federal resource management agencies exist as a component of a larger structure of governmental entities, typically headed by political appointees, themselves responsible to elected public officials who oftentimes must heed the loudest drumbeats. Natural resource management is not immune from political influence, although many agencies have boards or commissions which provide a degree of insulation. Natural resource managers, and scientists as well, must understand their role in the political struggle⁴⁸ and adeptly further their goals through a process of politic engagement, honest and factual education, collaborative dialogue⁵⁰, reasonable compromise, and a sensible approach to wins and losses.

8. Dallas Lore Sharp was right. The influence of the brooks and fields makes for the health of the spirit. Yet, our children (Figure 67) are losing⁵¹ the generational bond between themselves and those who once went forth each day, into the sun-dappled woodlands, rippling streams and flower-brightened meadows. So too, the naturalists⁵², field biologists⁵², and hunters and anglers⁵³ are withering away. Agencies must devote resources, staff, and energy to research-based programs of recruitment and retention⁵⁴.

Why does the salmon thrust upstream, persevering despite difficult obstacles? To return to whence it came. “River run, from swerve of shore to bend of bay”⁵⁵.



Photo © Bill Byrne

Figure 68. Merrimack River, Haverhill.

ACKNOWLEDGMENTS

The germination of this book began 40 years ago when I read the series of historical articles in *Massachusetts Wildlife* published in 1964-65 about the origins of the Division of Fisheries & Wildlife. I thank Director Wayne MacCallum for his vision in finally bringing the idea, and my substantial collection of notes and references, to fruition. I particularly thank Paul Caruso, Laura Conlee, William Davis, Robert Deblinger, Stephen DeStefano, Thomas French, Richard Hartley, Ellie Horwitz, Steven Hurley, Mark Jester, Kristin McCarthy, Mark Madison, Peter Mirick, Richard Murray, George Pushee, Susan Sacco, Martha Sheldon, Caleb Slater, David Szczebak, Mark Tisa, Philip Truesdell, Richard Turner, Andrew Vitz, and Christina Wolfe for their assistance and cooperation. I thank Robert Deblinger, Thomas French, Marion Larson, Kristin McCarthy, Wayne MacCallum, Thomas O’Shea and Caleb Slater for their careful review of the manuscript and Marion Larson, Bill Byrne and David Gabriel for editorial, photographic and graphics support. A debt also is owed to many other present and former colleagues, cooperators and friends too numerous to mention specifically for their remarks, suggestions and recollections over the past 44 years.

Some historical references and data were initially researched, retrieved or compiled under Massachusetts Federal Aid in Wildlife Restoration Grant W-35-R, Jobs VI-2 and VIII-1.

TABLES

Table 1. Massachusetts Commissioners on Fisheries & Game, 1866-1919.

Dates	Commissioners	Title
1865-1866	Thomas Lyman & Alfred R. Field	Fisheries
1867	Lyman & Field	Same
1868	Lyman & Field	Same
1869	Lyman, Field & E.A. Brackett	Inland Fisheries
1870	Lyman & Brackett	Same
1871	Lyman, Brackett & Thomas Talbot	Same
1872	Brackett & Talbot	Same
1873	Lyman, Brackett & Asa French	Same
1874	Lyman, Brackett & French	Same
1875	Lyman, Brackett & French	Same
1876	Lyman, Brackett & French	Same
1877	Lyman, Brackett & French	Same
1877-1878	Lyman, Brackett & French	Same
1878-1879	Lyman, Brackett & French	Same
1879-1880	Lyman, Brackett & French	Same
1880-1881	Lyman, Brackett & French	Same
1881-1882	Brackett, French & F.W. Putnam	Same
1883	Brackett, French & Putnam	Same
1884	Brackett, French & Edward H. Lathrop	Same
1885	Brackett, Putnam & Lathrop	Same
1886	Brackett, Putnam & Lathrop	Fish & Game
1887	Brackett, Putnam & Lathrop	Inland Fisheries & Game
1888	Brackett, Putnam & Lathrop	Same
1889	Brackett, Lathrop & Isaiah C. Young	Same
1890	Brackett, Lathrop & Young	Same
1891	Brackett, Lathrop & Young	Same
1892	Brackett, Lathrop & Young	Fisheries & Game
1893	Brackett, Lathrop & Young	Same
1894	Brackett, Young & Elisha D. Buffington	Same
1895	Brackett, Young & Buffington	Same
1896	Brackett, Young & Buffington	Same
1897	Brackett, Young & Buffington	Same

Table 1. (Continued)

1898	Brackett, Young & Buffington	Same
1899	Joseph W. Collins, Brackett, Buffington	Same
1900	Collins, Brackett & John W. Delano	Same
1901	Collins, Brackett & Delano	Same
1902	Collins, Brackett & Delano	Same
1903	Collins, Brackett & Delano	Same
1904	George W. Field, Brackett & Delano	Same
1905	Field, Brackett & Delano	Same
1906	Field, Brackett & Delano	Same
1907	Field, Brackett & Delano	Same
1908	Field, Delano & George H. Garfield	Same
1909	Field, Delano & Garfield	Same
1910	Field, Delano & Garfield	Same
1911	Field, Delano & George H. Graham	Same
1912- 1914	Field & Graham	Same
1912- 1914	Graham (1912-13) & W.C. Adams (1914)	Same
1915	Field, Graham & Adams	Same
1916	Field (exp. 2-16), Adams, Graham, Millett	Same
1917	Adams, Graham & Arthur L. Millett	Same
1917- 1918	Adams, Graham & Millett	Same
1918- 1919	Adams, Graham & Millett	Same

Table 2. Directors of the Division of Fisheries & Game (later “Wildlife”) 1919-2012

Dates	Director	
1919-1931	William C. Adams	Fisheries & Game
1931-1936	Raymond J. Kenney	Same
1936-1939	Patrick W. Hehir	Same
1939-1941	James E. Agnew	Same
1942-1945	Horatio S. duMont	Same
1945-1948	James F. Power	Same
1948-1955	Robert H. Johnson	Same
1955-1963	Charles L. McLaughlin	Same
1963-1964	Francis W. Sargent	Same
1964-1975	James M. Shepard	Same (“Wildlife” in 1974)
1975-1976	Colton H. Bridges	Fisheries & Wildlife
1976-1979	Matthew B. Connolly, Jr.	Fisheries & Wildlife
1979-1988	Richard Cronin	Fisheries & Wildlife
1988-	Wayne F. MacCallum	Fisheries & Wildlife

Table 3. Fisheries & Wildlife Board Members, 1948-2012.

Dates	Members
1948-1949	Oscar J. Anderson, James W. Cesan, Matthew T. Coyne, Ludlow Griscom, Frederick D. Retallick
1949-1950	Cesan, Coyne, Paul V. Fleming, Ovide N. Lanois, Frederick A. McLaughlin
1950-1951	Cesan, Coyne, Fleming, Lanois, McLaughlin
1951-1952	Cesan, Coyne, Fleming, Lanois, McLaughlin
1952-1953	Cesan, Coyne, Fleming, Lanois, McLaughlin
1953-1954	Powell M. Cabot (effective 3-54), Cesan, Coyne, Lanois (until 3-54), McLaughlin
1954-1955	Cabot, Cesan, Coyne, Fleming (until 10-54), McLaughlin, Frederick D. Retallick (effective 10-54)

Table 3 (continued). Fisheries & Wildlife Board Members, 1948-2012.

Dates	Members
1955-1956	Cabot, Cesan, Coyne, McLaughlin, Retallick
1956-1957	Cabot (died), Cesan, Coyne (term expired), Thomas M. Joyce (succeeded Cabot), McLaughlin, Retallick, Henry F. Russell
1957-1958	Cesan, Joyce, McLaughlin, Retallick, Russell
1958-1959	Cesan (until 5-59), Harper L. Gerry (effective 8-58), Joyce, Bert B. Nietupksi (effective 5-59), Frederick A. McLaughlin (until 8-58), Retallick, Russell (resigned)
1959-1960	Lawrence Barbieri (effective 10-59), Gerry, Joyce, F. Stanley Mikelk (effective 2-60), Nietupski, Retallick (until 10-59)
1960-1961	Barbieri, Gerry, Joyce (until 6-61), Mikelk, Nietupski, Roger D. Williams (effective 6-61)
1961-1962	Barbieri, Gerry, Mikelk, Nietupski, Williams
1962-1963	Barbieri, Harry C. Darling (effective 12-62), Gerry (until 10-62), Mikelk, Nietupski, Williams
1963-1964	Barbieri (term expired?), Martin H. Burns (effective 11-63), Darling, Mikelk, Nietupski (term expired?), Edward J. Tierney (effective 5-64), Williams
1964-1965	Burns, Darling, Mikelk, Tierney, Williams
1965-1966	Burns, Henry D. Columbo (effective 5-66), Darling, Mikelk, Tierney
1966-1967	Burns, Columbo, Darling, Bradlee E. Gage (effective 1-67), Mikelk (term expired), Tierney
1967-1968	Burns, Columbo, Darling, Gage, Tierney
1968-1969	Burns, Columbo, Darling, Gage, Tierney
1969-1970	Kenneth F. Burns (effective 2-70), M. Burns, Columbo, Darling, Gage, Tierney (until 10-69)
1970-1971	K. Burns, M. Burns, Columbo (term expired), Darling, Gage, Roger D. Williams (effective 10-70)
1971-1972	K. Burns, M. Burns, Darling, Gage, Williams
1972-1973	K. Burns, M. Burns, Darling, Gage, Williams
1973-1974	K. Burns, M. Burns, Darling (until 8-73), Gage, Henry R. Russell (effective 8-73), Williams
1974-1975	K. Burns, M. Burns, Gage, Russell, Williams
1975-1976	James Baird (new position 7-75), K. Burns, M. Burns, Gage, Russell, Philip Stanton (new position 7-75), Williams

1976- 1977	Baird, K. Burns, M. Burns, Gage, Russell, Stanton, Williams
1977- 1978	Baird, K. Burns, M. Burns, Donald Coughlin (succeeded Williams), George L. Darey (succeeded Russell), Gage, Russell (term expired), Stanton, Williams (term expired)
1978- 1979	Baird, Nancy E. Begin (succeeded M. Burns), K. Burns, M. Burns (term expired), Coughlin, Darey, Gage, Stanton
1979- 1980	Baird, Begin, K. Burns, Coughlin, Darey, Gage, Stanton

Table 3 (continued). Fisheries & Wildlife Board Members, 1948-2012.

Dates	Members
1980- 1981	Baird (term expired), Begin, Colton H. Bridges (succeeded Stanton), K. Burns, Coughlin (resigned), Darey, Gage, Richard Kleber (succeeded Baird), Jack Sylvia (succeeded Coughlin), Stanton (term expired)
1981- 1982	Begin, Bridges, K. Burns, Darey, Laurence Fountain (succeeded Gage), Gage (resigned), Kleber, Sylvia
1982- 1983	Begin, Bridges, K. Burns (died 7-82), Darey, Fountain, Kleber, Sylvia, Raymond Whitaker (succeeded Burns)
1983- 1984	Begin, Bridges, John F. Creedon (succeeded Sylvia), Darey, Fountain, Kleber, Sylvia (resigned)
1984- 1985	Begin, Bridges, Creedon, Darey, Fountain, Kleber, Whitaker
1985- 1986	Begin, Bridges, Creedon, Darey, Fountain, Gwilym S. Jones (succeeded Kleber), Kleber (term expired), Whitaker
1986- 1987	Begin, Bridges, Creedon, Darey, Fountain (until 10-86), Jones, Michael P. Roche (succeeded Fountain 3-87), Whitaker
1987- 1988	Begin, Bridges, Creedon, Darey, Jones, Roche, Whitaker
1988- 1989	Begin, Bridges, Creedon, Darey, Jones, Roche, Whitaker
1989- 1990	Begin, Bridges (died), Creedon, Darey, Ernest W. Foster, Jr. (succeeded Whitaker), Jones, Roche, Whitaker (term expired)
1990- 1991	Begin, Russell A. Cookingham (succeeded Bridges), Creedon, Darey, Foster, Jones, Roche
1991- 1992	Begin, Cookingham, Creedon, Darey, Foster, Jones, Roche
1992- 1993	Begin, Cookingham, Creedon, Darey, Foster, Jones, Roche
1993- 1994	Begin, Cookingham, Creedon, Darey, Foster, Jones, Roche
1994- 1995	Begin, Cookingham, Creedon, Darey, Foster, Jones, Roche
1995- 1996	Begin, Cookingham, Creedon, Darey, Foster, Jones, Roche
1996- 1997	Begin, Cookingham, Creedon, Darey, Foster, Jones, Roche

Table 3 (continued). Fisheries & Wildlife Board Members, 1948-2012.

1997-1998	Begin, Cookingham, Creedon, Darey, Foster, Jones, Roche
1998-1999	Begin, Cookingham, Creedon, Darey, Foster, Jones, Roche
1999-2000	Begin, Cookingham, Creedon, Darey, Foster, Jones (resigned 12-99), Joseph S. Larson (effective 2-00), Roche
2000-2001	Begin (resigned 11-00), Cookingham, Creedon, Darey, Foster, Larson, Roche, Frederic Winthrop, Jr. (effective 11-00).
2001-2002	Cookingham, Creedon, Darey, Foster, Larson, Roche, Winthrop
2002-2003	Cookingham, Creedon, Darey, Foster, Larson, Roche, Winthrop
2003-2004	Cookingham, Creedon, Darey, Foster, Larson, Roche, Winthrop
2004-2005	Cookingham, Creedon, Darey, Foster, Larson, Roche, Winthrop
2005-2006	Cookingham (until 8-05), Creedon, Darey, Foster, Larson, Roche, Brandi Van Roo (effective 10-05), Winthrop
2006-2007	Creedon, Darey, Foster, Larson, Roche, Van Roo, Winthrop
2007-2008	Creedon, Darey, Foster, Larson, Roche, Van Roo, Winthrop
2008-2009	Creedon, Darey, Foster, Larson, Roche, Van Roo, Winthrop
2009-2010	Bonnie Booth (replaced Foster), Creedon, Darey, Foster (until 10-09), Larson, Roche, Van Roo, Winthrop
2010-2011	Booth, Creedon, Darey, Larson, Roche, Van Roo, Winthrop
2011-2012	Booth, Creedon, Darey, Larson, Roche, Van Roo, Winthrop

**Table 4. Chairmen of the Massachusetts Fisheries & Game
(later “Wildlife”) Board, 1948 to 2012.**

Dates	Chairman	Agency
1948- 1950	Ludlow Griscom	Fisheries & Game
1950- 1956	Matthew T. Coyne	Same
1956- 1957	Powell M. Cabot	Same
1957- 1959	James W. Cesan	Same
1959- 1960	Frederick D. Retallick	Same
1960- 1962	Harper L. Gerry	Same
1962- 1965	Roger D. Williams	Same
1965- 1970	Harry C. Darling	Same
1970- 1975	Roger D. Williams	Same (“Wildlife” in 1974)
1975- 1982	Bradlee E. Gage	Fisheries & Wildlife
1982-	George L. Darey	Same

**Table 5. Natural Heritage and Endangered Species
Advisory Committee* Members, 1981-2012.**

Dates	Members
1981	Richard T. Kleber (Chair), Kathleen S. Anderson, Robert A. Clark, Marilyn J. Flor, Karsten E. Hartel, Gwilym S. Jones, Rudolph Stone
1982	Kleber, Anderson, Clark, Flor, Hartel, Jones
1983	Kleber, Anderson, Clark, Flor, Hartel, Jones, James McCarthy
1984	Jones (replaced Kleber as Chair in Jan 84), Anderson, Clark, Flor, Hartel, Jones, Kleber, McCarthy
1985	Jones, Anderson, Flor, Hartel, Kleber, McCarthy
1986	Jones, Anderson, Flor, Hartel, C. Barre Hellquist, Leslie Kaufman, Mark Pokras
1987	Jones, Anderson, Caren Caljouw, Flor, Hellquist, Kaufman, Pokras
1988	Jones, Anderson, Caljouw, Flor, Frederick Greeley, Hellquist, Pokras
1989	Jones, Anderson, Caljouw, Flor, Greeley, Hellquist, Pokras, Douglas Smith
1990	Jones, Anderson, Flor, Greeley, Hellquist, Pokras, Smith
1991	Jones, Anderson, Flor, Greeley, Hellquist, Tim Simmons, Smith
1992	Jones, Anderson, Flor, Hellquist, Tim Simmons, Smith, Pamela Wetherbee
1993	Jones, Anderson, Flor, Hellquist, Tim Simmons, Smith, Pamela Wetherbee
1994	Jones, Anderson, Flor, Hellquist, James MacDougall, Tim Simmons, Pamela Wetherbee
1995	Jones, Anderson, Flor, Hellquist, MacDougall, Tim Simmons, Pamela Wetherbee
1996	Jones, Anderson, Flor, Hellquist, MacDougall, Tim Simmons, Pamela Wetherbee
1997	Jones, Anderson, Flor, Hellquist, MacDougall, Mark Mello, Tim Simmons, Pamela Wetherbee
1998	Jones, Anderson, Flor, Hellquist, MacDougall, Mello, Pamela Wetherbee
1999	Jones, Anderson, Flor, Hellquist, Mello, Steven M. Meyer, Pamela Wetherbee
2000	Anderson (replaced Jones as Chair Jan 00), Flor, Hellquist, Joseph S. Larson, Mello, Meyer, Pamela Wetherbee
2001	Anderson, Flor, Hellquist, Larson, Mello, Meyer, Pamela Wetherbee
2002	Anderson, Flor, Hellquist, Larson, Mello, Meyer, Jonathan A. Shaw, Pamela Wetherbee
2003	Anderson, Flor, Larson, Mello, Meyer, Shaw, Wetherbee
2004	Anderson, Flor, Larson, Mello, Meyer, Thomas Rawinski, Shaw
2005	Anderson, Flor, Larson, Mello, Meyer, Rawinski, Shaw
2006	Anderson, Flor, Larson, Mello, Meyer, Rawinski, Shaw
2007	Anderson, Flor, Larson, Mello, Glenn Motzkin, Rawinski, Shaw
2008	Anderson, Flor, Larson, Mello, Motzkin, Rawinski, Shaw
2009	Anderson, Flor, Larson, Mello, Motzkin, Rawinski, Shaw
2010	Anderson, Flor, Larson, Mello, Motzkin, Rawinski, Shaw
2011	Anderson, Flor, Larson, Mello, Motzkin, Rawinski, Shaw
2012	Anderson, Flor, Larson, Mello, Motzkin, Rawinski, Shaw

* The Committee existed as an *ad hoc* entity from September 1981 until established in accordance with statute in December 1983

Table 6. Important Events in the History of the Division of Fisheries & Wildlife.

Date	Event
1866	Commissioners on Fisheries appointed
1869	Commissioners on Fisheries given authority over all fisheries
1876-89	Atlantic salmon restoration on Merrimac River fails
1886	Fisheries Commissioners given authority over Game
1894	Sutton Hatchery built; first state-owned fish hatchery
1895	Introduction of ring-necked pheasant
1897	First Superintendent of Hatcheries hired
1898-99	First paid deputy enforcement officers
1900	First agency-issued “Abstracts” of fish and game laws
1902	First participation in a Sportsman’s Show
1902	Authority to conduct investigations into fish & game matters
1905	First biologist hired
1905	Hunting licenses required for non-naturalized aliens
1906	First pheasant hunting season
1907	Hunting licenses required for non-resident citizens
1907	Land acquired for a heath hen reservation
1909	First resident hunting “registration”
1912	Wilbraham Game Farm built; first state-owned game farm
1919	Commission on Fisheries & Game becomes a Division
1919	First fishing license (did not apply to women and minors)
1920	First resident fishing licenses (in waters stocked since 1-1-10)
1921	Women included in licensing requirements
1923	Mass. law to conform to federal law regarding migratory birds
1924	Nye property in Sandwich is the first donated under new law
1924	Penikese Island becomes the first wildlife sanctuary
1925	First sporting license; first adult trapping license
1930	Sporting license required to fish in any inland waters
1930	Authorization to acquire public fishing grounds
1931	Authorization to acquire public shooting grounds
1931	Minor (15-17) fishing licenses; free licenses over 70
1933	Archery allowed for deer hunting within firearms season
1933	Ad Hoc Advisory Council for the Division created
1939	Division separated into 3 agencies (but temporary until 1-30-40)
1939	Enabling legislation to participate in Pittman-Robertson program
1942	First research bulletin published
1945	Inland Fish & Game Fund established
1946	Phillips Wildlife Laboratory established at Upton
1948	Fisheries & Game Board established
1949	Information & Education program begun

Table 6 (continued). Important Events in the History of the Division of Fisheries & Wildlife.

1949	Junior Conservation Camp begun at Swann Forest in Monterey
1949	Massachusetts Wildlife begun as a mimeographed newsletter
1949	Birch Hill becomes the first public shooting ground
1950	Inauguration of District Manager system
1951	Enabling legislation to participate in Dingell-Johnson program
1951	Authorization to acquire land for fish & wildlife management
1952	Pantry Brook becomes the first agency wildlife management area
1953	Director and Board given authority to set rules and regulations
1955	Certificate of competency required; minors w/o previous license
1955	New Field Headquarters in Westborough to replace Phillips Lab
1956	Massachusetts Wildlife first issued in magazine format
1957	First formal Board policy document
1960	First archery stamp
1965	License fee increase of \$1.00, subject to appropriation
1967	Recodification of Chapter 131
1968	Sutton Fish Hatchery closed (sold 1970)
1969	McLaughlin Trout Hatchery; first modern hatchery
1972	\$1 million bond issue for wetlands acquisition
1973	First primitive firearms deer season
1974	Division renamed "Division of Fisheries & Wildlife"
1975	Board increased by two at-large non-game members
1979	Regulatory authority for reptiles & amphibians
1980	First modern-day spring turkey hunting season
1980	First statutorily authorized list of endangered species
1983	Nongame Wildlife Fund & income tax checkoff established
1984	Natural Heritage Program transferred from DEM to DFW
1985	Wilbraham Game Farm closed
1989	First bald eagle nesting since 1905
1990	First modern-day fall turkey hunting season
1990	Massachusetts Endangered Species Act enacted
1992	Mass. Endangered Species Act regulations promulgated
1996	Successful "Question 1" referendum prohibiting traps <etc.>
1996	Inception of Biodiversity Initiative
2001	"BioMap" published
2002	First nesting of peregrine falcons at a natural site since 1955
2003	"Living Waters" published
2003	First statewide (no turkeys on Nantucket) spring turkey hunt
2003	The Division's forests attain green certification
2003	The Division's two dedicated funds are eliminated and restored

2006	Inception of on-line license sales (in addition to hard copy)
2012	Inception of all-electronic licensing (no hard copy)
2012	Field Headquarters moves from Westborough to West Boylston
2014	Anticipated date of completion of new Field Headquarters



Art for updated Division of Fisheries & Wildlife Logo by Barry Julius
2001

REFERENCES AND CHAPTER NOTES

Introduction:

¹ Coke, E. [1660] 1826. *The Reports of Sir Edward Coke, Knt.*, in thirteen parts. A new edition <etc.> by J.H. Thomas and J.F. Fraser, in 6 vols. J. Butterworth & Sons, London & J. Cooke, Dublin, vol. 1 (pts. I-II), 669pp. The quotation is from page xxv.

² “Commonwealth” is an old English term for a polity formed for the common good, i.e., a republic. The term is used in the Preamble to the Massachusetts Constitution, further proclaiming that “The body politic is formed by a voluntary association of individuals: it is a social compact, by which the whole people covenants with each citizen, and each citizen with the whole people, that all shall be governed by certain laws for the common good”. Kentucky, Pennsylvania, and Virginia are also Commonwealths. The term is simply designational; it conveys no special status among the various states.

³ The area now encompassed by the State of Maine became part of the Massachusetts Bay Colony in 1652. It remained part of Massachusetts until 1820, when, after a vote by Maine citizens, it became a state as part of the Missouri Compromise. For the purposes of this publication, DFW history is largely restricted to that within current state boundaries.

⁴ U.S. Bureau of the Census, accessed at <http://2010.census.gov/2010census.data> on 27 November 2012.

⁵ Total area (i.e., including surface water). Data from MassGIS 1999 landuse layer, as compiled from aerial photographs, provided by David Szczebak, Division of Fisheries & Wildlife, March 2013.

⁶ County government has been abolished in eight counties (Berkshire, Essex, Franklin, Hampden, Hampshire, Middlesex, Suffolk, and Worcester), thus those counties exist simply as geographical entities and not as functioning political subdivisions.

⁷ Massachusetts was the first state to create a governmental fisheries commission (“game” was not included until 1886), followed by California and New Hampshire in 1878 and Maine in 1880. See: Palmer, T.S. 1912. *Chronology and index of the more important events in American game protection, 1776-1911*. U.S. Department of Agriculture, Biological Survey, Bulletin 41, 62pp.

⁸ The Executive Branch of the Massachusetts government has a cabinet structure serving under the Governor (G.L. c. 6, § 17A). Cabinet offices are termed “Executive Offices” and are headed by a Secretary. “Departments” (headed by a Commissioner) are subordinate to the Executive Office, and “Divisions” (headed by a Director) generally to the Department. “Bureaus” (headed by a Superintendent), when used, are subordinate entities within a Division.

- ⁹ Thomas, W.L. (ed.) 1956. *Man's Role in Changing the Face of the Earth*. University of Chicago Press, Chicago, Ill., 1193pp.
- ¹⁰ Detwyler, T.R. 1971. *Man's Impact on Environment*. McGraw-Hill Book Co., New York, 731pp.
- ¹¹ Matthews, W.H., F.E. Smith and E.D. Goldberg (eds.) 1971. *Man's Impact on Terrestrial and Oceanic Ecosystems*. M.I.T. Press, Cambridge, Mass., 540pp.
- ¹² Whitney, G.G. 1994. *From Coastal Wilderness to Fruited Plain: a History of Environmental Change in Temperate North America from 1500 to the Present*. Cambridge University Press, Cambridge, 485pp.
- ¹³ Diamond, J. 1987. The worst mistake in the history of the human race. *Discover* (May 1987):64-66.
- ¹⁴ Carroll, C.F. 1973. *The Timber Economy of Puritan New England*. Brown University Press, Providence, R.I., 221pp.
- ¹⁵ Cronon, W. 1983. *Changes in the Land. Indians, Colonists, and the Ecology of New England*. Hill & Wang, New York, 241pp.
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- ³⁰ The reference is to Matthew 5:14.
- ³¹ Winthrop, J. [1644] 1968. John Winthrop: a negative view of a democracy. Pages 168-169 in M. Adler (ed.) *The Annals of America, 1493-1754*. Vol. 1. Discovering a new world. Encyclopedia Britannica, Inc., Chicago, 529pp.
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- ³³ Hart, A.B. 1927. John Winthrop, Commonwealth Builder (1588-1649). Pages 159-190 in A.B. Hart (ed.) *Commonwealth History of Massachusetts*. Vol. 1. The States History Co., New York, 608pp.
- ³⁴ Higginson, F. [1630] 1976. The Rev. Francis Higginson to his friends at Leicester. Pages 29-39 in E. Emerson (ed.) *Letters from New England. The Massachusetts Bay Colony, 1629-1638*. University of Massachusetts Press, Amherst, 263pp. Higginson's letter was later published as "*New-Englands Plantation*".
- ³⁵ Promotional literature was a common feature of early exploration and travel accounts, designed to maximize opportunities and minimize detriments, so as to encourage future occupation and settlement of the described regions (thus benefitting the sponsors or promoters of the endeavor).
- ³⁶ Morton, T. [1637] 1972. *New English Canaan, or New Canaan*. Arno Press, New York, 191pp.
- ³⁷ Josselyn, J. [1672] 1977. *New-Englands Rarities Discovered*. University Microfilms, Ann Arbor, Mich., 114pp. A xerographic rendering.
- ³⁸ Lindholdt, P.J. (ed.) 1988. *John Josselyn, Colonial Traveler. A Critical Edition of Two Voyages to New-England*. University Press of New England, Hanover, N.H., 221pp.

- ³⁹ Morton 1972:74.
- ⁴⁰ Vaughan 1977:47. The quote is from the 1634 edition.
- ⁴¹ Josselyn 1977:16.
- ⁴² Vaughan 1977:44. The quote is from the 1634 edition.
- ⁴³ Lindholdt 1988:20.
- ⁴⁴ Morison 1971:464-493.
- ⁴⁵ Eccles, W.J. 1988. The fur trade in the colonial Northeast. Pages 324-350 in W.E. Washburn (ed.) *Handbook of North American Indians*. Vol. 4. History of Indian-White relations. Smithsonian Institution Press, Washington, D.C., 838pp.
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- ⁴⁷ See the Introduction, Note 2.
- ⁴⁸ Bradford 1908:123.
- ⁴⁹ Moloney, F.X. [1931] 1967. *The Fur Trade in New England, 1620-1676*. Archon Books, Hamden, Conn., 150pp.
- ⁵⁰ De Rasieres, I. [1849] 1909. Letter of Isaak de Rasieres to Samuel Blommaert, 1628(?). Pages 97-115 in J.F. Jameson (ed.) *Narratives of New Netherlands, 1609-1664*. Charles Scribner's Sons, New York, 478pp.
- ⁵¹ Wampum was obtained from the coastal tribes, and used in trading with inland or more northerly tribes, who had no direct access to the molluscs used to create it.
- ⁵² A storehouse for trading with Indians. See the *Compact Oxford English Dictionary* (2nd ed.), page 2120.
- ⁵³ Shurtleff, W.B. (ed.) 1853. *Records of the Governor and Company of the Massachusetts Bay in New England*. Vol. 1, 1628-1641. W. White, Boston, page 93.
- ⁵⁴ Shurtleff 1853:96.
- ⁵⁵ Shurtleff 1853:140.
- ⁵⁶ Greenbie, S. 1929. *Frontiers and the Fur Trade*. The John Day Company, New York, 235pp.
- ⁵⁷ Judd, S. 1857. The fur trade on Connecticut River in the seventeenth century. *New England Historic & Genealogical Register* 11:217-219.
- ⁵⁸ An Act for continuing and amending an act made in the first year of his present Majesty intituled "An Act for allowing necessary supplies to the Eastern Indians and for regulating the trade with them and preventing abuses therein". Chapter 32, *Province Laws of 1763/64 in Acts and Resolves, Public and Private, of the Province of Massachusetts Bay*, vol. 4, 1757-1768, page 690, Wright & Potter, Boston, 1890.
- ⁵⁹ Vaughan 1977:46. The quote is from the 1634 edition.

- ⁶⁰ Shurtleff, W.B. (ed.) 1853. Records of the Governor and Company of the Massachusetts Bay in New England. Vol. 1, 1628-1641. W. White, Boston, page 81. "It is ordered, that whereas eũy Englishe man that killeth a wolfe in any pte within the lymitts of this pattent shall haue allowed him 1^d for eũy beast & horse, & ob. for eũy weane swyne & goate in eũy plantacõn, to be leiued by the constables of the s^d plantacõns".
- ⁶¹ Johnson, C. 1932. Historic Hampshire in the Connecticut Valley. Milton Bradley Co., Springfield, Mass., 406pp.
- ⁶² Judd, S. [1863] 1905. The history of Hadley, including the Early History of Hatfield, South Hadley, Amherst, and Granby, Massachusetts. H.R. Huntting & Co., Springfield, Mass., 504+205pp.
- ⁶³ McCabe, R.E. and T.R. McCabe. 1984. Of slings and arrows: an historical retrospection. Pages 19-72 in L.K. Halls (ed.) White-tailed Deer. Ecology and Management. Stackpole Books, Harrisburg, Pa., 870pp.
- ⁶⁴ Allen, G.M. 1930. History of the Virginia deer in New England. Proceedings of the New England Game Conference for 1929:19-41.
- ⁶⁵ "An Act to restrain the exportation of raw hides and skins out of the Province of the Massachusetts Bay, and for the better preservation and increase of deer in the said province". Chap. 19, Province Laws of 1693/4 in Acts and Resolves, Public and Private, of the Province of the Massachusetts Bay <etc.>. Vol. 1. Wright & Potter, Boston, 1865, pages 152-153.
- ⁶⁵ "An Act for the better preservation and increase of deer within this Province". Chap. 21, Province Laws of 1698 in Acts and Resolves, Public and Private, of the Province of Massachusetts Bay <etc.>. Vol. 1. Wright and Potter, Boston, 1869, pages 355-356.
- ⁶⁷ A bailiff, steward, or overseer appointed to fulfill a specific task.
- ⁶⁸ Jensen, A.C. 1972. The Cod. The Uncommon History of a Common Fish and its Impact on American Life from Viking Times to the Present. Thomas Y. Crowell Co., New York, 182pp.
- ⁶⁹ Rostlund, E. 1952. Freshwater Fish and Fishing in Native North America. University of California Publications in Geography 9:1-314.
- ⁷⁰ Kendall, W.C. 1935. The Fishes of New England. The Salmon Family. Part 2. The Salmon. Memoirs of the Boston Society of Natural History 9:1-166.
- ⁷⁰ Vaughan 1977:53 & 55.
- ⁷² Sturgeon was considered to be a "royal" fish and highly desired in England. See http://en.wikipedia.org/wiki/Royal_fish, accessed on 7 December 2012.
- ⁷³ Bradford 1908:205-206.
- ⁷⁴ Bradford 1908:258.
- ⁷⁵ King, H.R. 1994. Cape Cod and Plymouth Colony in the Seventeenth Century. University Press of America, Lanham, Md., 307pp.
- ⁷⁶ King 1994:210.
- ⁷⁷ Secretary of the Commonwealth. 1887. A Collection of the Laws Relating to Inland

Fisheries in Massachusetts, 1623-1886. Wright & Potter Printing Co., Boston, 404pp.

⁷⁸ Secretary of the Commonwealth 1887:6-7.

⁷⁹ Magra, C.P. 2006. The New England cod fishing industry and maritime dimensions of the American Revolution. Dissertation, University of Pittsburgh, Pittsburgh, Pa., pages 117-118.

⁸⁰ Magra 2006:121.

⁸¹ Gray, F.C. 1843. On the early laws of Massachusetts; with the Code adopted in 1841, and called *The Body of Liberties*, now first printed. Collections of the Massachusetts Historical Society 8(3rd series):191-237.

⁸² The Body of Liberties was revoked by King Charles II in 1684, reinstated by King James II in 1686, and remained in effect until replaced in 1691 by the Provincial Charter.

⁸³ Whittlesey, J.J. 1932. Laws of the Seashore, Tidewaters, and Great Ponds in Massachusetts and Maine (under the colony ordinance of 1641-47). The Murray Printing Co., Cambridge, Mass., 90pp.

⁸⁴ Massachusetts Water Resources Commission. 1970. Compilation and summarization of the Massachusetts general laws, special laws, pertinent court decisions <etc.> relating to water and water rights. Mass. Water Resources Commission, Boston, 269pp.

⁸⁵ "Great Ponds" are generally natural (not impounded or constructed) lakes and ponds 20 acres or greater for fishing, fowling or navigation. See c. 384, St. 1869 and G.L. c. 91, §§ 1, 18A, & 35 and c. 131, §§ 1 & 45. For great ponds between 10 and 20 acres in extent, see the Opinion of the Attorney General, 11 December 1916. See also c. 384, § 8, St. 1869.

⁸⁶ Hoskins, H.L. 1927. Trade and shipping (1630-1689). Pages 442-468 in A.B. Hart (ed.) Commonwealth History of Massachusetts. Vol. 1. The States History Co., New York, 608pp.

⁸⁷ King 1994:208.

⁸⁸ Lilliard, R.G. 1947. The Great Forest. A.A. Knopf & Co., New York, 399pp.

⁸⁹ Josselyn 1977:4.

⁹⁰ Carroll, C.F. 1973. The Timber Economy of Puritan New England. Brown University Press, Providence, R.I., 221pp. The reference is from page 28.

⁹¹ Higginson 1976:32.

⁹² Vaughan 1977:38. The quote is from the 1634 edition.

⁹³ Morton 1972:62 & 63.

⁹⁴ Carroll 1973:85.

⁹⁵ Bradford 1908:123 & 157.

⁹⁶ While possible that "clapbord" referred to cedar clapboards for wainscoting rooms, it

is more likely that the items were barrel staves. See Carroll 1973:171 and the Compact Oxford English Dictionary (2nd ed.), page 264.

⁹⁷ Tager, J. and R.W. Wilkie. 1991. Puritan Commonwealth, 1620-1691. Pages 16-19 in R.W. Wilkie and J. Tager (eds.) Historical Atlas of Massachusetts. University of Massachusetts Press, Amherst, Mass., 152pp.

⁹⁸ Carroll 1973:18.

⁹⁹ Gordon, N.M. 1998. The economic uses of Massachusetts forests. Pages 67-100 in C.H.W. Foster (ed.) Stepping Back to Look Forward. A History of the Massachusetts Forest. Harvard University for the Harvard Forest, Petersham, Mass., 339pp.

¹⁰⁰ Carroll 1973:77-78.

¹⁰¹ Carroll 1973:64-65.

¹⁰² Hoskins 1927:447-448.

¹⁰³ Foster, C.H.W. 1998. The Massachusetts forest: an historical overview. Pages 3-18 in C.H.W. Foster (ed.) Stepping Back to Look Forward. A History of the Massachusetts Forest. Harvard University for the Harvard Forest, Petersham, Mass., 339pp.

¹⁰⁴ Gordon 1998:72-74.

¹⁰⁵ Carroll 1973:204.

¹⁰⁶ Carroll 1973:110.

¹⁰⁷ Judd 1905:99.

¹⁰⁸ A platform on which hay or straw is stacked, i.e., in context, the timbers from which a staddle is constructed.

¹⁰⁹ Judd 1905:100.

¹¹⁰ Carroll 1973:127.

¹¹¹ Jernegan, M.W. 1928. The Province Charter (1689-1715). Pages 1-28 in A.N. Hart (ed.) Commonwealth History of Massachusetts. Vol. 2. The States History Company, New York, 592pp.

¹¹² Mileur, J.N., J. Tager, R.W. Wilkie, and N.R. Chrisman. 1991. Political organization. Pages 58-79 in R.W. Wilkie and J. Tager (eds.) Historical Atlas of Massachusetts. University of Massachusetts Press, Amherst, Mass., 152pp.

¹¹³ Carroll 1973:128.

“They Destroy All That Comes In Their Way”: The 1700s:

¹ “[The settlers] in clearing the ground for cultivation they destroy all that comes in their way...which utterly destroys woods of trees which require an hundred years to come to perfection...”. Carman, H.J. (ed.) 1939. American Husbandry. Columbia University Press, New York, 582pp. The quotation is from page 61.

² Quoted in: Snow, E.R. 1973. The Lighthouses of New England, 1716-1973. Dodd,

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³ Eccles, W.J. 1988. The fur trade in the colonial Northeast. Pages 324-350 in W.E. Washburn (ed.) *Handbook of North American Indians*. Vol. 4. History of Indian-White relations. Smithsonian Institution Press, Washington, D.C., 838pp.

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⁵ Martin, C. 1978. *Keepers of the Game. Indian-animal Relationships and the Fur Trade*. University of California Press, Berkeley and Los Angeles, 226pp. The quotation is from page 2.

⁶ Krech, S. III (ed.) 1981. *Indians, Animals, and the Fur Trade. A Critique of Keepers of the Game*. University of Georgia Press, Athens, Ga., 208pp.

⁷ Krech, S. III. 1999. *The Ecological Indian. Myth and History*. W.W. Norton & Co., New York, 318pp.

⁸ Richard Eburne (1624), in Carroll, C.F. 1973. *The Timber Economy of Puritan New England*. Brown University Press, Providence, R.I., 221pp. The quotation is from page 126.

⁹ Carroll 1973:127.

¹⁰ Mileur, J.N., J. Tager, R.W. Wilkie, and N.R. Chrisman. 1991. Political organization. Pages 58-79 in R.W. Wilkie and J. Tager (eds.) *Historical Atlas of Massachusetts*. University of Massachusetts Press, Amherst, Mass., 152pp.

¹¹ Leach, D.E. 1973. *Arms for Empire. A Military History of the British Colonies in North America, 1607-1763*. Macmillan Co., New York, 566pp.

¹² Plimpton, G.A. 1928. French and Indian wars (1741-1763). Pages 419-454 in A.N. Hart (ed.) *Commonwealth History of Massachusetts*. Vol. 2. The States History Company, New York, 592pp.

¹³ Alden, J.R. 1975. *A History of the American Revolution*. A.A. Knopf, New York, 541pp.

¹⁴ The Massachusetts Constitution is the oldest functioning written constitution in continuous effect since its ratification.

¹⁵ Richard Coote, 1st Earl of Bellomont (1700), in Norton, T.E. 1974. *The Fur Trade in Colonial New York, 1686-1776*. University of Wisconsin Press, Madison, 243pp. The quotation is from page 100.

¹⁶ Freeland, M.D. 1894. *The Records of Oxford, Mass.* J. Munsell Sons, Albany, N.Y., 429pp. The quotation is from page 170.

¹⁷ Norton 1974:92.

¹⁸ Emmons, E. 1840. A report on the quadrupeds of Massachusetts in *Reports on the Herbaceous Plants and on the Quadrupeds of Massachusetts*. Published agreeably to an Order of the Legislature. Commissioners on the Zoological and Botanical Survey of

the State, Folsom, Wells & Thurston, Cambridge, Mass., 277+86pp.

¹⁹ Shaw, S.P. 1948. The beaver in Massachusetts. A research and management study. Massachusetts Department of Conservation Division of Fisheries & Game Research Bulletin 11, 44pp.

²⁰ Beard, D.B., V.H. Cahalane, H.H.T. Jackson, and B.H. Thompson. 1942. Fading Trails. The Story of Endangered American Wildlife. Macmillan Co., New York, 279pp.

²¹ Allen, M.O. 1860. The History of Wenham, Civil and Ecclesiastical, from the Settlement in 1639 to 1860. Bazin & Chandler, Boston, 220pp. The reference is from page 67.

²² Coffin, J. 1845. A Sketch of the History of Newbury, Newburyport, and West Newbury, from 1635 to 1845. Samuel G. Drake, Boston, 416pp. The reference is from page 256.

²³ Ballard, H.H. 1885. Town of Lenox. Pages 182-219 in History of Berkshire County, Massachusetts, with Biographical Sketches of its Prominent Men. Vol. 2. J.B. Beers & Co., New York, 708pp. The reference is from pages 182-183.

²⁴ Bryant, L.D. and C. Maser. 1982. Classification and distribution. Pages 1-59 in J.W. Thomas and D.E. Toweill (eds.) Elk of North America. Ecology and Management. Stackpole Books, Harrisburg, Pa., 698pp.

²⁵ Allen, J.A. 1876. The extirpation of the larger indigenous mammals of the United States. Penn Monthly (Oct.):794-806.

²⁶ Adams, C.F. (ed.) 1883. The New English Canaan of Thomas Morton. The Prince Society, Boston, 381pp. The reference is from the footnote on page 200.

²⁷ Nourse, H.S. 1894. History of the Town of Harvard, Massachusetts, 1732-1893. Printed for Warren Hapgood, Harvard, Mass., 605pp. The reference is from page 74.

²⁸ Sewall, S. [1878-82] 1973. The diary of Samuel Sewall, 1674-1729. Farrar, Strauss & Giroux, New York, 2 v. The quotations are from pages 380 and 454.

²⁹ Miller, B.K. and D. Sherro. 1987. Factors influencing the disappearance of the eastern wild turkey from southern New England in the 19th century. Transactions of the Northeast Section of The Wildlife Society 44:8-15.

³⁰ Judd, S. [1863] 1905. The History of Hadley, including the Early History of Hatfield, South Hadley, Amherst, and Granby, Massachusetts. H.R. Huntting & Co., Springfield, Mass., 504+205pp. The references are from pages 346-354 and 358.

³¹ Bennet, in Earle, A.M. [1893] 1973. Customs and Fashions in Old New England. Charles E. Tuttle Co., Rutland, Vt., 387pp. The reference is from pages 157-158.

³² Nuttall, T. 1840. A Manual of the Ornithology of the United States and of Canada: the Land Birds. Hilliard, Gray & Co., Boston, 832pp. The quotation is from page 800.

³³ Forbush, E.H. 1912. A History of the Game-birds, Wild-fowl, and Shore Birds of Massachusetts and Adjacent States. Massachusetts State Board of Agriculture, Boston, 622pp.

³⁴ "An Act for the better regulation of fowling", c. 13, Province Laws of 1710-11.

³⁵ Earle 1973:314-316.

³⁶ Allen, G.M. 1930. History of the Virginia deer in New England. Proceedings of the New England Game Conference for 1929:19-41.

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³⁹ Lindgren, J. 2002. Fall from Grace: Arming America and the Bellesiles scandal. Yale Law Journal 111:2195-2249.

⁴⁰ Cramer, C.E. 2004. Colonial firearms regulation. Journal on Firearms and Public Policy 16:1-44.

⁴¹ Fobes, P. 1794. A topographical description of the town of Raynham, in the County of Bristol, February 6, 1793. Collections of the Massachusetts Historical Society 3 (1st series):166-175. Fowling Pond was drained in the 18th century.

⁴² Seccombe, J. 1743. Business and diversion innocent to God. A discourse utter'd in part at Ammauskeag-Falls, in the fishing season. S. Kneeland & T. Green, Boston, 21pp.

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⁴³ Usher, A.P. 1928. Colonial business and transportation. Pages 386-418 in A.N. Hart (ed.) Commonwealth History of Massachusetts. Vol. 2. The States History Company, New York, 592pp.

⁴⁴ Jensen, A.C. 1972. The Cod. The Uncommon History of a Common Fish and its Impact on American Life from Viking Times to the Present. Thomas Y. Crowell Co., New York, 182pp.

⁴⁵ A weight of 100 pounds (100 kg in the metric system). Pronounced "kwintəl", it lends itself by corruption to the idiom "A fine kettle of fish".

⁴⁶ Woodbury, C.L. 1880. The relation of the fisheries to the discovery and settlement of North America. A. Mudge & Sons, Boston, 26pp. The quotation is from page 26.

⁴⁷ Starbuck, A. 1878. History of the American Whale Fishery from its Earliest Inception to the Year 1876. Published by the author, Waltham, Mass., 768pp.

⁴⁸ Judd 1905:313-315.

⁴⁹ T. Lyman and A.A. Reed. 1865. Report of the Commissioners concerning the obstructions to the passage of fish in the Connecticut and Merrimack Rivers. Senate Document 8, Boston, 59pp. The reference is from page 39.

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⁵² Storer, D.H. 1839. Dr. Storer's report on the fishes. Pages 5-202 in Report on the

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⁵⁸ Carman, H.J. (ed.) 1939. American Husbandry. Columbia University Press, New York, 582pp. The quotation is from page 61.

⁵⁹ Walcott, R.R. 1936. Husbandry in colonial New England. New England Quarterly 9:218-252. The quotation is from page 226.

⁶⁰ Whitney, P. 1793. The History of the County of Worcester, in the Commonwealth of Massachusetts. Isaiah Thomas, Worcester, Mass., 339pp. The quotation is from page 146.

⁶¹ Williams, M. 1989. Americans and Their Forests. A historical overview. Cambridge University Press, Cambridge, U.K., 599pp.

⁶² Bureau of the Census. 1908. Heads of Families at the First Census of the United States Taken in the Year 1790. Massachusetts. Government Printing Office, Washington, D.C., 363pp.

⁶³ Although Maine was still part of Massachusetts in 1790 (see the Introduction, Note 2), the Census Bureau separated Maine's data from that of Massachusetts in the 1908 published version of the 1790 census records.

Non Nobis Solum: 1800-1865:

¹ "Not for ourselves alone", the motto of the New York Association for the Protection of Game, one of the first statewide game protective organizations, organized in 1844 under the leadership of Robert B. Roosevelt, Theodore's uncle.

² Emerson, R.W. [1849] 1983. Nature. Pages 5-49 in Essays and Lectures. Library of America, New York, 1150pp. The quotation is from page 12.

- ³ Hubbard, C.C. 1929. Massachusetts state government (1789-1820). Pages 440-470 in A.N. Hart (ed.) *Commonwealth History of Massachusetts*. Vol. 3. The States History Company, New York, 582pp.
- ⁴ Tager, J. and R.W. Wilkie. 1991a. Revolutionary and Federalist ages, 1765-1815. Pages 24-27 in R.W. Wilkie and J. Tager (eds.) *Historical Atlas of Massachusetts*. University of Massachusetts Press, Amherst, Mass., 152pp. The last two towns to be settled in Massachusetts were Monroe (1800) and Erving (1801).
- ⁵ Bartlett, R.J. 1929. Commerce and industry (1789-1820). Pages 526-547 in A.N. Hart (ed.) *Commonwealth History of Massachusetts*. Vol. 3. The States History Company, New York, 582pp.
- ⁶ Tager, J. and R.W. Wilkie. 1991b. Industrial beginnings, 1815-1860. Pages 28-33 in R.W. Wilkie and J. Tager (eds.) *Historical Atlas of Massachusetts*. University of Massachusetts Press, Amherst, Mass., 152pp.
- ⁷ The U.S. National Armory at Springfield was in operation from 1777-1968, producing a wide variety of long arms for the Army. The activities at the Arsenal encouraged other manufacturers, and Springfield became known as a center for invention and innovation.
- ⁸ Gilbert, A.W. 1930. Massachusetts agriculture (1820-1889). Pages 372-400 in A.N. Hart (ed.) *Commonwealth History of Massachusetts*. Vol. 4. The States History Company, New York, 626pp.
- ⁹ Bidwell, P.W. and J.I. Falconer. 1925. *History of Agriculture in the Northern United States*. Carnegie Institute, Washington, D.C., 512pp.
- ¹⁰ Foster, D., G. Motzkin, J. O'Keefe, E. Boose, D. Orwig, J. Fuller, and B. Hall. 2004. The environmental and human history of New England. Pages 43-100 in D. Foster and J.D. Aber. 2004. *Forests in Time. The Environmental Consequences of 1,000 years of Change in New England*. Yale University Press, New Haven, Conn., 477pp.
- ¹¹ Now the University of Massachusetts (Amherst).
- ¹² Tager, J. and R.W. Wilkie. 1991c. Industrialization and urbanization, 1860-1900. Pages 34-37 in R.W. Wilkie and J. Tager (eds.) *Historical Atlas of Massachusetts*. University of Massachusetts Press, Amherst, Mass., 152pp.
- ¹³ Tager, J. and R.W. Wilkie. 1991d. Royal Colony, 1691-1765. Pages 20-23 in R.W. Wilkie and J. Tager (eds.) *Historical Atlas of Massachusetts*. University of Massachusetts Press, Amherst, Mass., page 20, and Tager and Wilkie 1991a:24.
- ¹⁴ Apess, W. 1835. *Indian Nullification of the Unconstitutional Laws of Massachusetts, Relative to the Marshpee Tribe*. Jonathan Howe, Boston, 168pp. The quotations are from pages 21 and 82.
- ¹⁵ Pomeroy, S.C. [1862] 1966. [Extract from] Speech of the Honorable S.C. Pomeroy, of Kansas, on the Homestead Bill, May 5, 1862. Pages 301-303 in Richmond, R.W. and R.W. Mardock (eds.) *A Nation Moving West: Readings in the History of the American Frontier*. University of Nebraska Press, Lincoln, Nebr., 366pp. Pomeroy was born in Southamptton, Mass., and died in Whitinsville, Mass. In 1871, he introduced the Act of Dedication bill which later led to the formation of Yellowstone National Park. The quotation is from page 302.

- ¹⁶ Turner, F.J. [1894] 1966. *The Significance of the Frontier in American History*. University Microfilms, Ann Arbor, Mich. A facsimile reprint. The quotation is from page 227.
- ¹⁷ Coxe, T. [1794] 1965. *A view of the United States of America <etc.>* Augustus M. Kelley, New York, 513pp. A facsimile reprint. The quotation is from page 452.
- ¹⁸ Dwight, T. [1823] 1969. *Travels in New England and New York*. Belknap Press of Harvard University Press, Cambridge, Mass., 4 v. The quotations are from vol. 1, pages 75 and 258.
- ¹⁹ Hawes, A.F. 1923. New England forests in retrospect. *Journal of Forestry* 21:209-224.
- ²⁰ O'Keefe, J.F. and D.R. Foster. 1998. An ecological history of Massachusetts forests. Pages 19-66 in C.H.W. Foster (ed.) *Stepping Back to Look Forward. A History of the Massachusetts Forest*. Harvard University for the Harvard Forest, Petersham, Mass., 339pp.
- ²¹ Emerson, G.B. 1846. *Report on the Trees and Shrubs Growing Naturally in the Forests of Massachusetts*. Published agreeably to an Order of the Legislature. Commissioners on the Zoological and Botanical Survey of the State, Dutton & Wentworth, Boston, Mass., 547pp. The quotation is from page 1.
- ²² Marsh, G.P. [1864] 1965. *Man and Nature or, Physical Geography as Modified by Human Action*. Belknap Press of Harvard University Press, Cambridge, Mass., 472pp. The quotation is from page 279.
- ²³ Thoreau, H.D. [1860] 1887. The succession of forest trees. Pages 33-52 in *The Succession of Forest Trees and Wild Apples*. Houghton-Mifflin Co., Boston, 84pp. The quotation is from page 46.
- ²⁴ Foster, D.R., G. Motzkin, D. Bernardos, and J. Cardoza. 2002. Wildlife dynamics in the changing New England landscape. *Journal of Biogeography* 29:1337-1357.
- ²⁵ Askins, R.A. 1993. Population trends in grassland, shrubland, and forest birds in eastern North America. *Current Ornithology* 11:1-34.
- ²⁶ Forbush, E.H. 1927. *The Birds of Massachusetts and Other New England States*. v. 2. Massachusetts Department of Agriculture, Boston, 461pp. (e.g., bobolink. See page 414).
- ²⁷ Litvaitis, J.A. 1993. Response of early successional vertebrates to historic changes in land use. *Conservation Biology* 7:866-873.
- ²⁸ Vecellio, G.M., R.D. Deblinger, and J.E. Cardoza. 1993. Status and management of moose in Massachusetts. *Alces* 29:1-7.
- ²⁹ Anonymous. 1896. *The History of the Town of Amherst, Massachusetts*. Carpenter & Morehouse, Amherst, 640+263pp. [two parts bound as 1] The reference is from pt. 1, page 31.
- ³⁰ Allen, J.A. 1869. Catalogue of the mammals of Massachusetts; with a critical review of the species (Cetacea). *Bulletin of the Museum of Comparative Zoology* 1(8):143-252.
- ³¹ Forbush, E.H. 1912. *A History of the Game-birds, Wild-fowl, and Shore Birds of*

Massachusetts and Adjacent States. Massachusetts State Board of Agriculture, Boston, 622pp.

³² Stoner, D. 1950. Extant New York state specimens of the Adirondack cougar. New York State Museum Circular 25, 34pp. The reference is from pages 27-28.

³³ Laws of the Commonwealth of Massachusetts, Chapter 56, Acts of 1830 (effective February 1831), "An Act to incorporate the Boston Society of Natural History".

³⁴ Resolves of the General Court of the Commonwealth of Massachusetts, Chapter 73, Resolves of 1837, "Resolve for a further geological survey of this Commonwealth".

³⁵ D.H. Storer and W.B.O. Peabody "Reports on the fishes, reptiles, and birds" (1839); C. Dewey and E. Emmons "Reports on the herbaceous plants and on the quadrupeds" (1840); T.W. Harris "Report on the insects, injurious to vegetation (1841); A.A. Gould "Report on the invertebrata, comprising the mollusca, crustacea, annelida, and radiata" (1841); and G.A. Emerson "Report on the trees and shrubs growing naturally in the forests" (1846).

³⁶ Doughty, T. [1830] 1930. Characteristics of a true sportsman. Pages 7-9 in J.C. Phillips and L.W. Hill (eds.) Classics of the American Shooting Field. Houghton-Mifflin Co., Boston, 214pp.

³⁷ Fisher, S.G. 1911. The True Daniel Webster. J.B. Lippincott Co., Philadelphia, 516pp.

³⁸ Hammond, S.H. [1857] 1967. Wild Northern Scenes; or Sporting Adventures with the Rifle and the Rod. Arno Press, New York, 341pp. The quotation is from page 83.

³⁹ Jensen, A.C. 1972. The Cod. The Uncommon History of a Common Fish and its Impact on American Life from Viking Times to the Present. Thomas Y. Crowell Co., New York, 182pp.

⁴⁰ Goode, G.B. (ed.) 1887. The Fisheries and Fisheries Industries of the United States. Section V. History and methods of the fisheries. Vol. 1. U.S. Government Printing Office, Washington, D.C., 881pp. The references are from pages 234 and 277.

⁴¹ Curtis, J.G. 1930. Industry and transportation (1820-1889). Pages 401-433 in A.N. Hart (ed.) Commonwealth History of Massachusetts. Vol. 4. The States History Company, New York, 626pp.

⁴² Koch, A.C. [1847] 1972. Journey through a Part of the United States of America in the Years 1844 to 1846. Southern Illinois University Press, Carbondale, Ill., 177. The reference is from page 19.

⁴³ Starbuck, A. 1878. History of the American Whale Fishery from its Earliest Inception to the Year 1876. Published by the author, Waltham, Mass., 768pp. The references are from pages 95 and 702.

⁴⁴ Smith, J.V.C. [1833] 1970. Natural History of the Fishes of Massachusetts, Embracing a Practical Essay on Angling. Freshet Press, Rockville Centre, N.Y., 400pp. The quotation is from page 323.

⁴⁵ Fisher 1911:190.

⁴⁶ Tisdale, S.T. 1871. Fish culture in New England. Pages 24-28 in Fifth annual report of the Commissioners on Inland Fisheries [for 1870]. Wright and Potter, State Printers, Boston, 77pp. The quotations are from pages 24-25. This was the smallmouth bass, *Micropterus dolomieu*. Largemouth bass were introduced sometime during the next 10-12 years from an unknown source.

⁴⁷ This is the village (formerly a Plymouth Colony “plantation”) in Wareham, Bristol County, not the incorporated Town of the same name in Hampden County.

⁴⁸ Secretary of the Commonwealth. 1887. A Collection of the Laws Relating to Inland Fisheries in Massachusetts, 1623-1886. Wright & Potter Printing Co., Boston, 404pp.

⁴⁹ See (e.g.) c. 36, St. 1849, and c. 150, St. 1864.

⁵⁰ “An Act regulating the hunting of deer”, c. 15, St. 1802.

⁵¹ An Act to prevent the destruction of certain useful birds at unseasonable times of the year”, c. 103, St. 1818.

⁵²This was apparently the first legislation in the United States to establish a closed season on songbirds.

⁵³ “An Act to prevent the destruction of birds on salt marshes at particular times of the year”, c. 10, St. 1821.

⁵⁴ “An Act in addition to an act entitled “An Act to prevent the destruction of certain useful birds at unseasonable times of the year”, c. 69, St. 1831.

⁵⁵ “An Act to prevent the destruction of certain birds”, c. 136, St. 1835.

⁵⁶ “An Act for the preservation of the Grouse or Heath Hen”, c. 170, St. 1837.

⁵⁷ “An Act for the better protection of certain birds”, c. 158, St. 1849.

⁵⁸ “An Act for the better preservation of useful birds”, c. 197, St. 1855.

⁵⁹ *Martin v. Waddell*, 41 U.S. (16 Pet.) 367 (1842)

⁶⁰ Bean, M.J. and M.J. Rowland. 1997. The Evolution of National Wildlife Law (3rd ed.) Praeger Publishers, Westport, Conn., 544pp. See pages 10-12.

⁶¹ “Resolve concerning the obstruction to the passage of fish in the Connecticut and Merrimack Rivers”, c. 45, Resolves of 1865.

⁶² The concept of “commissioners” was used in the earlier zoological and botanical survey of the state (See Note 34 above) and in the investigation “into the condition of the fisheries” in the Taunton River (c. 22, Res. 1854).

⁶³ Lyman was a staff officer (LtCol) under General G.G. Meade during the Civil War, an overseer of Harvard University, both a state and federal fisheries commissioner, and a Republican representative to Congress (1883-85). He protected several hundred acres of sea run trout habitat in Barnstable and Plymouth counties, much of which is now included in the Trustees of Reservations “Lyman Reserve” and DFW’s “Red Brook Wildlife Management Area”. His father, Theodore Lyman II, was the philanthropist and mayor of Boston for whom the former Lyman School for Boys (1886-1971) was named. DFW’s Field Headquarters was successively in two of the former Lyman School dormitories between 1956 and 2012.

⁶⁴ T. Lyman and A.A. Reed. 1865. Report of the Commissioners concerning the obstructions to the passage of fish in the Connecticut and Merrimack Rivers. Senate Document 8, Boston, 59pp. The references are from page 40.

⁶⁵ “An Act concerning obstructions to the passage of fish in the Connecticut and Merrimack Rivers”, c. 238, St. 1866.

⁶⁶ The same year in which the German scientist Ernst Haeckel (1834-1919) coined the term “*oekologie*” to describe the study of the relationships between an organism and its environment.

Obstructions to the Passage of Fish: 1866-1869.

¹ From this point on, any references to or data pertaining to marine fisheries will be minimal.

² Accessed from www.massachusettscivilwar.com/statistics.asp on 20 December 2012.

³ Wells, W. 1930. Political and governmental readjustments (1865-1889). Pages 588-620 in A.N. Hart (ed.) Commonwealth History of Massachusetts. Vol. 4. The States History Company, New York, 626pp.

⁴ Tager, J. and R.W. Wilkie. 1991. Industrialization and urbanization, 1860-1900. Pages 34-37 in R.W. Wilkie and J. Tager (eds.) Historical Atlas of Massachusetts. University of Massachusetts Press, Amherst, Mass., 152pp.

⁵ [First] Report of the Commissioners of Fisheries, for the year ending January 1, 1867. Commonwealth of Massachusetts, House Document 3, [Wright & Potter? Boston] submitted November 30, 1866, [9]pp. [in transcription]

⁶ “An Act concerning obstructions to the passage of fish in the Connecticut and Merrimack Rivers”, c. 238, St. 1866.

⁷ [Second] Report of the Commissioners of Fisheries, for the year ending January 1, 1868. Wright & Potter, State Printers, Boston, 50pp. The quotation is from page 7.

⁸ Hardin, G. 1968. The tragedy of the commons. *Science* 162:1243-1248.

⁹ [Third] Report of the Commissioners of Fisheries, for the year ending January 1, 1869. Wright & Potter, State Printers, Boston, 71pp. The quotation is from page 25.

¹⁰ Fifth Annual Report of the Commissioners on Inland Fisheries. January 1871. Wright & Potter, State Printers, Boston, 77pp. The reference is from page 12.

¹¹ “An Act for encouraging the cultivation of useful fishes”, c. 384, St. 1869.

¹² [Fourth] Report of the Commissioners of Fisheries, for the year ending January 1, 1870. Wright & Potter, State Printers, Boston, 67pp.

¹³ Brackett (b. Vassalboro, ME; d. Winchester, MA) served on the Commission (in its various configurations) longer than anyone else, from 1869-1907.

“Successful Cultivation of Fish is No Longer a Matter of Doubt”: 1870-1879.

- ¹ Massachusetts was the first state to take action in fish culture (c. 58, Resolves of 1856), acting upon experiments by the French and others.
- ² Seventh Annual Report of the Commissioners on Inland Fisheries, for the year ending January 1, 1873. Wright & Potter, State Printers, Boston, 31pp. The quotation is from page 19.
- ³ Grun, B. 1982. *The Timetables of History*. Touchstone Books, Simon & Schuster, New York, 676pp.
- ⁴ Thompson, P.E. 1970. The first fifty years—The exciting ones. Pages 1-11 in N.G. Benson (ed.) *A Century of Fisheries in North America*. American Fisheries Society, Washington, D.C., Special Publication No. 7, 330pp.
- ⁵ Theodore Lyman was President of the organization in 1884-85. The process to implement the name change was thus begun under his leadership.
- ⁶ Burroughs, J. [1871] 1887. *Wake-Robin*. Houghton-Mifflin Co., Boston, 256pp. The quotation is from page v.
- ⁷ Anderson, G.S. 1895. Protection of the Yellowstone National Park. Pages 327-402 in T. Roosevelt and G.B. Grinnell (eds.) *Hunting in Many Lands*. Forest and Stream Publishing Co., New York, 447pp. See also pages 403-423.
- ⁸ “An Act to set apart a certain Tract of Land lying near the Headwaters of the Yellowstone River as a public park”, approved March 1, 1872, and,
“An Act to protect the birds and animals in Yellowstone National Park, and to punish crimes in said Park, and for other purposes”, approved May 7, 1894.
- ⁹ Trefethen, J.B. 1975. *An American Crusade for Wildlife*. Winchester Press and Boone and Crockett Club, New York, 409pp. and, http://en.wikipedia.org/wiki/Forest_and_Stream accessed on 1 January 2013.
- ¹⁰ Batchelder, C.F. 1937. *An Account of the Nuttall Ornithological Club, 1873-1919*. Nuttall Ornithological Club, Memoirs No. 8, 109pp.
- ¹¹ Progulske, D.R. 1974. *Yellow Ore, Yellow Hair, Yellow Pine*. A photographic study of a century of forest ecology. South Dakota Agricultural Experiment Station, South Dakota State University, Brookings, S.D., Bulletin 616, 169pp.
- ¹² “An Act to incorporate the Massachusetts Anglers’ Association”, c. 66, Acts of 1874.
- ¹³ Fifth Annual Report of the Commissioners on Inland Fisheries. January 1871. Wright & Potter, State Printers, Boston, 77pp. The reference is from page 12.
- ¹⁴ *Commissioners on Inland Fisheries v. Holyoke Water Power Co.*, 104 Mass. 451 (1870).
- ¹⁵ “An Act to aid in the preservation of birds, birds’ eggs, and deer”, c. 304, St. 1870.
- ¹⁶ Sixth Annual Report of the Commissioners on Inland Fisheries, for the year ending January 1, 1872. Wright & Potter, State Printers, 270pp. Note that the compilation “A collection of the laws relating to inland fisheries in Massachusetts, 1623-1886” is attached to this report (and was also published as a separate).

- ¹⁷ “An Act to prohibit the taking of black bass in Lake Cochituate”, c. 382, St. 1870.
- ¹⁸ Seventh Annual Report of the Commissioners on Inland Fisheries, for the year ending January 1, 1873. Wright & Potter, State Printers, Boston, 35pp.
- ¹⁹ Stolte, L. 1981. The Forgotten Salmon of the Merrimack. U.S. Department of the Interior, Northeast Region, 214pp.
- ²⁰ Eighth Annual Report of the Commissioners on Inland Fisheries, for the year ending January 1, 1874. Wright & Potter, State Printers, Boston, 63pp.
- ²¹ *Holyoke Company v. Lyman*, 82 U.S. 500 (1872).
- ²² “An Act in relation to the smelt fishery”, c. 211, St. 1873.
- ²³ Ninth Annual Report of the Commissioners on Inland Fisheries, for the year ending January 1, 1875. Wright & Potter, State Printers, Boston, 57pp.
- ²⁴ “An Act for the protection of trout, land-locked salmon, and lake-trout”. c. 186, St. 1874.
- ²⁵ Tenth Annual Report of the Commissioners on Inland Fisheries, for the year ending January 1, 1876. Wright & Potter, State Printers, Boston, 72pp. The quotation is from page 69.
- ²⁶ Eleventh Annual Report of the Commissioners on Inland Fisheries, for the year ending January 1, 1877. Albert J. Wright, State Printer, Boston, 50pp.
- ²⁷ Twelfth Annual Report of the Commissioners on Inland Fisheries, for the year ending January 1, 1878. Rand, Avery & Co., Printers to the Commonwealth, Boston, 68pp.
- ²⁸ A conservative estimate is 350 fish. See: Stolte 1981:51 and 177-182.
- ²⁹ “An Act for the preservation and protection of birds, birds’ eggs, deer and game”, c. 95, St. 1877.
- ³⁰ Thirteenth Annual Report of the Commissioners on Inland Fisheries, for the year ending September 30, 1878. Rand, Avery & Co., Printers to the Commonwealth, 1879, 63pp. This is a shortened (9-month) report due to a change in the state’s fiscal year.
- ³¹ “An Act to suppress pigeon shooting and similar sports”, c. 187, St. 1879.
- ³² Fourteenth Annual Report of the Commissioners on Inland Fisheries, for the year ending September 30, 1879. Rand, Avery & Co., Printers to the Commonwealth, 1880, 50pp.
- ³³ Fifteenth Annual Report of the Commissioners on Inland Fisheries, for the year ending September 30, 1880. Rand, Avery & Co., Printers to the Commonwealth, Boston, 1881, 77pp.
- ³⁴ “An Act requiring certain returns to the Commissioners on Inland Fisheries”, c. 104, St. 1876.

“The Protection and Preservation of Birds and Mammals in Like Manner as to Fish”:
1880-1889.

- ¹ Grun, B. 1982. *The Timetables of History*. Touchstone Books, Simon & Schuster, New York, 676pp.
- ² Hart, A.B. (ed.) 1930. *Commonwealth History of Massachusetts*. Vol. 4. States History Company, New York, 626pp. See pages 186-189, 612-613, 617-618.
- ³ Williams, M. 1989. *Americans and Their Forests. A Historical Overview*. Cambridge University Press, Cambridge, U.K., 599pp. The reference is from page 361.
- ⁴ O’Keefe, J.F. and D.R. Foster. 1998. An ecological history of Massachusetts forests. Pages 19-66 *in* C.H.W. Foster (ed.) *Stepping Back to Look Forward. A History of the Massachusetts Forest*. Harvard University for the Harvard Forest, Petersham, Mass., 339pp.
- ⁵ Trefethen, J.B. 1975. *An American Crusade for Wildlife*. Winchester Press and Boone and Crockett Club, New York, 409pp.
- ⁶ Dunlap, T.R. 1988. *Saving America’s Wildlife*. Princeton University Press, Princeton, N.J., 222pp.
- ⁷ Palmer, T.S. 1933. A brief history of the American Ornithologists’ Union. Pages 7-27 *in* *Fifty Years Progress of American Ornithology, 1883-1933*. American Ornithologists’ Union, Lancaster, Pa., 249pp.
- ⁸ Sargent, C.S. 1884. *Report on the Forests of North America (exclusive of Mexico)*. U.S. Department of the Interior, Census Office, Government Printing Office, Washington, D.C., 612pp. The quotations are from page 490.
- ⁹ Grinnell, G.B. 1913. Brief history of the Boone and Crockett Club. Pages 435-491 *in* G.B. Grinnell (ed.) *Hunting at High Altitudes*. Harper & Brothers, New York, 511pp.
- ¹⁰ Cardoza, J.E. 1976. The history and status of the black bear in Massachusetts and adjacent New England states. Division of Fisheries & Wildlife, Westborough, Mass., Research Bulletin 18, 113pp.
- ¹¹ Kilpatrick, C.W., N. Merrill, P. Hapeman, J. Petty, and D.H. Hirth. 2003. Genetic structure of Vermont black bear populations. Paper presented at 10th Annual Conference of The Wildlife Society, Burlington, Vermont, Program Abstracts, page 163.
- ¹² Allen, J.A. 1869. Catalogue of the mammals of Massachusetts; with a critical review of the species (Cetacea). *Bulletin of the Museum of Comparative Zoology* 1(8):143-252. The quotation is from page 194.
- ¹³ Anonymous. 1879. Game bag and gun. *Forest & Stream* 13:773. “The annual October hunt of the Spencer Sportsmen’s Club took 1 ‘coon, 2 rabbits, 19 gray squirrel, [and] 9 red squirrel”.
- ¹⁴ Atwood, H.D. 1909. A hunt in the Hockomock. *Forest & Stream* 73:577-578. [Snowshoe hare, 30 years prior]

- ¹⁵ Sixteenth Annual Report of the Commissioners on Inland Fisheries, for the year ending September 30, 1881. Rand, Avery & Co., Printers to the Commonwealth, Boston, 62pp.
- ¹⁶ The total salmon passed was estimated at 650. See: Stolte, L. 1981. The Forgotten Salmon of the Merrimack. U.S. Department of the Interior, Northeast Region, 214pp. The references are from pages 90-91.
- ¹⁷ Seventeenth Annual Report of the Commissioners on Inland Fisheries, for the year ending December 31, 1882. Wright & Potter Printing Co., State Printers, 58pp. See page 9. "Lake Superior salmon trout" are lake trout.
- ¹⁸ Estimated at 170 salmon actually passing. Stolte 1981:92.
- ¹⁹ Eighteenth Annual Report of the Commissioners on Inland Fisheries, for the year ending December 31, 1883. Wright & Potter, State Printers, Boston, 118pp.
- ²⁰ Estimated at 54 salmon actually passing. Many were large fish >40 inches in length. Stolte 1981:92-93.
- ²¹ See c. 72, Resolves (special session) of 1881. Fisheries comprises Chapter 91 (and Game comprises Chapter 92). See also: Secretary of the Commonwealth. 1887. A collection of the laws relating to inland fisheries in Massachusetts, 1623-1886. Wright & Potter Printing Co., Boston, pages 361-377.
- ²² Nineteenth Annual Report of the Commissioners on Inland Fisheries, for the year ending December 31, 1884. Wright & Potter Printing Co., State Printers, Boston, 107pp.
- ²³ Estimated at 350 salmon actually passing. Again, many were large fish >15 pounds. Stolte 1981:93-94.
- ²⁴ Twentieth Annual Report of the Commissioners on Inland Fisheries, for the year ending December 31, 1885. Wright & Potter Printing Co., State Printers, Boston, 83pp.
- ²⁵ Stolte 1981:94.
- ²⁶ Smiley, C.W. 1885. Carp and carp ponds. Pages 40-48 in Twentieth Annual Report of the Commissioners on Inland Fisheries, for the year ending December 31, 1885. Wright & Potter Printing Co., State Printers, Boston, 83pp.
- ²⁷ [Twenty-first Annual] Report of the Commissioners on Inland Fisheries and Game, for the year ending December 31, 1886. Wright & Potter Printing Co., State Printers, Boston, 91pp.
- ²⁸ "An Act for the Better Preservation of Birds and Game", c. 276, St. 1886.
- ²⁹ [Twenty-second Annual] Report of the Commissioners on Inland Fisheries and Game for the year ending December 31, 1887. Wright & Potter Printing Co., State Printers, Boston, 69pp.
- ³⁰ Stolte 1981:102 gives "87" (nearly 1500 estimated). Typographical error?
- ³¹ Barrows, W.B. 1889. The English sparrow (*Passer domesticus*) in North America, especially in its relations to agriculture. U.S. Department of Agriculture, Division of Economic Ornithology and Mammalogy, Bulletin 1, 405pp.

³² [Twenty-second Annual] Report of the Commissioners on Inland Fisheries and Game for 1887. The quotations are from pages 29, 31, and 32.

³³ [Twenty-third Annual] Report of the Commissioners on Inland Fisheries and Game for the year ending December 31, 1888. Wright & Potter Printing Co., State Printers, Boston, 81pp.

³⁴ Once again Stolte's (1981:102) figures (30 taken, ≈2000 estimated) do not tally with those in the Commissioners' report.

³⁵ [Twenty-third Annual] Report of the Commissioners on Inland Fisheries and Game for 1888. The quotations are from pages 21 and 35.

³⁶ [Twenty-fourth Annual] Report of the Commissioners on Inland Fisheries and Game for the year ending December 31, 1889. Wright & Potter Printing Co., State Printers, Boston, 89pp.

³⁷ Estimated at "a little over" 1100 salmon actually passing. Stolte 1981:103.

Mongolian Pheasants and Wilkinsonville Trout: the 1890s.

¹ Grun, B. 1982. *The Timetables of History*. Touchstone Books, Simon & Schuster, New York, 676pp.

² Tager, J. and R.W. Wilkie. 1991. Industrialization and urbanization, 1860-1900. Pages 34-37 in R.W. Wilkie and J. Tager (eds.) *Historical Atlas of Massachusetts*. University of Massachusetts Press, Amherst, Mass., 152pp.

³ Abbot, W.J. 1930. Press and publications (1889-1929). Pages 479-503 in A.N. Hart (ed.) *Commonwealth History of Massachusetts*. Vol. 5. The States History Company, New York, 808pp.

⁴ Foster, D., G. Motzkin, J. O'Keefe, E. Boose, D. Orwig, J. Fuller, and B. Hall. 2004. The environmental and human history of New England. Pages 43-100 in D. Foster and J.D. Aber. 2004. *Forests in Time. The Environmental Consequences of 1,000 years of Change in New England*. Yale University Press, New Haven, Conn., 477pp.

⁵ Accessed from www.thetrustees.org on 10 January 2013.

⁶ "An Act to incorporate the Trustees of Public Reservations", c. 352, St. 1891.

⁷ Trefethen, J.B. 1975. *An American Crusade for Wildlife*. Winchester Press and Boone and Crockett Club, New York, 409pp.

⁸ Dunlap, T.R. 1988. *Saving America's Wildlife*. Princeton University Press, Princeton, N.J., 222pp.

⁹ Grant, M. 1897. The origin of the New York Zoological Society. Pages 313-320 in G.B. Grinnell and T. Roosevelt (eds.) *Trail and Campfire. The Book of the Boone and Crockett Club*. Forest and Stream Publishing Co., New York, 353pp.

¹⁰ Leahy, C., J.H. Mitchell, and T. Conuel. 1996. *The Nature of Massachusetts*. Addison-Wesley Publishing Co., Reading, Mass., 226pp.

- ¹¹ *Geer v. Connecticut*, 161 U.S. 519 (1896). But also see the later *Hughes v. Oklahoma*, 441 U.S. 322 (1979). See Lund (1980) and Bean et al. (1997).
- ¹² Samuels, E.A. 1897. Game and fish in Massachusetts. Pages 351-370 in *With Rod and Gun in New England and the Maritime Provinces*. Samuels & Kimball, Boston, 540pp.
- ¹³ Thayer, C.N. [1896] 1976. Trout fishing in Falmouth. Pages 12-13 in *Falmouth-by-the-Sea. The Naples of America*. Falmouth Chamber of Commerce, Falmouth, Mass., 193pp.
- ¹⁴ Cleveland, G. 1906. *Fishing and Shooting Sketches*. The Outing Publishing Co., New York, 209pp.
- ¹⁵ Bates, F.A. 1899. *Stories of Lake, Field, and Forest. Rambles of a Sportsman-naturalist*. Bates Scientific and Historical Books, South Braintree, Mass., 165pp.
- ¹⁶ Anonymous. 1890. Worcester fox hunting. *Forest and Stream* 35:376.
- ¹⁷ Burnham, J.R. 1895. The western Massachusetts fox club hunt. *Forest and Stream* 45:447-448.
- ¹⁸ Stanton, M.G. (ed.) 1994. *Nantucket Argument Settlers. Island history at a glance, 1602-1993* (9th ed.) *The Inquirer and Mirror*, Nantucket, Mass., 318pp.
- ¹⁹ Forbush, E.H. 1912. *A History of the Game-birds, Wild-fowl, and Shore Birds of Massachusetts and Adjacent States*. Massachusetts State Board of Agriculture, Boston, 622pp.
- ²⁰ Hapgood, W. 1897. Brant and brant shooting at Chatham, Mass. Pages 246-251 in Samuels, E.A. 1897. *With Rod and Gun in New England and the Maritime Provinces*. Samuels & Kimball, Boston, 540pp.
- ²¹ Phillips, J.C. 1936. *Wenham Lake Shooting Record and the "Farm Bag", 1897-1925*. Cosmos Press, Cambridge, Mass., 171pp.
- ²² Phillips, J.C. 1929. *The Shooting Journal of George Henry Mackay, 1865-1922*. Cosmos Press, Cambridge, Mass., 373pp.
- ²³ Bates 1899:35-44.
- ²⁴ Samuels 1897:107.
- ²⁵ Nye, R.S. 1895. *Scientific Duck Shooting in Eastern Waters*. Independent Press, Spencer & West, Falmouth, Mass., 116pp.
- ²⁶ Cleveland, G. 1906. The serene duck hunter. Pages 47-75 in *Fishing and Shooting Sketches*. The Outing Publishing Co., New York, 209pp. The quotation is from page 75.
- ²⁷ [Twenty-fifth Annual] Report of the Commissioners on Inland Fisheries and Game for the year ending December 31, 1890. Wright & Potter Printing Co., State Printers, Boston, 93pp. The quotation is from page 21.
- ²⁸ Stolte, L. 1981. *The Forgotten Salmon of the Merrimack*. U.S. Department of the Interior, Northeast Region, 214pp. The reference is from page 105.

- ²⁹ “An Act providing for the better maintenance and enforcement of the fish and game laws and the distribution of fish”, c. 390, St. 1890.
- ³⁰ “An Act to limit the time within which trout, landlocked salmon, and lake trout may be taken in Berkshire, Franklin, Hampshire, and Hampden counties”, c. 193, St. 1890.
- ³¹ [Twenty-sixth Annual] Report of the Commissioners on Inland Fisheries and Game for the year ending December 31, 1891. Wright & Potter Printing Co., State Printers, Boston, 120pp. The quotations are from page 19.
- ³² Estimated at >1600 salmon actually passing. Stolte 1981:106.
- ³³ “Resolutions relating to the adoption of uniform laws for the protection of food fishes in the New England states”, Senate No. 265, adopted May 18, 1891, House in concurrence June 1, 1891.
- ³⁴ “An Act fixing the penalty for the taking or killing of woodcock, grouse, quail and duck within certain periods”, c. 142, St. 1891.
- ³⁵ “An Act relating to evidence in cases of violation of certain game laws”. c. 254, St. 1891.
- ³⁶ [Twenty-seventh Annual] Report of the Commissioners on Inland Fisheries and Game for the year ending December 31, 1892. Wright & Potter Printing Co., State Printers, Boston, 74pp.
- ³⁷ Estimated at >3000 salmon actually passing. Stolte 1981:113.
- ³⁸ [Twenty-eighth Annual] Report of the Commissioners on Inland Fisheries and Game for the year ending December 31, 1893. Wright & Potter Printing Co., State Printers, Boston, 77pp.
- ³⁹ Estimated at >3600 salmon actually passing. Stolte 1981:114-115.
- ⁴⁰ “An Act to authorize officers qualified to serve criminal processes, and the Commissioners on inland fisheries and game and their deputies, to make arrests without warrant for violation of fish and game laws”, c. 105, St. 1893.
- ⁴¹ [Twenty-ninth Annual] Report of the Commissioners on Inland Fisheries and Game for the year ending December 31, 1894. Wright & Potter Printing Co., State Printers, Boston, 91pp. The quotation is from page 16.
- ⁴² Estimated at >900 salmon actually passing. Stolte 1981:115-116.
- ⁴³ “An Act prohibiting the taking or killing of gray squirrels, hares or rabbits between the first day of March and the fifteenth day of September”, c. 97, St. 1894.
- ⁴⁴ “An Act for the protection of quail during the year eighteen hundred and ninety-four”, c. 102, St. 1894.
- ⁴⁵ “An Act concerning the preservation of birds and game”, c. 205, St. 1894.
- ⁴⁶ Attempts to establish English pheasants on Great Island on Cape Cod in the 1880s were a failure. See: Phillips, J.C. 1928. Wild birds introduced or transplanted in North America. U.S. Department of Agriculture Technical Bulletin 61, 64pp.

- ⁴⁷ [Thirtieth Annual] Report of the Commissioners on Inland Fisheries and Game for the year ending December 31, 1895. Wright & Potter Printing Co., State Printers, Boston, 97pp.
- ⁴⁸ Estimated at >1700 salmon actually passing. Stolte 1981:116.
- ⁴⁹ “An Act to remove the restrictions upon shad and alewife fishing in the Merrimac River”, c. 88, St. 1895.
- ⁵⁰ “Resolve relative to the fish hatching station at Plymouth, in the State of New Hampshire, now used and managed by said State and this Commonwealth in Common”, c. 127, Resolves of 1895.
- ⁵¹ “Resolve providing for the introduction of Mongolian pheasants into the Commonwealth”, c. 79, Resolves of 1894, and “Resolve providing for the purchase and propagation of Mongolian pheasants”, c. 12, Resolves of 1895.
- ⁵² Massachusetts was one of the first eastern states to successfully propagate and establish ring-necked pheasants. See: Studholme, A.T. and D. Benson. 1956. The pheasant in the northeastern states. Pages 388-430 in D.L. Allen (ed.) Pheasants in North America. Stackpole Co., Harrisburg, Pa. and Wildlife Management Institute, Washington, D.C., 490pp.
- ⁵³ [Thirty-first Annual] Report of the Commissioners on Inland Fisheries and Game for the year ending December 31, 1896. Wright & Potter Printing Co., State Printers, Boston, 69pp. The quotation is from page 18.
- ⁵⁴ Stolte 1981:120.
- ⁵⁵ “Resolve to provide for the establishment of a fish hatchery in the western part of the Commonwealth”, c. 114, Resolves of 1896.
- ⁵⁶ “An Act relative to black bass fishing”, c. 229, St. 1896.
- ⁵⁷ [Thirty-second Annual] Report of the Commissioners on Inland Fisheries and Game for the year ending December 31, 1897. Wright & Potter Printing Co., State Printers, Boston, 91pp.
- ⁵⁸ “Resolve to provide for repairing the fishway over the Lawrence Dam”, c. 53, Resolves of 1897.
- ⁵⁹ Stolte 1981:120.
- ⁶⁰ “Resolve to provide for rebuilding the state fish hatchery in the Town of Winchester”, c. 74, Resolves of 1897.
- ⁶¹ “An Act to provide for the stocking of the great ponds of the state with food fish”, c. 208, St. 1897.
- ⁶² “An Act relative to the protection of certain birds”, c. 524, St. 1897.
- ⁶³ [Thirty-third Annual] Report of the Commissioners on Inland Fisheries and Game for the year ending December 31, 1898. Wright & Potter Printing Co., State Printers, Boston, 81pp. The quotation is from page 15.
- ⁶⁴ “Resolve to provide for the establishment of a fish hatchery in the County of Berkshire”, c. 60, Resolves of 1898.

⁶⁵ Stolte 1981:120 and 128.

⁶⁶ “An Act to more effectually prevent the unlawful use of ferrets for hunting purposes”, c. 124, St. 1898.

⁶⁷ “An Act relative to the preservation of deer”, c. 181, St. 1898.

⁶⁸ “An Act relative to the protection of certain birds”, c. 339, St. 1898. See also Trefethen (1975) and Dunlap (1988).

⁶⁹ “An Act relative to fines and forfeitures under the laws for the protection of fish and game”, c. 205, St. 1898.

⁷⁰ [Thirty-fourth Annual] Report of the Commissioners on Inland Fisheries and Game for the year ending December 31, 1899. Wright & Potter Printing Co., State Printers, Boston, 93pp.

⁷¹ “An Act to provide for the cultivation of food fish”, c. 107, St. 1899.

⁷² “An Act to make the Lord’s Day close season for birds and game”, c. 116, St. 1899. See (among other references) c. 253, St. 1865, and the Tercentenary Edition of the Massachusetts General Laws (1932), c. 136, § 17.

⁷³ “An Act relative to fines and forfeitures under the laws protecting fish and game”, c. 360, St. 1899.

“Artificial Propagation and Protection of Native Varieties is More Essential than Introduction of New Varieties”: The 1900s.

¹ Grun, B. 1982. *The Timetables of History*. Touchstone Books, Simon & Schuster, New York, 676pp.

² Department of Commerce. 1975. *Historical Statistics of the United States. Colonial Times to 1970. Part I*. U.S. Department of Commerce, Bureau of the Census, Washington, D.C., 609pp.

³ Tager, J. and R.W. Wilkie. 1991. Industrialization and urbanization, 1860-1900. Pages 34-37 *in* R.W. Wilkie and J. Tager (eds.) *Historical Atlas of Massachusetts*. University of Massachusetts Press, Amherst, Mass., 152pp.

⁴ Tager, J., R.W. Wilkie and L.W. Owens. 1991. Metropolitan Commonwealth, 1900-1950. Pages 38-45 *in* R.W. Wilkie and J. Tager (eds.) *Historical Atlas of Massachusetts*. University of Massachusetts Press, Amherst, Mass., 152pp.

⁵ Hart, A.B. (ed.) 1930. *Commonwealth History of Massachusetts. Vol. 5. The States History Company, New York, 808pp.*

⁶ Foster, D., G. Motzkin, J. O’Keefe, E. Boose, D. Orwig, J. Fuller, and B. Hall. 2004. The environmental and human history of New England. Pages 43-100 *in* D. Foster and J.D. Aber. 2004. *Forests in Time. The Environmental Consequences of 1,000 years of Change in New England*. Yale University Press, New Haven, Conn., 477pp.

⁷ Rivers, W.H. 1998. Massachusetts state forestry programs. Pages 147-219 *in* C.H.W. Foster (ed.) *Stepping Back to Look Forward. A History of the Massachusetts Forest*. Harvard University for the Harvard Forest, Petersham, Mass., 339pp.

⁸ “An Act to establish the office of the State Forester”, c. 409, St. 1904.

⁹ The so-called “Province Lands” at the tip of Cape Cod, once part of the Massachusetts Bay Colony and in public ownership, were brought into the Colony of Massachusetts upon merger in 1687, and thence to the Commonwealth upon statehood.

¹⁰ “An Act to establish the Greylock State Reservation in the County of Berkshire”, c. 543, St. 1898.

¹¹ Originally c. 553, 31 Stat. 187 (1900), now at 16 U.S.C. §§ 3371-3378 and 18 U.S.C. § 42. Amended several times to address other taxonomic groups, injurious animals, and noxious weeds. See: Bean, M.J. and M.J. Rowland. 1997. *The Evolution of National Wildlife Law* (3rd ed.) Praeger Publishers, Westport, Conn., 544pp.

¹² Pinchot, G. 1947. *Breaking New Ground*. Harcourt, Brace and Co., New York, 522pp. The quotation is from page 150.

¹³ Belanger, D.O. 1988. *Managing American Wildlife. A History of the International Association of Fish and Wildlife Agencies*. University of Massachusetts Press, Amherst, Mass., 247pp.

¹⁴ See c. 561, 26 Stat. 1103 (1891)

¹⁵ Trefethen 1975:122-124. Enacted in response to public outrage over the killing of herons, egrets and other birds for feathers for hat and dress decorations.

¹⁶ Morris, E. 2001. *Theodore Rex*. Random House, New York, 772pp.

¹⁷ See 33 Stat. 628 (1905), later codified at 16 U.S.C. 472, 524, 554.

¹⁸ Trefethen, J.B. 1975. *An American Crusade for Wildlife*. Winchester Press and Boone and Crockett Club, New York, 409pp. The reference is from page 124.

¹⁹ “An Act for the preservation of American antiquities”, 16 U.S.C. §§ 431-433.

²⁰ Dunlap, T.R. 1988. *Saving America’s Wildlife*. Princeton University Press, Princeton, N.J., 222pp. The reference is from page 14.

²¹ Pearson, T.G. 1937. *Adventures in Bird Protection*. D. Appleton-Century Co., New York, 459pp. See pages 127-135.

²² Shaler, N.S. 1905. *Man and the Earth*. Chautauqua Press, Chautauqua, N.Y., 240pp. The quotations are from pages 159 and 207.

²³ [Thirty-fifth Annual] Report of the Commissioners on Inland Fisheries and Game for the year ending December 31, 1900. Wright & Potter Printing Co., State Printers, 140pp. The quotation regarding Belgian hare is from page 42. The Commissioners’ source is probably: Palmer, T.S. 1899. The danger of introducing noxious animals and birds. Pages 87-110 *in* Yearbook of the U.S. Department of Agriculture for 1898. U.S. Government Printing Office, Washington, D.C., 768pp.

²⁴ Crowell, A.E. 1947. Cape Cod memories. Pages 56-60 *in* E.V. Connett (ed.) *Duck Shooting along the Atlantic Tidewater*. W. Morrow & Co., New York, 308pp.

²⁵ Allen, G.M. 1930. History of the Virginia deer in New England. Proceedings of the New England Game Conference for 1929:19-41.

- ²⁶ Shaw, S.P. and C.L. McLaughlin. 1951. The management of white-tailed deer in Massachusetts. Massachusetts Division of Fisheries & Game, Research Bulletin 13, 59pp.
- ²⁷ Forbush, E.H. 1912. A History of the Game-birds, Wild-fowl, and Shore Birds of Massachusetts and Adjacent States. Massachusetts State Board of Agriculture, Boston, 622pp.
- ²⁸ Gill, R.E., Jr., P. Canevari, and E.H. Iversen. 1998. Eskimo curlew (*Numenius borealis*). In The Birds of North America, No. 347 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, Pa.
- ²⁹ Vaughan, E.T. (ed.) 1977. New England's Prospect [by] William Wood. University of Massachusetts Press, Amherst, Mass., 132pp. A modern translation of the second (1635) edition. The direct quote is from page 28 of a facsimile of the 1634 edition.
- ³⁰ Schorger, A.W. [1955] 1973. The Passenger Pigeon. Its Natural History and Extinction. University of Oklahoma Press, Norman, Okla., 424pp.
- ³¹ Cardoza, J.E. 1998. The European rabbit: history of introductions, and its status, biology, and environmental effects, with special reference to Massachusetts. Massachusetts Division of Fisheries & Wildlife, Westborough, Mass., 45pp.
- ³² This is apparently the first instance where the Massachusetts "fish and game" entity printed and distributed "Abstracts" of the pertinent laws. However, various commercial enterprises had done so in previous years.
- ³³ "An Act to provide for the protection of Mongolian, English and golden pheasants", c. 64, St. 1900.
- ³⁴ "An Act to provide for the better protection and to regulate the sale of game birds", c. 379, St. 1900.
- ³⁵ "An Act to regulate fishing in brooks stocked by the Commissioners on Inland Fisheries and Game", c. 284, St. 1900.
- ³⁶ [Thirty-sixth Annual] Report of the Commissioners on Inland Fisheries and Game for the year ending December 31, 1901. Wright & Potter Printing Co., State Printers, Boston, 192pp.
- ³⁷ "An Act relative to the taking or killing of gray squirrels, hares and rabbits", c. 102, St. 1901.
- ³⁸ "An Act to provide for the better protection of trout", c. 121, St. 1901.
- ³⁹ "An Act to provide for the further protection of wild pigeons, gulls and terns", c. 178, St. 1901. The passenger pigeon was almost certainly extirpated from the state by this time.
- ⁴⁰ [Thirty-seventh Annual] Report of the Commissioners on Fisheries and Game for the year ending December 31, 1902. Wright & Potter Printing Co., State Printers, Boston, 201pp.
- ⁴¹ "An Act to authorize the Board of Commissioners on Fisheries and Game to make certain investigations", c. 178, St. 1902.

⁴² “An Act to provide for the better protection of game”, c. 236, St. 1902.

⁴³ [Thirty-eighth Annual] Report of the Commissioners on Fisheries and Game for the year ending December 31, 1903. Wright & Potter Printing Co., State Printers, Boston, 248pp. The reference and quotation are from pages 8 and 135.

⁴⁴ “An Act to provide for the better protection of marsh and beach birds”, c. 162, St. 1903.

⁴⁵ “An Act to provide for the protection of certain marsh birds”, c. 244, St. 1903.

⁴⁶ “An Act to prohibit the sale of all trout except those artificially reared”, c. 205, St. 1903.

⁴⁷ “An Act to provide for the better protection of deer”, c. 245, St. 1903.

⁴⁸ “An Act relative to recovery for damages caused by wild deer”, c. 407, St. 1903.

⁴⁹ “An Act to provide for the better protection of song and insectivorous birds”, c. 287, St. 1903.

⁵⁰ “An Act to provide for the payment of a bounty for killing a wild cat, Canada lynx, or loupcevier”, c. 344, St. 1903.

⁵¹ [Thirty-ninth Annual] Report of the Commissioners on Fisheries and Game for the year ending December 31, 1904. Wright & Potter Printing Co., State Printers, Boston, 213pp.

⁵² Opinion of the Attorney General, 25 November 1904, concerning “Great Ponds-Sources of Water Supply-Rules and Regulations of State Board of Health-Commissioners of Fisheries and Game-Duty to Stock with Food Fish”.

⁵³ Ripley, T.H. 1954. New England bobwhite quail: history and investigations of present populations on Martha’s Vineyard and Cape Cod, Massachusetts. Thesis, University of Massachusetts, Amherst, 111pp.

⁵⁴ “An Act to provide further for the protection of pickerel”, c. 329, St. 1904.

⁵⁵ “An Act relative to the right of search by the Commissioners on Fisheries and Game and their deputies”, c. 367, St. 1904.

⁵⁶ “An Act to provide further for the protection of shore, marsh, and beach birds”, c. 369, St. 1904.

⁵⁷ [Fortieth Annual] Report of the Commissioners on Fisheries and Game for the year ending December 31, 1905. Wright & Potter Printing Co., State Printers, Boston, 258pp. The quotation is from page 2.

⁵⁸ Belding (subsequently an M.D.) was later recognized for his pioneering work on shellfish. Many of his personal records and papers are at the Massachusetts Archives, 220 Morrissey Blvd., Boston.

⁵⁹ “An Act relative to the taking and sale of small trout”, c. 190, St. 1905.

⁶⁰ “An Act relative to the protection of deer from dogs”, c. 245, St. 1905.

- 61 “An Act to provide for granting licenses to unnaturalized, foreign born persons licenses to hunt”, c. 317, St. 1905.
- 62 “An Act relative to shore, marsh and beach birds”, c. 414, St. 1905.
- 63 [Forty-first Annual] Report of the Commissioners on Fisheries and Game for the year ending December 31, 1906. Wright & Potter Printing Co., State Printers, Boston, 230pp.
- 64 “An Act to prevent the extermination of the heath hen, so-called”, c. 141, St. 1906.
- 65 “An Act relative to the transportation and sale of pike-perch”, c. 179, St. 1906.
- 66 “An Act relative to the protection of wood or summer duck”, c. 274, St. 1906.
- 67 “An Act relative to ducks and teal”, c. 301, St. 1906.
- 68 “An Act relative to quail”, c. 303, St. 1906.
- 69 “An Act to prohibit the sale of prairie chickens”, c. 304, St. 1906. This was to avoid similarity of appearance relative to the protected heath hen.
- 70 “An Act to provide for the protection of property and material used by the Commissioners on Fisheries and Game in making scientific investigations”, c. 327, St. 1906.
- 71 “An Act relative to the discharge of sawdust into streams”, c. 356, St. 1906.
- 72 [Forty-second Annual] Report of the Commissioners on Fisheries and Game for the year ending December 31, 1907. Wright & Potter Printing Co., State Printers, Boston, 135pp. The quotations are from pages 4 and 76.
- 73 Forbush, E.H. 1907. Useful Birds and Their Protection. Massachusetts State Board of Agriculture, Boston, 437pp.
- 74 “An Act relative to the protection of loons and eagles”, c. 118, St. 1907.
- 75 “An Act to provide for the better protection of gray squirrels”, c. 166, St. 1907.
- 76 “An Act to require non-resident hunters to procure licenses to hunt”, c. 198, St. 1907.
- 77 “An Act relative to certain birds of prey”, c. 250, St. 1907.
- 78 “An Act relative to the protection of deer”, c. 307, St. 1907.
- 79 “An Act to authorize the taking of certain unimproved land from the Island of Martha’s Vineyard for the protection of pinnated grouse and other birds”, c. 504, St. 1907.
- 80 [Forty-third Annual] Report of the Commissioners on Fisheries and Game for the year ending December 31, 1908. Wright & Potter Printing Co., State Printers, Boston, 143pp. The quotation is from page 56.
- 81 “An Act relative to the powers of the Commissioners on Fisheries and Game and their deputies”, c. 255, St. 1908.
- 82 “An Act to extend the authority of the Commissioners on Fisheries and Game and their deputies”, c. 417, St. 1908.

- ⁸³ “An Act further to provide for the protection of deer”, c. 377, St. 1908.
- ⁸⁴ “An Act relative to the purchase and sale of rabbits and hares lawfully killed”, c. 413, St. 1908.
- ⁸⁵ “An Act relative to ruffed grouse, woodcock, and quail”, c. 441, St. 1908.
- ⁸⁶ “An Act relative to Mongolian, Chinese, English, and golden pheasants”, c. 477, St. 1908.
- ⁸⁷ “An Act to provide for the registration of hunters”, c. 484, 1908.
- ⁸⁸ “An Act to authorize the State Board of Agriculture to appoint a state ornithologist”, c. 245, St. 1908. The first ornithologist was Edward Howe Forbush (1858-1929).
- ⁸⁹ [Forty-fourth Annual] Report of the Commissioners on Fisheries and Game for the year ending December 31, 1909. Wright & Potter Printing Co., State Printers, Boston, 140pp.
- ⁹⁰ “Resolve to provide for an investigation of the cost of propagating freshwater food and game fish and useful game birds and mammals”, c. 121, Resolves of 1909.
- ⁹¹ “An Act to provide for the establishment of refuges for birds and game”, c. 362, St. 1909.
- ⁹² “An Act relative to trout and salmon”, c. 377, St. 1909.
- ⁹³ “An Act to establish the open seasons for ruffed grouse, quail, and woodcock”, c. 272, St. 1909.
- ⁹⁴ “An Act to provide for the protection of wild fowl”, c. 421, St. 1909.
- ⁹⁵ “An Act relative to the protection and sale of hares and rabbits”, c. 466, St. 1909.
- ⁹⁶ “An Act relative to licenses to hunt”, c. 262, St. 1909.

“Conservation Has Captured the Nation...[It] is a Moral Issue”: the 1910s.

- ¹ Pinchot, G. [1910] 1967. *The Fight for Conservation*. University of Washington Press, Seattle, Wash., 152pp. The quotation is from pages 132-133. See Chapter 4 for Pinchot’s views on the meaning of “conservation”.
- ² Grun, B. 1982. *The Timetables of History*. Touchstone Books, Simon & Schuster, New York, 676pp.
- ³ Barry, J.M. 2004. *The Great Influenza*. Viking, New York, 546pp.
- ⁴ Hart, A.B. (ed.) 1930. *Commonwealth History of Massachusetts*. Vol. 5. The States History Company, New York, 808pp.
- ⁵ Van Hise, C.R. 1910. *The Conservation of Natural Resources in the United States*. Macmillan Co., New York, 413pp. The quotations are from pages 363-364.
- ⁶ Van Hise is referring to the concepts of Thomas Hobbes (1588-1679) whose masterwork *Leviathan* (1651) describes the natural state of man as “solitary, poor, nasty, brutish, and short” (First Part, Of Man, Chapter XII).

- ⁷ Trefethen, J.B. 1975. *An American Crusade for Wildlife*. Winchester Press and Boone and Crockett Club, New York, 409pp.
- ⁸ In 1946, the public activities of the American Wildlife Institute were assumed by the newly formed "Wildlife Management Institute" and the old American Wildlife Institute was transmuted into the "North American Wildlife Foundation". See Trefethen (1976):241.
- ⁹ *Wildlife Restoration and Conservation*. Proceedings of the North American Wildlife Conference <etc.> 1936. U.S. Government Printing Office, Washington, D.C., 675pp. The reference is from page xvi.
- ¹⁰ Hornaday, W.T. 1887. *The Extermination of the American Bison, with a sketch of its discovery and life history*. Pages 369-548 *in* Report of the United States National Museum under the direction of the Smithsonian Institution, 1887. U.S. Government Printing Office, Washington, D.C., 771pp. Hornaday and Theodore Roosevelt co-founded the American Bison Society in 1905.
- ¹¹ Hornaday, W.T. 1913. *Our Vanishing Wild Life. Its Extermination and Preservation*. New York Zoological Society, New York, 411pp.
- ¹² Migratory Bird Act of 1913, Act of March 4, 1913, c. 145, 37 Stat. 828, 847 (repealed 1918).
- ¹³ Hewitt, C.G. 1921. *The Conservation of the Wild Life of Canada*. Charles Scribner's Sons, New York, 344pp. See pages 264-274.
- ¹⁴ Convention for the Protection of Migratory Birds, Aug. 16, 1916, United States-Great Britain (on behalf of Canada), 39 Stat. 1702. T.S. No. 628. In later years, migratory bird treaties were ratified with Mexico (1936, amended in 1972), Japan (1972) and the Soviet Union (1976).
- ¹⁵ Act of July 3, 1918, c. 128, 40 Stat. 755 (1918). Current version at 16 U.S.C. §§ 703-712.
- ¹⁶ *Missouri v. Holland*, 252 U.S. 416 (1920)
- ¹⁷ Williams, M. 1989. *Americans and Their Forests. A Historical Overview*. Cambridge University Press, Cambridge, U.K., 599pp. The references are from pages 335-336.
- ¹⁸ Sherburne, J.H. 1930. *Massachusetts in the World War (1914-1919)*. Pages 598-631 *in* Hart, A.B. (ed.) 1930. *Commonwealth History of Massachusetts*. Vol. 5. The States History Company, New York, 808pp. The reference is from page 628.
- ¹⁹ Schubert, F.N. 1978. All wooden on the western front. *Journal of Forest History* 22 (October 1978):180-181.
- ²⁰ Rivers, W.H. 1998. *Massachusetts state forestry programs*. Pages 147-219 *in* C.H.W. Foster (ed.) *Stepping Back to Look Forward. A History of the Massachusetts Forest*. Harvard University for the Harvard Forest, Petersham, Mass., 339pp.
- ²¹ [Forty-fifth Annual] Report of the Commissioners on Fisheries and Game for the year ending December 31, 1910. Wright & Potter Printing Co., State Printers, Boston, 256pp.

²² See: Oldys, H. 1911. The game market of today. Pages 243-254 in U.S. Department of Agriculture for 1910, U.S. Government Printing Office, Washington D.C., 711pp. "The principal game markets of today are Chicago, New York, Philadelphia, and Boston. Boston is first in the deer trade, principally from Maine". In New York, venison sold for 5 d./lb. in 1763 and 22-25¢/lb. in 1910; black or mallard ducks for 5 s. ea. in 1763 and \$1.25 ea. in 1910. For the culinary qualities of wild game, see: DeVoe, T.F. 1867. The Market Assistant. Containing a brief description of every article of human food sold in the public markets <etc.> Hurd & Houghton, New York, 455pp.

²³ This is the actual number killed, from the table on pages 183-187. The "total" of 1413 on pages 14 and 188 includes the number reported as "wounded". However, the total "killed on record" and the number "wounded on record" (page 188) reflect only the actual number killed, by tallying pages 183-187.

²⁴ "An Act to establish the open season for ruffed grouse, quail, and woodcock", c. 365, St. 1910.

²⁵ "An Act to provide for protecting upland plover, wild pigeons, gulls and terns", c. 472, St. 1910. By the time this statute had sunset in 1915, the "wild pigeons" were extinct.

²⁶ "An Act relative to the protection of game birds, waterfowl, hares and rabbits", c. 533, St. 1910.

²⁷ "An Act relative to the taking or killing of deer", c. 545, St. 1910. Allowed for a 6-day season in late November, reporting required, one deer either sex, shotgun only.

²⁸ "An Act to increase the number of deputies of the Board of Commissioners on Fisheries and Game", c. 575, St. 1910.

²⁹ "Resolve to provide for an investigation and report as to the adaptability of the public waters to the rearing of food fish", c. 140, Resolves of 1910.

³⁰ [Forty-sixth Annual] Report of the Commissioners on Fisheries and Game for the year ending December 31, 1911. Wright & Potter Printing Co., State Printers, Boston, 139pp.

³¹ These initial reports were the start of the existing dynamic "pond files" of the Division of Fisheries and Wildlife.

³² Tallies as given on pages 66-71 of the 1911 report. Note that the total on page 66 differs from that on page 71 by two deer (no town given?). All reported deer harvest tallies should be carefully scrutinized to ascertain the correct total. Annual figures will not be given in [most] further summaries in this book. See: Shaw, S.P. and C.L. McLaughlin. 1951. The management of white-tailed deer in Massachusetts. Massachusetts Division of Fisheries & Game, Research Bulletin 13, 59pp. for harvest tabulations 1910-1950.

³³ "An Act to prevent the extermination of the heath hen, so-called", c. 18, St. 1911.

³⁴ "An Act relative to the protection of the wood or summer duck", c. 39, St. 1911.

³⁵ "An Act relative to the introduction of fish into state waters", c. 185, St. 1911.

³⁶ "An Act relative to the shooting of certain wild fowl", c. 187, St. 1911.

³⁷ “An Act to limit the number of black ducks that may be taken in one day”, c. 188, St. 1911. Bag limit was set at 15 ducks.

³⁸ “An Act to provide for the establishment of state bird and game preserves and the protection and propagation of wild birds and quadrupeds”, c. 410, St. 1911.

³⁹ “An Act relative to hunters’ certificate of registration”, c. 235, St. 1911. The licensee must prove residency and carry certificate on person; a person under the age of 16 must have written authorization from parent.

⁴⁰ “An Act relative to the protection and importation of wild turkeys”, c. 343, St. 1911.

⁴¹ “Resolve to provide for the establishment of a fish hatchery”, c. 68, Resolves of 1911.

⁴² [Forty-seventh through Forty-ninth Annual] Reports of the Commissioners on Fisheries and Game for the years 1912, 1913 and 1914. Wright & Potter Printing Co., State Printers, Boston, 94pp.

⁴³ “Resolve to authorize the sale of certain property of the Commonwealth now in the custody of the Board of Commissioners on Fisheries and Game”, c. 49, Resolves of 1912.

⁴⁴ “An Act to authorize the Board of Commissioners on Fisheries and Game to take lands in the County of Barnstable for establishing fish hatcheries”, c. 237, St. 1912.

⁴⁵ “An Act to authorize the Board of Commissioners on Fisheries and Game to take additional land in the County of Barnstable for establishing fish hatcheries”, c. 690, St. 1912.

⁴⁶ “Resolve to provide for the establishment of fish hatcheries and the propagation of food and game fish”, c. 6, Resolves of 1912.

⁴⁷ “An Act to authorize the Board of Commissioners on Fisheries and Game to take lands in the County of Worcester for establishing fish hatcheries and bird farms”, c. 682, St. 1912.

⁴⁸ An Act relative to the killing of pheasants”, c. 401, St. 1914.

⁴⁹ “An Act relative to the shooting of deer in the counties of Bristol, Essex and Middlesex”, c. 388, St. 1912.

⁵⁰ “An Act relative to the taking or killing of deer”, c. 529, St. 1913.

⁵¹ “An act to prohibit the hunting of birds or quadrupeds with rifles, revolvers or pistols during the open season on deer”, c. 542, St. 1913.

⁵² “An Act to prohibit the poisoning and snaring of wild animals and to regulate the use of traps”, c. 626, St. 1913. This law prohibited leghold traps with a jaw spread >6 inches, required trappers to visit traps at least once every 24 hours, and prohibited trapping on private land without written permission.

⁵³ “An Act to provide for the protection of moose”, c. 144, St. 1913.

⁵⁴ Moose from Canada were released on the 10,000 acre Whitney Estate (which became October Mountain State Forest in 1922) in Berkshire County in the early 1900s. When the estate was abandoned c. 1913, four moose escaped and one was shot. See: Eaton,

W.P. 1919. Big game returning to New England hills. Bulletin of the American Game Protective Association 8(1):11.

⁵⁵ “An Act to protect wild game and to encourage its propagation”, c. 567, St. 1912.

⁵⁶ “An Act to provide for a closed season on quail in the County of Essex for five years”, c. 79, St. 1914.

⁵⁷ “Resolve relative to an investigation and a report by the Board of Commissioners of Fisheries and Game relative to pheasants”, c. 70, Resolves of 1913.

⁵⁸ “Resolve to provide for a codification of the fish and game laws of the Commonwealth”, c. 107, St. 1913.

⁵⁹ “Resolution relative to federal protection of migratory game birds”. Adopted by the Senate April 16, 1912, adopted in concurrence by the House of Representatives April 23, 1912.

⁶⁰ Fiftieth Annual Report of the Commissioners on Fisheries and Game for the year 1915. Wright & Potter Printing Co., State Printers, Boston, 234pp.

⁶¹ “An Act relative to the discharge of waste materials into the streams of the Commonwealth”, c. 460, St. 1910.

⁶² “An Act to provide for further protection for wild birds and quadrupeds”, c. 240, St. 1915.

⁶³ Fifty-first Annual Report of the Commissioners on Fisheries and Game for the year 1916. Wright & Potter Printing Co., State Printers, Boston, 100pp.

⁶⁴ “Resolve providing for exhibitions and other means of increasing public interest in the protection of fish and game”, c. 159, Resolves of 1916.

⁶⁵ Forbush, E.H. 1916. The domestic cat. Bird killer, mouser and destroyer of wild life. Means of utilizing and controlling it. Massachusetts State Board of Agriculture, Boston, Economic Biology Bulletin 2, 112pp.

⁶⁶ “An Act relative to the taking of pickerel”, c. 6, St. 1916.

⁶⁷ “An Act relative to the open season for brook trout”, c. 25, St. 1916.

⁶⁸ “An Act relative to the granting of hunters’ licenses to minors”, c. 74, St. 1916.

⁶⁹ “An Act to prohibit the use of artificial light and of vehicles in hunting”, c. 110, St. 1916.

⁷⁰ Fifty-second Annual Report of the Commissioners on Fisheries and Game for the year ending November 30, 1917. Wright & Potter Printing Co., State Printers, Boston, 160pp. The quotation is from page 37.

⁷¹ “Resolve providing for exhibitions and other means of increasing public interest in the protection of fish and game”, c. 78, Resolves of 1917.

⁷² “An Act relative to the establishment of stations for the rearing of trout in certain counties”, c. 228, St. 1917.

- 73 "An Act to establish a closed season on quail in the counties of Hampden and Middlesex", c. 157, St. 1917.
- 74 "An Act relative to the open season for the killing of deer", c. 139, St. 1917.
- 75 "An Act to provide for the protection of birds on the Island of Muskeget", c. 40, St. 1917.
- 76 Long, J.L. 1981. *Introduced Birds of the World*. David & Charles, London, 528pp. See pages 359-363.
- 77 Morris, R.O. 1907. The introduction of the starling at Springfield, Mass. *Bird-Lore* 9(5):206-207.
- 78 "An Act relative to starlings", c. 20, St. 1917.
- 79 Eaton, W.P. 1920. *In Berkshire Fields*. Harper & Brothers, New York, 312pp. See pages 196-197.
- 80 "An Act to permit the taking of European hares in the County of Berkshire", c. 196, St. 1917.
- 81 "An Act relative to taking fish which frequent fresh water", c. 53, St. 1917.
- 82 "An Act authorizing and directing the Commissioners on Fisheries and Game and their deputies to enforce the laws relating to dogs", c. 271, St. 1917.
- 83 *Fifty-third Annual Report of the Commissioners on Fisheries and Game for the year ending November 30, 1918*. Wright & Potter Printing Co., State Printers, Boston, 303pp. The quotation is from page 52.
- 84 "An Act to provide for the construction of fishways on the Merrimack River at Lawrence and Lowell", c. 174, St. 1918.
- 85 *Fifty-fourth Annual Report of the Commissioners on Fisheries and Game for the year ending November 30, 1919*. Wright & Potter Printing Co., State Printers, Boston, 197pp.
- 86 Accessed from <http://www.acf.org> on 24 January 2013.
- 87 "An Act to organize in departments the executive and administrative functions of the government", c. 350, St. 1919. See §§ 39-43 relative to the Department of Conservation.
- 88 "An Act to permit the spearing of carp and eels", c. 33, St. 1919.
- 89 "An Act to prohibit until the year nineteen hundred and twenty-two the taking of quail in the counties of Essex, Dukes and Nantucket", c. 40, St. 1919.
- 90 "An Act authorizing the Board of Commissioners on Fisheries and Game to regulate the taking of smelt in great ponds", c. 57, St. 1919.
- 91 "An Act to establish a close season for the hunting or killing of raccoons", c. 66, St. 1919.
- 92 "An Act to provide for a bounty on seals", c. 200, St. 1919.
- 93 "An Act relative to hunting and fishing licenses", c. 296, St. 1919.

⁹⁴ These new provisions mandated a fishing license in order to fish in inland waters stocked by the Commissioners since January 1, 1910. Licensing did not apply to minors or women. It also provided for a minor trapping license, for which the applicant must provide written permission from the parent and for a “combined” hunting and fishing license for non-residents. A legal resident was allowed to hunt or fish on his own property without a license, provided that he was domiciled on the property and that it was used exclusively for agriculture and not for club, shooting or fishing purposes.

“The Stock Must Have Places to Feed and to Breed”: the 1920s.

¹ Grun, B. 1982. *The Timetables of History*. Touchstone Books, Simon & Schuster, New York, 676pp.

² Phelan, J.J. and D.G. Robbins. 1930. Public finance of Massachusetts (1890-1930). Pages 329-369 in Hart, A.B. (ed.) *Commonwealth History of Massachusetts*. Vol. 5. The States History Company, New York, 808pp.

³ Rivers, W.H. 1998. Massachusetts state forestry programs. Pages 147-219 in C.H.W. Foster (ed.) *Stepping Back to Look Forward. A History of the Massachusetts Forest*. Harvard University for the Harvard Forest, Petersham, Mass., 339pp.

⁴ Hawes, A.F. 1923. New England forests in retrospect. *Journal of Forestry* 21:209-224. The quotation is from page 224.

⁵ Shelford, V.E. (ed.) *Naturalist’s Guide to the Americas*. Williams & Wilkins Co., Baltimore, Md., 761pp. The quotation is from page v. See part IV, Section 2.B.3, pages 318-326 relative to Massachusetts.

⁶ Sharp, D.L. [1908] 1922. *The Lay of the Land*. Houghton-Mifflin Co., Boston, 214pp. The quotations are from pages 125-126.

⁷ Beston, H. 1928. *The Outermost House*. Doubleday, Doran & Co., New York, 222pp. The quotation is from page 222. Beston’s “Fo’castle” was claimed by the winds and tide in the Blizzard of 1978.

⁸ Hemingway, E. 1972. *The Nick Adams Stories*. Charles Scribner’s Sons, New York, 278pp.

⁹ Elton, C.S. [1927] 1966. *Animal Ecology*. Methuen & Co., Ltd., London, 207pp. The quotation is from page 189.

¹⁰ Phillips, J.C. 1928. *A Sportsman’s Scrapbook*. Houghton-Mifflin Co., Boston, 212pp.

¹¹ Phillips, J.C. 1933. *A Sportsman’s Second Scrapbook*. Houghton-Mifflin Co., Boston, 198pp. See Chapter VII.

¹² Allen, G.M. 1939. In memoriam: John Charles Phillips, M.D. *Auk* 56:221-226. The “Phillips Wildlife Research Laboratory” of the Division of Fisheries & Game was named for him and his grandson of the same name was later appointed Commissioner of the Massachusetts Department of Fisheries, Wildlife and Recreational Vehicles.

¹³ Act of June 10, 1920, c. 285, 41 Stat. 1063.

- ¹⁴ Bean, M.J. and M.J. Rowland. 1997. *The Evolution of National Wildlife Law* (3rd ed.) Praeger Publishers, Westport, Conn., 544pp. See pages 416-422.
- ¹⁵ Later amendments expanded the Act to include wild animals generally, bird eggs, animal parts, and fish taken contrary to federal law of that of a foreign country. See Bean et al. (1997):42-43.
- ¹⁶ Act of May 20, 1926, c. 346 44 Stat. 756 (codified at 16 U.S.C. 851-856 (1976), repealed 1981 and subsumed into Lacey Act provisions.
- ¹⁷ *Missouri v. Holland*, 252 U.S. 416 (1920).
- ¹⁸ *Dapson v. Daly*, 257 Mass. 1925 (1926). In this replevin to recover the carcass of a deer, the court also found that the “Huntsman acquires no title to wild animals by pursuit alone, even though there is wounding, unless the animal is followed up and reduced to actual possession”.
- ¹⁹ Shaw, S.P. 1948. The beaver in Massachusetts. A research and management study. Massachusetts Department of Conservation Division of Fisheries & Game Research Bulletin 11, 44pp.
- ²⁰ Pell, K.W. 1944. Story of a beaver colony. Bulletin of the Massachusetts Audubon Society 27(9):262-266.
- ²¹ [Fifty-fifth] Annual Report of the Division of Fisheries and Game for the year ending November 30, 1920. Wright & Potter Printing Co., State Printers, Boston, 173pp. The quotation is from page 3.
- ²² “An Act relative to the protection of wild and undomesticated birds”, c. 208, St. 1920.
- ²³ “An Act relative to hunting and fishing licenses for minors and others”, c. 300, St. 1920.
- ²⁴ “An Act to authorize the Commissioners of Fisheries and Game to make rules and regulations relative to the taking of salmon”, c. 339, St. 1920. These provisions were not implemented.
- ²⁵ “An Act relative to the taking of fur-bearing animals”, c. 437, St. 1920. The Act established a window during which open seasons for the hunting and trapping of fur-bearers may be set, provided a landowner exemption, set restrictions on trap placement and prohibited destruction of muskrat houses.
- ²⁶ “Resolve authorizing the sale by the Commissioner of Conservation of the fish hatchery in the Town of Adams”, c. 5, Resolves of 1920. Sale of the Hadley hatchery had been approved in an earlier resolve.
- ²⁷ [Fifty-sixth] Annual Report of the Division of Fisheries and Game for the year ending November 30, 1921. Wright & Potter Printing Co., State Printers, Boston, 195pp. The quotations are from pages 1 and 43.
- ²⁸ “An Act relative to the better protection of birds within reservations”, c. 55, St. 1921.
- ²⁹ “An Act relative to the release of wild birds or animals”, c. 90, St. 1921.
- ³⁰ “An Act relative to the closed season on hares and rabbits”, c. 152, St. 1921.
- ³¹ “An Act relative to the restrictions on the taking of freshwater fish”, c. 188, St. 1921.

- ³² “An Act relative to the restrictions on the taking of pickerel”, c. 224, St. 1921.
- ³³ “An Act providing for the payment by the Commonwealth of damage caused by wild moose”, c. 257, St. 1921.
- ³⁴ “An Act relative to certificates of registration to hunt, trap and fish”, c. 467, St. 1921.
- ³⁵ [Fifty-seventh] Annual Report of the Division of Fisheries and Game for the year ending November 30, 1922. Wright & Potter Printing Co., State Printers, Boston, 48pp. The quotation is from page 7.
- ⁷² “An Act relative to the taking, marketing and transportation of shellfish”, c. 370, St. 1926.
- ⁷³ [Sixty-second] Annual Report of the Division of Fisheries and Game for the year ending November 30, 1927. Department of Conservation, Boston, Public Document No. 25, 84pp. The quotations are from pages 3-4 and 11.
- ⁷⁴ “An Act regulating the taking and possession of Loch Leven trout”, c. 5, St. 1927.
- ⁷⁵ “An Act relative to the taking, possession and sale of bluegills and shiners”, c. 6, St. 1927.
- ⁷⁶ “An Act relative to the payment by the Commonwealth of damages caused by wild deer and moose”, c. 194, St. 1927.
- ⁷⁷ [Sixty-third] Annual Report of the Division of Fisheries and Game for the year ending November 30, 1928. Department of Conservation, Boston, Public Document No. 25, 83pp.
- ⁷⁸ “An Act prohibiting the use of certain apparatus for fishing in inland waters”, c. 8, St. 1928.
- ⁷⁹ “An Act prohibiting the use of traps, nets or snares for the taking or killing of any wild birds and otherwise regulating the hunting thereof”, c. 24, St. 1928.
- ⁸⁰ “An Act prohibiting until the year nineteen hundred and thirty the taking of quail in certain counties”, c. 177, St. 1928.
- ⁸¹ “An Act extending the open season for deer”, c. 215, St. 1928.
- ⁸² The two-week season was in effect for only three years (1928-30). In 1928, it was open in all counties (except 1 week in Plymouth), in 1929 in all counties, and in 1930 only in the four western counties. See: Shaw, S.P. and C.L. McLaughlin. 1951. The management of white-tailed deer in Massachusetts. Massachusetts Division of Fisheries & Game, Research Bulletin 13, 59pp.
- ⁸³ “An Act relative to the taking of certain birds”, c. 271, St. 1928.
- ⁸⁴ “An Act relative to the payment by the Commonwealth of damages caused by wild deer and moose”, c. 361, St. 1928. Damage was to be evaluated by the property owner or agent, the Director or his agent, and an agent of the relevant trustees for county aid to agriculture.
- ⁸⁵ [Sixty-fourth] Annual Report of the Division of Fisheries and Game for the year ending November 30, 1929. Department of Conservation, Boston, Public Document No. 25, 99pp.

- ⁸⁶ Adams, W.C. 1929. The American system of free shooting and fishing. Transactions of the American Game Conference 16:185-194.
- ⁸⁷ Chidester, L.W. 1929. The advertising problem of the recreational industry in New England. Thesis, Tufts University, Medford, Mass., 242pp.
- ⁸⁸ See 16 U.S.C. §§ 715-715d, 715e, 715f-715k, 715n-715r.
- ⁸⁹ Bean, M.J. and M.J. Rowland. 1997. The Evolution of National Wildlife Law (3rd ed.) Praeger Publishers, Westport, Conn., 544pp. See page 284.
- ⁹⁰ Gross, A.O. 1928. The Heath Hen. Memoirs of the Boston Society of Natural History 6(4):487-588.
- ⁹¹ Gross, A.O. 1929. The last heath hen. Bird-Lore 31(4):252-254.
- ⁹² "An Act relative to the importation and liberation of certain live birds and quadrupeds", c. 44, St. 1929.
- ⁹³ "An Act relative to the taking, possession and sale of calico bass and crappie", c. 47, St. 1929.
- ⁹⁴ "An Act relative to the taking, possession or sale of great northern pike or muscalonge", c. 82, St. 1929.
- ⁹⁵ "Resolve to provide for a survey and revision by a special commission of the game and inland fish laws of the Commonwealth", c. 34, Resolves of 1929.

The Economy Collapses, a Profession Arises: the 1930s.

- ¹ Grun, B. 1982. The Timetables of History. Touchstone Books, Simon & Schuster, New York, 676pp.
- ² Filene, E.A. 1933. Unemployment in New England. Some fundamental factors. Pages 65-95 in *New England's Prospect: 1933*. American Geographical Society, New York, Special Publication No. 16, 502pp.
- ³ Adams, J.T. 1933. The historical background. Pages 1-13 in *New England's Prospect: 1933*. American Geographical Society, New York, Special Publication No. 16, 502pp.
- ⁴ Allen, E.S. 1979. The Black Ships. Rumrunners of Prohibition. Little, Brown & Co., Boston, 298pp.
- ⁵ "An Act annexing the Town of Dana and certain portions of the Towns of Prescott and Greenwich to the Town of Petersham", c. 240, St. 1938.
- ⁶ Conuel, T. 1981. Quabbin. The accidental wilderness. Massachusetts Audubon Society, Lincoln, Mass., and Stephen Greene Press, Brattleboro, Vt., 66pp.
- ⁷ Grover, N.C. 1937. The floods of March 1936: Pt. 1— New England Rivers. U.S. Government Printing Office, Washington, D.C., Geological Survey Water Supply Paper 798, 466pp.

- ⁸ Allen, E.S. 1976. *A Wind to Shake the World. The Story of the 1938 Hurricane.* Little, Brown & Co., Boston, 370pp.
- ⁹ Fisher, R.T. 1933. New England forests: biological factors. Pages 213-223 *in* *New England's Prospect: 1933.* American Geographical Society, New York, Special Publication No. 16, 502pp.
- ¹⁰ Williams, M. 1989. *Americans and Their Forests. A Historical Overview.* Cambridge University Press, Cambridge, U.K., 599pp.
- ¹¹ Rivers, W.H. 1998. Massachusetts state forestry programs. Pages 147-219 *in* C.H.W. Foster (ed.) *Stepping Back to Look Forward. A History of the Massachusetts Forest.* Harvard University for the Harvard Forest, Petersham, Mass., 339pp.
- ¹² Foster, C.H.W. 1998. The Massachusetts forest: an historical overview. Pages 2-18 *in* C.H.W. Foster (ed.) *Stepping Back to Look Forward. A History of the Massachusetts Forest.* Harvard University for the Harvard Forest, Petersham, Mass., 339pp.
- ¹³ American Game Policy Committee. 1930. Report to the American Game Conference on an American Game Policy. *Transactions of the American Game Conference* 17:284-309. The quotation is from page 306.
- ¹⁴ Shoemaker, C.D. 1935. The model state game and fish administrative law. *Transactions of the American Game Conference* 21:177-183.
- ¹⁵ Letter from the Council of Sportsmen's Clubs of Massachusetts, dated August 1936, to "Dear Fellow Sportsman" <from the Committee of> Lawrence I. Newton, William H. Brown [and] F.A. McLaughlin. Copy in files of the Division of Fisheries & Wildlife, Westborough, Mass.
- ¹⁶ See 16 U.S.C. §§ 718-718h, as amended by Act of February 17, 1976, Public Law No. 94-215 § 3, 90 Stat. 189:152.
- ¹⁷ Trefethen, J.B. 1975. *An American Crusade for Wildlife.* Winchester Press and Boone and Crockett Club, New York, 409pp.
- ¹⁸ There were nine participating states in the first cooperative venture. See also 16 U.S.C. 753a-753b, 74 Stat. 733, as amended by Public Law 86-686, September 2, 1960.
- ¹⁹ Now at 16 U.S.C. §§ 669-669i. The quotation is from § 669.
- ²⁰ Later amendments provided for a 10% tax on handguns, ammunition, and accessories, and an 11% tax on archery equipment.
- ²¹ "An Act constituting the assent of the Commonwealth to the provisions of the Act of Congress entitled "An Act to provide that the United States shall aid the states in wildlife-restoration projects, and for other purposes", c. 392, St. 1938.
- ²² Stoddard, H.L. 1931. *The Bobwhite Quail. Its Habits, Preservation and Increase.* Charles Scribner's Sons, New York, 559pp.
- ²³ Leopold, A. 1933. *Game Management.* Charles Scribner's Sons, New York, 481pp.
- ²⁴ Sears, P.B. 1935. *Deserts on the March.* University of Oklahoma Press, Norman, Okla., 231pp. The quotations are from page 168.

- ²⁵ Accessed from http://en.wikipedia.org/wiki/civilian_conservation_corps on 3 February 2013.
- ²⁶ See also Executive Order 6101, April 5, 1933. The C.C.C. was given agency status by Congress in 1937.
- ²⁷ Accessed from <http://www.mass.gov/dcr/ccc> on 3 February 2013.
- ²⁸ Lincoln was a pioneer in bird-banding and in charge of the U.S. bird-banding program from 1920-1946. He was also instrumental in developing the flyway concept in North America (adopted in 1947), based largely on banding results. See: Hawkins, A.S. et al. 1984. Flyways: Pioneering Waterfowl Management in North America. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C., 517pp.
- ²⁹ Phillips, J.C. and F.C. Lincoln. 1930. American Waterfowl. Their Present Situation and the Outlook for the Future. Houghton-Mifflin Co., Boston, 312pp. The quotation is from page 69.
- ³⁰ More Game Birds in America. 1931. More Waterfowl by Assisting Nature. More Game Birds in America, Inc., New York, 106pp. The quotation is from page 3.
- ³¹ Wildlife Restoration and Conservation. Proceedings of the North American Wildlife Conference called by President Franklin D. Roosevelt. 1936. U.S. Government Printing Office, Washington, D.C., 675pp. The quotation is from page iii.
- ³² Vaughn, G.F. 2002. Pioneer in wildlife conservation. Reuben Edward Trippensee, 1894-1997. The Environmental Institute, University of Massachusetts, Amherst, Mass., Publication No. 02-01, 30pp.
- ³³ Trippensee attended the 1936 North American Wildlife Conference and presented a paper on cottontail rabbit management in Michigan (pages 344-352).
- ³⁴ Swanson, G.A. 1987. Creation and early history. Wildlife Society Bulletin 15:9-14.
- ³⁵ Organ, J.F. 2012. Celebrating 75 years. The evolution of a professional society. The Wildlife Professional 6(3):24-31.
- ³⁶ Anonymous. 1938. Officers, committees, and members of The Wildlife Society, 1938. Journal of Wildlife Management 2 (supplement), unpagged.
- ³⁷ Harold Milton Bradbury (1886-1942) and Charles Andrew Stiles (1909-2000).
- ³⁸ [Sixty-fifth] Annual Report of the Division of Fisheries and Game for the year ending November 30, 1930. Department of Conservation, Boston, Public Document No. 25, 115pp. The quotation is from page 6.
- ³⁹ Adams, W.C. 1930. Development of Massachusetts game breeding work. Transactions of the American Game Conference 17:78-90.
- ⁴⁰ "An Act revising and recodifying the laws relative to game and inland fish", c. 393, St. 1930.
- ⁴¹ "An Act to amend chapter one hundred and thirty-one of the General Laws", c. 428, St. 1930. Enacted by the People and by their authority, approved at the State election on November 4, 1930. The text of the Act appears in the Acts and Resolves for 1931.
- ⁴² [Sixty-sixth] Annual Report of the Division of Fisheries and Game for the year ending

November 30, 1931. Department of Conservation, Boston, Public Document No. 25, 84pp.

⁴³ “An Act in addition to the general appropriation act making appropriations to supplement certain items contained therein, and for certain new activities and projects”, c. 460, § 269a, St. 1931.

⁴⁴ “An Act to prevent the defilement by gulls or terns of waters used for domestic water supply”, c. 21, St. 1931.

⁴⁵ “An Act permitting fishing with hook and line for other than commercial purposes”, c. 71, St. 1931.

⁴⁶ “An Act granting the consent of the Commonwealth of Massachusetts to the acquisition of migratory game refuges by the federal government”, c. 183, St. 1931.

⁴⁷ “An Act relative to sporting licenses authorizing certain minors to fish”, c. 263, St. 1931.

⁴⁸ “An Act relative to the holding of field trials for hunting dogs, so-called”, c. 270, St. 1931.

⁴⁹ “An Act authorizing the killing of predatory birds and mammals and the possession or carrying of shotguns and rifles in certain cases on Sunday”, c. 272, St. 1931.

⁵⁰ “An Act relative to hunting, trapping, and fishing”, c. 436, St. 1931.

⁵¹ [Sixty-seventh] Annual Report of the Division of Fisheries and Game for the year ending November 30, 1932. Department of Conservation, Boston, Public Document No. 25, 57pp.

⁵² “An Act relative to the hunting of quail in Berkshire, Franklin and Norfolk counties”, c. 28, St. 1932.

⁵³ “An Act authorizing the Division of Fisheries and Game to suspend or modify the open season or bag limit as to ruffed grouse and quail”, c. 60, St. 1932.

⁵⁴ “An Act relative to the time during which hunting dogs may be trained”, c. 81, St. 1932.

⁵⁵ “An Act prohibiting the hunting of beaver”, c. 82, St. 1932.

⁵⁶ “An Act relative to the open season for deer in certain counties”, c. 264, St. 1932.

⁵⁷ “An Act relative to the issuance of sporting, hunting, fishing and trapping licenses and the fees thereof”, c. 272, St. 1932.

⁵⁸ [Sixty-eighth] Annual Report of the Division of Fisheries and Game for the year ending November 30, 1933. Department of Conservation, Boston, Public Document No. 25, 50pp. The quotation is from page 4.

⁵⁹ Dexter, R.W. 1944. Ecological significance of the disappearance of eel-grass at Cape Ann, Massachusetts. *Journal of Wildlife Management* 8:173-176.

⁶⁰ Townsend, C.W. and F.H. Allen. 1933. Leach’s petrel breeding in Massachusetts. *Auk* 50:426-427.

- ⁶¹ “An Act to protect certain birds not now protected by statute”, c. 153, St. 1933.
- ⁶² “An Act relative to the use, setting and maintenance of certain traps or other devices for the capture of fur-bearing animals”, c. 203, St. 1933.
- ⁶³ “An Act making certain changes in the General Laws relative to inland fish, birds and mammals, and revising the General Laws relating to marine fish and fisheries, including shellfish”, c. 329, St. 1933.
- ⁶⁴ [Sixty-ninth] Annual Report of the Division of Fisheries and Game for the year ending November 30, 1934. Department of Conservation, Boston, Public Document No. 25, 64pp.
- ⁶⁵ These were undoubtedly New England cottontails, *Sylvilagus transitionalis*.
- ⁶⁶ Anderson, K.S. 1991. In memoriam: Joseph Archibald Hagar, 1896-1989. *Auk* 108:954-955.
- ⁶⁷ “An Act relative to the taking or possession of great northern pike or muscallonge”, c. 40, St. 1934.
- ⁶⁸ “An Act prohibiting the sale of black bass wherever taken”, c. 51, St. 1934.
- ⁶⁹ “An Act authorizing trap, skeet and target shooting on the Lord’s Day in certain cities and towns”, c. 55, St. 1934.
- ⁷⁰ “An Act establishing the office of state ornithologist in the Division of Fisheries and Game of the Department of Conservation”, c. 173, St. 1934.
- ⁷¹ “An Act relative to the hunting or possession of hares and rabbits in Nantucket and Dukes counties”, c. 183, St. 1934.
- ⁷² “An Act further regulating the use of traps and other devices for the capture of fur-bearing animals and providing for local option thereof”, c. 275, St. 1934. Note: an initiative petition to repeal this law was filed with the Secretary of State in October 1934 to be voted on at the state election on November 6, 1934 (apparently failed?)
- ⁷³ [Seventieth] Annual Report of the Division of Fisheries and Game for the year ending November 30, 1935. Department of Conservation, Boston, Public Document No. 25, 87pp. See pages 38-39 relative to the Nantucket season.
- ⁷⁴ Stanton, M.G. (ed.) 1994. *Nantucket Argument Settlers. Island history at a glance, 1602-1993* (9th ed.) The Inquirer and Mirror, Nantucket, Mass., 318pp. See page 131.
- ⁷⁵ The Director was instructed by Governor James Michael Curley (1874-1958) to issue an order closing the season at noon on February 12, when about 100 deer had been taken, due to substantial complaints from Nantucket citizens regarding the “slaughter” of deer, and since the objectives of the hunt had been met and there was a possibility of serious injury and loss of life due to the “rapidly increasing” number of hunters. See the *Boston Herald*, February 12, 1935, pages 1 & 13.
- ⁷⁶ The release of captive Canada geese after the ban resulted in the establishment of feral non-migratory flocks, particularly along the Ipswich and Concord rivers and around man-made reservoirs and impoundments. These geese were particularly successful along the Sudbury Reservoir system in Middlesex County. See: Heusmann, H W 1980. The wild (?) goose. *Massachusetts Wildlife* 31(3):2-5. There

were an estimated 5000-6000 captive live decoys in 1929; see: Phillips, J.C. 1929. Shooting-stands of Eastern Massachusetts. Privately printed, The Riverside Press, Cambridge, Mass., 158pp.

⁷⁷ “An Act relative to the open season on deer in Nantucket County”, c. 5, St. 1935.

⁷⁸ “An Act removing certain restrictions on the hunting of quail in Middlesex and Worcester counties”, c. 13, St. 1935.

⁷⁹ “An Act authorizing certain traps for the purpose of catching fish bait in the inland waters of the Commonwealth”, c. 98, St. 1935.

⁸⁰ “An Act relative to the trapping of mammals on Sunday”, c. 107, St. 1935.

⁸¹ [Seventy-first] Annual Report of the Division of Fisheries and Game for the year ending November 30, 1936. Department of Conservation, Boston, Public Document No. 25, 74pp. The quotations are from pages 24 and 48.

⁸² The “western” cottontails were the Eastern cottontail (*Sylvilagus floridanus*) and those from Vermont were the New England cottontail (*Sylvilagus transitionalis*). They are not “subspecies” but are separate species which are genetically distinct and do not cross-breed.

⁸³ “An Act abolishing the closed season on skunks”, c. 13, St. 1936.

⁸⁴ “An Act regulating the number of hooks that may be used in inland fishing”, c. 69, St. 1936.

⁸⁵ “An Act abolishing the closed season for deer in Dukes County”, c. 138, St. 1936.

⁸⁶ “An Act relative to fishing in ponds situated partly in the Commonwealth and partly in another state”, c. 294, St. 1936.

⁸⁷ “Resolve providing for a survey and study by a special commission relative to the administrative functions and financial needs of the Division of Fisheries and Game in the Department of Conservation”, c. 46, Resolves of 1936.

⁸⁸ [Seventy-second] Annual Report of the Division of Fisheries and Game for the year ending November 30, 1937. Department of Conservation, Boston, Public Document No. 25, 73pp. The quotation is from page 11.

⁸⁹ “An Act further regulating the appropriations for the use of the Department of Conservation”, c. 426, St. 1937.

⁹⁰ “An Act changing the titles of certain officers of the Division of Fisheries and Game and gradually abolishing the offices of such officers paid by municipalities”, c. 413, St. 1937.

⁹¹ “An Act relative to the hunting of deer and other mammals”, c. 324, St. 1937.

⁹² “An Act relative to the observance of Memorial Day”, c. 38, St. 1937.

⁹³ “An Act relative to hunting within the boundaries of certain public lands”, c. 89, St. 1937.

⁹⁴ “An Act relative to the hunting of quail in Nantucket County”, c. 167, St. 1937.

⁹⁵ “An Act authorizing the issuance to certain officials of certain other states of complimentary certificates entitling them to hunt and fish in the Commonwealth”, c. 191, St. 1937.

⁹⁶ “An Act relative to hunting and other uses of the Province Lands in Provincetown”, c. 373, St. 1937.

⁹⁷ [Seventy-third] Annual Report of the Division of Fisheries and Game for the year ending November 30, 1938. Department of Conservation, Boston, Public Document No. 25, 81pp. The quotation is from page 12.

⁹⁸ “An Act authorizing cities and towns to appropriate money for stocking inland waters with fish and for liberating game therein”, c. 142, St. 1938.

⁹⁹ “An Act relative to the setting of fires in the open air”, c. 204, St. 1938.

¹⁰⁰ “Resolve providing for a survey and study of the fish and game laws by the Department of Conservation”, c. 9, Resolves of 1938.

¹⁰¹ [Seventy-fourth] Annual Report of the Division of Fisheries and Game for the year ending November 30, 1939. Department of Conservation, Boston, Public Document No. 25, 76pp.

¹⁰² “An Act making certain changes in the organization and functions of the Department of Conservation”, c. 491, St. 1939.

¹⁰³ “An Act making certain changes in the General Laws relative to the reports of state officials which have become necessary or advisable by reason of the initiative amendment to the Constitution providing for biennial sessions of the General Court and for a biennial budget”, c. 499, St. 1939. See § 4A.

¹⁰⁴ Project W-1-R, “Massachusetts Waterfowl Research”.

The War Years and the Aftermath: 1940-1947.

¹ Beevor, A. 2012. *The Second World War*. Little, Brown & Co., Boston, 863pp.

² Grun, B. 1982. *The Timetables of History*. Touchstone Books, Simon & Schuster, New York, 676pp.

³ Trefethen, J.B. 1975. *An American Crusade for Wildlife*. Winchester Press and Boone and Crockett Club, New York, 409pp.

⁴ Tager, J., R.W. Wilkie and L.W. Owens. 1991. Metropolitan Commonwealth, 1900-1950. Pages 38-45 in R.W. Wilkie and J. Tager (eds.) *Historical Atlas of Massachusetts*. University of Massachusetts Press, Amherst, Mass., 152pp.

⁵ Murie, A. 1940. Ecology of the coyote in the Yellowstone. U.S. National Park Service, *Fauna of the National Parks of the United States*, Bulletin No. 4, 206pp.

⁶ Goldman, E.A. 1930. The coyote—archpredator. *Journal of Mammalogy* 11: 325-334.

⁷ The American Committee for International Wild Life Protection was founded in 1930 by the Boone & Crockett Club, with John C. Phillips as its chair. It was later in-

corporated into the International Union for the Conservation of Nature <and Natural Resources> and is now known as the American Committee for International Conservation. See also http://en.wikipedia.org/wiki/Boone_and_Crockett_Club, accessed on 2 February 1913.

⁸ Allen, G.M. 1942. *Extinct and Vanishing Mammals of the Western Hemisphere, with the Marine Mammals of all the Oceans*. American Committee for International Wild Life Protection, Special Publication No. 11, 620pp.

⁹ Gabrielson was the first Director of the U.S. Fish and Wildlife Service and later the President of the Wildlife Management Institute.

¹⁰ Gabrielson, I.N. 1941. *Wildlife Conservation*. The Macmillan Co., New York, 250pp. (2nd ed., 1959). The quotation is from page 106 of the first edition.

¹¹ Gabrielson, I.N. 1953. *Wildlife Refuges*. The Macmillan Co., New York, 257pp.

¹² Leopold, A. 1943. Wildlife in American culture. *Journal of Wildlife Management* 7:1-6. The quotation is from page 6. See also Leopold's earlier paper (*Journal of Forestry* 31:634-643, 1931).

¹³ Among many other expositions of how humans view animals, see: Allen, M. 1983. *Animals in American Literature*. University of Illinois Press, Urbana, Ill., 210pp.; Gillespie, A.K. and J. Mechling (eds.) 1987. *American Wildlife in Symbol and Story*. University of Tennessee Press, Knoxville, Tenn., 251pp.; and Herman, D.J. 2001. *Hunting and the American Imagination*. Smithsonian Institution Press, Washington, D.C., 356pp.

¹⁴ Babcock, H. 1947. *My Health is Better in November*. University of South Carolina Press, Columbia, S.C., 284pp.

¹⁵ Spiller, B.L. [1935] 1947. *Grouse Feathers*. The Macmillan Co., New York, 207pp.

¹⁶ Leopold, A. 1949. *A Sand County Almanac and Sketches Here and There*. Oxford University Press, New York, 226pp.

¹⁷ Flader, S.L. 1974. *Thinking Like a Mountain. Aldo Leopold and the Evolution of an Ecological Attitude toward Deer, Wolves, and Forests*. University of Missouri Press, Columbia, 284pp. See esp. pages 101-102 and 267-268.

¹⁸ Vogt, W. 1948. *Road to Survival*. William Sloane Associates, Inc., New York, 335pp.

¹⁹ The writings of both Vogt and Osborn stimulated a resurgent interest in the ideas of Thomas Robert Malthus (1766-1834) whose *Essay on the Principles of Population* (1798) predicted a return to subsistence-level society once human population out-paced agricultural food production.

²⁰ Osborn, F. 1948. *Our Plundered Planet*. Little, Brown & Co., Boston, 217pp. The quotations are from pages ix and 201.

²¹ Bald Eagle Protection Act of 1940 (16 U.S.C. 668-668d, 54 Stat. 250) as amended. Approved June 8, 1940, and amended by P.L 86-70 (73 Stat. 143) June 25, 1959; P.L. 87-884 (76 Stat. 1346) October 24, 1962; P.L. 92-535 (86 Stat. 1064) October 23, 1972; and P.L. 95-616 (92 Stat. 3114) November 8, 1978.

²² Act of March 10, 1934, c. 55 § 2, 48 Stat. 401. Now codified at 16 U.S.C. §§ 661-667e.

- ²³ Bean, M.J. and M.J. Rowland. 1997. *The Evolution of National Wildlife Law* (3rd ed.) Praeger Publishers, Westport, Conn., 544pp. See Chapter 11.
- ²⁴ Newell, C. 1899. Marsupialia or Marsupiata. *The Museum* [Albion, N.Y.] 5:183-185.
- ²⁵ Anonymous. 1944. Field notes. *Bulletin of the Massachusetts Audubon Society* 8(4):140. (Falmouth, adult & 2 young, suspected release from Camp Edwards), and, Snyder, D.E. 1944. Animal tales from the hills. *Bulletin of the Massachusetts Audubon Society* 8(4):124-126 (Dalton).
- ²⁶ Seventy-fifth Annual Report of the Division of Fisheries and Game for the year ending November 30, 1940. Part V (pages 22-44) of the Annual Report of the Commissioner of Conservation. Public Document No. 73. Department of Conservation, Boston, 59pp.
- ²⁷ First Annual Report of the Division of Wildlife Research and Management for the year ending November 30, 1940. Part IV (pages 19-22) of the Annual Report of the Commissioner of Conservation. Public Document No. 73. Department of Conservation, Boston, 59pp.
- ²⁸ The Annual Reports of the Division of Wildlife Research & Management for the years 1941-1947 are missing from the files of the Division of Fisheries & Wildlife.
- ²⁹ Seventy-sixth Annual Report of the Division of Fisheries and Game for fiscal year December 1, 1940 to November 30, 1941. Part V of the Annual Report of the Commissioner of Conservation. [Division of Fisheries & Game], Boston, 35pp.
- ³⁰ "An Act repealing certain provisions of law relative to the appointment of a special officer by the Town of Nantucket to enforce the provisions of law relative to the protection of birds on the island of Muskeget, their eggs and young", c. 26, St. 1941.
- ³¹ "An Act penalizing the taking of fish from Big Homers Pond in the Town of West Tisbury otherwise than by means of fly fishing", c. 157, St. 1941. NOTE; this statute was apparently in effect at least through 1969.
- ³² "An Act imposing a penalty for carrying firearms while intoxicated in places where hunting is permitted", c. 159, St. 1941.
- ³³ "An Act relative to the possession of shotguns and shotgun shells as constituting prima facie evidence of the unlawful hunting of deer", c. 175, St. 1941.
- ³⁴ "An Act relative to the revision and codification of the laws relative to inland fisheries, birds and mammals", c. 599, St. 1941. Includes a specific summary of the powers of the Director, as in effect at that time.
- ³⁵ "An Act further defining the words "birds" and "mammals" in the laws relating to inland fisheries, birds and mammals", c. 663, St. 1941.
- ³⁶ Seventy-seventh Annual Report of the Division of Fisheries and Game for fiscal year December 1, 1941 to November 30, 1942. Part V of the Annual Report of the Commissioner of Conservation. [Division of Fisheries & Game], Boston, 30pp.
- ³⁷ Swartz, A.H. 1942. Fisheries survey report—1942. Division of Fisheries & Game, Boston, 180pp.
- ³⁸ McCabe, B.C. 1942. The distribution of fishes in the streams of western Massachusetts. Dissertation, Cornell University, Ithaca, N.Y., 181pp.

³⁹ McLaughlin, C.L. 1942. Food habits of the ring-necked pheasant in the Connecticut River Valley, Massachusetts. Mass. Department of Conservation, Division of Wildlife Research & Management, Research Bulletin No. 1, 51pp. Based on McLaughlin's thesis at Massachusetts State College.

⁴⁰ There were six subsequent Research Bulletins dealing with pheasants: Wandell, "1943 progress report on the pheasant banding study", Res. Bull, 2, 1944; Wandell, "An appraisal of pheasant stocking in Massachusetts", Res. Bull. 3, 1945; Wandell, "Results of the 1943 and 1944 pheasant banding studies", Res. Bull. 4, 1945; Wandell, "Progress report of the ring-necked pheasant investigations in the Connecticut River Valley", Res. Bull, 5, 1942; Pushee, "1945 progress report on the pheasant banding study", Res. Bull. 8, 1946; and Pushee, "Summary report: pheasant banding studies, 1943-46", Res. Bull. 9, 1948.

⁴¹ Seventy-eighth Annual Report of the Division of Fisheries and Game for fiscal year December 1, 1942 to June 30, 1943. Part V of the Annual Report of the Commissioner of Conservation. [Division of Fisheries & Game], Boston, 19pp. Note that this is an 8-month report due to a change in the state's fiscal year.

⁴² "An Act relative to the open season on opossums or raccoons", c. 90, St. 1943.

⁴³ "An Act permitting the sale of heads, hides and hoofs of deer in certain instances", c. 100, St. 1943.

⁴⁴ "An Act providing for the issuance of fishing licenses without charge to certain recipients of old age assistance, so-called", c. 265, 1943. Persons over 70 were eligible for a free license; those under 70 must be receiving old age assistance in order to receive one.

⁴⁵ "An Act temporarily authorizing the issuance to person in the military or naval service of the United States of special certificates entitling them to hunt and fish in this Commonwealth", c. 388, St. 1943. Residents were entitled to a free certificate; non-residents, \$2.00. This law was only in effect during the state of war.

⁴⁶ Seventy-ninth Annual Report of the Division of Fisheries and Game for fiscal year July 1, 1943 to June 30, 1944. Part V of the Annual Report of the Commissioner of Conservation. [Division of Fisheries & Game], Boston, 21pp.

⁴⁷ Eightieth Annual Report of the Division of Fisheries and Game for fiscal year July 1, 1944 to June 30, 1945. Part V of the Annual Report of the Commissioner of Conservation. [Division of Fisheries & Game], Boston, 21pp. The quotation is from page 8.

⁴⁸ Komins, M.W. 1979. Wildlife sanctuaries. Mass. Division of Fisheries & Wildlife, Westborough, Mass., 47pp. The Robson Sanctuary was the last sanctuary obtained by the Division until a few acres at Tarpaulin Cove on Naushon Island was transferred by the U.S. General Services Administration in 1977.

⁴⁹ "An Act defining the term "loaded shotgun or rifle" as used in laws relative to inland fisheries, birds and mammals", c. 83, St. 1945.

⁵⁰ "An Act providing for the enforcement of certain provisions of law relating to firearms and other dangerous weapons and ammunition therefor by officers charged with the enforcement of the fish and game laws", c. 132, St. 1945.

⁵¹ "An Act relative to the protection of the wood duck", c. 232, St. 1945.

- ⁵² “An Act authorizing the hunting or trapping and the possession of beaver during a portion of the year nineteen hundred and forty-six”, c. 251, St. 1945.
- ⁵³ Eighty-first Annual Report of the Division of Fisheries and Game for fiscal year July 1, 1945 to June 30, 1946. Part V of the Annual Report of the Commissioner of Conservation. [Division of Fisheries & Game], Boston, 29pp. The quotation is from page 1.
- ⁵⁴ “An Act establishing and setting up on the books of the Commonwealth a separate fund to be known as the Inland Fisheries and Game Fund”, c. 548, St. 1945.
- ⁵⁵ McCabe, B.C. (compiler) 1948. Fisheries report for lakes of central Massachusetts, 1944-1945. Department of Conservation, Division of Fisheries & Game, Boston, 254pp.
- ⁵⁶ “An Act penalizing the use of bait other than natural bait in ice fishing elsewhere than in the Connecticut River”, c. 79, St. 1946.
- ⁵⁷ “An Act relative to hunting on November eleventh or the day following when November eleventh occurs on Sunday”, c. 190, St. 1946.
- ⁵⁸ “An Act penalizing the use of certain firearms for hunting purposes”, c. 334, St. 1946.
- ⁵⁹ An Act permitting fishing in certain parts of the Quabbin Reservoir from the shore thereof”, c. 421, St. 1946.
- ⁶⁰ Eighty-second Annual Report of the Division of Fisheries and Game for fiscal year July 1, 1946 to June 30, 1947. Part V of the Annual Report of the Commissioner of Conservation. [Division of Fisheries & Game], Boston, 30pp.
- ⁶¹ Friends of the Upton State Forest, Inc., *Newsletter* v. 6(1), Winter 2011, page 2. Records of the Division of Fisheries & Wildlife indicate that the Phillips Laboratory was occupied in 1945.
- ⁶² Hagar, J.A. 1969. History of the Massachusetts peregrine falcon population, 1935-1957. Pages 123-131 in J.J. Hickey (ed.) *Peregrine Falcon Populations: Their Biology and Decline*. University of Wisconsin Press, Madison, Wisc., 596pp.
- ⁶³ Berger, D.D., C.R. Sindelar, Jr. and K.E. Gamble. 1969. The status of breeding peregrines in the eastern United States. Pages 165-173 in J.J. Hickey (ed.) *Peregrine Falcon Populations: Their Biology and Decline*. University of Wisconsin Press, Madison, Wisc., 596pp.
- ⁶⁴ Ratcliffe, D. 2003. Discovering the causes of peregrine decline. Pages 23-33 in T.J. Cade and W. Burnham (eds.) *Return of the Peregrine. A North American Saga of Tenacity and Teamwork*. The Peregrine Fund, Boise, Id., 394pp.
- ⁶⁵ “An Act relative to the revocation of certain licenses issued by the Division of Fisheries and Game”, c. 193, St. 1947.
- ⁶⁶ “An Act relative to fishing privileges for patients in veteran’s hospitals in Massachusetts”, c. 245, St. 1947.
- ⁶⁷ “An Act directing the Metropolitan District Commission to promulgate rules and regulations relative to the use of its lands and waters at Quabbin Reservoir for fishing purposes”, c. 300, St. 1947.

⁶⁸ Eighty-third Annual Report of the Division of Fisheries and Game for fiscal year July 1, 1947 to June 30, 1948. Division of Fisheries & Game, Boston, 26pp.

⁶⁹ “An Act providing for a close season on all birds and mammals during certain periods”, c. 249, St. 1948.

⁷⁰ “An Act relative to the issuance of sporting, hunting, fishing, and trapping licenses”, c. 302, St. 1948.

⁷¹ “An Act further regulating the trapping of certain animals, and providing for the registration of traps used therefor”, c. 615, St. 1948.

⁷² “An Act relative to the Department of Conservation”, c. 651, St. 1948. See esp. §§ 1-7, relative to the Fisheries and Game Board.

“Conservation is the Science of Man’s Successful Living in Relation
to Nature and Her Resources”: 1948-1959.

¹ Grange, W.B. 1949. *The Way to Game Abundance, with an Explanation of Game Cycles*. Charles Scribner’s Sons, New York, 365pp. The quotation is from page 350.

² Grun, B. 1982. *The Timetables of History*. Touchstone Books, Simon & Schuster, New York, 676pp.

³ Department of Commerce. 1975. *Historical Statistics of the United States. Colonial Times to 1970. Part I*. U.S. Department of Commerce, Bureau of the Census, Washington, D.C., 609pp.

⁴ Tager, J., R.W. Wilkie and L.W. Owens. 1991. Metropolitan Commonwealth, 1900-1950. Pages 38-45 in R.W. Wilkie and J. Tager (eds.) *Historical Atlas of Massachusetts*. University of Massachusetts Press, Amherst, Mass., 152pp.

⁵ Rivers, W.H. 1998. Massachusetts state forestry programs. Pages 147-219 in C.H.W. Foster (ed.) *Stepping Back to Look Forward. A History of the Massachusetts Forest*. Harvard University for the Harvard Forest, Petersham, Mass., 339pp.

⁶ Allen, D.L. [1954] 1962. *Our Wildlife Legacy*. Funks & Wagnalls, New York, 422pp. The quotation is from page 340.

⁷ Errington, P.L. 1957. *Of Men and Marshes*. Iowa State University Press, Ames, Ia., 150pp. The quotation is from page viii.

⁸ Greenway, J.C., Jr. 1958. *Extinct and Vanishing Birds of the World*. American Committee for International Wildlife Protection, New York, Special Publication No. 13, 518pp.

⁹ Matthiessen, P. 1959. *Wildlife in America*. Viking Press, New York, 304pp. (Rev. ed., 1987)

¹⁰ Ruark, R. 1957. *The Old Man and the Boy*. Holt, Rinehart & Winston, New York, 303pp., and, Ruark, R. 1961. *The Old Man’s Boy Grows Older*. Holt, Rinehart & Winston, New York, 302pp.

¹¹ The “Old Man” is modeled on both of Ruark’s grandfathers, but principally on his maternal grandfather, Captain Edward (“Ned”) Hall Adkins.

- ¹² Petrie, C. (ed.) 1987. *The Corey Ford Sporting Treasury*. Willow Creek Press, Wautoma, Wisc., 351pp.
- ¹³ Ford's poignant short story "The Road to Tinkhamtown" (written in 1964, published in 1969) has been praised as one of the best pieces of outdoor literature ever written.
- ¹⁴ Carlander, K.D. 1970. Education and training. Pages 57-69 in N.G. Benson (ed.) *A Century of Fisheries in North America*. American Fisheries Society, Washington, D.C., Special Publication No. 7, 330pp.
- ¹⁵ Ricker, W.E. 1948. *Methods of Estimating Vital Statistics of Fish Populations*. Indiana University Press, Bloomington, Ind., 101pp.
- ¹⁶ Ricker, W.E. 1958. *Handbook of Computations for Biological Statistics of Fish Populations*. Fisheries Research Board of Canada, Bulletin 119, 300pp.
- ¹⁷ Lagler, K.F. 1952. *Freshwater Fishery Biology*. W.C. Brown Co., Dubuque, Ia., 360pp. Primarily a laboratory or field manual, this book arose from earlier mimeographed or lithographed editions, and was succeeded by a second edition in 1956.
- ¹⁸ Rounsefell, G.A. and W. Harry Everhart. 1953. *Fishery Science, Its Methods and Applications*. J. Wiley & Sons, New York, 444pp. Revised and updated in 1975.
- ¹⁹ Larson, J.S. and F. Greeley. 1988. William Gulliver Sheldon, 1912-1987. *Wildlife Society Bulletin* 16:95-96.
- ²⁰ Act of August 9, 1950, c. 658, § 2, 64 Stat. 431; now codified at 16 U.S.C. §§ 777-777k, with amendments through 2005.
- ²¹ "An Act constituting the assent of the Commonwealth to the provisions of the Act of Congress entitled "An Act to provide that the United States shall aid the states in fish restoration and management projects, and for other purposes", c. 207, St. 1951.
- ²² Belanger, D.O. 1988. *Managing American Wildlife. A History of the International Association of Fish and Wildlife Agencies*. University of Massachusetts Press, Amherst, Mass., 247pp. See page 178.
- ²³ Shaw, S.P. 1951. The effect of insufficient harvests on an island deer herd. Paper presented at the Northeastern Fish and Wildlife Conference, Wilmington, Delaware, 6pp.
- ²⁴ Leopold, A., L.K. Sows and D.L. Spencer. 1947. A survey of over-populated deer ranges in the United States. *Journal of Wildlife Management* 11:162-177. Note: the date when deer were introduced to Nantucket and the alleged fact of their later "extermination" are both erroneous.
- ²⁵ Jones, W.R. 1950. The deer herd of Prescott Peninsula, Quabbin Reservation, and its ecology. Thesis, University of Massachusetts, Amherst, 123pp.
- ²⁶ Silver, H. and W.T. Silver. 1969. Growth and behavior of the coyote-like canid of northern New England with observations on canid hybrids. *Wildlife Monographs* 17:1-41.
- ²⁷ Severinghaus, C.W. 1974. Notes on the history of wild canids in New York. *New York Fish and Game Journal* 21:117-125.

- ²⁸ The taxonomy of *Canis* spp. in northeastern North America is contentious, and sometimes considered to encompass the gray wolf (*C. lupus*), the so-called eastern or Algonquin wolf (*C. lycaon*), and the coyote (*C. latrans*), as well as hybrids between and among these taxa. See (e.g.) Grewal, S.K., P.J. Wilson, T.K. King, K. Shami, M.T. Theberge, J.B. Theberge, and B.N. White. 2004. A genetic assessment of the eastern wolf (*Canis lycaon*) in Algonquin Provincial Park. *Journal of Mammalogy* 85:625-632.
- ²⁹ Until alternate taxonomy is widely accepted, I continue to refer to wild *Canis* in Massachusetts as “coyotes” (*C. latrans*), following *Mammal Species of the World* (3rd ed.) (Wilson & Reeder, Johns Hopkins University Press, 2005), accessed from www.bucknell.edu/msw3/ on 15 February 2013. See the account for *Canis lupus*.
- ³⁰ Pringle, L.P. 1960. Notes on coyotes in southern New England. *Journal of Mammalogy* 41:278.
- ³¹ Eighty-fourth Annual Report [of the] Division of Fisheries and Game covering the fiscal year from July 1, 1948 to June 30, 1949. Division of Fisheries & Game, Massachusetts Department of Conservation, Boston, 38pp.
- ³² Minutes of <the Fisheries and Game> Board Meeting, Thursday, October 21, 1948, 15 Ashburton Place, Boston, Mass. On file with the Division of Fisheries & Wildlife, Field Headquarters.
- ³³ McCabe, B.C. and A.H. Swartz. 1952. Fisheries Report—Lakes of Plymouth County—1946, Berkshire County—1947, Barnstable County—1948. Division of Fisheries & Game [Boston], 269pp.
- ³⁴ “An Act relative to the hunting of deer”, c. 283, St. 1949.
- ³⁵ “An Act authorizing the granting of fishing licenses to certain aliens”, c. 516, St. 1949.
- ³⁶ “An Act relative to the form of licenses issued for sporting, hunting, fishing, and trapping”, c. 545, St. 1949.
- ³⁷ “An Act relative to the payment of compensation for damage caused by deer or moose”, c. 751, St. 1949.
- ³⁸ “An Act further regulating the trapping of certain animals and providing for the registration of traps used therefor”, c. 758, St. 1949.
- ³⁹ “Resolve providing for an investigation and study by a special commission relative to the organization, administration, powers and duties of the Department of Conservation and of similar departments or authorities in other states”, c. 50, Resolves of 1949.
- ⁴⁰ Eighty-fifth Annual Report [of the] Massachusetts Division of Fisheries and Game covering the fiscal year from July 1, 1949 to June 30, 1950. Division of Fisheries & Game [Boston], 48pp.
- ⁴¹ McCabe, B.C. 1952. Fisheries report for lakes of Northeastern Massachusetts—1949. Division of Fisheries & Game, Bureau of Wildlife Research & Management, 115pp.
- ⁴² McCabe, B.C. 1953. Fisheries report for lakes and ponds of Northcentral Massachusetts—1950. Division of Fisheries & Game, Bureau of Wildlife Research & Management, 122pp.

- ⁴³ “An Act authorizing the Division of Fisheries and Game to enter into an agreement with the Secretary of the Army of the United States for the purpose of acquiring a license for the Commonwealth to use the Birch Hill area for fish and wildlife management”, c. 723, St. 1950.
- ⁴⁴ Hagar, J.A. 1948. Black duck mortality in the Parker River region, winter of 1947-48. Mass. Department of Conservation, Boston, 31pp.
- ⁴⁵ “An Act further regulating the trapping of certain mammals”, c. 107, St. 1950.
- ⁴⁶ “An Act further regulating the trapping of mammals”, c. 138, St. 1950.
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- ⁵⁷ “An Act relative to the use of firearms”, c. 353, St. 1951.
- ⁵⁸ “An Act increasing the fees for sporting, hunting, fishing, and trapping licenses”, c. 405, St. 1951.
- ⁵⁹ “An Act relative to the keeping of certain records by fur buyers”, c. 429, St. 1951.
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Bureau of Wildlife Research and Management, 447pp.

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⁶⁷ “An Act further regulating the discharge of injurious substances into waters used for fishing”, c. 501, St. 1952.

⁶⁸ [Eighty-eighth] Annual Report [of the] Massachusetts Division of Fisheries and Game [Department of Conservation, Boston], [July 1, 1952 to June 30] 1953, 55pp.

⁶⁹ “An Act relative to the organization, powers and duties of the Department of Natural Resources”, c. 631, St. 1953.

⁷⁰ “An Act authorizing the director of the Division of Fisheries and Game to regulate the taking of certain fish”, c. 478, St. 1953.

⁷¹ “An Act authorizing the director of the Division of Fisheries and Game to regulate the taking of deer”, c. 480, St. 1953.

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⁷³ “An Act authorizing the director of the Division of Fisheries and Game to regulate the hunting and taking of mammals”, c. 482, St. 1953.

⁷⁴ “An Act allowing the use of dogs for waterfowl hunting during the open season on deer”, c. 115, St. 1953.

⁷⁵ “An Act providing for the display of sporting, hunting, fishing or trapping licenses”, c. 218, St. 1953.

⁷⁶ “An Act requiring the tagging of deer”, c. 241, St. 1953.

⁷⁷ “An Act relative to the protection of salmon on the Connecticut River or its tributaries”, c. 285, St. 1953.

⁷⁸ “An Act authorizing the Commonwealth to enter into a compact with the State of Connecticut for inaugurating legislation to protect the return of salmon and other migratory fish to the Connecticut River”, c. 599, St. 1953.

⁷⁹ [Eighty-ninth] Annual Report [of the] Massachusetts Division of Fisheries and Game [Boston], [July 1, 1953 to June 30] 1954, 32pp.

⁸⁰ Couture, L.H. 1954. Seventy-four million dollars a year just for fun. Massachusetts Division of Fisheries & Game [Boston], Research Bulletin No. 14 [first ed. not numbered], 10pp. Supplement, “How It was Done” [by] S. Russell and L.H. Couture, University of Massachusetts Extension Service, Amherst, 8pp. Second ed., 1957.

⁸¹ Hagar, J.A. 1954. Northeastern flyway: a proposal for more effective waterfowl management in the New England coastal states and Long Island. Division of Fisheries &

Game, Bureau of Wildlife Research & Management [Boston], 28pp.

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⁸⁴ “An Act regulating the taking of trout in coastal waters”, c. 99, St. 1954.

⁸⁵ “An Act relative to sporting, hunting, fishing and trapping licenses issued to certain minors”, c. 457, St. 1954.

⁸⁶ [Ninetieth] Annual Report [of the] Massachusetts Division of Fisheries and Game [Boston], [July 1, 1954 to June 30] 1955, 30pp.

⁸⁷ Boyle, J.D. 1955. An evaluation of stocking New Brunswick hare in Massachusetts mixed forest habitat. Thesis, University of Massachusetts, Amherst, 67pp.

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⁸⁹ “An Act authorizing the issuance of fishing licenses to aliens”, c. 292, St. 1955.

⁹⁰ “An Act authorizing the sale of live bait on the Lord’s Day”, c. 304, St. 1955.

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⁹² “An Act relative to the revocation of hunting, fishing, and trapping licenses”, c. 647, St. 1955.

⁹³ “Resolve providing for an investigation and study by a special commission relative to hunting and fishing within the Commonwealth and certain matters relating thereto, including the subject of ground water level within the Commonwealth”, c. 84, St. 1955.

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⁹⁵ Hoar, A.R. 1990. Partial chronology of events associated with fish passage on the mainstem Connecticut River. U.S. Fish & Wildlife Service, Newton Corner, Mass., [10] pp., unpublished document.

⁹⁶ Saville, W.S. 1958. Fur facts and trapping in Massachusetts. Division of Fisheries & Game, Boston, 41pp.

⁹⁷ The first issue, numbered Vol. VII, No. 1, dated January-February 1956, featured the Quabbin Reservoir on the cover, and contained the Director’s remarks, and articles on fishing at Quabbin, forestry and fishing, and gun safety, as well as a pictorial on the raising and stocking of trout.

⁹⁸ “An Act relative to the penalty for hunting birds by boats and the possession of fire-arms therein”, c. 254, St. 1956.

⁹⁹ “An Act authorizing the director of the Division of Fisheries and Game to take certain lands by eminent domain”, c. 326, St. 1956.

¹⁰⁰ “An Act relative to permits for netting certain fish in the inland waters of the Commonwealth”, c. 420, St. 1956.

¹⁰¹ “Resolve reviving and continuing the special commission relative to hunting and fishing within the Commonwealth and certain matters relating thereto, including the subject of the ground water level within the Commonwealth”, c. 23, Resolves of 1956.

¹⁰² “Resolve increasing the scope of the investigation and study of the commission established to make an investigation and study relative to hunting and fishing within the Commonwealth and certain matters relating thereto, including the subject of the ground water level within the Commonwealth”, c. 60, Resolves of 1956.

¹⁰³ [Ninety-second] Annual Report [of the] Massachusetts Division of Fisheries and Game [Boston], [July 1, 1956 to June 30] 1957, 28pp.

¹⁰⁴ Ripley, T.H. 1957. The bobwhite in Massachusetts. Massachusetts Division of Fisheries & Game [Boston], Research Bulletin No. 15, 20pp.

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¹⁰⁶ “An Act requiring the wearing of red or yellow clothing or material while hunting during the open season for deer”, c. 40, St. 1957.

¹⁰⁷ “An Act authorizing the director of the Division of Fisheries and Game to extend the number of days for the hunting of ruffed grouse, quail or pheasant”, c. 105, St. 1957.

¹⁰⁸ “An Act allowing the taking of certain fish by means of a bow and arrow”, c. 116, St. 1957.

¹⁰⁹ “An Act authorizing the director of the Division of Fisheries and Game to acquire additional public shooting grounds and to regulate further the use of such grounds”, c. 320, St. 1957.

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¹¹¹ [Ninety-third] Annual Report [of the] Massachusetts Division of Fisheries and Game [Boston], [July 1, 1957 to June 30] 1958, 33pp. The quotation is from page 2.

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¹¹³ Mullan, J.W. 1958. The sea-run or “salter” brook trout fishery of the coastal streams of Cape Cod, Massachusetts. Massachusetts Division of Fisheries & Game, Research Bulletin No. 17, 25pp.

¹¹⁴ “An Act prohibiting the hunting of certain wild and undomesticated birds”, c. 440, St. 1958.

¹¹⁵ “Resolve providing for an investigation and study relative to the feasibility of establishing a fish hatchery in the area adjacent to Quabbin Reservoir”, c. 80, Resolves of 1958.

¹¹⁶ [Ninety-fourth] Annual Report [of the] Massachusetts Division of Fisheries and Game [Boston], [July 1, 1958 to June 30] 1959, 31pp.

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- 118 Larson, J.S. 1958. A study of posting on private land in Massachusetts. Thesis, University of Massachusetts, Amherst, 106pp.
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- 123 "An Act increasing the fees for sporting, hunting, fishing and trapping licenses", c. 333, St. 1959.
- 124 "An Act relative to hunting and fishing rights of a person without a license on land owned or leased by him", c. 498, St. 1959.
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- ⁷⁷ “An Act designating the fish hatchery on the Swift River in the town of Belchertown as the Charles L. McLaughlin Fish Hatchery”, c. 205, St. 1967.
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- ⁸³ “An Act revising the laws relating to inland fisheries and game and other natural resources”, c. 802, St. 1967.
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- ⁸⁵ The revisions also repealed the existing bounty on “wildcats” (i.e., bobcat). This action terminated the last state bounty on terrestrial mammals. However, some municipalities paid bounties on woodchucks and foxes at least until 1970 (e.g., Annual Reports of the Town of Falmouth for 1970, page 252).
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⁹⁹ Heusmann, H.W. 1969. An analysis of the potential creation of productive wetlands by interstate highway construction with emphasis on waterfowl management. Thesis, University of Massachusetts, Amherst, Mass., 97pp.

¹⁰⁰ “An Act further regulating the wearing of hunting clothes during the open deer season”, c. 157, St. 1969.

¹⁰¹ “An Act authorizing the Division of Fisheries and Game to acquire land and construct a fishing pier at Cook Pond in the city of Fall River”, c. 542, St. 1969.

¹⁰² “An Act authorizing the director of fisheries and game to undertake a program of management to provide sport fishing at Cook Pond in the city of Fall River”, c. 566, St. 1969.

¹⁰³ “An Act exempting paraplegics from payment of a fee for a hunting license”, c. 652, St. 1969.

¹⁰⁴ [One Hundred and Fifth] Annual Report [of the] Massachusetts Division of Fisheries and Game [Boston], [July 1, 1969 to June 30] 1970, 33pp.

¹⁰⁵ “An Act providing for the transfer of certain land and buildings in the town of Westborough from the Department of Mental Health to the Division of Fisheries and Game”, c. 501, St. 1970.

¹⁰⁶ Hoar, A.R. 1990. Partial chronology of events associated with fish passage on the mainstem Connecticut River. U.S. Fish & Wildlife Service, Newton Corner, Mass., [10] pp., unpublished document.

¹⁰⁷ Cardoza, J.E. 1976. The history and status of the black bear in Massachusetts and adjacent New England states. Division of Fisheries & Wildlife, Westborough, Mass., Research Bulletin 18, 113pp.

¹⁰⁸ “An Act providing that action required for the protection of certain fisheries in inland waters be assigned to the director of the Division of Water Pollution Control”, c. 136, St. 1970.

¹⁰⁹ “An Act further regulating the wearing of hunting clothing during the deer season”, c. 167, St. 1970. This law changed the requirement to 500 in² and provided for the Director to define “hunter orange”. See the Code of Massachusetts Regulations, 321 CMR 3.01(2).

¹¹⁰ “An Act permitting fishing in Silver Lake in the towns of Pembroke, Halifax, Kingston and Plympton”, c. 579, St. 1970. This is a special law, not an amendment to a general law.

¹¹¹ “An Act relative to the injury and killing of fish and fish spawn in the inland waters of the Commonwealth and requiring remuneration for fish so injured or killed”, c. 612, St. 1970.

¹¹² “An Act providing aid to paraplegics while hunting”, c. 732, St. 1970.

“A National Teach-In on the Crisis of the Environment”: the 1970s.

¹ Remarks of Senator Gaylord Anton Nelson (1916-2005) proposing the concept of “Earth Day”, *Congressional Record*, v. 115, no. 164, October 8, 1969.

² Grun, B. 1982. *The Timetables of History*. Touchstone Books, Simon & Schuster, New York, 676pp.

³ National Environmental Policy Act of 1969, P.L. 91-190, 83 Stat. 852, codified at 42 U.S.C. § 4321 *et seq.* Accessed from http://en.wikipedia.org/wiki/National_Environmental_Policy_Act on 1 March 2013.

- ⁴ Clean Air Act of 1970, P.L. 88-206, 77 Stat. 382, codified at 42 U.S.C. 7401 *et seq.* Extension in 1970 and amendments in 1977 and 1990. Accessed from [http://en.wikipedia.org/wiki/Clean_Air_Act\(UnitedStates\)](http://en.wikipedia.org/wiki/Clean_Air_Act(UnitedStates)) on 1 March 2013.
- ⁵ Federal Water Pollution Control Amendments of 1972 (“Clean Water Act”), P.L. 92-500, 86 Stat. 816, codified at 33 U.S.C. § 1251 *et seq.* Accessed from http://en.wikipedia.org/wiki/Clean_Water_Act on 1 March 2013.
- ⁶ Bean, M.J. and M.J. Rowland. 1997. *The Evolution of National Wildlife Law* (3rd ed.) Praeger Publishers, Westport, Conn., 544pp. See pages 109-147.
- ⁷ Marine Mammal Protection Act of 1972, P.L. 92-522, 86 Stat. 0127, codified at 16 U.S.C. §§ 1361-1421h.
- ⁸ Joint Resolution asking the President of the United States to declare the fourth Saturday of September 1972 “National Hunting and Fishing Day”. Senate Joint Resolution 117, 92nd Congr., 2 Sess., 86 Stat. 133.
- ⁹ “An Act to provide for the conservation of endangered and threatened species of wild-life and plants, and for other purposes”. P.L. 93-205, 87 Stat. 884, codified at 7 U.S.C. § 136 and 16 U.S.C. §§ 1531 *et seq.*, as amended in 1978, 1979, and 1983.
- ¹⁰ Convention on International Trade in Endangered Species of Flora and Fauna, signed at Washington D.C. on March 3, 1973, and amended at Bonn, Germany, on June 22, 1979. See also <http://www.cites.org> accessed on 1 March 2013.
- ¹¹ *Kleppe v. New Mexico*, 426 U.S. 529 (1976).
- ¹² *Baldwin v. Fish and Game Commission of Montana*, 436 U.S. 371 (1978).
- ¹³ Allen, J.A. 1869. Catalogue of the mammals of Massachusetts; with a critical review of the species (Cetacea). *Bulletin of the Museum of Comparative Zoology* 1(8):143-252.
- ¹⁴ Cardoza, J.E. 1986. A preliminary assessment of the status of fisher and river otter in Massachusetts. Appended to: Report of Massachusetts Federal Aid in Wildlife Restoration Project W-35-R-28, Job I-6, [18]+[71]pp.
- ¹⁵ Fisher continued to expand their range in Massachusetts and by 2012 were well-distributed statewide except the island counties of Dukes and Nantucket.
- ¹⁶ Turner, J. 1980. *Reckoning with the Beast. Animals, Pain, and Humanity in the Victorian Mind.* Johns Hopkins University Press, Baltimore, Md., 190pp.
- ¹⁷ Gentile, J.R. 1987. The evolution of anti-trapping sentiment in the United States: a review and commentary. *Wildlife Society Bulletin* 15:490-503.
- ¹⁸ Peterle, T.J. 1977. Hunters, hunting, anti-hunting. *Wildlife Society Bulletin* 5:151-161.
- ¹⁹ Singer, P. 1990. *Animal Liberation* (2nd ed.) New York Review of Books, New York, 320pp.
- ²⁰ Schweitzer, A. 1933. *Out of My Life and Thought.* Henry Holt & Co., New York, 288pp. See page 185.
- ²¹ Brabazon, J. 2000. *Albert Schweitzer: a Biography* (2nd ed.) Syracuse University Press, Syracuse, N.Y., 555pp.

- ²² Ortega y Gasset, J. 1972. *Meditations on Hunting*. Charles Scribner's Sons, New York, 152pp. The quotation is from page 112.
- ²³ Shepard, P. 1996. *The Others. How animals made us human*. Island Press, Washington, D.C., 374pp. The quotation is from page 9.
- ²⁴ The Wildlife Society did not include public relations in its "Techniques Manual" until 1980 (and then only briefly). See: Shay, R.E. 1980. Gaining public acceptance of wildlife management. Pages 495-498 in Schemnitz, S.D. (ed.) *Wildlife Management Techniques Manual* (4th ed.) The Wildlife Society, Washington, D.C., 686pp.
- ²⁵ Gilbert, D.L. 1971. *Natural Resources and Public Relations*. The Wildlife Society, Washington, D.C., 320pp. A rewriting of Gilbert's earlier college text. The quotation is from page 1.
- ²⁶ Horwitz, E.C.J. (ed.) 1977. *The Ways of Wildlife*. Citation Press/Scholastic, New York, 157pp.
- ²⁷ Bailey, J.A., W. Elder and T.D. McKinney (eds.) 1974. *Readings in Wildlife Conservation*. The Wildlife Society, Washington, D.C., 722pp.
- ²⁸ Some later key papers "that have advanced the wildlife profession" were referenced by: Leopold, B.D. and P.R. Krausman. 2012. Science in print: the lifeblood of the Society. *The Wildlife Professional* 6(3):48-53.
- ²⁹ O'Roke, E.C. 1948. Diseases and parasites of wild animals. Pages 309-384 in R.E. Trippensee. *Wildlife Management: upland game and general principles*. v. 1. McGraw Hill Book Co., New York, 479pp. The quotation is from page 369.
- ³⁰ Davis, J.W., L.H. Karstad, and D.O. Trainer (eds.) 1970. *Infectious Diseases of Wild Mammals*. Iowa State University Press, Ames, Ia., 421pp. The most recent [3rd] edition is by Williams and Barker, 2001.
- ³¹ Davis, J.W. and R.C. Anderson (eds.) 1971. *Parasitic Diseases of Wild Mammals*. Iowa State University Press, Ames, Ia., 364pp. The most recent [2nd] edition is by Samuel et al., 2001.
- ³² Davis, J.W., R.C. Anderson, L. Karstad, and D.O. Trainer (eds.) 1971. *Infectious and Parasitic Diseases of Wild Birds*. Iowa State University Press, Ames, Ia., 344pp. The quotation is from page ix. The most recent editions are by Atkinson et al., 2007 (parasitic) and Thomas et al., 2007 (infectious).
- ³³ Trefethen, J.B. 1975. *An American Crusade for Wildlife*. Winchester Press and Boone and Crockett Club, New York, 409pp.
- ³⁴ Another conservation history appearing at the same time (Reiger, G.F. 1975. *American Sportsmen and the Origins of Conservation*. Winchester Press, New York, 316pp.) has been criticized for its near-sole focus on the role of sportsmen. See (e.g.) Banks, R.C. 1976. [Review of] *American sportsmen and the origins of conservation*. *Auk* 93:864-865.
- ³⁵ Caughley, G. 1977. *Analysis of Vertebrate Populations*. J. Wiley & Sons, New York, 234pp.
- ³⁶ [One Hundred and Sixth] Annual Report [of the] Massachusetts Division of Fisheries and Game [Boston], [July 1, 1970 to June 30] 1971, 25pp.

- ³⁷ The use of rotenone has been challenged as to its effects on aquatic communities and human health. Standards are now in place regarding its application in fisheries management. See: Finlayson, B., R. Schnick, D. Skaar, J. Anderson, L. Demay, D. Duffield, W. Horton, and J. Steinkjer. 2010. Planning and standard operating procedures for the use of rotenone in fish management. American Fisheries Society, Bethesda, Md., 128pp.
- ³⁸ Haines, T.A. and R.E. Johnson (eds.) 1982. Acid Rain/Fisheries. Proceedings of an international symposium on acidic precipitation and fishery impacts in northeastern North America. American Fisheries Society, Bethesda, Md., 357pp.
- ³⁹ “An Act authorizing trapping by certain minors when accompanied by an adult”, c. 60, St. 1971.
- ⁴⁰ “An Act relative to regulating boating on great ponds”, c. 498, St. 1971.
- ⁴¹ [One Hundred and Seventh] Annual Report [of the] Massachusetts Division of Fisheries and Game [Boston], [July 1, 1971 to June 30] 1972, 21pp.
- ⁴² Hoar, A.R. 1990. Partial chronology of events associated with fish passage on the mainstem Connecticut River. U.S. Fish & Wildlife Service, Newton Corner, Mass., [10] pp., unpublished document.
- ⁴³ “An Act providing for the protection of endangered species of wild animals”, c. 876, St. 1971.
- ⁴⁴ “An Act protecting the gray wolf, giant otter, and all South American otters of the genus *Lutra*”, c. 126, St. 1972.
- ⁴⁵ “An Act further regulating the transfer of protected species of fish, birds and mammals and exempting certain zoos from the law prohibiting the sale, possession or importation of such species”, c. 125, St. 1972.
- ⁴⁶ “An Act authorizing shooting on commercial shooting preserves on certain Sundays”, c. 135, St. 1972.
- ⁴⁷ “An Act further regulating the procedure for importing inland fish and wildlife into the Commonwealth”, c. 223, St. 1972.
- ⁴⁸ “An Act further regulating the discharge of firearms within a certain distance from buildings”, c. 261, St. 1972.
- ⁴⁹ “An Act designating the Montague State Fish Hatchery in the Town of Montague as the Bitzer State Fish Hatchery”, c. 322, St. 1972. Named in honor of fish culturists Harold M. Bitzer (1903-1984) with 50 years of service and Ralph Raymond Bitzer (1901-1990), with 55 years of service.
- ⁵⁰ “An Act providing for an annual deer hunt for paraplegics”, c. 422, St. 1972.
- ⁵¹ “An Act relative to hunting certain birds of prey”, c. 445, St. 1972.
- ⁵² [One Hundred and Eighth] Annual Report [of the] Massachusetts Division of Fisheries and Game [Boston], [July 1, 1972 to June 30] 1973, 18pp. The quotation is from the inside front cover.
- ⁵³ “An Act further protecting the inland wetlands and flood plains of the Commonwealth”, c. 782, St. 1972.

⁵⁴ “An Act relative to the protection of wetlands”, c. 784, St. 1972. See G.L. c. 131, §§ 40 and 40A, and 310 CMR 10.00.

⁵⁵ For an evaluation of the Massachusetts wetlands protection act (through 1988) and its associated regulations, see: Griffin, C.R. 1989. Protection of wildlife habitat by state wetland regulations: the Massachusetts initiative. Transactions of the North American Wildlife and Natural Resources Conference 54:22-31.

⁵⁶ Blandin, W.W. and H.W. Heusmann. 1974. Establishment of Canada goose populations through urban gosling transplants. Transactions of the Northeast Wildlife Conference 31:83-100.

⁵⁷ Heusmann, H.W., W.W. Blandin, and R.E. Turner. 1977. Starling-deterrent nesting cylinders in wood duck management. Wildlife Society Bulletin 5:14-18.

⁵⁸ “An Act further regulating the licensing of propagators and dealers of certain birds and mammals and increasing the license fees therefor”, c. 573, St. 1972.

⁵⁹ “An Act transferring certain land in the Town of Westborough from the Department of Mental Health and the Trustees of the Westborough State Hospital to the Division of Fisheries and Game”, c. 580, St. 1972.

⁶⁰ “An Act further regulating licensing programs and fees relative to fish, birds and mammals”, c. 706, St. 1972.

⁶¹ “An Act further regulating trapping by minors and the issuance of minor’s certificates of competency in the safe handling of firearms”, c. 156, St. 1973.

⁶² [One Hundred Ninth and One Hundred Tenth] Annual Reports [of the] Massachusetts Division of Fisheries and Game [Boston], [July 1 to June 30] 1974 and 1975, 35pp.

⁶³ Since this was a 2-year combined Annual Report, I have separated the accomplishments and activities into annual segments, where possible.

⁶⁴ Report of the Attorney General for 1974, Public Document No. 12, pages 45-46, Opinion No. 2 regarding applications for an antlerless deer permit, July 17, 1973.

⁶⁵ Cardoza, J.E. 2009. The wild turkey in Massachusetts. Massachusetts Division of Fisheries & Wildlife, Westborough, Mass., Research Bulletin 20, 172pp.

⁶⁶ “An Act relative to the use of certain raptors for hunting purposes”, c. 496, St. 1973.

⁶⁷ “An Act authorizing the State Treasurer to receive funds from the director of the Division of Fisheries and Game”, c. 879, St. 1973.

⁶⁸ “An Act requiring persons owning certain animals to be licensed by the Department of Natural Resources”, c. 1071, St. 1973. The “exemption list” is promulgated at 321 CMR 9.01

⁶⁹ “An Act providing for a Massachusetts waterfowl stamp”, c. 420, St. 1974.

⁷⁰ “Resolve providing for an investigation and study by the Division of Fisheries and Game relative to certain hunting, fishing and wildlife matters”, c. 129, Resolves of 1973.

⁷¹ “An Act establishing an Executive Office of Environmental Affairs”, c. 806, St. 1974.

⁷² See c. 806 §§ 26-27, 29, 31, St. 1974.

⁷³ See: McCord, C.M. 1974a. Courtship behavior in free-ranging bobcats. *World's Cats* 2:76-89, and, 1974b. Selection of winter habitat by bobcats (*Lynx rufus*) on the Quabbin Reservation, Massachusetts. *Journal of Mammalogy* 55:428-437.

⁷⁴ “An Act proving for the quarantine of certain diseased fish, birds, mammals, reptiles and amphibians”, c. 667, St. 1974.

⁷⁵ “An Act prohibiting the use of certain traps or other devices for the capture of fur-bearing mammals”, c. 796, St. 1974.

⁷⁶ “An Act further regulating the protection of wetlands”, c. 818, St. 1974.

⁷⁷ “An Act relative to the penalty for the unlawful possession of a deer”, c. 30, St. 1975.

⁷⁸ “An Act redefining the term “loaded shotgun or rifle” in the law relative to inland fisheries and game”, c. 162, St. 1975.

⁷⁹ “An Act further regulating the issuance of minor’s certificate of competency in the safe handling of firearms”, c. 217, St. 1975.

⁸⁰ [One Hundred Eleventh and One Hundred Twelfth] Annual Reports [of the] Massachusetts Division of Fisheries and Game [Boston], [July 1 to June 30] 1976 and 1977, 55pp.

⁸¹ Since this was a 2-year combined Annual Report, I have separated the accomplishments and activities into annual segments, where possible.

⁸² Phenicie, C.K. and J.R. Lyons. 1973. Tactical planning in fish and wildlife management and research. U.S. Bureau of Sport Fisheries & Wildlife, Washington, D.C., Resource Publication No. 123, 19pp.

⁸³ Mugford, P.S. 1976. An inventory of Massachusetts fish and wildlife (vertebrate) resources. Massachusetts Division of Fisheries & Wildlife, Boston, 70pp. The document also includes a list of “declining” species in 6 categories.

⁸⁴ “An Act relative to the appraisal of damages caused by deer”, c. 498, St. 1975.

⁸⁵ “An Act providing for the reimbursement of certain farmers for damage caused by deer or moose”, c. 115, St. 1976.

⁸⁶ “An Act relative to the Executive Office of Environmental Affairs”, c. 706, St. 1975.

⁸⁷ “An Act allowing certain non-residents of the Commonwealth to be issued complimentary hunting and fishing licenses”, c. 178, St. 1976.

⁸⁸ Grose, P.L. and J.S. Mattson (eds.) 1977. The Argo Merchant oil spill: a preliminary scientific report. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Washington, D.C., variously paged.

⁸⁹ Hoar, A.R. 1990. Partial chronology of events associated with fish passage on the mainstem Connecticut River. U.S. Fish & Wildlife Service, Newton Corner, Mass., [10] pp., unpublished document.

⁹⁰ “An Act relative to the payment of fees for antlerless deer permits”, c. 381, St. 1976.

- ⁹¹ “An Act further regulating license requirements for falconers and the sport of falconry”, c. 542, St. 1977.
- ⁹² “An Act prohibiting the use of certain animals as lures or bait”, c. 679, St. 1977.
- ⁹³ “An Act further regulating field trials under the control of the Division of Fisheries and Wildlife”, c. 921, St. 1977.
- ⁹⁴ “An Act relative to the commercial harvest of eels in the waters of the Commonwealth”, c. 971, St. 1977.
- ⁹⁵ “An Act reducing the fee for hunting and fishing licenses for certain persons over sixty-five years of age”, c. 983, St. 1977.
- ⁹⁶ [One Hundred and Thirteenth] Annual Report [of the] Massachusetts Division of Fisheries and Wildlife [Boston], [July 1, 1977 to June 30] 1978, 53pp.
- ⁹⁷ Heusmann, H W 1983. Are the Canada geese a threat to shellfish? Cape Naturalist 12:4648.
- ⁹⁸ Schultz, W.C. 1978. Acclimation of stocked New Brunswick hare in Massachusetts. Thesis, University of Massachusetts, Amherst, 65pp.
- ⁹⁹ Harding, J. 1978. An animal damage identification guide for urban, suburban, and agricultural areas in Massachusetts. Thesis, University of Massachusetts, Amherst, 157pp.
- ¹⁰⁰ “An Act further regulating the issuance of sporting, hunting, fishing and trapping licenses”, c. 113, St. 1978.
- ¹⁰¹ “An Act relative to the loss of licenses for certain fish and game violations”, c. 276, St. 1978.
- ¹⁰² “An Act providing for the noncriminal disposition of certain fish and game and marine fishery violations”, c. 387, St. 1978.
- ¹⁰³ [One Hundred and Fourteenth] Annual Report [of the] Massachusetts Division of Fisheries and Wildlife [Boston], [July 1, 1978 to June 30] 1979, 54pp.
- ¹⁰⁴ Hodgdon, H.E. 1978. Social dynamics and behavior within an unexploited beaver (*Castor canadensis*) population. Dissertation, University of Massachusetts, Amherst, 292pp.
- ¹⁰⁵ “An Act relative to permits issued for certain aquacultural purposes”, c. 473, St. 1978.
- ¹⁰⁶ “An Act transferring control of certain land at Gardner State Hospital to the Executive Office of Environmental Affairs”, c. 505, St. 1978.
- ¹⁰⁷ [One Hundred Fifteenth and One Hundred Sixteenth] Annual Reports [of the] Massachusetts Division of Fisheries and Wildlife [Boston], [July 1 to June 30] 1980 and 1981, 62pp. The quotation is from page 4.
- ¹⁰⁸ Since this was a 2-year combined Annual Report, I have separated the accomplishments and activities into annual segments, where possible.
- ¹⁰⁹ McCord, C.M. 1981a. Controversy. Massachusetts Wildlife 32(1):10-11.

- ¹¹⁰ McCord, C.M. 1981b. Bobcat update. *Massachusetts Wildlife* 32(3):14-17.
- ¹¹¹ Lancia, R.A. 1979. Year-long activity patterns of radio-marked beaver (*Castor canadensis*). Dissertation, University of Massachusetts, Amherst, 146pp.
- ¹¹² Cooperative agreement between the United States Fish and Wildlife Service and the Massachusetts Division of Fisheries and Wildlife for the management of endangered species, 6pp. <signed> William Ashe, Regional Director, USFWS, 31 August 1979 [and] Richard Cronin, Director, MDFW, 21 August 1979. Later amended.
- ¹¹³ “An Act relative to the hunting of wild turkeys”, c. 404, St. 1979.
- ¹¹⁴ “An Act relative to reptiles and amphibians”, c. 614, St. 1979.
- ¹¹⁵ “An Act providing for the listing of endangered wildlife and wild plant species”, c. 726, St. 1979.
- ¹¹⁶ “An Act amending license fees for hunting, fishing, and trapping”, c. 767, St. 1979.
- ¹¹⁷ “An Act relative to registration and identification of traps”, c. 84, St. 1980.
- ¹¹⁸ “An Act further regulating rules and regulations relative to great ponds”, c. 154, St. 1980.
- ¹¹⁹ “An Act regulating access to the Massachusetts Natural Heritage data base”, c. 328. St. 1980.

“The Division [has] a Clear Mandate to Operate a Nongame Program”: the 1980s:

- ¹ For one historical perspective, see: Adams, W.C. 1931. Wild life administration and the fish and game commissioner. *Auk* 48:42-51.
- ² For an early usage of the word, see: Anonymous. 1887. Fourth meeting of the American Ornithologists’ Union. *Auk* 4:56-61. “...Committee for the Protection of North American Birds...has drafted what it seems a suitable law for the protection of song and nongame birds”. [page 58]
- ³ Accessed from <http://en.wikipedia.org/wiki/1980s>, on 7 March 2013.
- ⁴ Tager, J., R.W. Wilkie and L.W. Owens. 1991. Metropolitan Commonwealth, 1900-1950. Pages 38-45 in R.W. Wilkie and J. Tager (eds.) *Historical Atlas of Massachusetts*. University of Massachusetts Press, Amherst, Mass., 152pp.
- ⁵ Fish and Wildlife Conservation Act (“Nongame Act”), P.L. 96-366, approved September 29, 1980, codified at 16 U.S.C. 2901-2911, 94 Stat. 1322.
- ⁶ Federal Aid in Sport Fish Restoration Act, P.L. 98-369, approved July 18, 1984, codified at 26 U.S.C. 9504, 98 Stat. 1012. Amended several times.
- ⁷ Accessed from <http://www.fws.gov/birdhabitat/NAWMP/index.shtm> on 8 March 2013.
- ⁸ Soulé, M. 1987. History of the Society for Conservation Biology. *Conservation Biology* 1:4-5.

- ⁹ The phrase appears in the first sentence of the first paper in the first issue of the *Journal of Wildlife Management*: “In the new and growing field of conservation biology...”. See: Errington, P.L. and F.N. Hamerstrom, Jr. 1937. The evaluation of nesting losses and juvenile mortality of the ring-necked pheasant. *Journal of Wildlife Management* 1/2:3-20.
- ¹⁰ Soulé, M.E. (ed.) 1987. *Conservation Biology. The Science of Scarcity and Diversity*. Sinauer Associates, Sunderland, Mass., 584pp. The quotation is from page ix. A rewriting and expansion of *Conservation Biology: an evolutionary-ecological perspective*, Soulé and Wilcox, 1980.
- ¹¹ Chapman, G.A. and G.A. Feldhamer (eds.) 1982. *Wild Mammals of North America. Biology•Management•Economics*. Johns Hopkins University Press, Baltimore, Md., 1147pp. Second edition by G.A. Feldhamer, B.C. Thompson, and J.A. Chapman, 2003.
- ¹² Novak, M., J.A. Baker, M.E. Obbard, and B. Malloch (eds.) 1987. *Wild Fur-bearer Management and Conservation in North America*. Ontario Ministry of Natural Resources, Toronto, Ont., Canada, 1150pp.
- ¹³ Nielsen, L.A. and D.L. Johnson (eds.) 1983. *Fisheries Techniques*. American Fisheries Society, Bethesda, Md., 468pp. [2nd ed., Murphy & Willis, 1996; 3rd ed., Zale et al., 2012).
- ¹⁴ [One Hundred Fifteenth and One Hundred Sixteenth] Annual Reports [of the] Massachusetts Division of Fisheries and Wildlife [Boston], [July 1 to June 30] 1980 and 1981, 62pp.
- ¹⁵ Since this was a 2-year combined Annual Report, I have separated the accomplishments and activities into annual segments, where possible.
- ¹⁶ “An Act authorizing the Commissioner of Administration to set fees and charges paid to the Commonwealth”, c. 572, St. 1980. See esp. §§ 231-248.
- ¹⁷ [One Hundred Seventeenth and One Hundred Eighteenth] [sic; this is only a 1-year, 117th Report] Annual Reports [of the] Massachusetts Division of Fisheries and Wildlife [Boston], [July 1 to June 30] 1982, 55pp.
- ¹⁸ Sczerzenie, P.J. 1981. *An ecological approach to deer management in Massachusetts*. Dissertation, University of Massachusetts, Amherst, 220pp.
- ¹⁹ Heusmann, H.W. and R.H. Bellville. 1982. *Wood duck research in Massachusetts, 1970-1980*. Massachusetts Division of Fisheries & Wildlife, Westborough, Mass., Research Bulletin 19, 67pp. Includes errata sheet.
- ²⁰ “An Act relative to the use of certain weapons during the primitive hunting season”, c. 661, St. 1981.
- ²¹ “An Act concerning the establishment of a Connecticut River Atlantic Salmon Commission”, c. 716, St. 1981. CRASC was reauthorized for 20 years in 2002.
- ²² “An Act authorizing the Division of Capital Planning and Operations to convey certain land in the Town of Sunderland to the Department of the Interior, Fish and Wildlife Service”, c. 741, St. 1981.
- ²³ “An Act relative to certain fish and game fees”, c. 758, St. 1981.

- ²⁴ “An Act providing for the use of special equipment by handicapped hunters”, c. 39, St. 1982.
- ²⁵ [One Hundred Nineteenth] [sic; this was misnumbered and is the 118th Report] Annual Report [of the] Massachusetts Division of Fisheries and Wildlife [Boston], [July 1, 1982 to June 30] 1983, 47pp.
- ²⁶ See (among other critiques): Allen, S.K., Jr. and R.J. Waffendorf. 1987. Triploid grass carp: status and management implications. *Fisheries* (Bethesda) 12:20-24.
- ²⁷ Olsen, G.H. 1983. Population dynamics of raccoons in Massachusetts. Dissertation, University of Massachusetts, Amherst, 179pp.
- ²⁸ [One Hundred Nineteenth] Annual Report [of the] Massachusetts Division of Fisheries and Wildlife [Boston], [July 1, 1983 to June 30] 1984, 64pp. This is the correct 119th Annual Report.
- ²⁹ “An Act relative to funding for nongame wildlife programs in the Commonwealth”, c. 330, St. 1983.
- ³⁰ Elowe, K.D. 1984. Home range, movements, and habitat preferences of black bear in western Massachusetts. Thesis, University of Massachusetts, Amherst, 112pp. See also his later dissertation: “Factors affecting black bear reproductive success and cub survival in Massachusetts”, 1987, University of Massachusetts, Amherst, 71pp.
- ³¹ “An Act increasing the surety bond of persons authorized to issue licenses for the Division of Fisheries and Wildlife”, c. 538, St. 1983.
- ³² “An Act relative to the Connecticut River Salmon Compact”, c. 610, St. 1983.
- ³³ [One Hundred and Twentieth] Annual Report [of the] Massachusetts Division of Fisheries and Wildlife [Boston], [July 1, 1984 to June 30] 1985, 49pp.
- ³⁴ A policy for the conservation of inland fish and wildlife resources of Massachusetts. Adopted by the <Fisheries and Game> Board, August 30, 1984. 18pp. Amendments include those relative to naming of wildlife management areas (1980), issuance of farmer-landowner antlerless permits (1982), rules to speak before the Board (1984), *Massachusetts Wildlife* magazine (1986), land resources and disposition (1990), advertising (2008), and bicycle paths (2010).
- ³⁵ For opposing views, see: Eveland, T.E. and E.B. Horton. 1984. The Crane and its deer. Friends of Animals, Inc., Norwalk, Conn., 32pp., and, Deblinger, R.D., D.W. Rimmer, J.J. Vaske, G.M. Vecellio, and M.P. Donnelly. 1993. Ecological benefits and hunter acceptance of a controlled deer hunt in coastal Massachusetts. *Northeast Wildlife* 50:11-21.
- ³⁶ This was to be the highest amount ever received (1984-2012).
- ³⁷ “An Act allowing for a turkey hunting season in a certain area of the Mount Greylock State Reservation”, c. 219, St. 1985.
- ³⁸ “An Act further regulation commercial shooting preserves”, c. 254, St. 1985.
- ³⁹ “An Act authorizing the shooting of certain wounded migratory game birds from a powered boat”, c. 329, St. 1985.

⁴⁰ “An Act authorizing the reproduction of the Fuertes bird paintings”, c. 483, St. 1985.

⁴¹ “An Act making appropriations for the fiscal year nineteen hundred and eighty-six for the maintenance of the departments, boards, commissions, institutions and certain activities of the Commonwealth <etc.>”, c. 140, St. 1985. See § 52 (page 577-78 in the Acts & Resolves) relative to *Massachusetts Wildlife*.

⁴² [One Hundred and Twenty-first] Annual Report [of the] Massachusetts Division of Fisheries and Wildlife [Boston], [July 1, 1985 to June 30] 1986, 50pp.

⁴³ Memorandum of Understanding concerning Bear and Moose Control <between the Division of Fisheries and Wildlife and the Division of Law Enforcement> <signed> Richard Cronin, Director Division of Fisheries & Wildlife <and> Allan McGroary, Director, Division of Law Enforcement. Later amended.

⁴⁴ Limited authorities cooperative agreement between the United States Fish & Wildlife Service and the Massachusetts Division of Fisheries and Wildlife <for> Endangered and Threatened Plant Species. Unnumbered pages <signed> William Ashe, Regional Director, USFWS, 28 January 1986 [and] Richard Cronin, Director, MDFW, 23 January 1986. Later amended.

⁴⁵ “An Act authorizing use of the Division of Fisheries and Wildlife Nongame Wildlife Fund to acquire other than fee interests in certain property”, c. 770, St. 1985.

⁴⁶ “An Act exempting veterinarians from civil liability as a result of rendering emergency care to nondomestic animals”, c. 131, St. 1986.

⁴⁷ [One Hundred and Twenty-second] Annual Report [of the] Massachusetts Division of Fisheries and Wildlife [Boston], [July 1, 1986 to June 30] 1987, 47pp.

⁴⁸ A cross between a domestic (i.e., hatchery-raised) brook trout and a wild-strain Canadian brook trout, so named for the Témiscamie River in Quebec. These trout allegedly have greater survival in acidified water than do domestic-strain trout and have a longer life span.

⁴⁹ “An Act protecting wildlife under the Wetlands Protection Act”, c. 262, St. 1986. Regulations addressing wildlife values and protection—other than fish, “rare” species and vernal pools—have yet to be developed and implemented.

⁵⁰ “An Act prohibiting the counterfeiting of tags and seals issued by the Division of Fisheries and Wildlife”, c. 159, St. 1986.

⁵¹ “An Act regulating the transportation of certain reptiles and amphibians for commercial purposes”, c. 160, St. 1986.

⁵² “An Act relative to contributions to the Nongame Wildlife Fund on state income tax returns”, c. 570, St. 1986.

⁵³ [One Hundred and Twenty-third] Annual Report [of the] Massachusetts Division of Fisheries and Wildlife [Boston], [July 1, 1987 to June 30] 1988, 51pp.

⁵⁴ For two historical perspectives on the effects of lead poisoning in waterfowl, see: McAtee, W.L. 1908. Lead poisoning in ducks. *Auk* 25:472, and, Sanderson, G.C. and F.C. Bellrose. 1986. A review of the problem of lead poisoning in waterfowl. *Illinois Natural History Survey Special Publication No. 4*, 34pp.

- ⁵⁵ Heusmann, H W and T. Early 1988. A comparison of wooden boxes and plastic buckets as waterfowl nesting structures. *Wildlife Society Bulletin* 16:4548.
- ⁵⁶ “An Act designating the Field Headquarters of the Division of Fisheries and Wildlife at the Lyman School for Boys in the Town of Westborough as the Richard Cronin Building”, c. 6, St. 1988.
- ⁵⁷ [One Hundred and Twenty-fourth] Annual Report [of the] Massachusetts Division of Fisheries and Wildlife [Boston], [July 1, 1988 to June 30] 1989, 59pp.
- ⁵⁸ Promulgated at 321 CMR 2.13.
- ⁵⁹ Promulgated at 321 CMR 2.14.
- ⁶⁰ Halliwell, D.B. 1989. A classification of streams in Massachusetts: to be used as a fisheries management tool. Dissertation, University of Massachusetts, Amherst, 234pp.
- ⁶¹ “An Act further regulating permitted shotgun shell size”, c. 193, St. 1988.
- ⁶² “An Act establishing a procedure for the disposal of certain killed deer”, c. 294, St. 1988.
- ⁶³ [One Hundred and Twenty-fifth] Annual Report [of the] Massachusetts Division of Fisheries and Wildlife [Boston], [July 1, 1989 to June 30] 1990, 54pp.
- ⁶⁴ *Commonwealth v. Black*, 403 Mass. 675, 679 (1989).
- ⁶⁵ Newman, D.G. 1990. Habitat ecology of river otters in central Massachusetts. Thesis, University of Massachusetts, Amherst, 56pp.
- ⁶⁶ Promulgated at 321 CMR 9.02.
- ⁶⁷ “An Act making appropriations for the fiscal year nineteen hundred and ninety for the maintenance of the departments, boards, commissions, institutions and certain activities of the Commonwealth <etc.>”, c. 240, § 122, St. 1989.
- ⁶⁸ “An Act relative to the establishment of nature preserves”, c. 652, St. 1989.
- ⁶⁹ MacIvor, L.H. 1990. Population dynamics, breeding ecology, and management of piping plovers on outer Cape Cod, Massachusetts. Thesis, University of Massachusetts, Amherst, 100pp.
- ⁷⁰ “An Act establishing the budget control and reform act of 1989”, c. 653, §§ 22 and 93, St. 1989.

Lessons Ably Formulated and Implemented as a Conservation Doctrine: the 1990s.

- ¹ Accessed from <http://en.wikipedia.org/wiki/1990s>, on 17 March 2013.
- ² Junger, S. 1997. *The Perfect Storm: a True Story of Men against the Sea*. W.W. Norton & Co., New York, 227pp.
- ³ Foster, C.H.W. 1998. The Massachusetts forest today. Pages 319-331 *in* *Stepping Back to Look Forward. A History of the Massachusetts Forest*. Harvard University for the Harvard Forest, Petersham, Mass., 339pp.

- ⁴ Geist, V. 1995. North American policies of wildlife conservation. Pages 77-129 in V. Geist and I. McTaggart-Cowan (eds.) *Wildlife Conservation Policy*. Detselig Enterprises, Ltd., Calgary, Alberta, Canada, 308pp. The quotation is from page 77.
- ⁵ Geist, V., S.P. Mahoney, and J.F. Organ. 2001. Why hunting has defined the North American model of wildlife conservation. *Transactions of the North American Wildlife and Natural Resources Conference* 66:175-185.
- ⁶ Organ, J.F., S.P. Mahoney and V. Geist. 2010. Born in the hands of hunters: the North American model of wildlife conservation. *The Wildlife Professional* 4(3):22-27.
- ⁷ Mahoney, S.P. and D. Cobb. 2010. Future challenges to the model. *The Wildlife Professional* 4(3):83-85.
- ⁸ Dunlap, T.R. 1988. *Saving America's Wildlife*. Princeton University Press, Princeton, N.J., 222pp.
- ⁹ Cartmill, M. 1993. *A View to a Death in the Morning*. Hunting and Nature through History. Harvard University Press, Cambridge, Mass., 331pp.
- ¹⁰ The anatomist and anthropologist Raymond Arthur Dart (1893-1988) proposed that early hominids evolved large brains and bipedal locomotion because those features allegedly facilitated hunting.
- ¹¹ Herman, D.J. 2001. *Hunting and the American Imagination*. Smithsonian Institution Press, Washington, D.C., 356pp.
- ¹² For another perspective on hunting traditions and ethics, see: Posewitz, J. 1994. *Beyond Fair Chase*. The ethic and tradition of hunting. Falcon Press Publishing, Helena, Mt., 118pp., and, 1999. *Inherit the Hunt*. A Journey into the Heart of American Hunting. Falcon Press, Helena, Mt., 122pp.
- ¹³ Dizard, J.E. 2003. *Mortal Stakes*. Hunters and Hunting in Contemporary America. University of Massachusetts Press, Amherst, Mass., 225pp. See esp. pages 199-207.
- ¹⁴ [One Hundred and Twenty-sixth] Annual Report [of the] Massachusetts Division of Fisheries and Wildlife [Boston], [July 1, 1990 to June 30] 1991, 53pp.
- ¹⁵ "An Act relative to the protection and maintenance of Quabbin watershed lands", c. 436, St. 1990.
- ¹⁶ Lyons, P.J. 1993. Deer management on a public water supply. *Northeast Wildlife* 50:29-36.
- ¹⁷ Dizard, J.E. 1994. *Going Wild*. Hunting, Animal Rights, and the Contested Meaning of Nature. University of Massachusetts Press, Amherst, Mass., 182pp.
- ¹⁸ This is still (as of 2012) an all-time record for the fall turkey season.
- ¹⁹ Decker, T.A. 1991. Mortality, habitat use, and bedsite characteristics of white-tailed deer fawns in western Massachusetts. Thesis, University of Massachusetts, Amherst, 92pp.
- ²⁰ "An Act to provide protection for endangered and threatened species", c. 408, St. 1990.

- ²¹ The statute did not repeal G.L. c. 131, § 4(13A), thus there are two processes providing for lists of “rare” species. In actuality, the two lists (321 CMR 8.01 and 10.90) are cross-referenced to be identical.
- ²² “An Act making appropriations for the fiscal year nineteen hundred and ninety-one for the maintenance of the departments, boards, commissions, institutions and certain activities of the Commonwealth <etc.>”, c. 150, §§ 225, 226, and 312. These sections changed the name of the Nongame Wildlife Fund, provided for accrual of interest, and increased the waterfowl stamp fee and provided for allocation of stamp monies.
- ²³ “An Act establishing a wildlands conservation stamp and a wildlands acquisition account”, c. 72, St. 1990.
- ²⁴ “An Act relative to the revocation and suspension of fish and game licenses”, c. 371, St. 1990.
- ²⁵ “An Act relative to the Massachusetts waterfowl stamp”, c. 433, St. 1990.
- ²⁶ [One Hundred and Twenty-seventh] Annual Report [of the] Massachusetts Division of Fisheries and Wildlife [Boston], [July 1, 1991 to June 30] 1992, 51pp.
- ²⁷ Jenkins, S.R. and W.G. Winkler. 1987. Descriptive epidemiology from an epizootic of raccoon rabies in the Middle Atlantic states, 1982-1983. *American Journal of Epidemiology* 126:429-437.
- ²⁸ “An Act making appropriations for the fiscal year nineteen hundred and ninety-two for the maintenance of the departments, boards, commissions, institutions and certain activities of the Commonwealth <etc.>”, c. 138, § 49, St. 1991.
- ²⁹ “An Act relative to the harassment of hunters, fishermen, and trappers”, c. 364, St. 1991.
- ³⁰ “An Act designating the wild turkey as the game bird of the Commonwealth”, c. 406, St. 1991.
- ³¹ [One Hundred and Twenty-eighth] Annual Report [of the] Massachusetts Division of Fisheries and Wildlife [Boston], [July 1, 1992 to June 30] 1993, 48pp.
- ³² Fuller, D.P. 1993. Black bear population dynamics in western Massachusetts. Thesis, University of Massachusetts, Amherst, 136pp.
- ³³ “An Act making appropriations for the fiscal year nineteen hundred and ninety-three for the maintenance of the departments, boards, commissions, institutions and certain activities of the Commonwealth <etc.>”, c. 133, § 488, St. 1992.
- ³⁴ [One Hundred and Twenty-ninth] Annual Report [of the] Massachusetts Division of Fisheries and Wildlife [Boston], [July 1, 1993 to June 30] 1994, 50pp.
- ³⁵ Jackson, S. and P. Mirick. 1993. Massachusetts snakes. A guide. Mass. Division of Fisheries and Wildlife & University of Massachusetts Cooperative Extension Service, Publication C-214, 20pp.
- ³⁶ “An Act further regulating civil infractions”, c. 182, St. 1993.
- ³⁷ “An Act relative to archery”, c. 217, St. 1993.

³⁸ “An Act making appropriations for the fiscal year ending June thirtieth, nineteen hundred and ninety-four to provide for supplementing existing appropriations and for certain other activities and projects”, c. 495, St. 1993, §§ 33 and 34.

³⁹ [One Hundred and Thirtieth] Annual Report [of the] Massachusetts Division of Fisheries and Wildlife [Boston], [July 1, 1994 to June 30] 1995, 50pp.

⁴⁰ Promulgated at 321 CMR 4.09.

⁴¹ “An Act authorizing the division of capital planning and operations to transfer certain parcels of land in the Towns of Westborough and Northborough and the City of Worcester”, c. 329, St. 1994.

⁴² [One Hundred and Thirty-first] Annual Report [of the] Massachusetts Division of Fisheries and Wildlife [Boston], [July 1, 1995 to June 30] 1996, 51pp.

⁴³ *Massachusetts Society for the Cruelty of Animals et al. v. Division of Fisheries and Wildlife* (and a companion case), 420 Mass. 639.

⁴⁴ Promulgated at 321 CMR 2.07

⁴⁵ Cardoza, J.E. 2009. The wild turkey in Massachusetts. Massachusetts Division of Fisheries & Wildlife, Westborough, Mass., Research Bulletin 20, 172pp.

⁴⁶ York, E.C. 1996. Fisher population dynamics in north-central Massachusetts. Thesis, University of Massachusetts, Amherst, 122pp.

⁴⁷ “An Act making appropriations for the fiscal year nineteen hundred and ninety-six for the maintenance of the departments, boards, commissions, institutions, and certain activities of the Commonwealth <etc.>”, c. 38, St. 1995, §§ 143, 144, 145 and 266.

⁴⁸ “An Act providing for an environmental and protection program for the Commonwealth”, c. 15, St. 1996, §§ 25, 26 and 60 and items 2310-8960-62.

⁴⁹ [One Hundred and Thirty-second] Annual Report [of the] Massachusetts Division of Fisheries and Wildlife [Boston], [July 1, 1996 to June 30] 1997, 53pp.

⁵⁰ “An Act [sic] The Massachusetts Wildlife Protection Act”, c. 453, St. 1996. Enacted by ballot referendum at the November 5, 1996 state election. This legislation: (1) prohibited all traps except body-gripping traps and cage, box, or net traps, restricted body-gripping traps to certain health and safety situations, when so permitted by a municipal Board of Health, and allowed cage, box, and net traps, (2) prohibited the hunting of bear and bobcat with dogs or bait, except under permit for damage control or research, and (3) removed the requirement for Fisheries & Wildlife board members to have held a sporting license for five years.

⁵¹ In 1996, 85% of those voting in the election voted on Question 1 (the “Wildlife Protection Act”), with 55% “yes” and 30% “no”. In 1992, 95% of those voting in the election voted on Question 3 (“Proposition 2½”), with 56% “yes” and 40% “no”. The Wildlife Protection Act imposed certain requirements on municipal Boards of Health, which was determined by the Division of Local Mandates to be a “unfunded mandate” and thus a contravention of G.L. c. 59, § 21C as enacted by Question 3.

⁵² Promulgated at 321 CMR 2.08.

⁵³ Promulgated at 321 CMR 2.05

- ⁵⁴ Endangered Species Act Section 6 Cooperative Agreement among the National Marine Fisheries Service of the National Oceanic and Atmospheric Administration of the U.S. Department of Commerce, the Massachusetts Department of Fisheries, Wildlife & Environmental Law Enforcement, and the Massachusetts Division of Fisheries and Wildlife for the conservation of endangered and threatened species. <approved> July 8, 1996, <amended> November 13, 2012.
- ⁵⁵ Davis, W.J. 1997. Massachusetts Wildlife Viewing Guide. Falcon Press, Helena, Mt., 96pp.
- ⁵⁶ “An Act making appropriations for the fiscal year nineteen hundred and ninety-seven for the maintenance of the departments, boards, commissions, institutions, and certain activities of the Commonwealth <etc.>”, c. 151, §§ 290, 549 and 640.
- ⁵⁷ “An Act relative to the use of certain firearms during the hunting season”, c. 296, St. 1996.
- ⁵⁸ “An Act relative to the mandatory display of fish and game licenses”, c. 422, St. 1997.
- ⁵⁹ [One Hundred and Thirty-third] Annual Report [of the] Massachusetts Division of Fisheries and Wildlife [Boston], [July 1, 1997 to June 30] 1998, 57pp.
- ⁶⁰ Jackson, S. and T. Decker. 1993. Beavers in Massachusetts. Natural history, benefits and ways to resolve conflicts between people and beavers. University of Massachusetts Cooperative Extension System & Massachusetts Division of Fisheries and Wildlife, Publication C-213, 16pp. [Revised edition, 2004]
- ⁶¹ Langlois, S. and T. Decker. 1997. The use of water flow devices in addressing flooding problems caused by beaver in Massachusetts. Massachusetts Division of Fisheries & Wildlife, 13pp.
- ⁶² Milam, J.C. 1997. Home range, habitat use and conservation of spotted turtles (*Clemmys guttata*) in central Massachusetts. Thesis, University of Massachusetts, Amherst, Mass., 114pp.
- ⁶³ French, T.W., J.E. Cardoza, and G.S. Jones. 1997. A homeowner’s guide to Massachusetts bats and bat problems (Rev. ed.) Massachusetts Division of Fisheries & Wildlife, 15pp.
- ⁶⁴ “An Act allowing for the use of crossbows by certain handicapped persons”, c. 146, St. 1997.
- ⁶⁵ “An Act authorizing the competitive disposition of certain land located in the Town of Wilbraham”, c. 175, St., 1996, and, “An Act authorizing certain conveyances in the Town of Wilbraham”, c. 143, St. 1998.
- ⁶⁶ [One Hundred and Thirty-fourth] Annual Report [of the] Massachusetts Division of Fisheries and Wildlife [Boston], [July 1, 1998 to June 30] 1999, 51pp.
- ⁶⁷ Connecticut River Atlantic Salmon Commission. 1998. Strategic plan for the restoration of Atlantic salmon to the Connecticut River. Connecticut River Atlantic Salmon Commission, Sunderland, Mass., 109pp.
- ⁶⁸ McDonald, J.E., Jr. 1998. The effects of food supply and nutrition on black bear reproductive success and milk composition. Dissertation, University of Massachusetts, Amherst, 156pp.

⁶⁹ Barbour, H., T. Simmons, P. Swain and H. Woolsey. 1998. Our irreplaceable heritage. Massachusetts Division of Fisheries and Wildlife & Massachusetts Chapter of The Nature Conservancy, 83pp.

⁷⁰ “An Act making appropriations for the fiscal year 1999 for the maintenance of the departments, boards, commissions, institutions, and certain activities of the Commonwealth <etc.>”, c. 194, § 309, St. 1998.

⁷¹ [One Hundred and Thirty-fifth] Annual Report [of the] Massachusetts Division of Fisheries and Wildlife [Boston], [July 1, 1999 to June 30] 2000, 53pp.

⁷² Agreement between the Division of Law Enforcement and the Division of Fisheries and Wildlife Governing the Hunter Education Program<signed> David M. Peters, Commissioner, Department of Fisheries, Wildlife & Environmental Law Enforcement, Richard A. Murray, Director, Division of Law Enforcement <and> Wayne F. MacCallum, Director, Division of Fisheries & Wildlife, April 26, 2000.

The Intrinsic Value of Biological Diversity and [its] Importance for Evolution and for Maintaining Life Sustaining Systems of the Biosphere: the 2000s.

¹ Convention on Biological Diversity, United Nations, 1992. Preamble, paragraphs 1 and 2.

² Accessed from [**http://en.wikipedia.org/wiki/2000s_\(decade\)**](http://en.wikipedia.org/wiki/2000s_(decade)) on 22 March 2013.

³ Accessed from [**http://www.census.gov/2010_census/data/**](http://www.census.gov/2010_census/data/) on 22 March 2013.

⁴ de la Crétz, A.L., L.S. Fletcher, P.E. Gregory, W.R. Van Doren and P.K. Barten. 2010. An assessment of the forest resources of Massachusetts. Department of Natural Resources Conservation, University of Massachusetts, Amherst, and Massachusetts Department of Conservation & Recreation, 175pp. See pages 173-74.

⁵ Accessed from [**http://en.wikipedia.org/wiki/International_Year_of_Biodiversity**](http://en.wikipedia.org/wiki/International_Year_of_Biodiversity) on 22 March 2013.

⁶ Accessed from [**http://en.wikipedia.org/wiki/Convention_on_Biological_Diversity**](http://en.wikipedia.org/wiki/Convention_on_Biological_Diversity) on 22 March 2013.

⁷ Exclusive of the United States, Andorra and the Holy See. The U.S.A. has signed—but not ratified—the Convention.

⁸ Rands, M.R.W., W.M. Adams, L. Bennun, S.H.M. Butchart, A. Clements, D. Coomes, A. Entwistle, I. Hodge, V. Kapos, J.P.W. Scharlemann, W.J. Sutherland, and B. Vira. 2010. Biodiversity conservation: challenges beyond 2010. *Science* 329:1298-1303.

⁹ Durand, B. 2001. Scalable solutions: managing biodiversity in Massachusetts. *Transactions of the North American Wildlife and Natural Resources Conference* 66:33-38.

¹⁰ Massachusetts Natural Heritage and Endangered Species Program. 2001. Biomap: guiding land conservation for biodiversity in Massachusetts. Massachusetts Division of Fisheries & Wildlife, Westborough, Mass., 58pp.

- ¹¹ Massachusetts Natural Heritage and Endangered Species Program. 2003. Living Waters: guiding the protection of freshwater biodiversity in Massachusetts. Massachusetts Division of Fisheries & Wildlife, Westborough, Mass., 50pp.
- ¹² Woolsey, H., A. Finton and J. DeNormandie. 2010. BioMap 2: conserving the biodiversity of Massachusetts in a changing world. Massachusetts Division of Fisheries & Wildlife and The Nature Conservancy, 60pp.
- ¹³ “Department of the Interior and Related Agencies Appropriations Act, 2002”, P.L. 107-63, November 5, 2001, 115 Stat. 414 et seq. See § 414. See later reauthorizations, 2007 and 2012.
- ¹⁴ [One Hundred and Thirty-sixth] Annual Report [of the] Massachusetts Division of Fisheries and Wildlife [Boston], [July 1, 2000 to June 30] 2001, 63pp.
- ¹⁵ “An Act relative to foothold traps and certain other devices”, c. 139, St. 2000.
- ¹⁶ [One Hundred and Thirty-seventh] Annual Report [of the] Massachusetts Division of Fisheries and Wildlife [Boston], [July 1, 2001 to June 30] 2002, 68pp.
- ¹⁷ Whitlock, A.L. 2002. Ecology and status of the bog turtle (*Clemmys muhlenbergii*) in New England. Dissertation, University of Massachusetts, Amherst, 147pp.
- ¹⁸ “An Act designating natural heritage functions of the department of fisheries, wildlife and environmental law enforcement”, c. 23, St. 2002.
- ¹⁹ “An Act relative to the environmental protection of the Massachusetts Military Reservation”, c. 47, St. 2002.
- ²⁰ [One Hundred and Thirty-eighth] Annual Report [of the] Massachusetts Division of Fisheries and Wildlife [Boston], [July 1, 2002 to June 30] 2003, 71pp.
- ²¹ “An Act making appropriations for the fiscal year 2004 for the maintenance of the departments, boards, commissions, institutions, and certain activities of the Commonwealth <etc.>”, c. 26, §§ 384, 622, 710 and 713, St. 2003.
- ²² “An Act authorizing certain conveyances of land to establish the Southeastern Massachusetts Bioreserve”, c. 266, St. 2002.
- ²³ “An Act further regulating the use of crossbows in the Commonwealth”, c. 397, St. 2002.
- ²⁴ [One Hundred and Thirty-ninth] Annual Report [of the] Massachusetts Division of Fisheries and Wildlife [Boston], [July 1, 2003 to June 30] 2004, 67pp.
- ²⁵ “An Act relative to the Inland Fisheries and Game Fund”, c. 101, St. 2003.
- ²⁶ [One Hundred and Fortieth] Annual Report [of the] Massachusetts Division of Fisheries and Wildlife [Boston], [July 1, 2004 to June 30] 2005, 75pp.
- ²⁷ Blodget, B.G., R. Dettmers and J. Scanlon. 2009. Status and trends of birds in an extensive western Massachusetts forest. *Northeastern Naturalist* 16:423-442.
- ²⁸ [One Hundred and Forty-first] Annual Report [of the] Massachusetts Division of Fisheries and Wildlife [Boston], [July 1, 2005 to June 30] 2006, 77pp.
- ²⁹ Division of Fisheries and Wildlife. 2006. Massachusetts Comprehensive Wildlife

Conservation Strategy, 2005. Executive Office of Environmental Affairs, Division of Fisheries & Wildlife, Boston, Mass., 790pp. Available at: http://www.mass.gov/dfwele/dfw/habitat/cwcs/pdf/mass_cwcs_final.pdf.

³⁰ “An Act relative to a loaded shotgun or rifle”, c. 137, St. 2005.

³¹ [One Hundred and Forty-second] Annual Report [of the] Massachusetts Division of Fisheries and Wildlife [Boston], [July 1, 2006 to June 30] 2007, 86pp.

³² Somers, P., R. Kramer, K. Lombard and B. Brumback. 2006. A guide to invasive plants in Massachusetts. Massachusetts Division of Fisheries & Wildlife, 79pp.

³³ “An Act removing automatic qualification for certain licenses”, c. 137, St. 2006.

³⁴ [One Hundred and Forty-third] Annual Report [of the] Massachusetts Division of Fisheries and Wildlife [Boston], [July 1, 2007 to June 30] 2008, 88pp. ³⁵ “An Act prohibiting Internet hunting”, c. 83, St. 2007.

³⁶ [One Hundred and Forty-fourth] Annual Report [of the] Massachusetts Division of Fisheries and Wildlife [Boston], [July 1, 2008 to June 30] 2009, 85pp.

³⁷ Kashiwagi, M. and T. Richards. 2009. Development of target fish community models for Massachusetts mainstem rivers. Massachusetts Division of Fisheries & Wildlife, Technical Report, 85pp.

³⁸ [One Hundred and Forty-fifth] Annual Report [of the] Massachusetts Division of Fisheries and Wildlife [Boston], [July 1, 2009 to June 30] 2010, 87pp.

³⁹ “An Act relative to the inspection, registration, construction and reconstruction of dams”, c. 330, St. 2002. See G.L. c. 253, §§ 44-50 and 302 CMR 10.00-10.16.

⁴⁰ Cardoza, J.E., D.P. Fuller and R. Taylor. 2009. What’s new in Massachusetts black bear studies? *Massachusetts Wildlife* 59(1):33-37.

⁴¹ Armstrong, D.S., T.A. Richards and S.L. Brandt. 2010. Preliminary assessment of factors influencing riverine fish communities. U.S. Geological Survey, Open File Report 2010-1139, 44pp. Accessed from <http://pubs.usgs.gov/of/2010/1139> on 26 March 2013.

⁴² [One Hundred and Forty-sixth] Annual Report [of the] Massachusetts Division of Fisheries and Wildlife [Boston], [July 1, 2010 to June 30] 2011, 93pp.

⁴³ “An Act regulating the use of off-highway and recreation vehicles”, c. 202, St. 2010.

⁴⁴ Wattles, D.W. 2011. Status, movements and habitat use of moose in Massachusetts. Thesis, University of Massachusetts, Amherst, 115pp.

⁴⁵ Coleman, J. et al. 2011. A national plan for assisting federal agencies, states and tribes in managing white-nose syndrome in bats. U.S. Fish & Wildlife Service, 17pp. Losses now (2012) approximate 5.7-6.7 million bats.

⁴⁶ [One Hundred and Forty-seventh] Annual Report [of the] Massachusetts Division of Fisheries and Wildlife [Boston], [July 1, 2011 to June 30] 2012, 96pp.

⁴⁷ “An Act making appropriations for the fiscal year 2012 for the maintenance of the departments, boards, commissions, institutions, and certain activities of the Common-

wealth <etc.>”, c. 68, § 92, St. 2011.

⁴⁸ Slater, C. 2013. Anadromous fish investigations. Progress Report, 2012-2013. Massachusetts Federal Aid in Fisheries Restoration Grant F-45-R-31, [14]pp.

⁴⁹ Data provided by Caleb Slater, Massachusetts Division of Fisheries & Wildlife, March 2013.

⁵⁰ MacCallum, W. 2013. Letting go of a dream. Massachusetts Wildlife 63(1):2-3.

⁵¹ DFW Biodiversity Initiative Update—Spring 2013. Accessed from <http://www.mass.gov/dfwele/dfw/habitat/management/bdi/> on 1 April 2013.

In Summary: the Essence of Wildlife Management:

¹ Riley, S.J., D.J. Decker, L.H. Carpenter, J.F. Organ, W.F. Siemer, G.F. Mattfeld, and G. Parsons. 2002. The essence of wildlife management. Wildlife Society Bulletin 30:585-593.

² Buchan, J. 1923. Introduction *in* The Nations of Today. Vol. 1. Great Britain. Houghton-Mifflin Co., Boston. The quotation is from page 12.

³ DeGraaf, R.M. and W.H. Healy. 1993. The myth of nature’s constancy—preservation, protection and ecosystem management. Transactions of the North American Wildlife and Natural Resources Conference 58:17-28.

⁴ Hoffer, E. 1967. The Temper of Our Times. Harper & Row, New York, 111pp. “The nature of a society is largely determined by the direction in which talent and ambition flow—by the tilt of the social landscape” (p. 104).

⁵ Eliot, T.S. [1943] 1952. Burnt Norton. Pages 117-122 *in* The Complete Poems and Plays, 1909-1950. Harcourt, Brace & World, Inc., New York, 392pp. The quotation is from Pt. I, page 117. Eliot emphasizes the need of the individual to focus on the present moment.

⁶ “An Act concerning obstructions to the passage of fish in the Connecticut and Merrimack Rivers”, c. 238, St. 1866.

⁷ [First] Report of the Commissioners of Fisheries, for the year ending January 1, 1867. Commonwealth of Massachusetts, House Document 3, [Wright & Potter? Boston] submitted November 30, 1866, [9]pp. [in transcription].

⁸ Department of Fish and Game Affirmative Action Report, second quarter FY13, 28 March 2013. Totals do not include 4 vacant full-time positions or seasonal employees (an indeterminate number are generally hired annually in spring and summer).

⁹ In 1977, women comprised 25% of the students in college programs in wildlife and 20% of those in fisheries, most as undergraduates. See: Hodgdon, H.E. 1980. Enrollment of women and ethnic minorities in wildlife curricula, 1977. Wildlife Society Bulletin 8:158-163.

¹⁰ G.L. c. 131 and 131A and 321 CMR. Some few additional duties, responsibilities and powers appear elsewhere in law.

- ¹¹ MacDonnell, C.A. 2012. Wildlife lands acquisition and inventory. FY12 Draft. Massachusetts Division of Fisheries & Wildlife, [15]pp.
- ¹² [One Hundred and Forty-seventh] Annual Report [of the] Massachusetts Division of Fisheries and Wildlife [Boston], [July 1, 2011 to June 30] 2012, 96pp.
- ¹³ Marine fish and fisheries, including marine molluscs and crustaceans, are subject to the powers and authorities of the Division of Marine Fisheries.
- ¹⁴ Regulatory authority is a delegation of legislative power to a body or individual, subject to any constraints set forth in the enabling legislation. This delegation is typically done because the proposed regulatory provisions change frequently (and may need to be done quickly), are lengthy, or require specialized technical knowledge and detail. The Division's regulations, severally or individually, typify these considerations.
- ¹⁵ Galsworthy, J. [1928] 1987. A Modern Comedy. Book III. Swan Song. Part II. Chapter VI. Charles Scribner's Sons, Macmillan Publishing House, New York, 722pp. The quotation is from page 587.
- ¹⁶ Leopold, A. 1933. Game Management. Charles Scribner's Sons, New York, 481pp. See pages 4-5 and 407.
- ¹⁷ Division of Fisheries and Wildlife. 2006. Massachusetts Comprehensive Wildlife Conservation Strategy, 2005. Executive Office of Environmental Affairs, Division of Fisheries & Wildlife, Boston, Mass., 790pp. Available at: http://www.mass.gov/dfwele/dfw/habitat/cwcs/pdf/mass_cwcs_final.pdf.
- ¹⁸ Inkley, D.B., M.G. Anderson, A.R. Blaustein, V.R. Burkett, B. Felzer, B. Griffith, J. Price, and T.L. Root. 2004. Global climate change and wildlife in North America. The Wildlife Society, Washington, D.C., Technical Review 04-2, 26pp.
- ¹⁹ Hayes, D.J. 2011. Facing the inevitable. The Wildlife Professional 5(3):24-25. See also the subsequent papers in the same issue.
- ²⁰ Wildlife Management Institute (ed.). 2008. Season's end: global warming's threat to hunting and fishing. Bipartisan Policy Center, Washington, D.C., 111pp.
- ²¹ O'Leary, J. 2008. Getting ready for the warming. Massachusetts Wildlife 58(4):4-12.
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**THE MASSACHUSETTS DIVISION OF FISHERIES AND
WILDLIFE: 1866-2012 [BY] JAMES E. CARDOZA**

ERRATA

Page 8; Figure 1: *change* photo credit *from* “Stephen Hurley” *to* “Steven T. Hurley”

Page 75, line 11: *change* “Reuben Edward Trippensee” *to* “Reuben Edwin Trippensee”

Page 237, Table 1, line 1 (1865-66): *change* “Thomas Lyman” *to* “Theodore Lyman III”

Page 239, Table 2, line 9: *change* dates for Francis W. Sargent *from* “1963-64” *to* “1963”

Page 248, *replace* endnote 7 with the following:

“⁷ Massachusetts was the third state to form a government fisheries commission, preceded by New Hampshire and Vermont in 1985: “Game” was not included in the Massachusetts Commissioners authority until 1886, preceded by California (1878) and Maine (1880). See Palmer. T.S. 1912. Chronology and index of the more important events in American game protection, 1776-1911. U.S. Department of Agriculture, Biological Survey, Bulletin 41, 62pp.”

Page 263, endnote 51: *change* “c. 103, St. 1818” *to* “c. 103, St. 1817”

Page 253, *replace* endnote 67 with the following:

“⁶⁷ A bailiff, steward or overseer appointed to fulfill a specific task. See: c. 3, Province Laws of 1739/40”