

## 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.

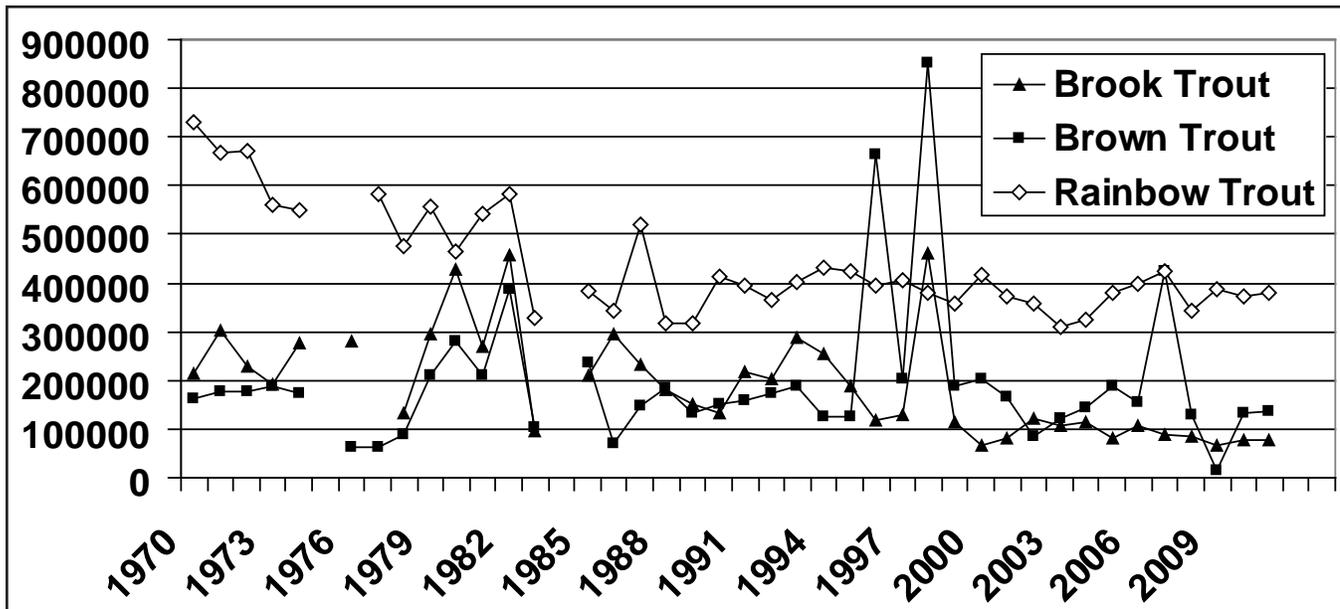


Figure 48. Numbers of Brook, Brown and Rainbow Trout (all age classes) stocked in Massachusetts waters, 1970-2011.

—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”<sup>1</sup>: THE 1970s

The 1970s<sup>2</sup> 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)<sup>3</sup>, 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 1963<sup>4</sup> 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 Act<sup>5</sup> 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<sup>6,7</sup> (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 Resolution<sup>8</sup> 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<sup>6,9</sup>. 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)<sup>6,10</sup> 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*<sup>11</sup>, 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*<sup>12</sup> 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 1869<sup>13</sup> 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<sup>14,15</sup>.



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 Darwinism<sup>16</sup>, 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<sup>17,18</sup>.

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”<sup>19</sup>. 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 mind<sup>20</sup>. Yet, Schweitzer would sometimes kill genuinely dangerous animals and would not impose his value system on others<sup>21</sup>. 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 hunting<sup>22</sup>, 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”<sup>23</sup>.

By the 1970s, The Wildlife Society—heeding complaints from employers—recognized the need for training wildlife students and professionals in public relations<sup>24</sup>. Douglas Lee Gilbert’s (1923-1980) text<sup>25</sup>, 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 guide<sup>26</sup> 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*<sup>27,28</sup>.

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 populations<sup>29</sup>. Detailed reference texts on infectious<sup>30</sup> and parasitic<sup>31</sup> diseases of wild mammals and birds<sup>32</sup> 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 America<sup>33</sup>—building on his earlier *Crusade for Wildlife* (1961)—documented past tragedies and later successes. Conservationists, preservationists, and exploiters were depicted in context<sup>34</sup> 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 analysis<sup>35</sup> 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.

**1970-71**<sup>36</sup>: 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 management<sup>37</sup>.

—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 acidification<sup>38</sup>.

—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 limit<sup>39</sup> and a provision that municipalities may regulate motorboats on great ponds<sup>40</sup>.

**1971-72<sup>41</sup>**: 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 salmon<sup>42</sup>. 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<sup>43,44</sup>, an exemption for certain zoos from Division authority<sup>45</sup>, an authorization for hunting on

commercial shooting preserves on Sundays<sup>46</sup>, procedures strengthening importation permits for fish and wildlife<sup>47</sup>, restrictions further regulating the discharge for firearms near buildings<sup>48</sup>, a designation of the Montague Fish Hatchery as the “Bitzer” Hatchery<sup>49</sup>, provisions for a deer hunt for paraplegic sportsmen<sup>50</sup>, and strengthened protections for birds of prey<sup>51</sup>.

**1972-73<sup>52</sup>:** 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<sup>53,54,55</sup>. 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 observed<sup>56</sup>.

—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 cylinders<sup>57</sup> 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' permits<sup>58</sup>, a transfer of the so-called "Warren Colony" property in Westborough to the Division<sup>59</sup>, a provision for a general license fee increase<sup>60</sup>, and a revision of the procedures for hunting by minors aged 12-14<sup>61</sup>.



Photo © Bill Byrne

Figure 51. Black Bear digging for ants, Heath.

**1973-74**<sup>62,63</sup>: 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  $\geq 12$  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 lawful<sup>64</sup>. 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 37<sup>65</sup>. 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 program<sup>66</sup>, a provision that the State Treasurer hold certain funds for the Division<sup>67</sup>, further regulating propagators' permits and providing for an "exemption" list of animals not requiring permits<sup>68</sup>, and a provision for a waterfowl hunting stamp<sup>69</sup>. A legislative resolve provided for a study by the Division relative to the implementation of a nongame wildlife program<sup>70</sup>.

**1974-75**<sup>62,63</sup>: The environmental agencies were reorganized under an Executive Office of Environmental Affairs<sup>71</sup>. 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)<sup>72</sup>, 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 Reservation<sup>73</sup>.

—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 vertebrates<sup>74</sup>, a prohibition on leghold traps in most situations<sup>75</sup>, further protections for wetlands<sup>76</sup>, further penalties for the illegal taking of deer<sup>77</sup>, a further definition of “loaded shotgun or rifle”<sup>78</sup>, and a provision for the acceptance of hunter education certificates from certain other states<sup>79</sup>.

**1975-76**<sup>80,81</sup>: 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 approaches<sup>82</sup> 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 vertebrates<sup>83</sup> 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<sup>84,85</sup>, a reorganization of the Executive Office of Environmental Affairs (including the Fisheries and Game Board)<sup>86</sup>, and a provision for the issuance of complimentary licenses to certain paraplegics<sup>87</sup>.

**1976-77**<sup>80,81</sup>: 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 spill<sup>88</sup> 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 Falls<sup>89</sup>.

—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 permits<sup>90</sup>, further provisions for licensing and regulation of falconry<sup>91</sup>, an amendment to the cruelty laws (G.L. c. 272) relative to animals used as lures or bait<sup>92</sup>, further regulating field trials<sup>93</sup>, an authorization to issue permits for the commercial harvest of eels<sup>94</sup>, and a provision for the issuance of reduced-price licenses to persons aged 65-69<sup>95</sup>.

**1977-78<sup>96</sup>:** 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  $\approx 2268$  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.

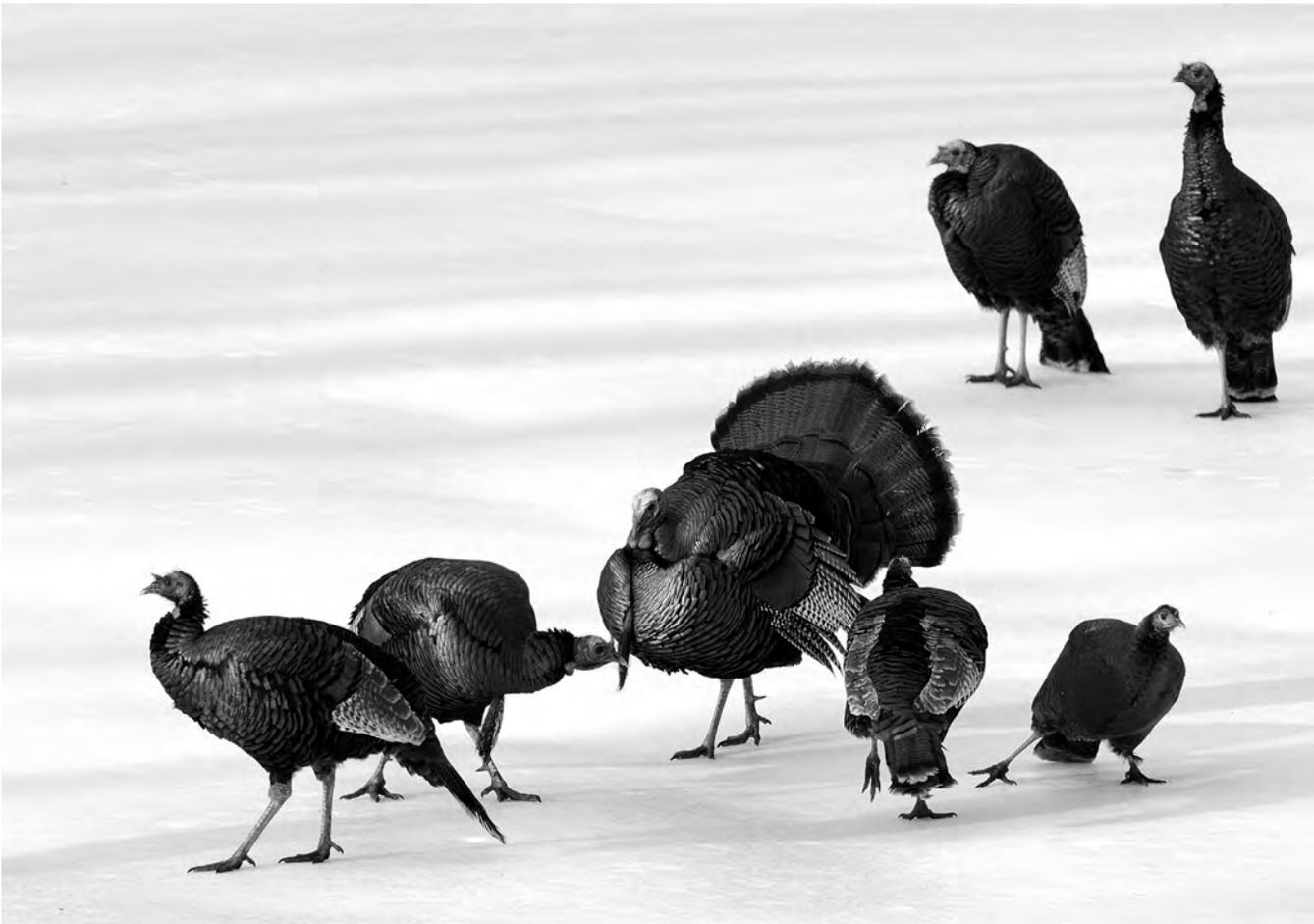


Photo © Bill Byrne

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 cooperator 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 claims<sup>97</sup>.

—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 hare<sup>98</sup> and animal damage identification<sup>99</sup>.

—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 licenses<sup>100</sup>, revisions to the procedures for the revocation of licenses<sup>101</sup> and a provision for issuance of non-criminal citations for violations of certain fish and wildlife laws<sup>102</sup>.

**1978-79**<sup>103</sup>: 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 Reservation<sup>104</sup>.

—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 aquaculture<sup>105</sup> and a provision for the transfer of certain lands in Gardner<sup>106</sup>.

**1979-80**<sup>107,108</sup>: 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 lampry, 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  $\geq 8300$  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<sup>109,110</sup> 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 beaver<sup>111</sup>.

—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 adopted<sup>112</sup>. 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 hunting<sup>113</sup>, to

regulate reptiles and amphibians<sup>114</sup>, and to formulate a list of endangered and threatened species<sup>115</sup>, increases in license fees<sup>116</sup>, further provisions regarding trap registration<sup>117</sup>, a provision that the Director must approve municipal restrictions on access to great ponds<sup>118</sup>, and a provision that the Natural Heritage database was exempt from state public records laws<sup>119</sup>.

## “THE DIVISION [HAS] A CLEAR MANDATE<sup>1</sup> TO OPERATE A NONGAME<sup>2</sup> PROGRAM”: THE 1980s

The 1980s<sup>3</sup> 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 students<sup>4</sup>.

The Fish and Wildlife Conservation Act (“Nongame Act”)<sup>5</sup> 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 Act<sup>6</sup> 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 Plan<sup>7</sup> 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 Biology<sup>8</sup> was incorporated in 1986 to promote “conservation biology”<sup>9</sup> 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”<sup>10</sup>. 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 America<sup>11</sup>. 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*<sup>12</sup> 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*<sup>13</sup> setting forth capture and sampling methods, marking procedures, analytical techniques, and other fisheries science practices.

**1980-81**<sup>14,15</sup>: 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 fees<sup>16</sup>.

**1981-82**<sup>17</sup>: 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  $\geq 300$  acres. A graduate student at the Cooperative Wildlife Research Unit completed a dissertation on the ecological basis for deer management zones<sup>18</sup>.

—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 cooperator banded 590 shorebirds. During winter banding, the staff banded 1121 black ducks.

—A bulletin on wood duck research during 1970-80 was published<sup>19</sup>. 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 bores<sup>20</sup>, establishment of the Connecticut River Atlantic Salmon Commission<sup>21</sup>, a provision for the transfer of the Podick Springs Hatchery to the U.S. Fish and Wildlife Service<sup>22</sup>, a provision for an increase in license fees retained by town clerks<sup>23</sup>, and a provision that persons confined to a wheelchair may use a mechanical bow release<sup>24</sup>.

**1982-83**<sup>25</sup>: 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”<sup>26</sup> (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 zones<sup>17</sup> 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 completed<sup>27</sup>.

—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.

**1983-84**<sup>28</sup>: 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 authority<sup>29</sup>.

—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 bear<sup>30</sup>.

—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 employees<sup>31</sup> and a directive for Massachusetts to enter into the Connecticut River Atlantic Salmon Compact<sup>32</sup>.

**1984-85<sup>33</sup>:** 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 document<sup>34</sup> 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 program<sup>35</sup>.

—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 ≈\$380,000<sup>36</sup> 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 Reservation<sup>37</sup>, further regulating commercial shooting preserves<sup>38</sup>, an authorization for the shooting of wounded migratory birds from a powered boat<sup>39</sup>, an authorization to reproduce the Fuertes bird paintings<sup>40</sup> and the FY86 budget (see the authorizations for the Division)<sup>41</sup>.

**1985-86<sup>42</sup>:** 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 control<sup>43</sup>.

—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 plants<sup>44</sup>.

—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.

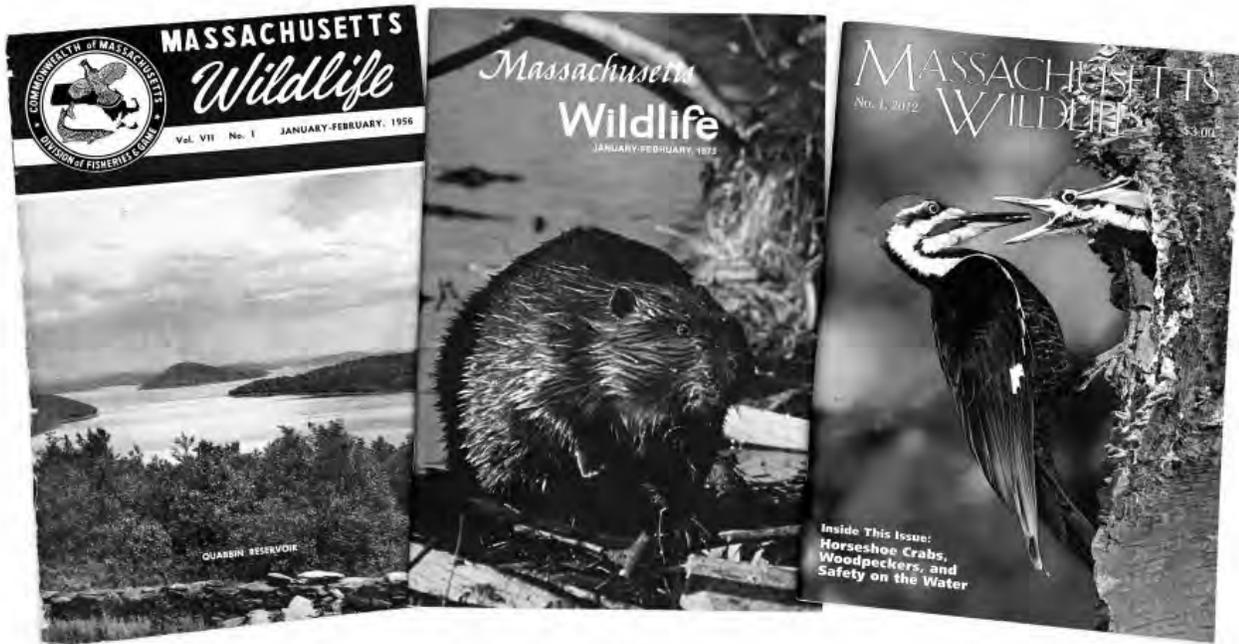


Photo © Bill Byrne

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 lands<sup>45</sup>, and an exemption for veterinarians from civil liability when rendering emergency aid to non-domestic animals<sup>46</sup>.

**1986-87<sup>47</sup>:** 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”<sup>48</sup> 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 amended<sup>49</sup> 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 tags<sup>50</sup>, a prohibition on the importation of certain of reptiles and amphibians<sup>51</sup>, and

the revision of procedures for the Nongame tax checkoff and the renaming of the Non-game Wildlife Fund<sup>52</sup>.

**1987-88**<sup>53</sup>: 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 shot<sup>54</sup> 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%)<sup>55</sup>. 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" building<sup>56</sup>.

**1988-89**<sup>57</sup>: 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 rehabilitation<sup>58</sup> and problem animal control<sup>59</sup>.

—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 system<sup>60</sup>.

—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 deer<sup>61</sup> and an authorization for the Director to regulate certain BB shot for waterfowl hunting<sup>62</sup>.

**1989-90<sup>63</sup>:** 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 Court<sup>64</sup>, 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 completed<sup>65</sup>.

—The Board established a domestic animal list<sup>66</sup> 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 form<sup>67</sup>; 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 preserves<sup>68</sup>. 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 plover<sup>69</sup>.

—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 wildlife<sup>70</sup>.

#### LESSONS ABLY FORMULATED AND IMPLEMENTED AS A CONSERVATION DOCTRINE: THE 1990s.

The 1990s<sup>1</sup>—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 book<sup>2</sup> and film.

The Massachusetts forest, comprising 64% of the state, was still quite extensive and was principally industrial timberland, mostly privately owned and largely unmanaged<sup>3</sup>. Future forest management was projected to require public awareness, active ecosystem management, energetic partnerships, and a formulated strategy for the utilization of forest products<sup>3</sup>.

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”<sup>4</sup>. 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<sup>4,5,6</sup>. However, the components did not arise simultaneously nor were they consistently applied to all entities. The model is challengeable and alteration is inevitable<sup>7</sup>. 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 nature<sup>7</sup>.

While other groups and factions indeed fostered and promoted land and wildlife conservation<sup>8</sup>, hunters—hunting—were fundamental to the development of the model. It still is so, despite no longer being an indicator of high social status<sup>9</sup> and sharp criticisms of the “hunting hypothesis”<sup>10</sup>. The anthropologist Matt Cartmill<sup>9</sup> 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. Herman<sup>11</sup> described early American hunters as settlers and farmers who hunted for subsistence, with the “hunting tradition”<sup>12</sup> 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 future<sup>13</sup>. 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 wildlife<sup>13</sup>.

**1990-91**<sup>14</sup>: 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 legislation<sup>15</sup>, a special controlled (and controversial) deer hunt<sup>16,17</sup>, 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 turkeys<sup>18</sup> 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 fawns<sup>19</sup>. Studies on black bear response to habitat changes and furbearer population models were being finalized.

—After five years, the Massachusetts Endangered Species Act<sup>20</sup> 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 species<sup>21</sup> and set a process for the designation of significant habitats, and related matters. Another statute<sup>22</sup> 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 legislation<sup>23</sup> 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 circumstances<sup>24</sup> and a directive for the commissioner of administration to set the fee for a waterfowl stamp<sup>25</sup>.

**1991-92<sup>26</sup>:** 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 rabies<sup>27</sup>, 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. properties<sup>28</sup>, prohibiting hunter harassment<sup>29</sup>, and designation of the wild turkey as the official state game bird<sup>30</sup>.

**1992-93<sup>31</sup>:** 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 use<sup>32</sup> 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 Fund<sup>33</sup>.

**1993-94<sup>34</sup>:** 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 Massachusetts<sup>35</sup> 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 game<sup>36</sup>, authorization for the Board to establish rules and regulations for archery<sup>37</sup>, 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 classes<sup>38</sup>.

**1994-95<sup>39</sup>:** 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 regulations<sup>40</sup>, 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 Division<sup>41</sup>.



Photo © Bill Byrne

Figure 63. Roseate and Common Terns, Ram Island, Marion.

**1995-96<sup>42</sup>:** 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  $\geq 12$  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 decision<sup>43</sup> 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 ferrets<sup>44</sup>. 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 completed<sup>45</sup> 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 dynamics<sup>46</sup>.

—The Massachusetts Endangered Species Act was amended<sup>47</sup> 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 budget<sup>47</sup> 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 Bill<sup>48</sup> 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.

**1996-97<sup>49</sup>:** 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 lakery 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<sup>50,51</sup>. After a public hearing, the Board approved new regulations relative to the use of certain traps<sup>52</sup>, 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 regulations<sup>53</sup> 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 agreement<sup>54</sup> 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 Guide<sup>55</sup> 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 budget<sup>56</sup> 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 bores<sup>57</sup> and to remove the mandatory license display requirement when the Division has implemented an electronic licensing system<sup>58</sup>.

**1997-98<sup>59</sup>:** 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 Massachusetts<sup>60</sup> and the use of water flow devices for controlling beaver damage<sup>61</sup> 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 movements<sup>62</sup>.

—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*”<sup>63</sup> 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 palsy<sup>64</sup> and procedures for the disposition of the closed Wilbraham Game Farm<sup>65</sup>.

**1998-99**<sup>66</sup>: 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 plan<sup>67</sup> 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 dissertation<sup>68</sup>, 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*”<sup>69</sup> 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 license<sup>70</sup>.

**1999-2000**<sup>71</sup>: 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 Division<sup>72</sup>.

—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”<sup>1</sup>: 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 affected<sup>2</sup> 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 308,745,538<sup>3</sup>.

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 Massachusetts<sup>4</sup> 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”<sup>5</sup> to celebrate biodiversity and to raise awareness of its importance. Eighteen years earlier, the United Nations had brought forward the “Convention on Biological Diversity”<sup>1,6</sup>, 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 2012<sup>7</sup>. The effective conservation of biodiversity is essential for both human survival and the maintenance of ecosystem processes<sup>8</sup>. 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 actions<sup>8</sup>.

In Massachusetts, the biodiversity agenda among the state’s environmental agencies<sup>9</sup> 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”<sup>10</sup> and “Living Waters”<sup>11</sup> comprehensive biodiversity conservation plans. BioMap was updated<sup>12</sup> in 2010 to update and broaden the scope of the original plans in the face of rapid and uncertain climate change.

Congress enacted legislation<sup>13</sup> 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.

**2000-01<sup>14</sup>:** 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"<sup>10</sup> 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 damage<sup>15</sup>.

**2001-02**<sup>16</sup>: 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 ecology<sup>17</sup>.

—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”<sup>18</sup> and an Act defining the management, ownership and oversight of the Massachusetts Military Reservation<sup>19</sup>.

**2002-03**<sup>20</sup>: In 2003, the Division was faced with one of the most difficult challenges in its history when legislation<sup>21</sup> 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/mi<sup>2</sup> to >50/mi<sup>2</sup>. 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 bioreserve<sup>22</sup> and authorizing the use of crossbows by certain handicapped persons<sup>23</sup>.

**2003-04<sup>24</sup>:** 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 restored<sup>25</sup> 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  $\approx$ 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.

**2004-05**<sup>26</sup>: 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 survey<sup>27</sup> 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.

**2005-06**<sup>28</sup>: The draft Comprehensive Wildlife Conservation Strategy was released for review, comments were received and addressed, and the final document<sup>29</sup> 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”<sup>30</sup>, including muzzleloaders.

**2006-07**<sup>31</sup>: 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*<sup>32</sup> 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 certificate<sup>33</sup>.

**2007-08**<sup>34</sup>: 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 hunting<sup>35</sup>.

**2008-09<sup>36</sup>:** 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 report<sup>37</sup> 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 years 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.

**2009-10**<sup>38</sup>: 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 changes<sup>39</sup> 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 published<sup>40</sup>.

—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 1970<sup>41</sup>. 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.

**2010-11**<sup>42</sup>: 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 Law<sup>43</sup> 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 thesis<sup>44</sup> and will continue further analyses for his dissertation.

—White-nose syndrome caused catastrophic mortality of nearly 1 million bats in the Northeast<sup>45</sup>. 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 plan<sup>11</sup>.

—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.

**2011-12**<sup>46</sup>: 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 license<sup>47</sup> 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 1955-2011<sup>48</sup> and ≈137.6 million Atlantic salmon fry and ≈5.4 million smolts stocked in the Connecticut River watershed between 1967 to 2011<sup>49</sup>. 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 2013<sup>50</sup>.

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<sup>48</sup>. 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)<sup>51</sup>. Active management on 2041 acres of Division lands since 1996<sup>51</sup> 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 MANAGEMENT<sup>1</sup>**

"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)<sup>2</sup>