

Annual Report 2003



MassWildlife

MASSACHUSETTS
DIVISION OF FISHERIES & WILDLIFE

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THE BOARD REPORTS

George Darey
Chairman

The Massachusetts Fisheries and Wildlife Board is a group of seven persons, each selected for a demonstrated interest in wildlife. By law, the persons appointed to the Board are volunteers, receiving no remuneration or expenses for their service to the Commonwealth. Five of the seven are selected on a regional basis, with one member, by statute, representing agricultural interests. The two remaining seats are held by a professional wildlife biologist or manager, and a representative with a specific interest in the management and restoration of those wildlife populations not classified as game species. Each member is appointed by the Governor to a five year term. The Board oversees operations of the Division of Fisheries and Wildlife, reviews the agency's programs, and sets policy and regulations pertinent to wildlife in the Commonwealth.

During this fiscal year the Board has been faced with some of the most difficult challenges in its history. The current reorganization of state government and drastic changes in the state budget are currently having a major impact on the agency. As the year ends it appears that the powers and regulatory authority of the Board and the agency have been maintained. However, at present, the Inland Fish and Game Fund appears to have been eliminated, along with the Wildlands (Land Stamp) Fund and the Natural Heritage and Endangered Species Fund. We are hopeful that these matters will be rectified quickly and the funds restored before the agency loses its ability to receive federal aid. The current state budget has cut the agency's funding by more than \$850,000 (including the loss of more than \$107,000 in land stamp appropriations) from last fiscal year, and most disturbingly, the Natural Heritage and Endangered Species program is zero funded. In addition, there are now 17 vacant positions and no funds available to fill them. Clearly there are some trying times ahead, and unless a significant percentage of the funding is restored, the Board may be required to make drastic cuts in programs, installations and services.

Aside from working to meet these challenges which developed in the second half of the fiscal year, the Board has continued to hold monthly meetings at locations around the state, hold public hearings on proposed regulatory changes, and address issues of specific concern. While many different matters and issues were brought before the Board this year, most of its time was spent in scrutiny and review of agency programs and proposals for regulatory changes. Among the items examined were:

Waterfowl Regulations

The Board heard its annual presentation from Waterfowl Project Leader H Heusmann on the framework and proposed season dates, bag and possession limits for the the 2002 waterfowl seasons. Following a public hearing on these proposals, the Board voted unanimously to accept them.

Turkey Regulations

The Board heard a brief review and history of turkey management in Massachusetts in the previous fiscal year from Turkey Project Leader Jim Cardoza, along with a staff proposal to (1) extend the boundary of the fall turkey hunting season to the remainder of Worcester County; (2) adjust boundary of the spring turkey seasons to coincide with Deer Management Zone boundary lines; and (3) allow the harvest of nuisance game farm released turkeys on Martha's Vineyard (DMZ 13) during the 4 week spring season. The Board had voted unanimously to hold a public hearing on these proposals, and conducted that hearing in July. After considering public comment (all positive), and in consideration of a staff request to act immediately so that any regulation changes could be included in the 2003 Abstracts, the Board voted unanimously to adopt the regulations as presented and have them in effect for the 2003 seasons.

Deer Management Regulations

After hearing a presentation from Deer Project Leader Bill Woytek covering the 2002 deer harvest, the Board voted unanimously to approve staff recommendations for antlerless permit allocations for the 2003 season.

The Board also heard an updated report on Chronic Wasting Disease, a prion disease that is similar to the "Mad Cow Disease" of Europe. CWD can affect deer, moose and elk, and has been found in these species in a number of western states. Due to CWD's potential to decimate wild deer herds, and to protect the stock of the 25 deer farms in Massachusetts, the Board voted unanimously to impose an immediate moratorium on the importation of all live cervids into the Commonwealth in fiscal 2002, and we are gratified to hear that this disease has not been detected in the Commonwealth.

Problem Animal Control Regulations

The Board heard a staff proposal, developed after consultation with the Massachusetts Organization of Problem Animals Controllers, to update and improve various regulations relating to problem animal control.

The eight proposed changes were mostly of minor housekeeping nature and included removal of the size limit on cage traps, removal of the requirement for an EPO to initial PAC reporting books, and removal of the Massachusetts residency requirement. A public hearing was held in November to solicit comment on these proposals, and upon further review and discussion, the Board voted unanimously to approve them. We note, however, that some proposals brought up at the public hearing that did not relate to the proposed regulations, did relate to problem animal control in general, and we expect to revisit this subject again in the near future. We also note that Massachusetts is a leader in the regulation of problem animal control, setting precedent in this regulatory area, hence we will need to re-visit our regulations periodically to see how well they are working.

Red Brook / Sea Run Trout Regulations

The Board heard a presentation on four proposed regulatory changes from Fisheries Section staff. The first proposal was to (1) eliminate sea-run brown trout regulations on eight coastal rivers and/or streams (Parker, Jones, Mashpee, Quashnet, Coonamessett, Childs, Scorton and Santuit); change the daily creel limit on the Jones, Mashpee, Coonamessett, Childs, Scorton and Santuit Rivers to three trout; and revise the Catch & Release (C&R) regulation on the Quashnet River. The second change would (2) make Red Brook in Plymouth and Wareham a C&R area, artificial lures only, along its entire 4-mile length to protect sea run brook trout. The other proposed regulatory changes were to (3) extend current C&R boundaries to encompass the entire length of the Quashnet River and (4) eliminate the C&R regulations on Higgins Pond in Brewster to allow a standard daily creel of three trout. A public hearing was held on these proposals in June, and the Board will vote on them early in the new fiscal year.

Housatonic River Catch & Release

The Board spent considerable time studying and considering a Housatonic River Watershed Management Plan. The Board has long been interested in improving recreational opportunities on the Housatonic, a seriously polluted but ever improving and very viable recreational resource. Staff proposals the Board considered included one to create two new Catch and Release (artificial lures only, no bait in possession) areas on the river. The first, located in Lee, would be 6 miles long, starting at the Route 20 bridge and extending downstream to the Willow Mill Dam. The other, in Glendale, would be a one mile reach extending from the Glendale Dam downstream to the railroad bridge. Staff also proposed a daily creel limit of one trout, minimum 20 inch length, from the confluence of the East and West Branches to the CT border (not including the C&R areas).

There was considerable public and media discussion concerning these proposals, which were presented to the public at meetings in Lenox, Auburn and Westboro. The Board held a public hearing on the C&R proposal in May, and received substantial positive comment, along with some opposition primarily concerned with access issues and additional fishing gear restrictions. After considering public input, the staff amended the proposal to include the establishment of Refuge Areas: no fishing June 15 - August 30 within 100 feet of the mouths of posted tributaries including Beartown Brook, Goose Pond Brook, Hop Brook and Mohawk Brook. The idea is to create an exceptional brown trout fishery. The Board voted unanimously to adopt the proposals as amended, and predicts that there will be strong interest in this promising sport fishery as it develops.

Crossbow Regulations

The Board heard a review of how crossbows were authorized for hunting use by statutory change several years ago, but curiously were allowed for only two disabilities: paraplegia and persons disabled by cerebral palsy. Many other disabilities (missing limbs and fingers for example) also prevent people from using conventional archery equipment, however, and the statutory change was amended to include these people in 2003. The Board therefore had to consider replacing existing regulatory language to include all persons permanently disabled such that they cannot use conventional archery equipment. Under the proposed regulatory change, such people would have to fill out a permit application including a licensed physician's certification stating that they have a permanent disability which prevents them from using conventional archery gear. A public hearing was held in May, and after considering comment (which was all positive) the Board voted unanimously to change the regulation accordingly.

Miscellaneous

The Board reviewed protocol for handling problems with black bear and heard a presentation on this subject from Dr. Rob Deblinger. Dr. Deblinger presented a Memorandum of Understanding relative to Bear and Moose Control and Chemical Restraints which was developed about a decade ago as a result of discussions between this agency and the Division of Law Enforcement. We are pleased that agency personnel have been doing public presentations where bear problems have occurred in an effort to educate the public and reduce problems, many of which are clearly caused by people deliberately or inadvertently feeding bears.

The Board heard a report presented by Dr. Mark Tisa on the scope and impacts of drawdowns on fisheries and wildlife resources relative to performance standards to protect those resources. After reviewing the proposed standards, which will be submitted to the Citizens Advisory Committee for inclusion in their GEIR, the Board voted unanimously to support them.

The Board heard a staff proposal, approved by the Natural Heritage & Endangered Species Advisory Board, to add 17 species, delete eight species, and change the status of 56 species on the state list of endangered, threatened and special concern species. A public hearing was conducted in August, and following consideration of public comments, the Board voted unanimously to accept the proposed changes to the list.

The Board also heard presentations on the history and status of moose; the status and recovery of the roseate tern and other marine birds; and coyote management. The Board also reviewed and voted to release to the agency's website a statement describing the duties of the Board.

The Board is very pleased that the Massachusetts Conservation Camp, which had to be cancelled in 2002, will be back up and running with a two week session this summer.

As a final note, the Board wishes to specifically commend Tom O'Shea, Southeast District Manager, as well as Carolyn Mostello and Scott Melvin of the Natural Heritage & Endangered Species Program, for their outstanding and professional service in responding to the Bouchard Oil Spill in Buzzards Bay.

**Massachusetts
Fisheries and Wildlife Board**

George L. Darey, *Lenox, Chairman*

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Russell A. Cookingham, *Monument Beach*

Ernest W. Foster, Jr., *Worcester*

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Frederic Winthrop, *Ipswich*

FISHERIES

Dr. Mark S. Tisa
Assistant Director

Fishing, hunting, and wildlife related recreation are important recreational activities for both residents and nonresidents of Massachusetts. According to the 2001 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation, more than 278,000 Massachusetts residents age 16 and older went freshwater fishing during 2001. Additionally in 2001, more than 47,000 nonresidents fished the state's lakes, ponds, rivers and streams. An average of 14 days was spent fishing by each fisherman. Fishing pressure in Massachusetts is estimated at 40 trips/acre. This compares favorably to the national average of 27 trips/acre. The American Sportfishing Association estimated expenditures of \$274,273,777 for freshwater recreational fishing in Massachusetts, over \$26 million generated in sales tax revenue, and some 5,636 jobs created in 1996.

The Commonwealth's aquatic resource inventory includes a variety of both lotic and lentic fisheries habitat ranging from coldwater, wild trout fisheries to warmwater panfish fisheries. There are approximately 2,675 lakes and ponds, totaling about 142,681 surface acres. Ponded waters are mostly less than 500 acres in size. The two largest bodies of water, both man-made drinking water supplies, are the Quabbin (25,000 acres) and Wachusett (5,000 acres) Reservoirs. The largest river in Massachusetts is the Connecticut River with 72 miles (7,284 acres) transecting the Commonwealth. The 2,027 named streams flow about 10,704 miles and comprise approximately 14,900 acres. The protection, management and enhancement of these inland fisheries resources and their associated habitats involve several ongoing fisheries projects:

- **Fisheries Survey and Inventory Project**
 - Statewide Fisheries Survey and Inventory
 - Target Fish Community Development
 - Coldwater Fishery Resource Designation
- **Anadromous Fish Investigations**
- **Fish Kill Investigations**
- **Environmental Review**
- **Warmwater Fisheries Investigations**
- **Sport Fishing Awards**
- **Hatchery/Trout Program**

Fisheries Survey and Inventory Project

Project Leader: Todd Richards, M.S.

Fiscal Year 2003 Stream Survey project involved participation in the following projects:

1. Statewide Fisheries Survey and Inventory
2. Target Fish Community Development
3. Coldwater Fishery Resource Designation

1. Statewide Fisheries Survey and Inventory

MassWildlife received funding through the Massachusetts Watershed Initiative again this fiscal year. The total for FY03 was \$45,000. This funding was crucial in maintaining and upgrading our sampling resources and retaining our ability to be proactive in our approach to monitoring fisheries resources statewide. The funding was used to continue the trend toward fully equipping *MassWildlife* Districts and the Westboro field crew so they can monitor and assess fisheries resources across the state and maintain the equipment they have received. Field equipment, including, motors, GPS units, digital cameras, nets, waders, laboratory equipment, and other accessories were purchased to enable five fully equipped crews to sample watersheds throughout the state. *MassWildlife's* ability to present this information to stakeholders was also enhanced through the purchase of LCD projectors and computer equipment.

Watersheds were sampled as part of the 5-year basin cycle using a standard sampling protocol (see FY02 Annual Report – Appendix I for sampling protocol plan). Of 211 sites sampled in FY 2003, the majority of the samples were from the Connecticut, Housatonic, Nashua, Taunton, Charles and Hudson watersheds. Samples were also taken in the Boston Harbor, Buzzards Bay, Chicopee, Ipswich, Merrimack, North Coastal, Parker, and Ten Mile Watersheds (see Appendix I, Table 1, page 63). The sampling resulted in the collection of 25,031 fish of 44 different species. Requests for potential stream survey and inventory sampling locations in the above watersheds were solicited from agencies and stakeholders and were used to prioritize sampling locations. Planning was initiated to focus FY04 sampling in the Hudson, Deerfield, Housatonic, Connecticut, Chicopee, Merrimack, and Cape Cod Watersheds.

2. Target Fish Community Development

Efforts continued on the development of the Target Fish Community and were based on the work of Bain and Meixler (2000). The planning process was continued for drafting target fish communities on the Charles and Housatonic Rivers (see chart, below). Refinements to the Target Fish Community concept were forwarded from federal and state fisheries experts throughout the northeast. When combined with Statewide Fisheries Survey and Inventory, the Target Fish Community concept continues to illustrate that our river fish communities are being impacted by water quality and quantity issues and habitat alteration. The Target Fish Community illustrates what a river fish population should look like in Southern New England and represents a measurable goal for restoration. A plan was drafted to use inventory procedures, Target Fish Communities, Indexes of Biotic Integrity, and Meso-Habitat Mapping to set priorities for habitat protection and restoration statewide. Data and Target Fish Community Analyses were employed in a draft USGS report on the Assabet and Charles River Watersheds that will be published in FY 2004.

3. Coldwater Fisheries Resource Designation

A project to identify waters that *MassWildlife* considers to be Coldwater Fishery Resources (CFRs), initiated in FY01, was continued and updated based on the 211 fish samples collected in FY03 (see Table 2, page 66).

This list of CFRs is useful as a screening tool to highlight sensitive environmental areas, not as a definitive list of all waters that are CFRs. Each year, as

subsequent sampling results are recorded, the list of CFRs will be updated to reflect the most current information. By the end of FY03, 547 named streams have been included in the Division's database of CFRs. This represents an addition of 31 coldwater streams to last year's total of 516.

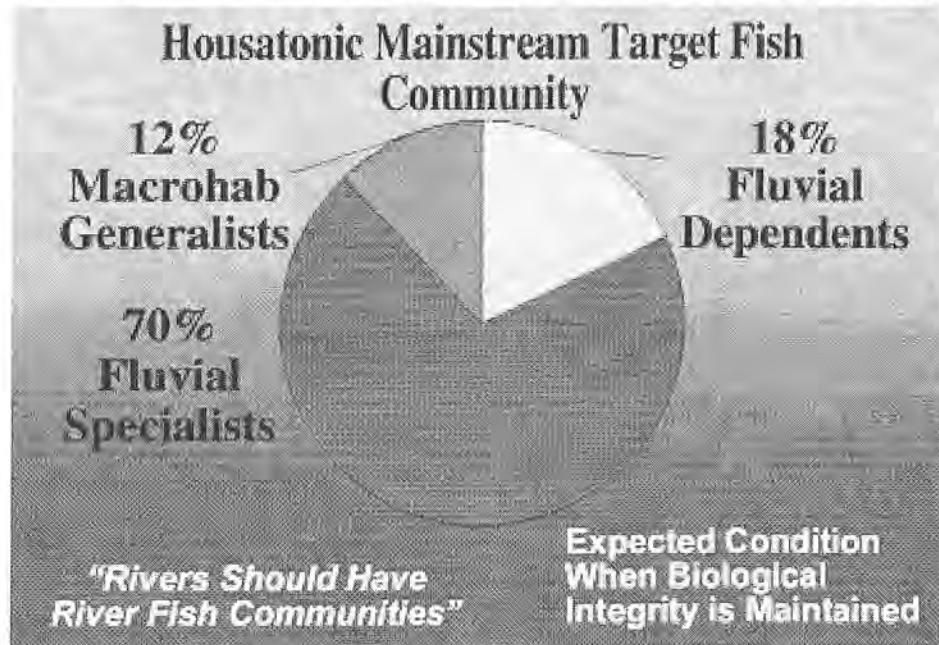
Hatchery/Trout Program

The Division met its annual trout production goal of between 400,000 and 450,000 pounds in FY2003. This production goal is based on the rearing capacity of each hatchery (determined mainly by a combination of the quantity and quality of the water supply and the amount of rearing space) and the limits imposed by the National Pollution Discharge Elimination System permit that each hatchery is issued by the U.S. Environmental Protection Agency. Predation by birds and mammals, in particular herons and otters, continues to cause significant losses at all trout hatcheries. In fact, predation on hatchery trout has reached the point where it jeopardizes our ability to meet the annual production goal. We are working with the wildlife section staff to address these issues and assess management options.

The Division's four trout hatcheries produced a total of 408,940 pounds of trout, comprised of a total of 567,667 brook, brown, rainbow and tiger trout in FY2003 (fall of 2002 and spring of 2003). Spring trout stocking began more than a month later than normal in FY2003 due to the abnormally heavy ice cover on lakes and ponds and the deep snow pack that resulted from the colder than normal winter and spring. Despite the late start, trout stocking was completed on time thanks to the hard work and dedication of Division staff who are involved in the stocking program.

A total of 376,169 pounds of trout were stocked during the spring. These trout included 319,056 rainbow trout that ranged between 12 and 18+ inches long, 106,067 brook trout that ranged between 9 and 18+ inches long, 79, 612 brown trout that ranged between 6 and 18+ inches long and 5,032 tiger trout that averaged 14 inches long (Tables 3 and 4, pages 11 and 12). The trout stocked during the fall included 37,950 rainbows that ranged between 11 and 15+ inches long, 5,500 twelve inch browns, and 14,450 brookies between 9 and 12 inches long. A total of 32,771 pounds of trout were stocked during

the fall season. As was also the case in FY2002, more trout than originally planned were stocked in the fall in order to keep each hatchery safely within the limit of its carrying capacity due to the extremely low water levels caused by the severe drought conditions of 2001 and 2002.



The results of the Target Fish Community work conducted for the mainstem of the Housatonic River, MA. The anticipated fish community, under restored conditions (e.g. improved water quality and restored physical habitat), would be composed of 88% fluvial dependent or specialist (river dwelling) and only 12% generalist (mostly pond dwelling) fish species.

Weather conditions had a marked impact on hatchery operations in FY2003. The most difficult challenge caused by the weather was the record low water levels that were a result of the drought conditions that persisted throughout much of 2001 and 2002. Rainfall totals in 2001 and 2002 were the third and fourth lowest recorded, respectively, for the region since 1892! At Sunderland Hatchery, which gets 80% of its water from free flowing springs, water flow through the hatchery was 28% below the previous ten year average. At Montague Hatchery, which relies 100% on spring water, flow was 30% below the previous ten year average. The volume of water pumped at Sandwich Hatchery also had to be reduced due to abnormally low ground water level and high CO₂ levels (caused by the low water table) in one of the major production wells. Fortunately precipitation increased beginning in late fall 2002, and by late spring 2003 water levels were back to normal at all hatcheries. In addition to the low water levels observed at each hatchery in FY2003, record temperature extremes created difficult rearing conditions. The summer of 2002 was one of the warmest summers on record. These warm temperatures, coupled with the reduced water supplies, made it difficult to maintain average growth rates and the health of the hatchery stock. The winter of 2002/2003 was also one of the coldest (average temperature was more than 4 degrees below normal) and snowiest (snow fall totals was 49.1 inches above normal at the Worcester station) on record. These cold and icy conditions produced below normal water temperatures and resulted in ice covered raceways and ponds, which made it difficult to maintain average winter growth rates of the trout.

Despite the difficult conditions, each of the Division's four trout hatcheries produced some great fish in FY2003. McLaughlin Hatchery produced more than 173,000 rainbow trout that were approximately 14 inches in length. Sandwich Hatchery produced more than 5,000 tiger trout which averaged approximately 14 inches and weighed close to one pound apiece. These fish, a cross between a male brook trout and a female brown trout, get their name from the tiger-like marks on their backs. Tiger trout have become popular among Baystate anglers because of their beauty and strong fight. Montague Hatchery produced 16,500 two-year old rainbow trout that averaged 1.3 pounds each. Sunderland and Sandwich Hatchery produced a combined total of more than 31,000 two-year-old brook trout.

The Roger Reed Hatchery in Palmer continued its key roles in the Atlantic salmon restoration program and the landlocked salmon program for Quabbin Reservoir in FY2003. A total of 13,200 landlocked salmon smolts were produced and stocked into Quabbin Reservoir. A total of 1.75 million Atlantic salmon eggs were collected from broodstock held at the station and were distributed among cooperating hatcheries in New England. A total of one million unfed Atlantic salmon fry were also produced and stocked into rivers and streams in the Connecticut River drainage basin within Massachusetts.

In addition, 406 adult broodstock salmon reared at the Roger Reed Hatchery were stocked in selected waters across the Commonwealth. A summary of the numbers of each of the fish species produced by the Roger Reed Hatchery is in Table 5, page 12.

Anadromous Fish Investigations

Project Leader: Caleb Slater, Ph.D.

In FY2003 the Division hired three seasonal workers to conduct the Atlantic salmon smolt production assessment work in Connecticut River tributaries (July 1, 2002- September 30, 2002). During spring 2003, no seasonal workers were hired to stock salmon fry or staff the fishways on the Connecticut and Merrimack Rivers because of the Commonwealth's budget crisis. Holyoke Gas and Electric Co., as directed by the conditions of their new FERC hydroelectric license, hired seasonal employees for the Holyoke fishway. The Division supervised their activities. Because 2003 fishway operations are ongoing at this time, this report will summarize 2002 fish passage activities.

General

No major malfunctions were experienced at any of the fishways on the Connecticut or Merrimack rivers in Massachusetts in 2002. An American eel upstream passage facility was installed at the DSI dam on the Westfield River in West Springfield during the summer of 2001 and ran for the entire elver passage season in 2002 (May-Oct).

The Division continued to work closely with the EOE Watershed Teams in 2002, particularly, the Westfield, Connecticut, Deerfield, as well as the Millers, and Chicopee Rivers. The project leader attended many Westfield Team meetings, participated in the Westfield River's public forum, and worked successfully to involve the Watershed Teams in the salmon fry stocking program. The Connecticut River Team again stocked over 200,000 fry. The Westfield Team and The Westfield Watershed Association (private group) each organized a stocking day (75,000-100,000 fry each day), and the Deerfield and Millers River teams also helped to organize and stock 100,000 fry each. The Westfield Team volunteered to staff the DSI fishway during the fall fish passage season (September 15-October 31), and monitored the newly installed eel passage facility from May 1-October 31.

The project leader also has worked closely with the Deerfield/Millers chapter of Trout Unlimited on fry stocking, hydropower relicensing, completion of a trout study in the Deerfield #5 dam bypass reach, and on expanding the Atlantic salmon egg rearing program to 30 schools in the Connecticut River watershed.

Connecticut River

Holyoke

The City of Holyoke (Holyoke Gas and Electric Co. HG&E) bought the Holyoke Hydroelectric project from Northeast Utilities in 2002. The project leader has been involved in ongoing negotiations with the new owner to settle outstanding issues and finalize the FERC license for the project. The Holyoke Dam fishlift was operated for upriver fish passage April 10 through July 12 and September 15 through November 15, 2002, except during periods of high water April 16-22 and June 14-17. Seven species of anadromous fish were identified and counted during the spring/summer fish passage season. The number of Atlantic salmon trapped at the fishlift increased from 25 in 2001 to 34 in 2002. Four Atlantic salmon were radio-tagged and released at Holyoke as per agreement with HG&E. All trapped salmon not radio-tagged and released, were transported by personnel of the United States Fish & Wildlife Service to the Richard Cronin National Salmon Station, Sunderland, MA.

The number of American shad lifted at the Holyoke facility increased from 273,220 in 2001 to 374,548 in 2002. While this represents 52% of the record high passage of 1992, it is 142% of the previous five year mean and 125% of the previous ten year mean. The Holyoke fishlift continues to be a major source of American shad for restoration of other rivers in the Northeast. A total of 1,965 shad were captured in 2002 for out-of-basin restoration efforts. American shad were transported by state fisheries agencies from New Hampshire (964), Connecticut (826), and USFWS (175).

The number of blueback herring passing through the fishlift in 2002 was 1,939; down from 10,604 passed in 2001 and well below the runs of 500,000+ seen in the mid-1980s.

The number of sea lamprey passed in 2002 was 73,491, up from the 49,277 passed in 2001.

Turners Falls

The fishladders at Turners Falls operated from May 9 through July 10, 2002. Only minor operational problems were encountered during the season. However, the total number of shad passing through the facility remains disappointingly low. Only 2,870 shad were counted passing through the project. This equals only 0.8% percent of the total number of shad passed through the Holyoke facility. The agencies involved with the anadromous fish restoration project continued a research project directed at increasing the passage through the Cabot ladder in 2002. This project began in 1999 with the monitoring of PIT tagged shad at the Cabot ladder, and will continue in 2003 with the introduction of ladder modifications.

Westfield River

In 2002, a fish ladder was operated for the sixth year at the Decorative Specialties International Inc. (DSI) dam in West Springfield, MA. The fishway and associated

downstream bypass facilities were constructed in the fall of 1995. An American eel upstream passage facility was installed at the DSI dam during the summer of 2001 and began operation in the fall.

The DSI fishway was operated for upriver passage April 9 through July 11, and September 15 through October 31. Closures due to high water occurred on May 14-15, and June 7. Five species of anadromous fish and six species of resident fish were identified and tallied during the spring/summer fish passage season. Passage included 3,683 sea lamprey and 2,762 American shad. In addition, several species of resident fish were counted at the project in large numbers as well. The list includes white sucker, brook and brown trout, largemouth and smallmouth bass. 506 juvenile eels (elvers) were documented passing through the new eelway during Oct. 2002.

The number of Atlantic salmon returning to the Westfield River decreased this year from 8 in 2001 to 5 in 2002. All salmon were transported to the Richard Cronin National Salmon Station, Sunderland, MA by personnel of the United States Fish & Wildlife Service. No salmon were seen during the fall passage season.



Atlantic Salmon Fry Stocking, Survival and Habitat Assessment

During spring 2002 a total of 1,960,995 Atlantic salmon fry were stocked into tributaries of the Connecticut River in Massachusetts by volunteers and members of the Americorps Program. The majority of these fish were stocked into the Deerfield River system (758,619) and the Westfield River system (880,945). Other smaller tributaries to the Connecticut were stocked as well. These include the Manhan, Fourmile Brook, Mill (Northampton, Hatfield, Northfield) Sawmill, and Fall Rivers. A small segment of the Millers River was also stocked. Survival of the stocked fry was estimated by electrofishing techniques. Results of summer 2002 electrofishing show that salmon were found in all waters that had been stocked in the spring. Survival into the second year of life was also documented. The estimate of spring 2003 smolt production was 76,789 smolts from Massachusetts tributaries to the Connecticut River. A survey of the total amount of Atlantic salmon habitat in the tributary waters of the Connecticut in Massachusetts is now largely complete. An estimated 49,281 units (one unit equals 100 square meters of river area) of Atlantic salmon habitat have been assessed through this effort.

Merrimack River

The two mainstem dams on the Merrimack River in Massachusetts were operated and monitored for anadromous fish passage during the spring/summer of 2002.

Essex Dam

During the spring of 2002 the Essex Fishlift in Lawrence, MA was operated from April 29 to July 12. The lift was closed due to high water on May 4-5, 15-21, June 6 and 8 and on June 23 and July 4 for operational reasons. In 2002 Atlantic salmon numbers (57) were down from last year (78). American shad passing through the lift in 2002 (54,586) were 71% of the record high passage of 2001 (76,717). River herring (526) decreased from the number passed in 2001 (1,550). Striped bass (1,896) increased from 511 passed in 2001. Sea lamprey passage (8,055) was up significantly from the 2001 total (3,665).

Pawtucket Dam

The Pawtucket Dam Fishlift in Lowell, MA was operated from May 13 through July 10, 2002. The facility was not staffed in 2002. Fish numbers were estimated by CHI employees by observing the bucket as it was lifted. Due to low river flows and the early installation of flashboards at the dam, the fish ladder was not operated this season. 5,283 shad were lifted. This is down from the passage of 7,740 in 2001 and represents 9.7% of the shad lifted in Lawrence. River herring (0) decreased substantially from the number passed in 2001 (58) and remains depressed when compared to the 37,000 counted in 1989. 32 striped bass were lifted. Sea lamprey passage (2009 or 2% of Lawrence passage) was greater than the 2001 number (606). No sea-run Atlantic salmon were seen at the facility but a number of surplus broodstock from the New Hampshire sport fishery were counted in the vicinity of the lift.

Technical Assistance

In 2002 the CRASC legislation was re-authorized by the US Congress for another 20 years.

Also in 2002 the project leader completed the administrative work required to continue these federal aid supported anadromous fish investigation projects for the next five years.

As in 2001, the majority of technical assistance time was spent addressing fish passage issues pursuant to the FERC relicensing of the Holyoke project. The Holyoke Water Power Company (HWP) was awarded a new license to operate the Holyoke project in July of 1999 and the project was sold to the City of Holyoke and the Holyoke Gas and Electric Co. in July 2001. In 2001 an inflatable rubber dam crest was installed and rock removal near the west fish entrance in the tailrace was completed.

Downstream passage facilities were completed on the four lowest dams on the Deerfield system (#2, #3, #4, and Gardners Falls) in 1999. These facilities began operation during the smolt out-migration in the spring of 1999 and were evaluated at that time. Deficiencies

were found, corrections/modifications were made and evaluations continue.

The FERC relicensing process continues at the Woronoco project on the Westfield River. Technical assistance time was spent addressing fish passage and minimum flow issues at this project. The final draft of the license application was filed in 2001 and the license was issued in 2002. Eelways are to be built at the project in fall of 2003.

The project leader continued to attend CRASC Technical Committee Meetings, and continued as the chairman of the CRASC Shad Studies Group in 2002. The project leader attended Merrimack River Technical Committee meetings.

The project leader was actively involved with the River Restore Program, acting as the Division of Fisheries and Wildlife's representative on the Dam Removal Triage team. This involved traveling around the state looking at, and evaluating dams that may be removed. One dam on Yokum Brook in Becket, MA was removed in February, 2003, and another is scheduled to be removed during the summer of 2003.

Fish Kill Investigations

Pursuant to the 1999 Fish Kill Memorandum of Understanding between the Department of Environmental Protection (DEP), the Division of Fisheries and Wildlife (*MassWildlife*), the Division of Environmental Law Enforcement (DELE) and the Department of Food and Agriculture (DFA), *MassWildlife*, as the coordinating agency, received 61 reports which 56 involved fish kills (10 rivers; 51 ponds). The reports which did not involve dead fish included crayfish and freshwater mussel kills and a dye test on a river. Fourteen reports required field investigations: 9 natural kills (low oxygen, stress related and/or stranding), 1 no dead fish found, 2 pollution related, 1 stranding after low water, and 1 hydropower turbine.

Environmental Review

There were 109 requests to review project proposals potentially affecting 117 waters statewide. Twelve projects were proposed in areas which had no fisheries habitat. Sixty two percent of the requests were received from environmental consulting contractors to fulfill DEP and MEPA filing requirements. The remainder of the requests were from state agencies such as EOEA, DEM, and DEP (28%) and local conservation commissions (9%). Fisheries resources were partitioned as follows: warm water (20%), coldwater (55%) of which 29% were anadromous resources and 1% were threatened or endangered. The majority of the projects were bridge replacements/rehabilitations over streams and road reconstruction (50%). The remainder was divided between land development, habitat restoration, gas pipelines, nuisance aquatic vegetation management, lake draw downs, lake dredging, fish passage, water withdrawals and discharges, dam removal and/or repairs, contaminated site clean-up and combined sewer

overflows. *MassWildlife* provided resource data, impact assessments, technical assistance and mitigative strategies to protect fisheries resources.

In 2003, *MassWildlife* reviewed and provided comments to MEPA, DEP and EPA, as needed, on discharge permit renewals, water withdrawal permits and all major projects affecting fisheries resources published in the Environmental Monitor. *MassWildlife* also provided technical information to a wide variety of consultants, town and state officials on local projects. Beginning in 2003, the Division instituted a coordinated approach to environmental review, with one letter incorporating comments from the Fisheries and Wildlife Sections and the Natural Heritage & Endangered Species Program.

Warmwater Fisheries Investigations

Project Leader: Richard Hartley

Stocking:

The stocked esocid program continues to be modified as we monitor catches of northern pike and tiger muskies. Currently, each Wildlife Management District has one to three waters stocked annually with tiger muskies depending on total numbers available. In the Northeast District, Lake Mascopic, Tyngsborough has been the primary water stocked for the past 10 years. Aside from anecdotal reports of a few sub legal tigers produced during various ice fishing derbies, this water has not produced the fishery expected. Therefore, other waters, such as the Charles and Concord Rivers and Lake Cochituate, Natick are being considered for future stockings. In the Southeast District, South Watuppa Pond, Fall River has been stocked for the past five years. Like Lake Mascopic, South Watuppa Pond has failed to produce a fishery. In the Central District, the A-1 Site and Lake Chauncey, Westborough, and Flint Pond, Shrewsbury are being managed actively. One body of water in the Connecticut Valley District (Hampton Ponds, Westfield) has been stocked for the past ten years and is producing legal fish. Pontoosuc Lake, Pittsfield in the Western District, which has the most consistent stocking history in the state, continues to be the best producer. In fact, Pontoosuc Lake produced the largest tiger muskie for the third straight year in a row and now holds the world record for a tiger muskie caught on an ice fishing tip-up at 27 pounds even. Spring and summer surpluses of northern pike and tiger muskie from the states of New Jersey, Pennsylvania and Virginia were made available once again for stocking waters of the Commonwealth.

In addition to donating surplus fish, the Pennsylvania Fish Commission held an allotment of tiger muskellunge for Massachusetts until early fall, allowing for the stocking of a larger fish (> seven inches). Stocking studies have shown that esocids stocked at less than seven inches suffer mortality rates as high as 90% in the first 40 days. Stocking larger fingerlings increases chances for survival, which will ultimately lead to more legal fish entering the fishery.

As a result of the generosity of Pennsylvania, 150,299 tiger muskies were stocked into five waters: Lake Chauncey, Westborough, South Watuppa Pond, Fall River, Lake Cochituate, Framingham, Pontoosuc Lake, Pittsfield and Hampton Ponds, Westfield. The bulk of these tigers (90%) were summer surplus, however, and were three inches or less in length. The lack of high numbers of fish over seven inches plays a large part in our inability to establish fisheries in many of our stocked waters.

As with tiger muskies, the process for narrowing the list of waters stocked with northern pike continues. Spring surpluses from New Jersey, Pennsylvania and Virginia resulted in 45,468 northern pike stocked into three bodies of water: A-1 Site and Lake Chauncey, both in Westborough and Shaw Pond, Becket. As with the bulk of the tiger muskies, however, all of the northern pike were spring surplus fish which were 4 inches or less.

Bass Tournament Creel Analysis:

The Fisheries Section is monitoring the results of black bass (largemouth and smallmouth bass) tournaments to help establish a long term database of variables such as catch rates and average fish size for specific waters. Any organization which requests the use of a Public Access Board (PAB) facility (mainly boat ramps) to hold a fishing event must receive a Special Use Permit. As part of the permit, the PAB includes a creel sheet to be completed by the fishing club at the close of the event. Certain individual bass clubs as well as the Massachusetts Chapter of B.A.S.S. (Bass Anglers Sportsman Society) have been given creel sheets in an attempt to generate information on tournaments held on non PAB ramps. Completed creel sheets are mailed to the Warmwater/coolwater Project Leader at the Field Headquarters.

The creel survey seeks the following information: club name, date of event, location of event, start and end time, number of anglers, number of anglers weighing bass, number of anglers with limits of bass, total number of bass weighed in by species, total bass over 5 pounds, number of bass returned alive by species, total weight, winning weight and the weight of the biggest bass of the event. There is also room for the club to include comments. This information is entered into a database to allow the Division to detect long term trends in the bass populations in some of the Commonwealth's most heavily fished waters. Creel sheets are still being received for the 2003 tournament season, so results from the 2002 season will be presented here.

In 2002, a total of 176 creel sheets were sent in to Field Headquarters. These 176 tournaments represented 53 different bass clubs fishing on 43 different waters. The average size of a tournament was 20 anglers, with a high of 118 anglers. A total of 7,718 largemouth bass and 1,459 smallmouth bass were weighed in for a catch rate of approximately of 1 bass per 3 angler hours. The average weight of a bass weighed in was 1 lb. 13 oz. Our



Lucky gold pin recipients are honored each year by the Freshwater Sportfishing Awards Program.

figures show that 89% of all anglers weighed at least one bass, while 39% caught a limit (5 bass total of either species). At the close of the tournaments, 99% of all bass were returned to the waterbody alive.

These indicators have not changed significantly since tracking began in 1996. Mashpee-Wakeby Pond, Mashpee produced the highest number of bass over 5 pounds (16), while Manchaug Pond, Sutton produced the highest number of anglers weighing fish (99%). South Watuppa Pond, Fall River produced the highest number of anglers with limits (70%). Mashpee-Wakeby Pond also produced the highest average winning weight of bass (19 lbs.). A breakdown of the number of tournaments by waterbody revealed that most waters host less than six tournaments a year. The two highest occurrences took place on the Congomond Lakes, Southwick and the Connecticut River, which hosted 20 and 15 respectively. Over time, this data will aid in detecting possible changes to the bass fishery.

Freshwater Sportfishing Awards Program

Project Leader: Richard Hartley, M.S.

For over 30 years, the Freshwater Sportfishing Awards program has been awarding pins to anglers who catch trophy size fish from the waters of the Commonwealth. Minimum qualifying weights are currently in place for 22 different species of fish. Upon submitting an eligible fish to an authorized weigh station (nearly 100 across the state), the angler receives a bronze pin depicting the species of fish with the weight and year of catch stamped on the back. In addition to the bronze pin, the lucky angler who weighs in the largest fish of the year for each of the categories is awarded a plaque and gold

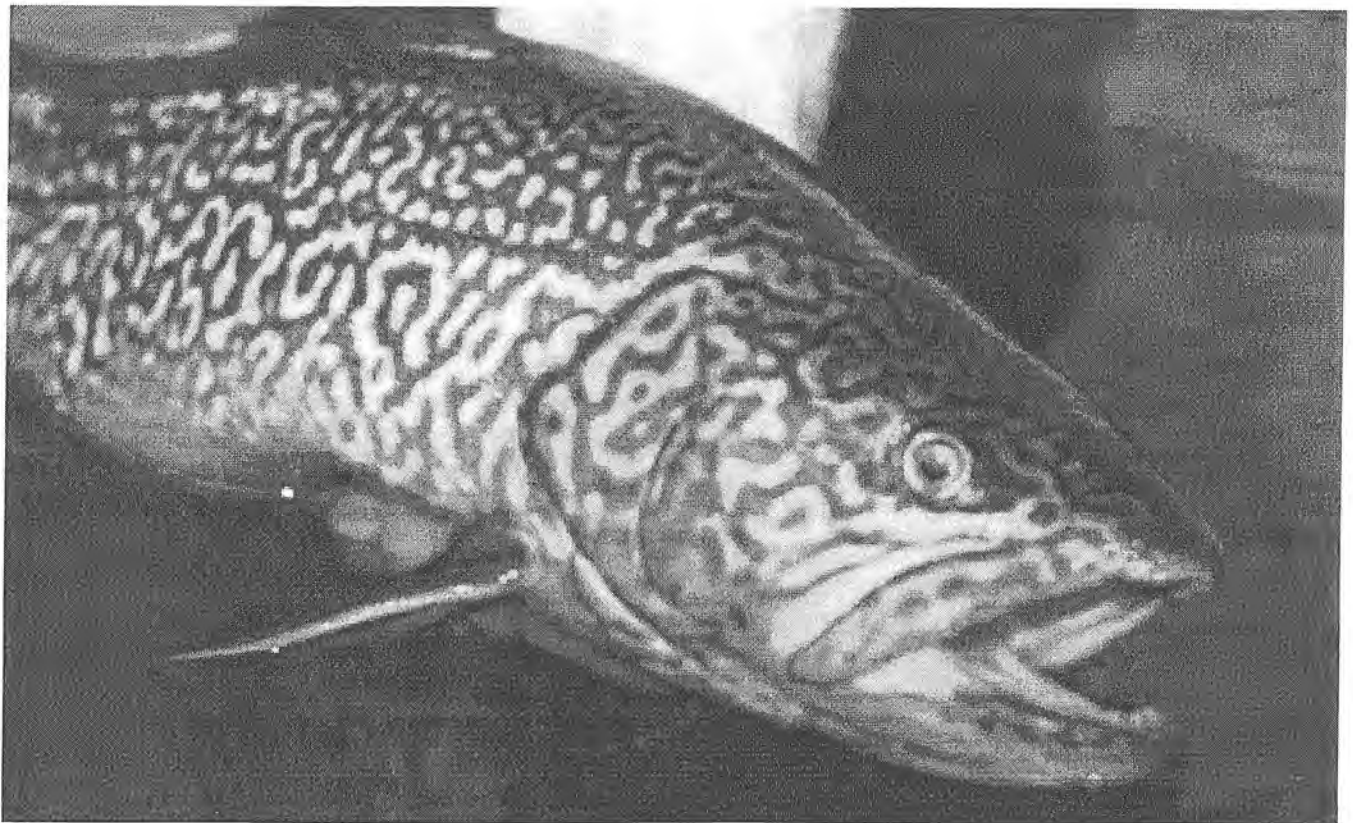
pin at the annual sportsmen's show held in February at the Worcester Centrum. Affidavits are still being received for 2003, so results from 2002 are presented here. 341 pins were awarded in all 22 categories for calendar year 2002. In addition, a new state record was submitted for tiger trout.

Species	Total Pins	Gold Pin
Broodstock salmon	31	17 lbs. 11 ozs.
Brook trout	31	3 lbs. 11 ozs.
Brown trout	7	8 lbs. 3 ozs.
Bullhead	18	2 lbs. 6 ozs.
Carp	8	39 lbs. 1 oz.
Chain pickerel	26	6 lbs. 0 ozs.
Channel catfish	24	13 lbs. 14 ozs.
Crappie	13	2 lbs. 12 ozs.
Lake trout	19	18 lbs. 7 ozs.
Landlocked salmon	11	5 lbs. 14 ozs.
Largemouth bass	21	10 lbs. 0 ozs.
Northern pike	9	25 lbs. 14 ozs.
Rainbow trout	19	6 lbs. 4 ozs.
Shad	10	6 lbs. 4 ozs.
Smallmouth bass	23	6 lbs. 1 ozs.
Sunfish	10	1 lb. 6 ozs.
Tiger muskellunge	3	21 lbs. 6 ozs.
Tiger trout	3	5 lbs. 9 ozs.
Walleye	2	5 lbs. 8 ozs.
White catfish	18	8 lbs. 12 ozs.
White perch	27	2 lbs. 4 ozs.
Yellow perch	8	1 lb. 13 ozs.

2003 FISH PRODUCTION

**Table 3. Summary of the number trout produced and stocked from each of the Division's four trout hatcheries in FY 2003.
(Fall stocking 2002 and Spring stocking 2003)**

Species	Size Cat. (inches)	Number of fish				Total No. of Fish
		Bitzer	McLaughlin	Sunderland	Sandwich	
Rainbow Trout	12+	16000	59309	45940	45350	166599
	14+	16500	173807	0	0	190307
	18+	100	0	0	0	100
	Sub-total	32600	233116	45940	45350	357006
Brook Trout	9+	15600	25126	37450	10000	88176
	12+	600	0	8960	22280	31840
	18+	0	0	0	501	501
	Sub-total	16200	25126	46410	32781	120517
Brown Trout	6 - 9	3800	0	0	0	3800
	9+	0	0	21780	0	21780
	12+	19500	0	33625	6110	59235
	18+	0	0	0	297	297
	Sub-total	23300	0	55405	6407	85112
Tiger Trout	14+	0	0	0	5032	5032
	Sub-total	0	0	0	5032	5032
Total		72100	258242	147755	89570	567667



The tiger trout, an infertile cross between a brook trout and a brown trout, has proven very popular with anglers. A new state record was set this year.

**Table 4. Summary of the weight of trout produced and stocked from each of the Division's four trout hatcheries in FY2003.
(Fall 2002 and Spring 2003)**

Size Cat. Species	(inches)	Weight of fish (lbs)				Total Wgt. of Fish
		Bitzer	McLaughlin	Sunderland	Sandwich	
Rainbow Trout	12+	13610	38202	29983	32343	114138
	14+	21800	159830	0	0	181630
	18+	500	0	0	0	500
	Sub-total	35910	198032	29983	32343	296268
Brook Trout	9+	8871	0	10601	2577	22049
	12+	600	9182	5161	11242	26185
	18+	0	0	0	931	931
	Sub-total	9471	9182	15762	14750	49165
Brown Trout	6 – 9	825	0	0	0	825
	9+	0	0	5166	0	5166
	12+	19023	0	29239	3845	52107
	18+	0	0	0	839	839
Tiger Trout	14+	0	0	0	4570	4570
	Sub-total	0	0	0	4570	4570
Total		65229	207214	80150	56347	408940

Table 5. Summary of landlocked salmon and Atlantic salmon produced at the Roger Reed Hatchery in FY2003.

Species	Size Category (inches)	Number	Weight (lbs)
Landlocked salmon	smolts (8+)	13200	3300
	Total	13200	3300
Atlantic salmon	green eggs	175000	
	unfed fry (1+)	1000000	350
	adults (15+)	406	3915
	Total	1175406	4265

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WILDLIFE

Dr. Robert D. Deblinger
Assistant Director

The Wildlife Section oversees research and management of all avian and mammalian species which are utilized in any way for meat, fur or sporting purposes. The wildlife section has a staff of eight wildlife biologists who conduct research and management projects throughout the state with assistance by District personnel and in cooperation with the U.S. Fish & Wildlife Service and the Massachusetts Cooperative Fish & Wildlife Research Unit (USGS).

Migratory Bird Census

Mourning Dove Census: The number of calling doves on 3 long-term survey routes decreased 33% from 2002 to 2003. Counts on 8 comparable routes decreased 8% from 2002 to 2003.

Woodcock Census: Results of the fall 2002 hunting season as measured by the woodcock wing-collection survey indicated that the average bag per hunt and per season decreased 5% and increased 11% respectively when compared to the previous season. Production of young, which is measured in a ratio of immatures per adult female, decreased 19% when compared to the long-term average.

Seven randomized spring woodcock singing ground surveys were conducted in 2003. The total number of singing woodcock heard during the spring census in Massachusetts decreased 4% from 2002 counts, but showed a 5% increase over 10 years.

Waterfowl Research and Surveys: The start of the airboat nightlight banding season was delayed by hull repairs to the airboat. The amount of leakage encountered last season, when the airboat sank while moored on a pond during a period in which the trailer axle was being repaired, required removing the polymer shield and re-fiberglassing the hull, a labor intensive operation. Drought-like conditions prevailed during the summer of 2002, limiting the number of sites suitable for boating. Either sites were too dry to attract ducks, or there was not enough water to launch the boat off the trailer. On areas that did have water, biologists did well. They banded 578 birds during 13 nights of airboating, averaging 46 birds per night with catches ranging from 0 to 120. Among the 578 birds banded were 399 wood ducks, 166 mallards, and 2 American black ducks.

Between September 3 and 25, Massachusetts conducted a resident Canada goose season with a five bird daily bag limit. The newly implemented Migratory Bird Hunter Harvest Information Program (H.I.P) of the U.S. Fish and Wildlife Service estimated a September season

harvest of 2,900 geese. This compares to a harvest estimate of 2,300 last year.

Duck hunting seasons in the Atlantic Flyway continued with the liberal option of 60-day seasons and a six bird bag limit. The Canada goose season was increased from a 45 day/2 bird bag season last year to a 60 day/2 bird bag season this year in the Central and Coastal waterfowl hunting zones. In addition, the season in the Berkshire zone was increased from a 30 day/2 bird bag that was allowed to begin the last Saturday in October to a similar 45 day season. This was the fourth regular season of goose hunting allowed in that region since 1995. It was made possible by increasing numbers of Canada geese in northern Quebec.

The annual midwinter coastal waterfowl inventory was flown between January 14 and 17, 2003. For the third year *MassWildlife* contracted out the survey to the U.S. Fish and Wildlife Service but this year a *MassWildlife* employee flew as the second observer and another employee accompanied the crew as a trainee. 113,899 waterfowl were counted. Black duck numbers were up 4% from 2002 and 2% above the 10-year average. Mallard counts (3,123) were 37% below last year and 7% below the 10-year average. Scaup numbers were well below last year (-69%) and the 10-year average (-54%). Similarly, counts of most other species were below average with the exception of goldeneyes (up 32%) and Canada geese (up 19%).

During January 2003, *MassWildlife* conducted a park waterfowl survey, an activity conducted every five years since 1973. A total of 15,244 mallards, 1,583 black ducks, and 3,361 Canada geese were counted at 193 sites in 120 municipalities where people fed waterfowl. The number of mallards counted on this survey is always several times greater than that counted on the "official" annual midwinter waterfowl survey because relatively few mallards winter near the coastal areas covered by that survey. The number of mallards, however, has been declining in recent years as Canada goose numbers increased. Anti-feeding ordinances directed at increasing numbers of resident Canada geese have meant less artificial provisioning for mallards, as well.

Between January 18 and February 15, 2003, Massachusetts held a late, resident Canada goose season in the Central waterfowl zone while the season in that portion of the Coastal zone north of Duxbury was conducted from January 20 to February 15. This is the latest the Canada goose season has run. The USFWS estimated a harvest of 1,900 geese compared to 3,000

birds last year, 4,600 in 2002 and 2,000 the previous year.

During April and May staff participated in the Northeastern states waterfowl breeding survey which is based on sampling randomly selected 1 kilometer square plots. Massachusetts checked 93 of the 1,495 plots used in the survey. Eleven states participated in the 2003 breeding pair survey for waterfowl. The population estimate for mallards was 347,280 pairs $\pm$ 44,598. The estimate for black ducks was 28,863 pairs $\pm$ 8,372; wood ducks, 167,135 pairs $\pm$ 29,328, and Canada geese, 388,672 pairs $\pm$ 56,404.

Data from this survey is used to set hunting season regulations tailored to the Atlantic Flyway.

Division personnel continued to conduct nest box checks on 51 sites used by *MassWildlife* to monitor wood duck populations statewide. Summer checks revealed 342 wood duck nest starts in 623 available boxes, with 279 successful hatches (81%). In addition, there were 62 hooded merganser hatches from 92 starts.

Massachusetts participates in the Atlantic Flyway Resident Goose Banding Program. This program is designed to band 1% to 2% of a state's breeding Canada goose population. Geese are captured by round ups during the summer molt. A total of 1,000 Canada geese were banded at 70 sites in 62 towns in Massachusetts. The total included 507 goslings and 493 adults. An additional 267 previously banded geese were recaptured. We also placed satellite radio collars on two nesting females, and then broke up the nests to determine if the birds would molt migrate but the radios failed to function. The radios are to be replaced, free of charge, by the company for a repeated attempt next year.

Massachusetts entered its sixth year of the new federal Migratory Bird Hunter Harvest Information Program (HIP). HIP is designed to replace the present survey based on collecting names of duck stamp buyers at post offices, and will allow for more specialized surveys of activities related to various migratory bird species. Waterfowl and woodcock hunters are required to register each time they buy a new license by calling a 1-800 number. Hunters were also able to register on line through the state's new internet registration system.

This was the second year that the Lackey Pond dam was in full service. Marsh vegetation is now fully regenerated, much more rapidly than expected, providing good waterfowl habitat. This was evidenced by airboat nightlight banding efforts. We banded 118 birds, including 92 wood ducks, up from 90 ducks last year. The Lackey Pond Dam restoration was a cooperative project involving several groups and was funded for the Division through Ducks Unlimited, Inc.'s M.A.R.S.H. program.

Cottontail Rabbit Survey

Sportsmen and others were solicited to provide specimens of cottontail rabbits to aid in ascertaining the statewide distribution of Eastern and New England

cottontails. A total of 183 usable specimens from 10 counties was received during 2001-03. No New England cottontails were received; however, this species was recorded in Barnstable and Berkshire counties by a cooperator on another project. Two cottontail specimens could not be conclusively identified as to species.

Wild Turkey

Wild Turkey Range and Harvest Evaluation

The 13th modern-day fall either-sex turkey season was held from October 28 to November 2, 2002. The zone included all of Berkshire, Dukes, Franklin, Hampden, and Hampshire counties and a portion of western Worcester county. A total of 125 turkeys was taken including 34 (27%) in Franklin County, 39 (31%) in Berkshire County, 22 (18%) in Hampshire County, 13 (10%) in Hampden County, 17 (14%) in the open portion of Worcester County, and none in Dukes County. There were 21 adult males, 35 immature males, 16 adult females, 7 immature females, and 46 un-aged females taken.

The 24th Massachusetts spring gobbler hunt was held in April-May 2003. The season framework was changed to conform to Deer Management Zone boundaries. The four-week open zone included Zones 01 through 10 and 13. The two-week zone included Zones 11 and 12. A near-record total of 13,910 permit applications were received. A near-record harvest of 2217 turkeys was attained (the 12th straight year over 1000 and the 5th over 2000). There were =337 persons (2.4%) who took their second bird in the bag, as compared to 282 persons (2.0%) in 2002. The overall estimated success rate for taking 1 turkey was 13.5% as compared to 12.4% in 2002. The Worcester County harvest was 592 (26.7%), followed by Berkshire (489, 22.1%), Franklin (321, 14.5%), Hampden (233, 10.5%), Hampshire (217, 9.8%), Plymouth (103, 4.6%), Middlesex (85, 3.8%), Essex (79, 3.6%), Bristol (53, 2.4%), Norfolk (35, 1.6%), Barnstable (5, 0.2%), and Dukes (5, 0.2%). Adult males comprised 1442 (65%) of the take, as compared to 888 (44%) in 2002.

Black Bear

Black Bear Distribution and Harvest Investigations

A record total of 2,646 bear hunting permits were issued for the 2002 hunting season. A near-record total of 116 bears was taken during the 23-day split season, including 110 during the 17-day September segment and 6 during the 6-day November segment. Sixty-six males and 50 females were taken in Berkshire (n=50), Franklin (n=27), Hampden (n=21), Hampshire (n=17), and Worcester (n=1) counties. There were 23 non-hunting mortalities (16 in 2001-02) including 10 depredation kills, nine road kills, three capture losses, and one bear was euthanized. A total of 114 problem bear complaints was received (147 in 2001-02) primarily including 36 residential complaints, and 35 trash and campground complaints. Additional untallied, but sub-

stantial, complaints were received by the Division of Law Enforcement and local officials.

The black bear field study conducted by the University of Massachusetts (in cooperation with DFW) was shifted to DFW in 1999. Six radio-collared bears (1 male and 5 females) were active in July 2002. Two females and the male were killed in the September hunting season. During winter 2003, the three remaining bears were tracked to their winter dens. Two of the three were captured in the den; both had newborn cubs. The remaining sow (with two yearlings) abandoned the den during heavy rains but was recaptured by barrel trapping in spring. Five additional 5 bears, 2 males and 3 females, were captured in barrel traps in May and June 2003. Three free-ranging females and one male were captured by ground darting or by chasing the animals up trees. Two uncollared females were captured in dens (one in brush, one under a porch) after citizens reported the bear's locations. Female bears were radio-collared and males ear-tagged only. Eleven collared bears were being monitored as of July 1, 2003.

Furbearer Program

The furbearer program is responsible for the management and research of fourteen species of wildlife in the Commonwealth. This group of species called furbearers includes beaver, muskrat, bobcat, eastern coyote, red and gray fox, river otter, fisher, striped skunk, mink, long-tailed and short-tailed weasel, raccoon and opossum.

Massachusetts' furbearers are abundant and widely distributed throughout the state. The populations of these species are scientifically managed and secure. None are threatened or endangered. The value of the Commonwealth's furbearer resource is very diverse and includes economic, ecological, cultural, biological, aesthetic and educational opportunities to individuals in the state.

The furbearer management program presents many challenges to wildlife managers in the state and uses various options including habitat manipulation, public education and regulated hunting and trapping as tools in the management of these renewable resources in the Commonwealth.

A combination of techniques is used to:

1. Control problem animals
2. Regulate wildlife populations
3. Reduce habitat degradation
4. Reduce crop and property damage
5. Aids in the recovery of endangered species
6. Allow a sustainable harvest of renewable furbearer resources.

In addition, these activities provide recreational and economic opportunity for citizens and households in the state. In this past fiscal year citizens spent more than

1,900 days afield harvesting and viewing furbearer resources. A total of 2,515 furbearers was harvested in the 2002-2003 season. The harvest by species was 495 beaver, 23 bobcat, 85 coyote, 303 fisher, 25 river otter, 24 red fox, 43 gray fox, 717 raccoon, 39 mink, 85 skunk, 27 opossum, and 649 muskrat.

Regulated trapping is an important component of wildlife management programs. It is the most feasible and effective method to control wildlife population growth. Regulated trapping conducted by a trained, licensed public is used by wildlife professionals to regulate wildlife populations and thus reduces negative aspects associated with high wildlife populations. Residents of the state derive financial savings due to decreased amounts of property damage caused by furbearers, and by diminishing the need to pay animal control agents.

The Massachusetts Division of Fisheries and Wildlife heavily regulates the harvest of furbearing animals. Massachusetts has complex laws and regulations that govern the activity of trapping. They include:

1. Mandatory licensing of trappers
2. Mandatory trapper training
3. Restrictions on the size of traps
4. Restrictions on types of traps
5. Restricted seasons for trapping
6. Restricted areas for trapping
7. Mandatory regular checking of traps
8. Mandatory tagging of traps to identify the owner.

Management and Research Efforts

Pelt sealing: Pelt sealing is used to gain harvest information and distribution of beaver, otter, red fox, gray fox, bobcat, coyote, mink, and fisher statewide. During the 2002-2003 harvest season, the Division sealed 1037 pelts.

Wetland/beaver management: In November, 1996 a Ballot Referendum known as "The Wildlife Protection Act" or "Question One" was approved by voters in Massachusetts during the general election. This statute modified existing laws that regulated lawful traps for certain species of wildlife. Beavers are prolific rodents that occasionally cause problems to public and private property. A consequence of the trapping restrictions was decreased harvest of beaver during the regulated trapping season and a concomitant increase in the statewide population.

Between 1996 and 2000, the beaver population tripled and complaints about flooding increased. Typical complaints included: flooded septic systems, wells, roads, driveways and railroad tracks. In July 2000 the Massachusetts Legislature passed and the Governor signed a new law that modified the restrictions on beaver and muskrat traps to provide relief for people suffering from flooding impacts caused by beaver or muskrat. An



Nervous tissue samples from harvested deer and road mortalities were collected to develop statistically valid data that will serve as a baseline in efforts to monitor for the presence of CWD in New England deer.

emergency permitting system was created at the town level with certain non-emergency permits for specific traps available from *MassWildlife*.

MassWildlife has developed brochures that explain options to landowners discussing the positive and negative aspect of beaver activities, associated wetland values and overall management of beaver. The newest brochure is a "sister-document" to the "Beavers in Massachusetts" booklet and explains the use of water flow devices to address flooding problems caused by beaver. The new brochure has been distributed to libraries throughout the Commonwealth and is provided to the public free. Public education, regulated harvest, and the installation of flow devices are major components of this program. *MassWildlife* management goals for beaver include managing beaver for their wetland values, regulating beaver populations within available

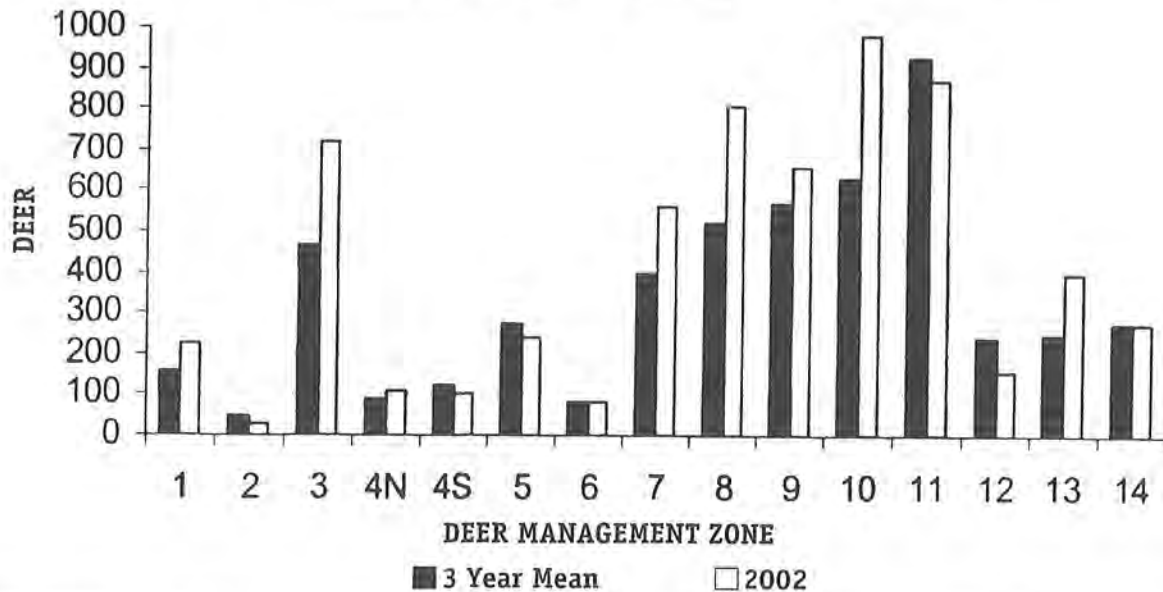
habitat and minimizing economic damage to public and private property by beaver.

Wildlife Depredation and Damage: *MassWildlife* personnel responded to complaints about eastern coyotes, red foxes and gray foxes concerning the loss of domestic livestock and pets. Site visits were conducted and technical advice given in an attempt to eliminate or alleviate damage situations. Coyotes currently occur in all communities in Massachusetts except Martha's Vineyard and Nantucket. Complaints regarding eastern coyotes have come from more than 340 separate towns in the Commonwealth since 1990. Complaints range from coyotes killing livestock, and poultry, harassing pet dogs and cats, to coyotes on airport run ways threatening the arrival and takeoff of aircraft.

Table 1. The 2002 White-tailed Deer Harvest by Season and Sex/Age Class.

Season	Antlered Male	Female	Male Fawn	Unknown	Total	% of Harvest
Paraplegic	4	2	2	0	8	0%
Archery	1751	824	240	4	2819	23%
Shotgun	3768	3464	847	5	8084	66%
Primitive	499	697	152	2	1350	11%
Subtotal	6023	4989	1241	11	12264	
Quabbin	54	74	25	0	153	
TOTAL	6077	5063	1266	11	12417	

Figure 1. Total Massachusetts Antlerless Deer Harvest from 2002 Seasons Compared to the 3 Year Average from 1999 — 2001 Deer Seasons.



Wildlife Welfare - Disease Program: Furbearer program personnel have been monitoring an outbreak of rabies in raccoon populations along the eastern seaboard since 1977. This epizootic was first documented in Massachusetts on September 16, 1992. The die-off of raccoons from this epizootic has been tremendous. The outbreak has peaked in the Commonwealth and has dramatically reduced the raccoon population.

Currently rabies has been confirmed in 327 (93%) towns in Massachusetts. The geographic distribution of

the outbreak now covers all of the Commonwealth except Cape Cod, Martha's Vineyard and Nantucket Island. From September 1992 - June 2003, 3,945 animals including, 2,136 raccoons, 1195 skunks, 76 woodchucks, 91 foxes, 106 domestic cats, 13 cattle, 4 domestic dog, 6 coyote, 2 otter, 2 fisher, 1 deer, and 10 others have tested positive. The Division developed informational brochures on zoonotic diseases that have been incorporated into trapper education training and are available to the public.

Table 2. White-tailed Deer Harvest by Sex/Age Class and Deer Management Zone for 2002.

DMZ	Antlered Male	Female	Male Fawn	Unknown	Zone Total
1	238	194	35	0	467
2	393	23	6	0	422
3	522	587	131	1	1241
4N	278	99	9	0	386
4S	197	95	11	1	304
5	416	192	50	3	661
6	136	68	15	0	219
7	384	459	106	0	949
8	637	659	148	1	1445
9	566	523	136	2	1227
10	735	763	217	1	1716
11	879	702	166	1	1748
12	190	131	27	0	348
13	248	293	104	0	645
14	190	196	78	1	465
Unknown	14	5	2	0	21
State Total	6023	4989	1241	11	12,264

Table 3. Massachusetts Deer Harvest by Season and Deer Management Zone for 2002.

DMZ	Parapelegic	Archery	Shotgun	Muzzleloader	Total
1	3	66	344	54	467
2	0	79	306	37	422
3	3	222	881	135	1241
4N	0	75	258	53	386
4S	0	62	194	48	304
5	0	87	493	80	661
6	2	33	155	29	219
7	0	174	691	84	949
8	0	217	1062	165	1445
9	0	290	786	151	1227
10	0	653	876	187	1716
11	0	564	989	195	1748
12	0	47	263	38	348
13	0	135	437	72	645
14	0	113	335	17	465
Unknown	0	2	14	5	21
Total	8	2819	6057	1350	12,264

White-tailed Deer Program

The deer population statewide is estimated to be between 85,000 and 95,000. Densities range from 10-12 deer mile² in western Massachusetts to over 50 deer mile² on Nantucket in eastern Massachusetts. With snow cover providing ideal hunting conditions during the shotgun and muzzleloader seasons, the 2002 harvest of 12,417 deer was a record harvest for Massachusetts (Table 1). Overall, there was a 25% increase in harvest from the 2001 hunting season with increases of 33% in shotgun and 58% in muzzleloader seasons, however archery had a 3% decrease in total harvest. Summary of the 2002 deer harvest by Deer Management Zone (DMZ) and sex is in Table 2, and the overall harvest by DMZ and season is in Table 3.

Currently, we estimate 45,000 to 50,000 deer hunters in Massachusetts, with 23,291 archery stamps and 22,597 muzzleloader stamps sold in 2002 representing a 15% and 27% increases, respectively. Permit allocation for 2002 was 41,050 permits while only 36,571 permits (89%) were issued. Nearly 32% of the 36,571 permits were sold over the counter as additional antlerless deer permits in those zones where allocation exceeded demand. This was the first hunting season after the regulation changes concerning antlerless deer permits, increased season lengths, DMZ boundary changes and muzzleloader equipment. These changes produced positive results toward deer management and increased hunter opportunity. We were able to increase antlerless deer harvest in DMZs that have deer densities above our goal, and reduce antlerless deer harvest in DMZs that are below goal through the antlerless deer permit allocation and sale of permits that were not issued through the deer permit drawing (Figure 1).

Research

The graduate student with the University of Massachusetts – Amherst will complete his project and defend his thesis in May 2003. The deer have been marked for over 3 hunting seasons in both study areas and hunting has accounted for <25% of total annual mortality. Roadkill mortality is nearly equal in both the urban northeast and rural western study areas. In western Massachusetts 2 collared deer were harvested in 2002, 1 in archery and 1 during the shotgun season, and 1 collared deer was harvested in the northeast study area during archery season.

We are continuing to determine cause specific mortality for deer in the 2 original study areas of the northeast and western Massachusetts, and will add a new area in north-central Massachusetts for 2003.

Chronic Wasting Disease

In accordance with the USDA-APHIS guidelines for CWD Surveillance, the states of Massachusetts, Connecticut and Rhode Island have submitted a surveillance plan intended to regionalize the tri-state area into one "Southern New England" region with respect to deer distribution, uniformity and the relatively small size of this region. Deer heads will be collected from each deer management zone/county to obtain the required samples to generate a statistically stratified valid sample for the Southern New England region. During the 2002 deer seasons, Massachusetts collected 87 of the 238 samples required by the plan. Results are still pending due to the late approval of the surveillance plan by the USDA.

Figure 2. Moose vehicle accidents in Massachusetts per month from 1980 to December 2002.

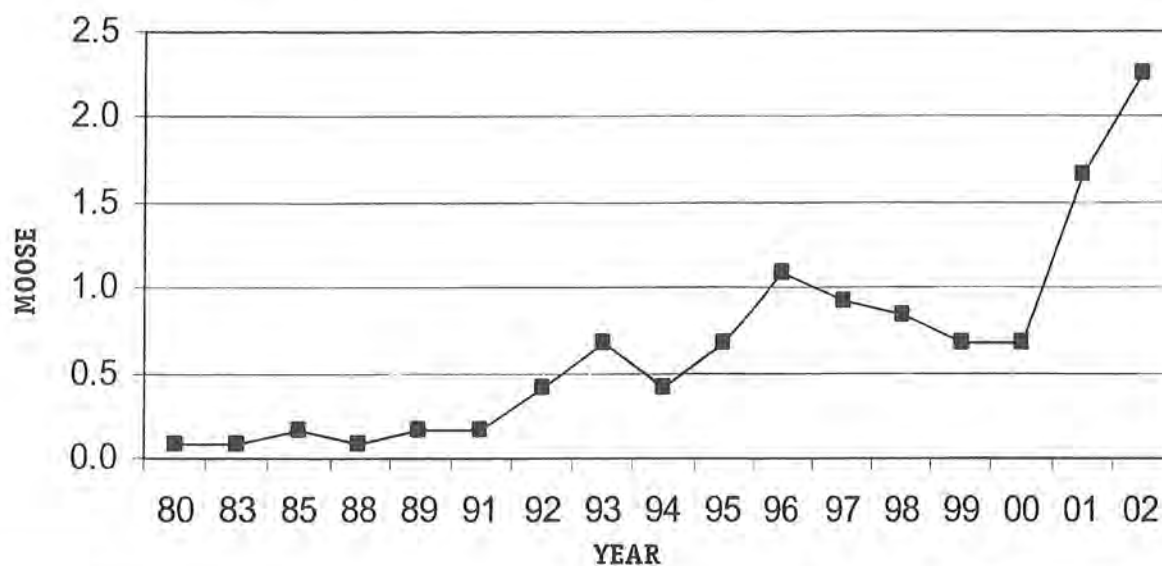


Table 4. Moose mortality in Massachusetts from 1980 to 2003. Total MVA is the sum of roadkill and collisions while total mortality is the sum of total MVA and other mortality.

Year	Roadkill	Collisions	Total MVA	Other Mortality	Total Mortality
1980	1	0	1	0	1
1981	0	0	0	0	0
1982	0	0	0	0	0
1983	1	0	1	0	1
1984	0	0	0	0	0
1985	2	0	2	0	2
1986	0	0	0	3	3
1987	0	0	0	0	0
1988	1	0	1	1	2
1989	2	0	2	2	4
1990	0	0	0	0	0
1991	2	0	2	4	6
1992	5	0	5	5	10
1993	8	0	8	4	12
1994	5	0	5	3	8
1995	8	0	8	4	12
1996	12	1	13	5	18
1997	11	0	11	4	15
1998	6	4	10	8	18
1999	8	0	8	9	17
2000	8	0	8	7	15
2001	18	2	20	9	29
2002	22	5	27	12	39
Total	120	12	132	80	212



Moose

Traditionally, the Division of Fisheries and Wildlife (DFW) has collected data concerning moose sightings from the public, moose found dead, and moose vehicle accidents (MVA). These indices are used for determining population trends and for estimating the moose population in Massachusetts. There have been 887 reports submitted to DFW concerning moose since 1924. Figure 2 represents the increasing trend of moose vehicle accidents per month from January 1980 through 2002. Moose vehicle accidents are all moose that were struck and killed on Massachusetts highways plus all moose that were struck by vehicles but walked away from the accident. There have been 132 MVA in Massachusetts from 1980 to 2002 (Table 4). The first moose road kill occurred in 1980 and the rate of MVA remained low at 0.1 to 0.2 MVA per month until the early 1990's. Since 1991, there have been at least 1 MVA in Massachusetts annually with the most (27 MVA) occurring in 2002, resulting in a MVA rate of 2.2 per month (Figure 2). Over 40% of all the MVA have occurred since 2000.

Currently, we use several indices to assess the trend in the moose population in Massachusetts. In 1997, the Division of Fisheries and Wildlife (DFW) started collecting moose sighting data from deer hunters through our bi-annual deer hunter survey. From the deer hunter survey conducted in 1997, approximately 5% of the deer hunters in Massachusetts saw at least 1 moose while hunting deer, and in 1999 it increased to 10% showing an increasing trend in the number of moose in the Commonwealth. Through improvements to the deer hunter survey and changing to an annual survey we have been able to estimate a moose sighting rate per 100 hours of deer hunting in Massachusetts. Currently, the sighting rate across the Commonwealth is 0.27 moose/100 hours of deer hunting which is a slight increase from the 0.25 moose/100 hours of deer hunting in 2001. In Deer Management Zones 5, 6 and 8 covering central Massachusetts, we have sighting rates that are over 1 moose/100 hours of deer hunting.

The current moose population in Massachusetts is estimated to be between 500 and 700 animals. We use

a basic population model that incorporates sighting rates from the deer hunter survey and available moose habitat in each of the 15 Deer Management Zones.

During the year we had 2 male moose radio-collared in western Massachusetts. Both animals were immobilized and relocated from problem situations and have been monitored since 2001. These animals are alive and are monitored bi-weekly. In September 2000, 2 yearling males were collared and relocated to the same Wildlife Management Area in north central Massachusetts. Both animals moved to southwest New Hampshire within 2 months. One animal died of unknown causes, and the second male was harvested during the 2002 New Hampshire moose season. We will continue to radio-collar moose in the future to improve our understanding of movement patterns, survival rates and causes of mortality on the increasing moose population in Massachusetts.

Forestry Program

The Forestry Program is a component of the MassWildlife Biodiversity Initiative, which seeks to maintain and restore the native diversity of flora and fauna through active land management. The Forestry Program focuses on creating a distribution of successional stages (from early-seral to late-seral forest) in a landscape context that will maintain biological diversity.

The forestry program's objectives are:

- 1) Build a forest inventory data base, prepare GIS-based landcover maps, and establish property boundary lines in the field for each wildlife management area (WMA).
- 2) Use inventory data to design and carry out both commercial forest cutting operations and non-commercial management activities that maintain biological diversity using ecological regions (ecoregions) as the fundamental planning unit.
- 3) Conduct pre- and post-treatment biological monitoring to determine the response of wildlife populations to forest cutting operations.

The Forestry Program leader and two full-time foresters conduct commercial cutting operations in compliance with Division forest management guidelines. The guidelines provide a sequential checklist of steps for each sale to insure that landscape conditions are assessed, and that management activities reflect landscape conditions. Prior to any cutting operation, Division foresters consult with District staff to address local access and aesthetic issues, and with personnel from the Division's Natural Heritage & Endangered Species Program to conserve state-listed species and priority natural communities on WMA's. All forest management activities receive permits from the Department of Environmental Management under the Massachusetts Forest Cutting Practices Act.

Forest Certification

In May of 2002, the three land managing agencies within the Massachusetts Executive Office of Environmental Affairs (DEM, MDC, and DFW) entered into a contract with Scientific Certification Systems (SCS) of California to conduct an independent, third party review of forest management practices on state-owned forestlands. As part of this review, a comprehensive field evaluation of DFW management practices was conducted by SCS in August, 2002 at the Fox Den, Herm Covey, High Ridge, Peru, Rocky Gutter, and Winimuset Wildlife Management Areas. Forest management site plans for each of these WMA's had previously been submitted to SCS for evaluation of the DFW planning process. The entire review was completed in May of 2003, and determined that DFW forest management practices meet ecological, economic, and social criteria for sustainable management as defined by the international, non-profit Forest Stewardship Council (FSC).

DFW Forestry Program personnel incorporated the site plan process into an ecoregion-based management planning process to comply with a recommendation by SCS that state forestlands be managed on a landscape basis, as opposed to an individual property basis. Fifteen ecoregions (as defined by the U.S. Forest Service and the U.S. Environmental Protection Agency) occur within Massachusetts, and within each ecoregion, DFW grouped individual properties by major watershed to form a series of management units. Currently, a total of about 40 management units have been established within the 14 ecoregions, for an average of about three units per ecoregion (the actual range of units is 1-5 per ecoregion). All individual DFW properties within each unit will be considered in a single management unit plan that will detail forestry activities on all properties.

Landcover Mapping

Based on the results of the comprehensive accuracy assessment of 86,000 acres of DFW lands that the Forestry Program conducted in FY2001 and FY2002 (see previous annual reports), the project leader determined to field check all polygons of any forest type that did not meet a $\geq 80\%$ accuracy threshold within any wildlife district across the state. An ArcView GIS analysis deter-

mined that this effort will result in field visits to $>35\%$ (1,899 of 5,368) all forested polygons that were not previously visited during the original accuracy assessment (of approximately 6,000 total forested polygons, 632 [10.5%] were field-checked during the original accuracy assessment). Overall, 2,531 of the approximately 6,000 forested polygons (42.2%) will have been field-checked between the original accuracy assessment work and the current low-accuracy polygon (LAP) work.. LAP field work began in June of 2003, and is scheduled for completion by October, 2003. As a result of this field effort, the overall map accuracy for forested polygons across the 86,000 acres mapped to date is expected to increase from 60% to $>80\%$.

The Forestry Project also contracted with Dendron Resource Surveys, Inc. of Ontario, Canada, to map an additional 11,500 acres of DFW lands that were not included in the previous landcover mapping effort described above. Aerial photography covering these DFW lands was borrowed from the Massachusetts Department of Environmental Protection (DEP) in April of 2003, and was sent to Dendron for interpretation. DEP wetlands data exists for all of these 11,500 acres, and Dendron will incorporate the DEP wetlands data into their interpretation. Initial photo calibration was conducted by Dendron staff and Forestry Project personnel during May and June of 2003 to acclimate Dendron's photo interpreter to DFW forestlands. Final interpretation is expected to be completed by August of 2003, to be followed by a comprehensive accuracy assessment similar to that described above.

Forest Cutting Operations & Management Activities

One timber sale was initiated in FY-2003. This sale is a cooperative effort with the Ecological Restoration Program of DFW's Natural Heritage Section, and will assist with fuel reduction to facilitate prescribed burning in a fire-adapted pitch pine/scrub oak community on the Montague Plains WMA. The extent of the sale area (about 70 acres) was determined and pre-treatment vegetation monitoring began in June of 2003. Sale preparation will occur in FY2004.

Sale preparation includes marking of trees to be cut, marking of trees to be retained, location of wetland resource areas, rare species habitat, and priority natural communities, lay out of temporary access roads, and preparation of Chapter 132 Forest Cutting Plans. This sale is being prepared in compliance with the Division's Forest Management Guidelines, which seek to create a distribution of forest successional stages (from early-seral to late-seral forest) in a landscape context that will maintain biological diversity. Intensity of cutting varies from moderate (group shelterwoods) to high (Aggregate Retention Cuts - ARC's), but groups of mature trees are retained on all sites. Planned harvests are designed to regenerate mixed stands of white pine, red and white oak, and high quality northern hardwoods including black cherry and white ash.

A portion of the monetary value for all sales is realized in the form of 'In-Kind' services on the WMA's. Services often include grading, liming, fertilizing and seeding of landing areas, improvement and subsequent stabilization of existing woods roads using Massachusetts Best Management Practices (BMP's), and felling and slash reduction of non-merchantable trees to encourage regeneration of desired tree species and enhance early-successional wildlife habitat. All income from a timber sale is generally not received in the same fiscal year the sale is marked. When a sale is awarded through the public bid process, the qualified vendor submitting the highest bid is awarded the contract. Ten percent of the high bid is due at the time the contract is awarded, and the balance (90%) is due prior to the start of cutting. Vendors are given up to two years to begin cutting so that they can take advantage of market conditions.

Biological Monitoring

Forest regeneration plots were sampled on a portion of the Fox Den WMA in September, 2002. Breeding bird surveys were conducted on portions of the Hiram Fox WMA in Chester, the Fox Den WMA in Worthington, the Peru WMA in Peru, and the Ware River Watershed Forest in Barre in June, 2003. The Forestry Project contracted with a private vendor to conduct data analysis of, and to write a summary report for the breeding bird survey results from the Hiram Fox WMA covering the 16-year period from 1987-2003. The data analysis and summary report is expected to be completed by December of 2003.

The project leader determined to field-check all 709 potential vernal pool (PVP) sites identified on DFW lands by the Natural Heritage section. Given that vernal pools require special attention during forest cutting operations, information on the location and condition of all vernal pools on DFW lands is needed. GIS maps of all PVP sites were generated in March of 2003, and field visits began in April of 2003. By the time vernal pools began drying up in June of 2003, about 78% (550 of 709) of PVP sites had been visited, and most of the PVP's were determined to be functional vernal pools. During the course of the initial PVP field effort >20 additional, previously unknown vernal pool sites were discovered and mapped. The remaining 159 PVP sites will be visited during the spring season of 2004.

Future Work

Work planned for fiscal year 2004 includes an analysis of potential forest reserve sites to establish late-seral forest habitat on DFW lands, as well as the drafting of eco-region assessments and wildlife management unit plans to guide DFW forest management activities. Biological monitoring efforts will be continued, and other work will be determined to meet a variety of conditions imposed on DFW as a result of the successful completion of the FSC forest certification process.

The Upland Habitat Management Program

The Upland Habitat Management Program (Upland Program) of MassWildlife is a component of The Biodiversity Initiative established under the 1996 Open Space Bond Act to maintain and restore native diversity of flora and fauna through active land management. The Upland Program focuses on reclaiming abandoned field and other early-successional habitats, which have been declining steadily for the past 75 years.

The specific goals of the Upland Program are to:

- 1) Foster and apply the best available science to identify appropriate sites for management of declining upland habitats, (including early-successional, post-agricultural herb/shrub plant communities, aspen forest stands, and abandoned orchard sites) while maintaining extensive, unfragmented, forest lands.
- 2) Implement strategies and techniques to manage and restore declining upland habitats to ensure they continue to support native flora and fauna.
- 3) Scientifically monitor the effects of upland habitat management on plant and animal communities to ensure that managed ecosystems continue to support the native biodiversity of Massachusetts.
- 4) Identify ecosystems and natural areas where Upland Program objectives are complementary with Ecological Restoration Program objectives and pursue joint endeavors with that program.

Abandoned Field Reclamation Projects

Haley Farm, Mt. Greylock State Reservation: Reclamation of abandoned pasture at Haley Farm is a cooperative project between MassWildlife and the Department of Conservation and Recreation. Clearing of twenty-eight acres, previously treated to control invasive exotic plants, began in October of 2002 using a Brontosaurus mower, but was halted when heavy snow prevented effective mowing. Winter snows were followed by an extremely wet spring, so clearing of these 28 acres will be completed in FY- 2004.

Phelon Forest: A project administered by MassWildlife in cooperation with the Ruffed Grouse Society reclaimed abandoned blueberry fields and pasture at the New England Forestry Foundation's Phelon Forest. In the fall of 2002, 12 acres were cleared using a Brontosaurus mower and tree shear. Sheared trees were piled and burned during the subsequent winter season.

Westboro WMA: Seventeen and a half acres, constituting the safety zone around the DFW Field Headquarters and neighboring businesses, were mowed just prior to the start of the pheasant hunting season. For safety reasons, this area will be mowed annually.

Cook Farm: Five acres on privately-owned property were cleared using a tree shear and chipper to regener-

ate aspen forest. The project was administered by the state's Forest Stewardship Program and funded by the Upland Habitat Management Program.

Invasive Plant Control Projects

Crane Wildlife Management Area

Invasive exotic plants on 36 acres were treated with herbicide to maintain grassland habitat.

Gibson Property: A project administered by the state's Forest Stewardship Program and funded via the Upland Habitat Management Program herbicide-treated invasive exotic plants on 10 acres of privately-owned land.

Mauri Property: A project administered by the state's Forest Stewardship Program and funded via the Upland Habitat Management Program herbicide-treated invasive exotic plants on 20 acres of privately-owned land.

Ouimet Property: A project administered by the state's Forest Stewardship Program and funded via the Upland Habitat Management Program herbicide-treated invasive exotic plants on 16 acres of privately-owned land.

Biological Monitoring

To determine the effects of habitat treatments over time, a long-term monitoring program of birds, butterflies, and vegetation was implemented during the summer of 1999 on Upland Program sites across the state. Survey data will be used to assess the status of native biodiversity on Upland Program sites and guide future habitat management activities. During May-June of 2003, breeding bird surveys occurred over a total of 2,000 acres on seven different sites, including Hiram Fox WMA in Chester, MA, Fox Den WMA in Worthington, MA, Peru WMA in Peru, MA, Leyden WMA in Leyden, MA, and the Ware River Watershed Forest in Barre, MA. Vegetation sampling occurred at an early-successional forest site on the Fox Den WMA, and in a pitch pine/scrub oak community on the Montague Plains WMA in Montague, MA. The vegetation monitoring at Montague Plains will facilitate a cooperative effort with the Ecological Restoration Program to introduce prescribed fire for habitat management at the Plains.

Forest Stewardship Program

The DCR-administered Forest Stewardship Program was funded during fiscal year 2003 to support Upland Program goals on private lands. The Upland Program provided \$24,837 for the previously-described abandoned field reclamation and invasive exotic plant control projects.

Coverts Program

The Upland Program provided \$11,200 to fund the Coverts Program, a habitat conservation workshop for community leaders responsible for the stewardship and management of >1000 acres of forestland in the north Quabbin region. Dr. David Kittredge, the Cooperative Extension forester, organizes the three-day forestry and wildlife habitat conservation workshop for individuals

serving on their community Conservation Commission, a local land trust, or within one of their town's conservation offices. Participants learn about topics including Massachusetts land use history, the Forest Cutting Practices Act, elements of wildlife habitat, habitat management techniques, and habitat types (including early-successional).

Massachusetts Cooperative Fish & Wildlife Research Unit

White-tailed Deer Population Ecology in Massachusetts: Division research programs on deer populations continued in Carlisle and Windsor study areas. Deer were captured and radio-collared to estimate population density and survival rates. The primary conclusion thus far is that deer are long lived and hunting mortality is low. Graduate Student Chris Gaughan is supervised by Dr. Steve DeStefano. The study will conclude in Spring 2003.

Beaver Ecology in Massachusetts: Dr. Steve DeStefano oversees this study to determine population ecology of beaver along an urban-rural gradient. He has radio-tagged approximately 50 beaver and observed their movements as population density increases and mortality decreases due to a 1996 ballot referendum that restricted trapping. Interestingly, a change in that law in 2000 has resulted in an upswing in harvest by the Problem Animal Control Community and is reflected in radio-tagged beaver mortality data. The objective is to study population ecology (i.e. growth and density), habitat occupancy of wetland areas and survival in suburban and rural Massachusetts.

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NATURAL HERITAGE & ENDANGERED SPECIES PROGRAM

Dr. Thomas W. French
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The Aquatic Biodiversity Project: Living Waters

This year, staff of the Natural Heritage and Endangered Species Program (NHESP) were busy developing the statewide conservation plan, *Living Waters: Guiding the Protection of Freshwater Biodiversity in Massachusetts*. Formerly referred to as the Aquatic Biodiversity Project, the Living Waters project began in 2001 with bond funds made available by the Executive Office of Environmental Affairs. The goal of the project was to promote the strategic protection of our freshwater plants and animals, including fishes, freshwater mussels, crayfish, snails, and other underwater groups.

The Program focused its 2002 field work on freshwater species and systems with the aid of three field assistants and several small research project contractors. One goal of this work was to learn more about the distribution and rarity of our lesser known freshwater species. In total, biologists surveyed more than 200 sites for rare aquatic plants, fishes, and invertebrates during the Living Waters project. These surveys resulted in nine proposed changes to the Massachusetts list of Endangered, Threatened, and Special Concern species. These data, combined with rare species observations from recent freshwater mussel surveys and the Fisheries Section's stream inventories, were then used to update the NHESP database that now documents over 600 recent observations of rare freshwater species.

During the 2002 field season, biologists also targeted some of our least developed ponds and streams that had been identified through a statewide GIS analysis. Despite the drought conditions in 2002, NHESP staff visited over 100 streams, collecting macro invertebrate samples at 60 sites, and also visited 30 ponds to conduct aquatic plant assessments. Through these surveys, biologists identified some of the most biologically important freshwater habitats in the Commonwealth. But with only one short field season during the Living Waters project, it was important to supplement this list of exemplary habitats with other sites selected from data gathered by state and federal programs, non-profit groups, and individuals.

With the information collecting phase of the project complete, Natural Heritage and Endangered Species Program biologists drafted the Living Waters conservation plan by delineating Core Habitats to represent the state's key freshwater biodiversity sites. In total, 429 Core Habitats were delineated in lakes, ponds, rivers, and streams to help focus proactive conservation on Massachusetts' freshwater species.

For each Core Habitat, the Living Waters conservation plan outlines a Critical Supporting Watershed to highlight the upland and upstream areas that have the greatest potential to influence, either positively or negatively, the species living in the Core Habitat. The boundaries of Critical Supporting Watersheds were derived from a GIS model that was developed in conjunction with the University of Massachusetts' Landscape Ecology Group. The Critical Supporting Watershed focuses our conservation actions, such as land protection and improved watershed management, on the portion of a Core Habitat's watershed where they are most needed.

The Living Waters conservation plan complements our recent BioMap so that when used together, these plans highlight conservation targets for all of Massachusetts' inland biodiversity. More details on Living Waters can be found in the Living Waters final report, technical report, colorful poster, and GIS data layers.

Living Waters Results

- 429 Core Habitats represent:
 - Key habitats for 58 rare species, including 11 fishes, 23 aquatic plants, and 24 invertebrates
 - Exemplary habitats in rivers, streams, lakes, and ponds
 - 1000 miles of rivers and streams and 247 lakes and ponds
- Critical Supporting Watersheds capture:
 - 1,380,000 acres of undeveloped and developed land that have the greatest potential to sustain or degrade the Core Habitats

2002 Field Season Summary

Birds

Bald Eagle: During 2002, there were 12 occupied bald eagle territories identified in Massachusetts. Four are in the Quabbin Reservation (Hamilton Island, Mt. Pomeroy, Little Quabbin Island, and Pelham), five are along the Connecticut River (Barton Cove in Gill, Gunn Farm, Hadley, West Springfield, and Long Meadow). Three other pairs are located at Lake Assawompset (Poocksha Pond) in Middleborough, Colebrook Reservoir in Sandisfield, and Quaboag Pond in Brookfield. Nine of the 12 occupied territories are known to have active nests (with eggs). A tenth nest, at Little Quabbin Island may have had eggs but failed early. The pairs on the Connecticut River in Longmeadow and at Quaboag Pond in Brookfield did not lay eggs. Since 1989, when the first

nesting in recent history occurred, a total of 131 young eagles have been fledged from nests in Massachusetts.

Peregrine Falcon: In the 2002 breeding season, the number of territorial pairs of Peregrine Falcons jumped to nine from six the previous year. (In fact, the previous annual report only included four pairs in 2001, rather than the six that were eventually documented.) Although the number of pairs increased, it was not a particularly good year for production. Only four nests successfully fledged a total of nine chicks. After establishing a territory on the Farley Cliffs in Erving in 2001, one pair hatched chicks and fledged at least two at this site this year. These are the first Peregrine Falcon chicks to be raised in Massachusetts on a cliff since 1955.

Common Loon: In 2002, a network of cooperators monitored nesting Common Loons (*Gavia immer*) in Massachusetts. Twenty-one territorial pairs of loons were observed, down from 23 pairs in 2001. Territorial loons were present on eleven waterbodies (although very temporarily on one of these), up from nine in 2001. This increase resulted from the presence of territorial pairs at Mare Meadow and Notown Reservoirs, which were unoccupied in 2001. Nesting loons were reported at five waterbodies. Loons nested for the first time at Wachusett Lake and Notown Reservoir. Ten pairs of loons laid eggs, down from eleven pairs in 2001. Just six chicks survived until fledging, resulting in a productivity estimate of 0.6 chicks per nesting pair (0.29 chicks per territorial pair); this is lower than last year's estimate of 0.73 chicks per nesting pair. As in past years, lack of nest sites likely limited Common Loon productivity in 2002. Rafts were deployed at two locations: Quabbin Reservoir (E. Branch Fever Brook) and Fitchburg Reservoir. Low water levels in 2002 rendered certain sites unsuitable for nesting, whereas last year flooding was a problem.

Terns, Laughing Gulls, Black Skimmers: Cooperators in Massachusetts surveyed 115 coastal sites in 2002 for the presence of breeding terns, Laughing Gulls (*Larus atricilla*), and Black Skimmers (*Rhynchops niger*); 72 sites were occupied by nesting birds of one or more of these species. Roseate Terns (*Sterna dougallii*) decreased 14.0% from 2001, to 1,460 pairs, a decline presumably precipitated by predation at Bird Island. Roseate productivity was fair. The Common Tern (*Sterna hirundo*) was the most abundant breeding tern species, with 13,744 pairs reported (a 4.4% decrease from 2001). Common Tern productivity was poor at the three largest colonies due to predation and starvation. Least Terns (*Sterna antillarum*) numbered 2,796 pairs, an 18.2% decrease over an all-time high in 2001. Notably, 2002 marked the collapse, as a result of predation, of the Dunbar Point (Kalmus Park) Least Tern colony. Laughing Gulls decreased 16.3% to 1,106 pairs this year, and, with the demise of the Nauset-New Island colony, nested at just one site. Arctic Terns (*Sterna paradisaea*) continued at trace levels. No Black Skimmers nested in Massachusetts in 2002.

Hiram Fox WMA Forest-nesting Bird Surveys: Begun as a pilot survey in 1987, data have been collected during early June in every year except 1998. Standard point survey methodology is employed, with data collected at 100 forest stations. Information from this survey has revealed little change in overall bird numbers and species composition on the property over the past 15 years. This suggests that bird populations in unfragmented forested landscapes continue to be quite stable. There has been some decline in species diversity, as forest openings created in the early 1990s have reverted to forest, resulting in a loss of some early successional species and a decline in the numbers of others.

In 2002, 1105 individuals from 61 species were recorded, as compared to 1136 individuals of 53 species in 2001. The eleven species recorded most frequently on the property in 2001 were: Red-eyed Vireo (214 detections); Ovenbird (163); Black-throated Green Warbler (108); Yellow-bellied Sapsucker (68); Veery (47); Black-throated Blue Warbler (43); Wood Thrush (42); Black-capped Chickadee (37); American Redstart (31); Black-and-white Warbler (30); and Blue Jay (30). An unusual occurrence was a Prairie Warbler (a species found more commonly in open woodlands, scrublands, or disturbed areas) that was likely a transient in the area.

Piping Plover: During the 2002 Field Season a coastwide network of observers reported breeding plovers at 109 sites; 57 additional sites were monitored but no breeding pairs were detected. The Index Count (census conducted 1-9 June) was 522 pairs, an 8.5% increase from 2001. The Adjusted Total Count (estimated total number of breeding pairs during the entire season) was 538, an 8.7% increase over 2001. Overall statewide productivity was 1.14 chicks fledged per pair, based on data from 525 of 538 pairs (99%). Of 782 nests, 44% hatched ≥ 1 egg; 43% of eggs hatched, and 53% of chicks fledged. The most common causes of nest loss were predation, abandonment, and overwash or flooding from high tides or heavy rains. The most frequently identified nest predators were crow, gull, fox, skunk, and coyote. Predation was the most frequently identified cause of nest abandonment. Nests protected by wire predator exclosures were abandoned more frequently than unexclosed nests (23% vs. 11%); however, nest success was higher for exclosed than unexclosed nests (71% vs. 28%).

American Oystercatcher: A coastwide census of American Oystercatchers was conducted during the 2002 field season. Oystercatchers were found at 62 of the 171 sites visited. A total of 317 adults, including 153 pairs, was recorded. The distribution of adults was as follows: North Shore (0), Boston Harbor (25), South Shore (0), Upper Cape (10), Lower Cape (83), Bristol County (12), Elizabeth Islands (23), Martha's Vineyard and Nomans Land (66), Nantucket (80), Tuckernuck and Muskegot (18).

Parula Warbler: During the 2002 field season surveys were conducted for breeding Northern Parulas (*Parula americana*) in Massachusetts. This small warbler is listed as Threatened in Massachusetts and is associated with mature wet woodland. It has an affinity for lichens of the genus *Usnea* (Old Man's Beard), which it uses for nest building. These stalked lichens can be found growing on the trunks and branches of both hardwoods and conifers. Although it is a relatively common breeder elsewhere in its range, the parula has undergone a decline here in Massachusetts. This may in turn out to be related to a decline in the abundance and distribution of *Usnea* due to air pollution. Searches included 9 of 14 previously known locations listed in the NHESP database, as well as de novo searches at 10 additional sites. Efforts were focused in Barnstable County, where *Usnea* is reported to be most abundant. One or more singing males were found at four sites. Follow-up visits at each of the sites confirmed the continued presence of these males, and their likely status as breeders. Two of the sites represent updates of NHESP records from the 1980s, and two are new. Although they did not yield any parulas, several other sites looked promising as parula breeding habitat, given their proximity to water and the presence of copious amounts of *Usnea*.

Invertebrates

Lepidoptera: Field survey efforts were focused on Lepidoptera (moths and butterflies) of Massachusetts and their habitats, though occasionally data on other insects were collected. During the course of the 2002 season, 486 species of Lepidoptera were recorded in Massachusetts (426 species of moths and 60 species of butterflies). Of these 486 species, 28 are listed as Endangered (E), Threatened (T), or of Special Concern (SC) in Massachusetts. Thus 58% of state-listed Lepidoptera were found during the course of the 2002 field season. Little time or effort was spent on insects other than Lepidoptera, although 5 species of tiger beetles were recorded, including the discovery of a new location for *Cicindela patruela* (SC). Many of the 30 listed species were encountered at multiple sites, so that a total of 48 rare species observation forms were submitted. A total of 274 Lepidoptera specimens were collected and curated to museum-quality standards. Over 900 photographs were taken of diurnal Lepidoptera and other insects and their habitats. Nine species (7 of which are state-listed) were reared in order to obtain both photos and specimens of immatures.

Most notable discoveries:

(1) The Persius Duskywing (*Erynnis persius persius*) is a butterfly that has disappeared from most of its historic range during the past 40 years (Endangered in Massachusetts). The only currently known site in Massachusetts is in Myles Standish State Forest, where in May of 2002 a healthy colony was found by Mike Nelson. Oviposition was observed twice on *Baptisia tinctoria*, providing the first concrete evidence for use of this larval host in the Northeast.

(2) In 1994 Mark Mello discovered two species of Tiger Moths (*Grammia oithona* and *Grammia phyllira*) at Westover Air Force Base in Chicopee. Both of these species were listed as Endangered in Massachusetts, as Westover has the only known remaining populations in the state. Following the peak agricultural period in Massachusetts, these species were much more widespread, with pre-1934 records from Sherborn, Milton, Lexington, Nantucket, Cape Cod, Newton, Newtonville, Amherst, Stoneham, and Rowley. For years many Lepidopterists have suspected that *G. oithona* and *G. phyllira* may actually be the same species, as the only discernible morphological difference is a discrete wing pattern variation that could be due to a single gene. Answering this question has been difficult, as both moths are relatively rare, and most of their scattered populations consist of only one of the two species/forms. So Westover, with both species/forms, provided an ideal opportunity to answer this question. In June of 2002 Mike Nelson obtained a female *G. oithona* at Westover, and with the help of several others, reared her offspring. The next generation consisted of both *G. oithona* and *G. phyllira* from the single *G. oithona* female. Thus it is a single species with two forms; the name *G. phyllira* has nomenclatural priority.

(3) In 1989 John Peacock of the U.S. Forest service was trapping moths in Plymouth, and captured a single male *Catocala pretiosa pretiosa*, a globally rare species that disappeared from almost all of its eastern North American range over 100 years ago. Currently the entire global range of *C. p. pretiosa* is restricted to southern New Jersey, and the individual found by Peacock in Plymouth was thought to be a stray. However, there is appropriate habitat for *C. p. pretiosa* in and around the Plymouth site. On July 27, 2002 Mike Nelson found a single male, not more than 300 meters away from the site where Peacock had set his trap in 1989. The presence of two individuals in the exact same location 13 years apart rules out the possibility that they were strays, and indicates that there is a population in the vicinity.

Tiger Beetles:

Puritan Tiger Beetle: We continued a cooperative management and research collaboration with the USFWS Conte National Wildlife Refuge. The goals of the effort are to increase understanding and improve the viability of this federally Threatened species. USFWS continued to fund a summer intern to continue the mark – re-sight study, coordinate and train volunteers, post and maintain signs, and provide information to the public. A total of 112 individual adults were marked and we are confident this represented a close approximation of actual total numbers. This represents a greater than twofold increase in numbers and reflects the successful translocation of larvae from Connecticut sites in 2001. In 2002, 65 larvae were translocated from Connecticut.

Northeastern Beach Tiger Beetle: (Also a federally threatened species) Habitat and population monitoring of northeastern beach tiger beetle populations contin-

ued at the three known sites. Population fluctuations continue to be documented with greater than 1500 individuals censused at the Chilmark site during the peak flight season. The Buzzard's Bay site continued to support very low numbers with only 2 individuals recorded during the peak count period this year. The population extension on the south shore of Martha's Vineyard has not spread further east, probably because habitat east of Long Cove is driven too frequently. Overwash fans resulting from previous tropical storms are occupied, while interstitial areas are not. Fluctuations appear to be correlated with large storms that result in major beach erosion events. Sampling of larvae densities was also conducted as a prerequisite for a translocation (to Monomoy National Wildlife Refuge), an ongoing restoration effort.

Plants

Sandplain Gerardia (*Agalinis acuta*): State and federally listed as Endangered. Highlights for the 2002 field season included continuing increase in numbers, as well as good health and vigor of three populations established by sowing of seed on lands managed for conservation. A Cape Cod population, which was established in 1994 on DEM property and now managed by a spring mowing regime, appeared to have a size approaching the 70,000-88,000 estimate obtained by sampling in 2001, even though the plants were not as vigorous due, no doubt, to a dry summer. At a DFW managed site on Cape Cod, the numbers increased somewhat in spite of the drought: from 3619 in 2001 to 4520. The same was true for a naturally occurring site on Martha's Vineyard where numbers climbed from the previous high of 3823 in 2001 to a new record of 4216 plants. An introduction site on Martha's Vineyard showed a dramatic increase, rising from 173 plants in 2001 to 1285. Sowing a small quantity of seed at a TTOR preserve on Martha's Vineyard resulted in the establishment of a small new colony. Unfortunately, for the first time no plants were found at a small experimental colony at Correllus State Forest established in 1997. Also, the numbers declined for the second year in a row at the two Cape Cod sites discovered in the early 1980s. In January, 2002, more seed was sown into experimental plots at the DFW owned site on the Cape, but only a few plants were detected in these plots in the fall. It is hoped that a long, cold winter this year will trigger more germination from this sowing in 2003. Dr. Maile Neel's paper on the reproductive biology of *Agalinis acuta* conducted at the DEM site was published in the American Journal of Botany.

Small Whorled Pogonia (*Isotria medeoloides*): State listed as Endangered and federally listed as Threatened. Nine years of careful monitoring of the largest population known in the Commonwealth by Paul and Lois Somers at a site in Worcester County are beginning to yield some useful demographic data. The nine-year trend shows a gradually increasing population. This is due, in part, to the all-time high of 145 individuals observed in 2002. The 27 mature fruiting individuals and 36 juvenile plants found in 2002 indicate a reproduc-

tively successful population. An exciting story about this species in 2002 was the "resurrection" of a small population in Essex County. No plants had been seen at the site since 1995, when only one plant was observed. In 1999, the overstory was thinned by TTOR employees in an attempt to improve the habitat for the species, and it seems to have worked because five individuals were observed there this year by TTOR staff. Three plants were observed at a privately owned Hampden County site which has had fewer plants than this in recent years.

Northeastern Bulrush (*Scirpus ancistrochaetus*): State and federally listed as Endangered. The State's only site for this species was not checked in 2002. No plants have been observed at the site since 1996.

New England Plant Conservation Program: Two Species Conservation Plans prepared by Ted Elliman under contract to NHESP were approved by the NEPCoP Regional Advisory Council. These plans were for New England Boneset (*Eupatorium leucolepis* var. *novae-angliae*) and Narrow-leaved Vervain (*Verbena simplex*). Also, plans for two taxa were completed by NHESP staff: *Desmodium cuspidatum* by Lynn Harper and *Rhynchospora capillacea* by Melissa Dow Cullina. Through the New England Wild Flower Society, "Species Conservation Plans" have been completed for 31 plant species that are rare or "historical" in Massachusetts.

Invasive Plant Species: The Massachusetts Invasive Plant Working Group approved the recommendations of its Plant Evaluation Subcommittee for the status of 38 species as either Invasive or Possibly Invasive in Massachusetts. Heritage data on invasive plants co-occurring with rare plant records was helpful in making the case that a number of taxa were invasive in natural habitats. A list of additional taxa worthy of similar evaluation was developed by the Plant Evaluation Subcommittee. A new committee was formed to work on a Strategic Plan to deal with invasive plants in the Commonwealth. Also, during the year comments and a list of potentially invasive aquatic plants were provided for the Aquatic Invasive Species Management Plan being developed by another EOE Working Group.

Bryophyte Surveys and Atlas: Susan Williams was employed via a small research contract to continue bryological surveys in western Massachusetts. One of her products was a revised and improved Atlas of the Bryophytes of Massachusetts.

Boston Harbor Islands Surveys: The second and final year of surveys for vascular plants, bryophytes and lichens on the Boston Harbor Islands was conducted by Ted Elliman, Scott LaGreca and others on this National Park Service funded project being overseen by NHESP. Program staff provided guidance and tools to Elliman to complete the classification and mapping of vegetation types on the Islands.

Other Botanical Highlights: Slender Marsh-pink (*Sabatia campanulata*) was rediscovered at a site on Nantucket by P. Somers and others; it had not been seen on the island since 1986 and was feared gone. Also, a second Massachusetts location of the globally rare Ogden's Pondweed (*Potamogeton ogdenii*) was found by M. Dow Cullina in Pittsfield.

Small Research Contracts

Small Research Contracts – \$6000.00. We were unable to fund new Small Research Projects this fiscal year due to a shortage of funds. Funds above salary costs were spent on producing *A Field Guide to the Dragonflies and Damselflies of Massachusetts* and the *Massachusetts Natural Heritage Atlas 11th edition*. The \$6000.00 represents the completion of committed projects from FY02.

Environmental Review

A total of 1,745 environmental reviews divided into five review categories were processed as follows:

Review Type	Count
Conservation Plan	19
Forest Cutting Plan	78
MA Endangered Species Act (reviews and information requests)	808
Notices of Intent	818
Water Management Act	22

Data Management and Data Products

Between July 1, 2002 and June 30, 2003, a total of 549 new records were entered into the Natural Heritage and Endangered Species (NHESP) Database. These included records for 343 certified vernal pools, 172 rare animal sites, 19 rare plant sites, and 118 natural communities. A total of 346 previously documented rare species site records were updated with new survey information. During this period, data management staff also created a GIS-based layer, for internal use, displaying the spatial location of over 963 rare species sites representing records awaiting entry into the NHESP Database. Additional data management products include: 1) an electronic version of the NHESP Rare Plant Field Form – the electronic form is posted on the NHESP web-site, and allows the user to enter data directly into the form via computer; and 2) a Microsoft Access database for entry of rare plant and rare animal field form data by NHESP staff.

Land Protection

In the fiscal year 2003, MassWildlife spent about \$2.43 million to protect approximately 2,563 acres of land across the state, bringing the agency's total land holdings to more than 135,000 acres. Due to the state's fiscal crisis, this is a considerably slower rate of land protection than in fiscal year 2002, when the agency spent \$16 million and protected about 8,000 acres. For example, no land was protected by the agency in the Northeast

District this year. Several of this year's acquisitions were of particular relevance to rare species and exemplary natural communities, as noted below.

Western District

In Otis and Becket 577 acres were added to the Farmington River WMA, protecting the drainage to an excellent example of an Acidic Shrub Fen, an uncommon natural community in the state. A 550-acre conservation restriction on the Boy Scout reservation in Chesterfield, plus the fee sale of 39 acres there, added to the Fisk Meadows WMA. Scout Pond, in the reservation, is Living Waters Core Habitat as an excellent example of a warm water pond. An 11-acre gift added to the Hinsdale Flats WMA in Hinsdale, including part of a Black Ash-Red Maple-Tamarack Calcareous Seepage Swamp with populations of two rare plants, one Threatened and one Special Concern.

Connecticut Valley District

The North Quabbin Initiative, which targeted large blocks of undeveloped forestland in the Millers River watershed, also protected significant rare species habitat. A 70.7-acre conservation restriction along the West Branch of the Tully River in Orange protects two Special Concern species of freshwater mussel – Triangle Floater and Creeper.

Central District

Also as part of the North Quabbin Initiative, DFW protected eight parcels – almost 400 acres – in Royalston, most of them along Towne and Scott Brooks, which are BioMap Core Habitat for Wood Turtle, Spotted Turtle, Blue-spotted Salamander, and Spring Salamander. In Spencer, 77 acres along the Sevenmile River was transferred to DFW from the state Division of Capital Assets and Management. This stretch of the river supports American Bitterns (Endangered), Blanding's Turtles (Threatened), and Wood Turtles (Special Concern).

Southeast District

In Provincetown, Mass Highway transferred control of about 122 acres along Rt. 6, abutting the Cape Cod National Seashore and the Clapps Pond WMA. From these narrow strips of land several rare species have been documented: Eastern Spadefoot (Threatened), Eastern Box Turtle (Special Concern), Common's Panic-Grass (Special Concern), and Broom Crowberry (Special Concern), as well as nine species of state-listed moths – two Threatened and seven Special Concern. In addition, the only known example in the state of an Atlantic White Cedar Swamp on a dune system is located on this property.

Two parcels totaling 55 acres were added to the Copicut WMA in Freetown, protecting populations of Long-leaved Panic-Grass (Threatened), Philadelphia Panic-Grass (Special Concern), and Weak Rush (Endangered). The Copicut WMA is part of the 14,000+-acre Southeast Bioreserve in Fall River and Freetown, all of which is BioMap Core Habitat for many rare plants and animals.

Natural Communities

Community ecology work focused on the Living Waters Project which involved intensive sampling of streams and describing their surrounding forested riparian areas.

Ecologist Pat Swain led the team that sampled small, acidic, low gradient streams, visiting 61 sites, 32 sites of which were sampled with 18 of those sites ultimately accepted as exemplary for the Living Waters report. Aquatic macro invertebrate taxonomist Francis Garretson and ecologist Elizabeth Brousseau focused on small, acidic, higher gradient streams and described the vegetation around them (55 streams visited, 27 sampled and 23 higher gradient stream segments delineated as exemplary). Both groups of streams were mostly within hemlock - northern hardwood forests, with some in oak forests, and a few in red maple and hemlock swamps. During the field work, aquatic macroinvertebrates were sampled and later identified by Fran Garretson and Maria Aliberti, a contracted aquatic macro invertebrate expert. The stream segments considered exemplary, based on the macro invertebrate fauna, were mapped in GIS for inclusion in the Living Waters core areas.

Nature Preserves Council

Members include:

Chair, Lisa Vernegaard, Director of Planning and Ecology at the Trustees of Reservations;

Secretary, Tom Rawinski, Director of Ecological Management at the Massachusetts Audubon Society and member also serving on the Natural Heritage & Endangered Species Advisory Committee;

Mark Mello, Research Director, The Lloyd Center for Environmental Studies; member also serving on the Natural Heritage & Endangered Species Advisory Committee;

Pamela Weatherbee, Botanist, member also serving on the Natural Heritage & Endangered Species Advisory Committee;

Agency Associate members were Jack Lash from DEM and Peter Church from MDC.

The Council visited the SE Bioreserve in October to see natural communities highlighted in an inventory report by naturalist Brian Reid, and mapped in a report by a consulting firm to the Bioreserve committee. TTOR regional and bioreserve staff organized the trip and DEM staff accompanied the Council throughout the Bioreserve. Meetings during the winter reviewed the field trip and the community occurrences in the Bioreserve. John Scanlon spoke to the Council about the Green Certification project and reviewed other *MassWildlife* projects that ascertain the community types on *MassWildlife* properties. The Council began consideration of reviewing exemplary forest lands to be set aside as reserves in the green certification, as possible Nature Preserves.

Natural Heritage & Endangered Species Advisory Committee

Full members are: Kathleen Anderson (Chair), Marilyn Flor, Joseph S. Larson, Mark Mello, Stephen M. Meyer, Jonathan A. Shaw and Pamela Weatherbee.

Associate members are: Brian Cassie, Scott Jackson, Glen Motzkin, Blair Nikula, Wayne Petersen, and Mark Pokras.

During FY03 the Committee held 11 scheduled meetings. August has been a traditional vacation month for the Committee. Ten of these meetings were held at the Westborough Field Headquarters and one was held at the Broad Meadow Brook Wildlife Sanctuary, Worcester, MA.

Business of the Committee included:

- Review of the proposed changes to the list of endangered, threatened, and special concern species;
- Continued work with the Department of Environmental Protection in proposing wildlife habitat protection guidelines for use with the Wetlands Protection Act regulations;
- Participation through the Committee's representative, Jonathan Shaw, on the MA Invasive Plant Committee;
- Review of guidelines on the release of site-specific rare species data from the Natural Heritage and Endangered Species Database.

Natural Heritage & Endangered Species Program Staff

Thomas French, Ph.D., *Assistant Director*
Henry Woolsey, *Program Coordinator*
Tara Boswell, *GIS Assistant*
Matt Burne, *Vernal Pool Ecologist*
Amy Burnham, *Finance & Projects Administrator*
Claire Corcoran, *Ecologist*
Melissa Dow-Cullina, *Botanist*
Hanni Dinkeloo, *Endangered Species Counsel*
Marea Gabriel, *Habitat Protection Specialist*
Fran Garretson, *Aquatic Ecologist*
Sergio Harding, *Data Manager*
Lynn Harper, *Regional Habitat Protection Specialist*
Patricia Huckery, *Wetlands Environmental Reviewer*
Jennifer Loose, *Invertebrate Zoologist*
Erica McGrath, *Environmental Review Assistant*
Scott Melvin, *Rare Species Zoologist*
Carolyn Mostello, *Tern Restoration Project Leader*
Michael Nelson, *Invertebrate Zoologist*
Jessica Patalano, *Projects Assistant*
Nancy Putnam, *Ecologist*
Tim Simmons, *Restoration Ecologist*
Joanne Singfield, *Ecologist*
Paul Somers, *State Botanist*
Chloe Stuart, *Aquatic Biodiversity Project Manager*
Patricia Swain, Ph.D., *Plant Community Ecologist*
David Szczebak, *GIS Manager*
Christine Vaccaro, *Environmental Review Assistant*

INFORMATION & EDUCATION

Ellie Horwitz
Chief, Information and Education

The Information and Education Section has the responsibility and challenge of keeping the public — and particularly sportsmen, conservationists and other wildlife constituents — apprised of regulations, laws and recreational opportunities related to wildlife. It provides news about wildlife and maintains a flow of information about wildlife related issues. In order to enhance public understanding of wildlife management and compliance with laws and regulations, the Section maintains an active program of educational outreach to develop a public which is aware of, and in tune with, wildlife issues. During the year we continued the many different information and education programs, and revised administrative processes and products.

NEW for 2003

During this year the section:

- Inaugurated *MassWildlife News* – an electronic newsletter conveying information through an open list serve;
- Redesigned the agency webpage;
- Saw significant increases in webpage use and web-based inquiries;
- Began work toward an electronic image library;
- Worked with faculty at Amherst College to obtain a comprehensive and unbiased survey of participants in the “Becoming an Outdoors-Woman” program.

Information and Outreach

Marion Larson, Coordinator

News Services

MassWildlife issued 19 news packets. These were distributed to 100 fax recipients, 587 e-mail recipients and 1600 hard copy recipients representing media outlets, town clerks, conservation commissions, conservation and sporting organizations, other state agencies, outdoor writers and agency staff.

This list, now set up as a listserve, has grown significantly since it was initiated in 2000 as a way to speed information to about 300 members of the news media and to conservation organizations. In 2002 information was transmitted electronically to 420 recipients. At the beginning of this fiscal year the list was opened to the public and an electronic *MassWildlife News* was born. Anyone who requests the service, is added to the list. By the end of FY 2003 there were 587 recipients – increasing outreach while saving *MassWildlife* over \$100 per

month in postage and an undetermined amount in print costs.

We also issued eight Media Advisories advising recipients of special events or time sensitive news items including presentation of the Francis Sargent Award, EOE Trout Stocking events, information on Chronic Wasting Disease, acquisition of lands at the Salisbury WMA, and more. Staff fielded more than 2000 telephone calls, over 25% of which were direct inquiries from television, newspaper, radio or outdoor writers. Through these efforts we assisted writers in the production of articles that generated 2,463 newsclips.

During this period staff also developed an electronic database compiling information on media contacts as well as logging information on calls and topics. This will allow for easy access to information on media contacts.

Website

The agency website serves an important role in fielding public inquiries. Use of the site continues to expand as people learn about it and its utility. In July 2001 there were 54,900+ hits on the site; in July 2002 there were 97,700+.

During the spring of 2002, the Commonwealth launched a redesigned webpage. Staff coordinated their efforts with those of the state Information Technology Department to ensure that the state's Outdoor Recreation area now includes links to *MassWildlife* webpages. Following the state's webpage redesign, agencies were asked to promote their websites using a “mass.gov” prefix. This agency's web address is now www.mass.gov/masswildlife, although we will continue to support www.masswildlife.org.

Keeping the website up-to-date with pertinent information — notes on trout stocking, news about regulations, listings of workshops, events and other activities — continues to be key. Additions to the agency web page include “turkey pages” that include a downloadable brood survey form, and “cottontail rabbit pages” accompanied by rabbit sighting survey information. Also posted were BioMaps, information about the ban on the importation of live cervids, a brief description of the agency mission, biographies of Fish & Wildlife Board members, and the Pocket Guide to Animal Tracks.

In addition to existing material and wildlife news, information sheets were posted including information about the agency; biographies and responsibilities of Fisheries & Wildlife Board members; If You Care, Leave Them There; a page on diseases of wildlife with links to

information on Chronic Wasting Disease, Rabies, West Nile Virus and other maladies; and a page of information about captive/exotic wildlife. Other materials posted include three additions to the "Living with Wildlife" series: fisher, bear and coyotes; and a set of Forest Management Guidelines. Additional information was posted enabling visitors to obtain duplicate copies of their Hunter Education certificates.

Response to Public Inquiry

The volume of communications coming to *MassWildlife* continues at a high level with most inquiries arriving by telephone, e-mail, and by way of the website. Telephone inquiries appear to be steady; mail and direct e-mail inquiries are down, and inquiries through the website are increasing. A total of 4377 e-mail messages came in through the Division's web message system during the year; most of them in spring and fall when there is maximum interest in information on fishing and hunting. Analysis of these inquiries assists staff in providing topic content to the website.

As in the past, Section staff fielded inquiries on a wide variety of wildlife issues and species, and participated in informational meetings.

Programs

Section staff members presented lectures, slide shows and "hands-on" programs on wildlife and wildlife management to many elementary, middle and high school groups. They also provided programs for civic groups, sportsmen's clubs, senior centers, museums and audiences at special events. They participated in "career days," judged science fairs and provided technical advice to schools seeking to improve their grounds as wildlife study areas.

In April, *MassWildlife* provided information on eagle hatching and nestling care for the eagle website maintained by Northeast Utilities. Communications staff met with representatives of the USFWS and local public cable group on a new format for video images, logos, events, and facts about eagles to be on screen.

Production of Annual Materials

Licenses and Abstracts

Production of licenses, abstracts and stamps proceeded smoothly although distribution was held up by a delay in receiving allocation information from the central office. Despite this, distribution was completed prior to the Christmas holidays. In addition to the annual Abstracts of Fish and Wildlife laws, abstracts were prepared of the regulations pertaining to the hunting of migratory birds and regulations pertaining to the trapping of furbearers.

Waterfowl Stamps

2003 is the 30th year of the Massachusetts Waterfowl Stamp! Artwork for the 2003 stamp was selected in a morning competition held at *MassWildlife's* Field Headquarters in September of 2002. The five judges selected

Bob Piscatori's painting of a greenwing teal carved by Jos. Lincoln. Following the contest, the Cape Cod Museum of Science hosted a reception honoring the waterfowl artists with a special tribute to Mr. Piscatori and also to John Eggert, a multiple winner of the competition who had passed away a few months earlier. The artwork remained on display at the museum throughout the month to the delight of area tourists.

Archery and Primitive Firearms Stamps

Artwork for the 2003 Archery and Primitive Firearms stamps was the head of a whitetail buck, an impressive painting submitted to the unrestricted competition by Connecticut artist Ed Bogaert.

Publications

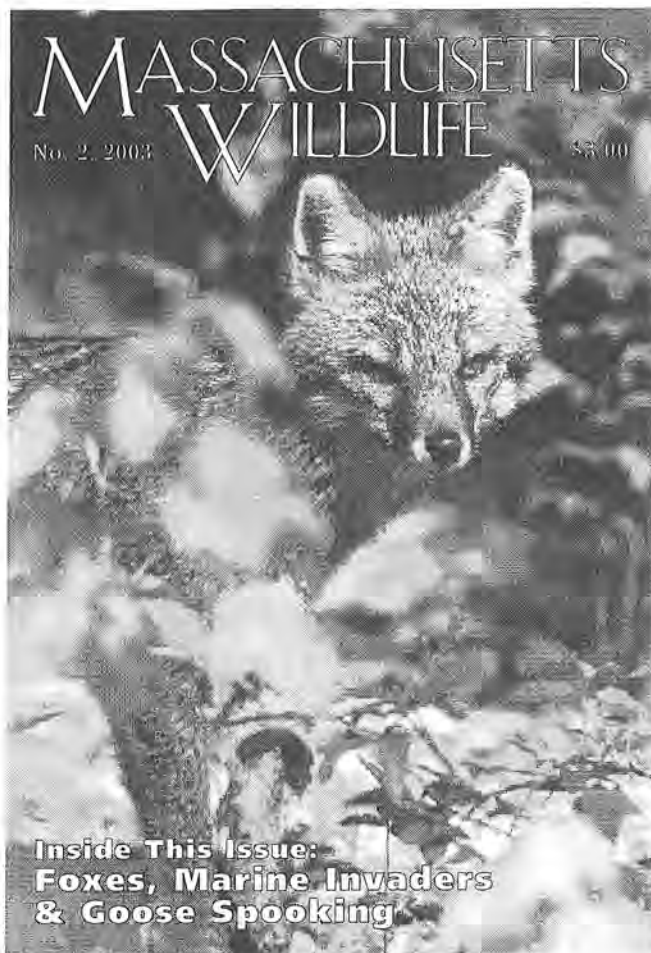
The Division's most visible publication is *MASSACHUSETTS WILDLIFE*, a 40 page, full color quarterly magazine which is sent to more than 22,500 paying subscribers, a rate which appears to be steady. The four issues produced this year, (Fall 2002 - Summer 2003), covered a wide variety of subjects, including wildlife management, education, habitat enhancement, rare and endangered species, history, general nature interest and "how to" articles for the hunter, angler and nature observer.

The summer issue of 2002 is of particular interest, as it was devoted entirely to the understanding of biodiversity and its protection, assessment and restoration. It included articles on the concept of bioreserves, forest management for biodiversity, and an overview of environmental education in Massachusetts. Articles of particular note this year included one on an extensive study of the New England Cottontail and the reasons for its decline; another on the natural history and identification of foxes; marine invasive species (including discovery of a new invasive species in Massachusetts waters previously unknown to science!); and a new method (coyote decoys) to keep Canada geese off lawns and playing fields. Examples of "how to" articles included ice fishing for tiger muskies (by the state record holder); hunting wild turkey (by the author of a book on the subject); photography of wild flowers; and survival in the wilderness. The 2002 deer statistics were also published, as were features on the Envirothon, the Conte National Wildlife Refuge, and what stimulates American shad to strike lures.

Other Publications

During the year Section staff worked on a revision of the tremendously popular booklet "Critters of Massachusetts." Certain other publications (trout & pheasant stocking lists, BOW event materials, the list of towns with special hunting regulations, a booklet on waterfowl devices used to address beaver damage, etc.) were updated, reprinted and re-issued.

In addition to these updated items, attention was focused on "infrastructure items" including a variety of signs for use on Wildlife Management Areas, agency



The No. 2, 2003 issue of Massachusetts Wildlife magazine featured articles on foxes and invasive species.

mailing labels, a revised version of the coyote poster, certificates and labels for Project WILD, teachers' manuals for the Junior Duck Stamp Program, sunrise-sunset tables suitable to the 21st century, and the agency's annual report. Items discussed but not yet printed are the Homeowners' Guide to Bats and the Massachusetts Bird List.

Photography

Staff photographer Bill Byrne continues to provide images in support of agency programs, as well as special photography for each of the four issues of *MASSACHUSETTS WILDLIFE* magazine. This year photo assignments included recording the activities at the Massachusetts Outdoor Expo ("The Big MOE"), a day of outdoor skills/activities for kids held in Sturbridge in celebration of National Hunting & Fishing Day. He also recorded *MassWildlife* staff using the airboat to band ducks, staff spawning Atlantic salmon, and youngsters stocking trout with Ellen Roy Herzfelder, newly named Secretary of Environmental Affairs. Bill captured images of urban dwellers fishing for striped bass in the heart of Boston, staffers banding eagle chicks at Quabbin, and Director MacCallum presenting the annual Sport Fishing Awards at the Eastern Outdoor Fishing Exposition in Worcester.

For the magazine Bill conducted a photo study of chipmunks, red squirrels and gray squirrels to be used in a future issue. He also documented an innovative use of 3-D coyote targets which have been used to deter resident Canada geese from landing on school athletic fields.

Bill took "B-roll video footage" of black bears, moose, winter deer, and wood ducks. Deer and moose video was provided to the Quabbin regional staff of the MDC to be used in the pre-hunt orientation for hunters participating in the Quabbin deer culling operation. Bill also created a black bear video which was shown to a full house at Massachusetts Audubon's Arcadia Sanctuary. A wood duck/moose video presentation was developed and shown to women participating in *MassWildlife's* Becoming an Outdoors-Woman program in Lenox.

In addition to working on assignment and shooting speculative material for the magazine, the photographer has the equally important quarterly task of reviewing all images, making certain that there is a sufficient supply of high quality images for the editor's selection, and assisting with the final image selection process and color proofing for each issue.

The Section also provides images to individuals and organizations working for wildlife and protecting the lands and natural resources of the Commonwealth. This year the Organization for the Assabet River requested and was authorized to use *MassWildlife* images on their website — www.assabetriver.org/streamwatch/fish.html.

In addition to the programs noted above, the photographer and the Section Chief met with *MassWildlife's* computer specialist to explore possibilities for the implementation of an electronic photo library for Massachusetts Wildlife.

Education Programs

Formal or School-based Education Programs — Pam Landry Coordinator Project WILD

Twenty-one Project WILD Facilitators conducted 25 workshops (7 WILD, 3 Aquatic and 15 combination WILD/Aquatic WILD) reaching a total of 343 educators from across the state including scout leaders, formal & informal educators, the Urban Center for Family Work & Community, pre-service teachers, City Year, and the Even Start Family Literacy Program.

The Annual Facilitator Gathering for this program was held at Heifer Project International's Overlook Farm in Rutland. Twenty-eight facilitators enjoyed a day of camaraderie, updates, recognition, and fun.

Work continued on Aquatic WILD which was, during this year, officially correlated to the Massachusetts Science and Technology/Engineering Curriculum Framework.

Public Education Programs

Through our education programs, public appearances at special events, and workshops we continue to reach urban youth, scouts, students in grades pre-K - 12, homeschoolers, pre-service teachers, college students and other adult audiences. This year we reached nearly 2000 people through these presentations.

Junior Duck Stamp Program (JDS)

This "conservation through the arts" program drew 785 pieces of artwork from across the Commonwealth for a statewide competition. Entries were received from thirty one K-12 schools and 14 other sources (i.e. homeschoolers, individuals, students taking private art lessons). Entries were judged by a panel of wildlife artists and educators at Great Meadows National Wildlife Refuge in Sudbury. A painting of a hen and drake bufflehead by Amy Covey of Lynnfield High School represented Massachusetts at the national competition.

Various combinations of the top 100 pieces of art formed a traveling JDS exhibit that reached ten different venues throughout the state.

Envirothon

The National Envirothon competition (Canon Envirothon) was held in Massachusetts in late July of 2002. The event brought 250 students, winners of spring competitions from almost all 50 states, to Massachusetts for the final competition in which the top teams from all participating states compete against each other. The site selected was central Massachusetts. The Current Events topic was invasive species. Marion Larson served

as Education Coordinator and team leader for the current events segment. Ellie Horwitz headed up the Wildlife Information segment. Peter Mirick was a judge.

At the state level, staff continued their involvement with the Envirothon with Pam Landry organizing and instructing at teacher and student workshops, chairing the education committee, preparing the wildlife exam, and attending monthly preparation meetings. Jim Lagacy assisted in these endeavors. Massachusetts' 2003 Envirothon was held at Heifer Project International's Overlook Farm in Rutland. Several *MassWildlife* I&E staffers served as judges.

Non-Formal Education Programs

Angler Education Program – Jim Lagacy, Coordinator

The Angler Education Program is the main component of *MassWildlife's* Aquatic Resource Education Program. The other two components are Aquatic Project WILD, and Watershed Education. The Angler Education Program has several components: fresh water fishing festivals, basic fresh-water fishing classes, fresh-water fishing clinics, and a fishing tackle loaner program through which angling equipment is provided to civic and community groups for special events.

The Angler Education component is primarily volunteer-driven. There are 90 volunteer instructors in nine workshop groups, approximately 75 to 80 of whom were active during the year. Instructors are recruited through the major sportsmen's shows in winter and early spring, and throughout the remainder of the year by word of



Fishing festivals are among the most popular of the many public events produced by the Angler Education Program.

mouth. This year the program was on display at four sportsmen's shows: the Worcester Sportsmen's Show, Springfield Sportsmen's Show, World Fly-Fishing Expo in Wilmington, and the Massachusetts Striped Bass Show in Plymouth. Instructors are trained by apprenticing within a given workshop group. Four instructors are currently training volunteers.

Fishing Festivals: Eighteen events were set up specifically as fresh water fishing festivals, including two special needs events held in conjunction with the Disabled American Veterans Association. These festivals ranged in size from 50 participants to 875. The events have a strong educational component through various learning stations (knot tying, casting, fish I.D., bait, equipment, etc.). Total participation for FY 03 is estimated at 6,665 people.

Four-Week Basic Fresh-Water Fishing Classes: There were 10 of these events during the year serving approximately 175 participants. Five groups (Nashoba Valley, North Shore, Pioneer Valley, Shrewsbury, and Rehoboth) joined the Program Coordinator in putting on these classes.

Freshwater Fishing Clinics: These programs, although short in duration, seem to be our most popular offerings. Clinics are generally two to three hours long. They consist of a short lecture on the basics of angling, followed by a healthy dose of fishing. Also in this category are stocking programs, casting programs, and any other aquatic education type programs. Handouts are provided, and class participation is kept small enough to allow the instructors to work with participants on a "one on one" basis. There were 43 of these programs during the year held in various parts of the Commonwealth conducted by the Coordinator, the seasonal Assistant Coordinator, and various program volunteers. 882 individuals (mostly children) participated.

Tackle Loaner Program: The Angler Education Program maintains fishing equipment on-site in Westboro for loan to various groups throughout the state. In FY 2003 the program loaned out 484 rods and reels on 23 separate occasions. Along with the rods and reels, the program also provides the necessary terminal tackle and related educational materials. The equipment noted above was loaned to various groups and agencies including the Department of Conservation and Recreation, scout programs, YMCA camps, and private groups.

In addition there are three off-site tackle loaner programs situated in the Stoneham and Shutesbury Public Libraries (set up in 1997) and at Spot Pond in Stoneham (set up in 2000.) Although the Angler Education Program was instrumental in setting up these programs, we do not manage or maintain these sites.

Newsletter: The program newsletter, *Shortcasts*, was produced twice during the year (fall 2002 and winter 2003) and sent to all program volunteers. In addition, the Coordinator communicated with volunteers by let-

ter, updated calendars, e-mail and telephone calls to keep them informed and up to date.

Cooperative Programs: Angler Education Program volunteers also contributed significant time to *MassWildlife's* Becoming an Outdoors-Woman programs, and to the Natural Resource Conservation Service's Massachusetts Envirothon program.

Skills Programs

Hunter Education Program — Susan Langlois, Coordinator

The mission of the Massachusetts Hunter Education Program is to protect the lives and safety of the public, promote the wise management and ethical use of our wildlife resources, and encourage a greater appreciation of the environment through education. The Hunter Education Program is a public education effort providing instruction in the safe handling of firearms and other outdoor activities related to hunting and firearm use. Funding is derived from the sale of hunting and sporting licenses, and from federal excise taxes on firearms and archery equipment. Massachusetts offered its first hunter safety course in 1954, and to date has graduated more than 140,000 students. The program is jointly administered by the Massachusetts Division of Fisheries and Wildlife and the Massachusetts Environmental Police. Courses are taught by trained volunteer instructors. All courses are free of charge.

Courses

Courses were offered in six disciplines. A total of 3,092 students participated in the Hunter Education Program in FY 2003. Participation levels decreased 20% from FY2002 and are below the five year average of 3,678 students. The following is a summary of course offerings and statistics on student participation:

Basic Hunter Education: These courses provide information on the safe handling and storage of hunting arms and ammunition, hunting laws and ethics, wildlife identification, wildlife management, care and handling of game, basic survival skills and first aid.

- Fifty-seven courses were offered this year. A total of 2,179 students participated; 2,021 successfully completed the course. Students are asked to volunteer information on age, gender and ethnic background on their registration forms. Three hundred twenty-two (322) students were minors (10-14 years old), 425 were 15-17 year old minors, and the remainder were over 18. Twenty eight participants identified themselves as minorities. Two hundred fifty-five (255) participants were women.

Bowhunter Education: These courses are designed for both the experienced and novice hunter. Course topics include the selection of equipment, safety, ethics, bowhunting methods, and care and handling of game. Students may bring their archery equipment to class to obtain advice on its use and care. This certificate is recognized in other states where Bow Hunter Education certificates are required.

- Seventeen courses were conducted. A total of 554 students participated; 551 successfully completed the course and 3 failed. Sixty students were 10-14 years of age; 44 were 15 -17 years of age. Two minorities and 25 women were identified.

Map, Compass & Survival: Topics in these courses include instruction on wilderness survival, as well as the use of a compass and topographical map for land navigation. Due to the technical nature of the course, it is not recommended for anyone under the age of 12.

- Nine courses were conducted (2 in Pittsfield, 7 in Westminster) this year. A total of 214 students participated, 213 passed, one was incomplete. Twenty-five minors (10 -14 year olds) and 5 minors (15-17 year olds) participated. Three minorities and 39 women were identified

Black Powder Education: Topics in these courses cover the selection of hunting equipment, state laws, the safe handling of muzzleloaders, and safe powder storage. There is a mandatory live-fire segment to this program. A Certificate of Completion from the Basic Hunter Education course is a pre-requisite for all students under 18 years of age.

- Four courses were conducted this year. Thirty-seven students participated. Twenty-nine successfully completed the course; 8 were incomplete. No minors or minorities participated. Three participants were women.

Trapper Education: Mandatory for all first-time trappers, this two-day course includes both classroom work and field training. Students learn the proper use of traps and how to set them, the identification of fur bearing animals and their habitat, trapping laws and ethics, and landowner relations.

- Three courses were offered during the year with a total of 89 participants. Eighty-seven successfully completed the course; two failed and two did not complete the course. Ten women were identified. One minority, one minor (10 -14 years old) and one 15-17 year old minor attended.

Waterfowl Identification: This course teaches the identification of migratory waterfowl, but also covers the shooting characteristics of steel shot, hunting safely from boats, and the proper use of waders.

- One course was held with nineteen students participating. Eighteen successfully completed the course, one was incomplete. Four participants were women.

Shooting Range Development and Enhancement

It is our objective to provide access for the public to range facilities for hunter education and shooting sports purposes by assisting shooting clubs with range development and improvement activities. A total of \$50,000.00 was made available to clubs for Shooting Range Maintenance and Enhancement projects in FY 03. Nine clubs responded with 27 project proposals. We funded 11

individual project proposals from six clubs. Paid invoices were submitted by the clubs, and clubs were reimbursed for all approved costs associated with the projects. Follow-up site visits were conducted by *MassWildlife* staff.

Becoming an Outdoors-Woman — Ellie Horwitz, Coordinator

Becoming an Outdoors-Woman (B.O.W.) is a program designed for women ages 18 and up.

The program provides basic skills instruction to women who have expressed an interest in participating in outdoor activities and field sports. Because of cultural barriers and lack of suitable equipment, women have been, and are, under-represented among persons who enjoy and feel a commitment to the natural resources of the Commonwealth. To address this, *MassWildlife* offers a program coordinated by one staff member and staffed by volunteer instructors. This program provides a secure venue for basic instruction in a variety of outdoor activities.

Over the course of FY 2003 the following workshops were offered:

July 26	On the Uses of Rivers	Charlemont
August 23 - 25	Advanced Survival	Leominster
August 25	Self Defense	Leominster
September 7	A B.O.W. Sampler	Boston
October 5	Fly Fishing	Belchertown
December 8	Deer Hunting Workshop	Devens RFTA
December 14	Deer Hunt	Devens RFTA
April 12	A Day of Shooting Sports	Leominster
April 26	Turkey Hunting Seminar	Devens RFTA
May 5	Turkey Hunt	Devens RFTA
June 6-8	A Weekend of Outdoorswoman Sessions	Lenox

New workshops this year were Advanced Survival, Self Defense and the B.O.W. Sampler in Boston. Advanced Survival was a specialized weekend for women who had previously taken B.O.W.'s Basic Survival Course. Self defense was an afternoon program offered in conjunction with the Advanced Survival weekend with instruction provided by Impact Inc. (Model Mugging). B.O.W. in Boston was a full day sampler of six B.O.W. activities held in cooperation with the Boston Park Rangers at Jamaica Pond in Boston. While this workshop drew participants from as far away as Connecticut, it primarily served women from inner city Boston who might otherwise never have attended or heard about the Outdoors-Women program or the Division of Fisheries and Wildlife.

The program also conducted one workshop as a fundraiser. Participants in the October fly-fishing workshop solicited donations for Casting for Recovery (CFR), a Needham based group which sponsors fly-fishing week-



Wildlife photographer Bill Byrne was able to capture a number of exceptional photos of gray (above) and red fox for an issue of Massachusetts wildlife this year, including examples of both species nursing their young.

ends for women who have been diagnosed with, or are battling, breast cancer. Income from this session was also earmarked for CFR. The final donation from this workshop came to \$750.00 plus an opportunity for CFR to present their program to the women's consortium at Fleet Bank. We hope that this will result in increased visibility for their program, plus additional donations.

As in the past, instruction was provided by specialists who volunteered their time and services in order to share their expertise and their passion for outdoor activities with newcomers.

During the year we refined the electronic notification system for this program. This system, developed last year, through which flyers and registration forms are delivered directly to the client's computer, speeds information delivery while significantly reducing the cost of disseminating the information.

Also during the year, program staff assisted researchers at Amherst College, Dept. of Sociology, who wished to survey past B.O.W. registrants to learn more about their motivation for participating in the program

Massachusetts Junior Conservation Camp

During the latter months of calendar year 2002 negotiations for a camp facility were concluded with the Great Trails Council of the Boy Scouts of America. A 10 year contract has been signed and the Conservation Camp will hold its August 2003 session at the Chesterfield Boy Scout Reservation.

Other Education Initiatives

Special Projects

Secretary's Advisory Group for Environmental Education (SAGEE): The Section Chief chaired the group that has oversight of implementation of the Mass. Environmental Education Plan. This group is charged with stimulating implementation of all parts of the plan, as well as monitoring those efforts that are already underway. As part of this implementation process the Section Chief organized a three day training session on Excellence in Environmental Education and adherence to the national learning standards for Members of SAGEE, the Mass. Environmental Education Plan group, and representatives of the Regional Environmental Education Associations. The workshop, taught by Dr. Deborah Simmons of So. Illinois University, was held in Westboro.

Great Falls Discovery Center (GFDC) Development: Although development of the exhibit was delayed for a period, things are now moving ahead both on the displays and on external arrangements for the Discovery Center area. These latter include a land swap, moving of a memorial and issuing bids for extensive landscape readjustments.

Newspapers in Education (NIE): The Section Chief worked with staff of the Hampshire Daily Gazette to sponsor a page of special materials for educators. As part of the statewide NIE initiative, participating newspapers print a full page of information on a selected topic once each quarter. This material, directed at teachers, is printed in the daily newspaper. The page is supplemented by a packet of supporting materials that is sent to all participating teachers. *MassWildlife* sponsored and provided material to the Gazette for a page on Healthy Environments.

North American Assn. for Environmental Education (NAAEE) Conference: The North American Assn. for Environmental Education chose Boston as the site for its 2002 annual meeting held in August. This event brought close to 800 participants and families to Boston's Park Plaza Hotel for a week of programs and field trips. The Section Chief served on the steering committee and worked with others to guide visitors to key Environmental Education areas in the Commonwealth.

Northeast Information & Education Technical Committee: Pursuant to the committee's five-year plan to enhance agency recognition and credibility with members of the public, the committee moved to the next step. In the past, focus groups were held to identify

levels of public recognition. Following this the group has now completed development of an opinion research template which will be available to all participating states and which will establish a baseline assessment of public perception of agency initiatives. A survey instrument developed over the course of the year will be applied in all 13 northeastern states during this fiscal year and the early part of next year. Because the survey instrument is the same for all states, results will be comparable. Results of the surveys will be compiled during the fall of 2003.

Further Outreach

Exhibits

Despite staff shortages, the agency participated in exhibits in the following venues:

{(new) indicates first time participation at this event or venue in FY 2003}

- August 1-January 1 — (new) Newburyport Maritime Museum, Newburyport

This is a collaborative effort with DU, MAS and USFWS on the Heritage of Waterfowlers on the Great Marsh. It featured a presentation on waterfowl stamps by Ellie Horwitz.

- September 2002 — Mass. Waterfowl Stamp reception, Brewster; Mass. Waterfowler's Association Annual Dinner, Fall River; National Hunting and Fishing Day events in Sturbridge and Ashburnham; Freetown Forest Fun Day, Freetown; Franklin County Fair, Greenfield

- October 2002 — Topsfield Fair — Combined with Hunter Education and Angler Education volunteers on outdoor skills theme.

- November 2002 — New England Pest Management Association Fall Seminar; (new) Successful Women's Trade Show, Fitchburg;

- January 2003 — Standish Sportsmen's Show, E. Bridgewater — Division table and Furbearer table; (new) Congress of Lakes & Ponds Annual Meeting, Leicester, Chloe Stuart and Melissa Dow Cullina set up table and display board. Chloe gave talk on the Aquatic BioMap project;

- February 2003 (new) Becoming an Outdoorswoman Program presentation to spouses and exhibit space for New England Outdoor Writers Association meeting; Worcester and Springfield Sportsmen's Show

- March 2003 (new) World Flyfishing Show, Wilmington; State Grange Program Day, Rutland; Westfield River Watershed Association Day; Mass Land Trust Conference, Worcester

- April 2003 — (new) Oil Spill Information Impact on Wildlife, Fall River

- May 2003 — (new) Mass. Medical Society Conference focusing on Public Health and the Environment

Exhibits with the table top display were used in a variety of venues including a Tufts Veterinary School Open House; Land Acquisition Events; National Hunting and Fishing Day events in Sturbridge and Ashburnham; and many more. Once again, the agency staffed displays at the sportsmen's shows, Topsfield and Franklin County Fairs. Members of the I & E Section assisted in staffing many of these events.

Tourism Outreach

Abstracts of fishing and hunting regulations were delivered to roadside visitor centers during license distribution for 2003. A mailing went out to those centers advising that we would be able to supply more if needed. Due to budget constraints, staffers did not attend any tourism conferences this year.

Tourist publications which have featured *MassWildlife* for the first time include a new Berkshires Outdoor/ Recreation publication (with Byrne photo); article in Plymouth County Business Journal on new Burrage Pond WMA dedication, (Spring of '03); the Outdoors-Woman's Fly-fishing workshop, and Moose, Deer and Eagle Programs offered in the Connecticut Valley were listed in the Greater Springfield Tourism Bureau Calendars.

The Rte. 2 visitor center in Lancaster continues to sell Wildlife Viewing Guides and is trying out the Critters of Massachusetts guides. Wildlife viewing guides are now being sold at the New Salem General Store and the Greenfield Visitor's Center.

Agency Visibility

In an effort to increase public identification of *Mass-Wildlife* staffers, T shirts, polo shirts dress shirts, caps and coveralls were made available to staffers. Name bars were prepared for all agency personnel.

Information & Education Staff

Ellie Horwitz — *Chief*

Bill Byrne — *Senior Photographer*

Jill Durand — *Circulation Manager, MASSACHUSETTS WILDLIFE Magazine*

Nancy Fulham — *Receptionist*

Jim Lagacy — *Aquatic Resources Education Coordinator*

Pam Landry — *Education Coordinator*

Susan Langlois — *Coordinator, Hunter Education Program*

Marion Larson — *Outreach Coordinator*

Peter Mirick — *Publications Coordinator*

DISTRICT REPORTS

Northeast District, Chuck Bell, *Manager*

Southeast District, Tom O'Shea, *Manager*

Central District, Bill Davis, *Manager*

Connecticut Valley District, Ralph Taylor, *Manager*

Western District, Tom Keefe, *Manager*

Most people seeking out *MassWildlife* make contact with one of the five Wildlife Districts. They are *MassWildlife's* field stations, administering wildlife lands, conducting on-site management, enhancing recreational opportunities and addressing wildlife issues pertinent to their region.

During the past year, staff from all of the Districts participated in numerous research programs including the annual mid-winter eagle survey, waterfowl inventory and banding, census of wild turkey, mourning doves, woodcock, ruffed grouse and quail. They monitored the water quality of lakes and streams prior to releasing fish into them. They released pheasants on Wildlife Management Areas (WMAs) and in open covers, and they released trout, northern pike and tiger muskies into waters scheduled to receive them.

District staff provide technical advice on the control of environmental problems — particularly in the handling of nuisance animals. In this context, District staff dealt with a large number of beaver complaints, deer damage complaints, questions about coyotes and other issues dealing with the impact of wildlife on human activities.

Districts deal with the public too, operating check stations where sportsmen register deer, bear, turkeys and furbearers taken during the designated hunting and trapping seasons; providing technical advice to members of the public; and providing programs for civic groups and schools within their region. In fact they are often the first ones sought by the media in developing an article on a topic with implications for wildlife. District managers serve as *MassWildlife's* local public relations/education "point persons," spending many hours with civic and conservation groups including sportsmen's clubs, and responding to inquiries from interested citizens.

District staff members monitor and enhance the Wildlife Management Areas in their region. This involves cutting brush, mowing, trimming trails, designing forest cutting operations, planting shrubs, and maintaining roads and parking areas. They take a primary role in erecting gates and signs and in making other arrangements related to the protection and management of the agency's lands, buildings and vehicles. They also build and maintain nesting boxes for wood ducks, bluebirds and bats, and establish cooperative agreements with farmers raising crops on *MassWildlife's* lands.

District personnel distribute licenses, abstracts, stamps and other materials related to the sale of hunting, fishing, and trapping licenses. They assist officers from the Division of Law Enforcement to assure public adherence to wildlife laws and regulations, and they assist the staff of the Wildlife Lands Section in locating titles, landowners, and bounds — and making arrangements for the acquisition of lands for wildlife.

In addition to the activities that are common to all of the Districts, there are certain projects that require the participation of staff from only certain Districts.

Northeast Wildlife District

Staff of the Northeast District continued to regulate and monitor activities at 10 Wildlife Management Areas including the latest acquisition, the Salisbury Marsh WMA.

Maintenance for public use was performed on five sanctuaries and at 10 boat access sites.

Survey and Inventory

District staff committed considerable time to field work in support of research projects designed by agency biologists and project leaders to sample and survey terrestrial and aquatic biota in the Northeast. Fisheries surveys were conducted on 21 streams and one river in the Nashua River drainage using a combination of backpack and barge electro-fishing gear.

Whitetail deer telemetry studies continued in Carlisle and surrounding communities where staff members monitored the movements of 14 collared animals.

Annual plot surveys of beaver presence and activity were limited due to seasonal environmental conditions such as deep snow cover and marginally safe ice conditions. Maintenance and inventory of wood duck boxes were completed. Other study and support activities included banding Canada geese, banding waterfowl from an airboat, conducting counts of grouse, woodcock, dove, and eagles, and conducting coastal and midwinter waterfowl surveys. Staff biologists also responded to nine reports of fish kills.

We assisted the Division of Marine Fisheries in the capture of Atlantic salmon and monitoring of anadromous fish passage at the Lawrence Fishway on the Merrimack River.

Assistance was also provided to the Natural Heritage and Endangered Species Program in the construction and placement of a nesting platform for peregrine falcons on a window ledge of an old factory building in Lawrence.

The District issued four camping permits, 15 field trial permits and nearly 500 target permits for the range that is maintained at the Martin Burns WMA.

Outreach

Northeast District staff continues their long-standing effort to support the Essex County League of Sportsmen's Clubs in promoting hunting and shooting sports for youth. The annual youth upland pheasant hunt was held on September 27th at the Martin Burns WMA with 13 teenagers participating.

Staff constructed duck blinds for, and managed, a special waterfowl hunt at the Delaney WMA during the waterfowl season. Controlled hunts were also conducted on the Martin Burns WMA during the pheasant season.

District personnel devised a new design for the display at the Topsfield Fair. The theme of this year's exhibit was the wetland/beaver complex and the wildlife supported by this habitat. Once constructed, District and Westboro staff answered questions and distributed literature to fair goers for nine consecutive days. Northeast District personnel also assisted at the Fishing & Outdoor Exposition in Worcester by selling licenses and responding to public inquiries. The District Manager and staff biologists participated in a total of 54 meetings at local Sportsmen's Clubs, County Leagues of Sportsmen, Watershed Associations, Boards of Health, Conservation Commissions, land trusts, town meetings, Trout Unlimited functions, and the Boy Scouts of America.

Southeast Wildlife District

During this fiscal year, Tom O'Shea took on the position of Southeast District Manager. He assumed these duties from Acting District Manager Steve Hurley on August 5, 2002. Salvatore Paterno, wildlife technician II, was out on extended illness leave during the months of May and June 2003.

A comprehensive equipment inventory was completed for the District in February 2003 and entered into a computer database. An energy and cost-saving upgrade was made to the existing lighting system. An updated alarm system was installed at the District office and buildings. District Staff constructed a new public office counter and re-arranged the office layout. The District upgraded its computer system and added Geographic Information Systems capabilities for the production of maps and storage of geospatial information for the Southeast region.

Buzzards Bay Oil Spill

Southeast District coordinated and directed various wildlife response efforts when Bouchard Transportation Barge # 120 struck a submerged rock on April 27, 2003,

creating a 98,000-gallon oil spill in Buzzards Bay. The District Manager represented the agency in televised press conferences, radio interviews, print media news releases and interviews, and District staff prepared and organized a televised press conference for members of the Boston and Providence media regarding oil spill-related mortalities, impacted habitats, endangered species issues, spill response and wildlife rehabilitation efforts. Staff responded to this spill in a variety of other ways as well as they:

- 1) directed the wildlife response team including federal and state wildlife biologists, law enforcement agents, and cooperating non-governmental organizations such as the Coalition for Buzzards Bay and Tri-State Bird Rescue,
- 2) participated in planning, operations, and information at the Unified Command Center,
- 3) captured live oiled birds for rehabilitation and collected dead oiled birds for documentation purposes,
- 4) maintained open telephone lines at the District Office for public reporting of impacts of the oil on wildlife
- 5) performed vegetation control on tern nesting islands,
- 6) installed tern nesting boxes and attractant devices,
- 7) provided equipment, vehicles, boats, and supplies necessary for the above functions.

Fish Stocking

Trout: In the fall of 2002 (September-October), staff stocked 22 ponds with a total allocation of 13,400 trout (rainbow trout, brown trout and brook trout from the McLaughlin, Bitzer (Montague) and Sandwich State Fish Hatcheries. In the spring of 2003, the district stocked its allocation of 98,600 trout (57,000 rainbows, 5,600 brown trout, 25,100 brook trout and 900 tiger trout) into 44 ponds and 42 streams. Sandwich State Fish Hatchery supplied the bulk of the stock, with McLaughlin and Sunderland hatcheries also providing trout. Although the cold winter delayed stocking until March 24th, most of the stocking was completed by early May. The last stocking was completed on May 28th.

Salmon: In December 2002, Atlantic salmon from the Palmer State Fish Hatchery and the Nashua National Fish Hatchery were stocked into Little and Long Ponds in Plymouth, Peters Pond in Sandwich and Cliff Pond and Sheep Pond in Brewster. Atlantic salmon were also stocked on March 26 (150 salmon) and April 14, 2003 (35 salmon).

Esocids: Tiger Muskies were stocked into South Watuppa Pond in Fall River/Westport on August 28, 2002.

Hatchery Assistance

The Southeast District continued to assist at the Sandwich Fish Hatchery as requested. This assistance

Western Wildlife District

Central Wildlife District

Northeast Wildlife District

Connecticut Valley Wildlife District

Southeast Wildlife District

took the form of helping with computer operations, painting the hatchhouse, developing display materials and in such routine hatchery operations as spawning trout and unloading of feed.

Survey and Inventory

Extensive pond and stream surveys were completed in the Ten Mile and Taunton River watersheds during the summer of 2002. The annual trout survey on the Quashnet River was conducted with the help of Trout Unlimited on September 15, 2002. Temperature monitors in the Quashnet River, the Mashpee River and the Childs River were checked on a regular basis. As part of a research study on salter brook trout, surveys were also conducted on the Childs River, Quashnet River, Red Brook and the Mashpee River.

In June 2003, fish surveys were conducted on North Watuppa and Copicut Reservoirs in the Southeastern Massachusetts Bioreserve area. The finding of a dead snakehead on the shores of Sassaquin Pond in New Bedford in fall 2002 led to local concerns and a pond survey in the spring of 2003, but no snakeheads were captured. Fish surveys were also conducted on the newly acquired Burrage Pond WMA. Data from pond and stream surveys were analyzed, summarized and survey reports were written throughout the year.

Other Fisheries Activities

The fisheries manager participated in the Watershed Initiative as a member of the South Coastal and Cape Cod Basin teams and provided information as requested to the basin team leaders. Close cooperation and communication with the Division of Marine Fisheries continued regarding alewife runs. The fisheries manager also served as the Division of Fisheries and Wildlife's representative on the Southeastern Massachusetts Bioreserve Planning and Working Groups. Monthly meetings were held with the Trustees of Reservations and Trout Unlimited to implement the Red Brook memorandum of understanding. Information on the recent surveys of the freshwater fisheries resources of the Buzzards Bay Watershed was provided to the Department of Environmental Protection.

Access Maintenance and Improvement

Permits for bass tournaments at Ashumet, Johns, Monponsett, Great Herring, Cooks, Tispaquin and Snipatuit Ponds were reviewed. Cleanups and inspections were conducted at access areas on Agawam Mill Pond, Ashumet Pond, Big Sandy Pond, Cooks Pond, Great Herring Pond, Hockomock River, Johns Pond, Mashpee River/Washburn Pond, Monponsett Pond, Nippenicket Pond, Pomponneset Beach, Quashnet River, Rochester Rearing System, Snipatuit Pond, Spectacle Pond (Wareham), Tispaquin Pond and Winneconnet Pond/Snake River landings. Input on fisheries issues and resources were made on proposed land acquisitions throughout the year. A storage area on District property and District staff assistance in loading ramp pads were provided to the Public Access Board. Signs were replaced at the Big Sandy Pond and Johns Pond Boat Ramps.

Fish Kill Investigation

Five fish kills were investigated in July 2002 including a large die-off of freshwater mussels from an algae bloom in Ashumet Pond and a large kill of young-of-the-year herring in Lovells Pond from cranberry bog diversions. Two fish kills due to winterkill occurred in March 2003 and two other natural fish kills occurred in June 2003.

Environmental Review

The fisheries manager was actively involved in monitoring the Massachusetts Military Reservation's cleanup plans as a member of the Plume Containment Team (PCT). Fisheries input was provided on plans for the Boston Golf Club in Hingham, the removal of the Mill

Pond Dam in Hanover, a development near Third Brook in Kingston, the restoration of the Bridge Creek salt marsh in Barnstable.

Technical Assistance

Local and state agencies, private consulting firms and individuals were provided with an increasing amount of technical assistance on matters dealing with the fisheries resources of southeastern Massachusetts. The District Manager spent a considerable amount of time reviewing proposals for, and providing technical assistance related to groundwater remediation activities on the Crane WMA for the Air Force Center for Environmental Excellence and Jacobs Engineering as part of the Massachusetts Military Reservation (MMR) cleanup. The District Fisheries Manager also provided technical assistance regarding the restoration of Pilgrim Lake in Truro and the coldwater resources in the Southeast Regional Planning District. Technical assistance was provided to the Butterworth Map Company in preparation of the Cape Cod Freshwater Fishing Guide with Pond Maps and to an author producing a book on Cape Cod's freshwater fishing.

Wildlife Issues

Surveys: In addition to participating in surveys of ruffed grouse, mourning doves and other species (surveys common to all of the Districts), staff of this District also surveyed 29 lake, pond, and river locations throughout Plymouth and Bristol Counties as part of the statewide Park Waterfowl Survey. This survey is important in understanding the ecology of mallards in the northeast, as winter waterfowl surveys have traditionally been conducted by aircraft and restricted to the coast.

Stocking: In addition to releasing pheasant, quail, trout, salmon and esocids, staff in this District released snowshoe hare. A total of 30 snowshoe hare were released in the Rocky Gutter WMA in Middleboro, Haskell Swamp WMA in Rochester and Mattapoisett, and the Freetown State Forest Wildlife Management Area in Freetown and Fall River.

Deer Management: Unanticipated demands for extra deer management zone 11 antlerless deer permits created burdens on District staff and facilities. Antlerless deer permits, which are sold on a first-come, first-served basis, were required in 2002 for archers as well as shotgun hunters and contributed to increased demand. Permits for DMZ 11 were sold out during the first two days of antlerless deer permit sales as over 1,100 hunters were serviced at the District office. Operational difficulties at the Southeast District office included concerns for public safety and customer service due to insufficient parking space, availability of restrooms, computer and printer breakdowns and capabilities, staff support, and crowd management.

Camp Edwards/ Otis ANG Base Controlled Hunt: The Southeast District conducted a controlled deer hunt on the Massachusetts Military Reservation in Bourne and Sandwich. District staff negotiated additional access

with the Army National Guard team regarding terms of the hunt. District staff successfully implemented the controlled deer hunt while involving and cooperating with a variety of community and government partners such as the Otis Fish & Game Club and the Division of Law Enforcement. Following the 2001 closure of the base due to national security threats, the 2002 controlled deer hunt resulted in the highest deer harvest recorded over the last decade totaling 169 deer. District staff coordinated pre-registration and then check-in of hunters during the three days of shotgun and three days of muzzleloader season while conducting a biological deer check station. *MassWildlife* also posted signs on areas off-limits to hunting on Camp Edwards.

Challenged Hunt: Two area residents, The Fund for Animals, the Humane Society of the United States, and the Massachusetts Society for the Prevention of Cruelty to Animals filed a lawsuit against the National Park Service in the fall of 2002 to prohibit pheasant stocking and hunting on the Cape Cod National Seashore. This lawsuit was filed just prior to pheasant stocking and plaintiffs sought an injunction to stop the hunt. Southeast District staff stocked pheasant after U.S. District Court Judge Patti B. Saris denied issuance of a temporary restraining order on pheasant stocking and hunting. Later in 2003, the plaintiffs amended the lawsuit to include the prohibition of all hunting on the Cape Cod National Seashore.

Nuisance Animal Complaints

In March of 2003, the District received its first moose road kill report. An adult cow moose had been struck by a vehicle in Raynham. Southeast District staff also received reports of heavy beaver activity in the North River area of Marshfield as well as in the Town of Duxbury. Complaints of coyote depredation on pets and farm animals, dens near human residences, and other forms of human habituation continued to increase. Deer damage complaints increased in the Sandwich area.

Technical Assistance

District staff addressed Provincetown's 2003 town meeting responding to citizen interest in matters pertaining to hunting safety, wildlife stewardship, and traditional uses of animals. District staff also attended town meetings and/or public hearings relative to hunting and safety in the towns of Halifax, Middleboro, and Duxbury. Staff spoke on behalf of the Division at the Town of Falmouth's public hearing on Coonamesset River Cranberry Bog issues relating to wetland restoration and native fisheries versus active conventional cranberry production within the river system.

Live fish were provided for educational displays at the South Shore Natural Science Center in Norwell and the Buttonwood Park Zoo in New Bedford.

In July 2002, an osprey was captured and turned over to the Cape Cod Wildlife Center for rehabilitation. District staff helped rebuild platforms on Ram Island used by the roseate tern crews.



Student volunteers stock fish in the Assabet River.

Land Stewardship

Staff of the Southeast District participated in the Assawompsett Pond Complex Team meetings addressing important management and public access issues on the associated water supply and municipal lands.

They monitored plume containment work at the Crane WMA in Falmouth and met regularly with the Air Force Center for Environmental Excellence (AFCEE) and Jacobs Engineering regarding proposed development plans and agreements for a treatment plant facility, infiltration gallery, re-injection and extraction wells on the Crane WMA property. District staff also met with AFCEE representatives in resolving user conflicts with plume containment work, especially in regards to road improvement within the Crane WMA.

During this year the District signed a five-year license agreement with the Division of Law Enforcement permitting the DLE to use a single-family house on the Burrage Pond Wildlife Management Area as the Inland South regional headquarters.

The District supervised demolition and cleanup of the former Northland Cranberry building site in Hanson and initiated District use of the former vehicle and equipment storage barn on site. Working with the Department of Environmental Protection, the Southeast District transferred water withdrawal registration for withdrawal from upper and lower Burrage Ponds from the Northland Cranberry Company to *MassWildlife*.

A total of seven field trials were scheduled at the Crane Wildlife Management Area in Falmouth. District staff worked with field trial and model airplane groups to reschedule events to prevent conflicts with endangered species concerns.

Central Wildlife District

District Manager Chris Thurlow retired effective April 1, 2003 after 29 years of service to *MassWildlife*. Twenty-five of those years were spent as the District Manager. His experience, knowledge and skills will be impossible to replace. Wildlife Biologist Bill Davis transferred from the Westboro Field Headquarters to assume the position of District Manager.

Wildlife Biologist Dave Fuller transferred to the Connecticut Valley Wildlife District in August of 2002 and Fisheries Biologist Mark Brideau assumed many of the wildlife-related duties left by the vacancy.

Wildlife

District personnel directed seven deer check stations, one turkey check station, and one black bear check station. The first black bear taken in Worcester County (Fitchburg) since check stations were established in 1970 was checked at the Central District office. Ruffed grouse, beaver and mourning dove censuses were completed. Canada goose census, banding, and summer and fall duck banding were also conducted. Beaver, otter, coyote, fisher, bobcat and fox pelts were tagged and recorded. 461 Wood Duck nesting boxes were checked and new boxes erected at numerous wetland sites.

Scheduling and monitoring of district stocking of 13,000 ring-necked pheasant was completed and 4,032 seven week old pheasants were distributed to 20 sportsmen's clubs for rearing and release on 18 Wildlife Management Areas (WMAs) and 15 town coverts. A proposal submitted by the Worcester County League of Sportsmen to allow winter pheasant hunting under permit was reviewed by the staff. Twenty-five snowshoe hare were released.

District personnel assisted in the annual Midwinter Bald Eagle Survey. Bluebird, kestrel, and songbird nesting boxes were constructed and erected on WMA's. Staff

assisted in a radio telemetry white-tailed deer survey, collaring and tracking 13 study animals. An adult cow moose was relocated from Ayer and collared prior to release in Winchendon while a moose calf was moved from a dangerous situation in Ashby to more suitable habitat. Multiple moose/vehicle collisions were documented and data collected from those moose carcasses which could be salvaged. Bear damage was assessed and electric fencing units loaned out at separate incidents in Hubbardston and Templeton.

Nesting rafts for common loons were floated at Quabbin and Wachusett Reservoirs and a loon nesting attempt at Paradise Pond in the Leominster State Forest was safeguarded by posting signage invoking Massachusetts General Law Chapter 131, Section 86.

A bald eagle nesting attempt was monitored at Quaboag Pond in Brookfield where a single chick hatched successfully. Eagle nestings at Quabbin were monitored in cooperation with the Connecticut Valley Wildlife District.

Central District's staff surveyed the Nashua River watershed. The main stem of the Nashua was surveyed at 9 sites, along with 30 tributaries. Work on a two-year study of the Chicopee River watershed was initiated.

Wildlife Management Area Projects

Fields were mowed, roads and parking areas were maintained, and signage was installed on nine Wildlife Management Areas. Timber trespasses were investigated on the Quisset and Millers River WMAs.

Staff worked closely with the Massachusetts Sportsmen's Council to plan improved access for the Merrill Ponds WMA and to place a commemorative plaque in recognition of outdoor writer Raymond Gribbons.

Information and Education Activities

Hunting, fishing and trapping licenses, and antlerless deer and turkey permits were sold at the District headquarters; and licenses, abstracts and stamps were distributed to central Massachusetts vendors.

District personnel set up and helped staff the Eastern Fishing and Outdoor Expo at the Worcester Centrum. The Tag's and Trout program was sponsored at seven water bodies. The District assisted with the judging of the Junior Duck Stamp competition.

Other Activities

Numerous nuisance animal complaints involving beaver, coyote, fox, fisher and others were investigated and acted upon.

The District Manager attended meetings and functions of the Worcester County League of Sportsman Clubs. The District Manager and District Biologists attended meetings with various federal, state and local agencies on subjects such as wetland permits, and other wildlife and environmental situations. Managers and Biologists attended various staff, planning, professional, training

and informational meetings. Technical assistance was provided to state and local departments and lake associations on such issues development of open space plans and matters related to water pollution.

Public Access

Six boat ramps were inspected and litter removed. Potential access sites were reviewed in Ashburnham, Clinton and Spencer.

Connecticut Valley Wildlife District

In addition to the stocking activities, the running of biological check stations, conducting wildlife surveys and response to wildlife nuisance complaints common to all districts, the Valley District participated in the following activities:

Ludlow Controlled Waterfowl Hunt

Valley District personnel conducted the annual controlled waterfowl hunt at the Ludlow WMA. This is a property owned by the town of Ludlow with which *MassWildlife* has an MOU to allow for hunting with special regulations. We clear and brush cut the area just prior to the waterfowl season and we administer the hunt. This involves distributing and accepting applications, running a drawing for blind sites and issuing permits with access keys to the area.

Black Bear Project

The Valley District continues to conduct the fieldwork for the black bear project. In the spring we barrel trap bears and affix ear tags to all captured bears. Sows are fitted with radio collars and their locations are determined throughout the year using radio telemetry. Home ranges are mapped for each sow and the den locations are determined. In late winter each bear is visited to assess condition and cub production/survival.

Eagles, Peregrines, Ravens and Loons

This District continues to monitor all breeding territories and band all eaglets that we can band safely. The only nest we cannot reach is the Barton's Cove nest. This long dead pine tree has been unsafe to climb for a number of years. New banding sites this year included the Merrimack River in Haverhill and Quaboag Pond in Brookfield. There were 15 territorial pairs this year, 8 of which successfully fledged 13 chicks.

The Valley District has four of the eight successful breeding pairs of peregrines in the state. A new site this year was the historical site of Sugarloaf Mountain in Deerfield. Last used over 50 years ago, this site produced three of the states 16 fledged chicks. Another new site was the UMASS Library in Amherst. These birds have nested here for a number of years. They finally produced a chick this year.

Staff climbed and rappelled at 12 sites to band raven chicks. This activity, although not a high priority for the Natural Heritage program, is still of interest to them. We

continue to band ravens when time permits.

The Valley district maintains and deploys loon rafts on the Quabbin Reservoir to enhance loon breeding success.

Staff of this District have worked booths in the Fish and Game Building at the Franklin County Fair, at the Springfield Sportsmen's Show and at the Earth Day Fair at the Springfield Science Museum. The District Manager regularly attends meetings of the Hampden, Hampshire and Franklin County Leagues of Sportsmen.

This District has a Meeting\Classroom facility and hosts Board Meetings, Deer Aging, and Beaver Management Workshops

Western Wildlife District

Administrative

District Manager Tom Keefe served as mentor to newly appointed S.E. Wildlife District Manager Tom O'Shea, helping him to gain familiarity with standard District operating procedures.

Fisheries

Both Manager and staff of this District monitor the Housatonic River PCB clean-up on site and review all pertinent documents with EPA and DEP consultants.

Fisheries staff carried out the annual activities of trout and salmon stocking, stream and pond surveys, tiger muskie stocking and fish kill investigations. In addition, the fisheries staff assisted the game section with biological deer check, goose banding, beaver surveys and pheasant distribution. The fisheries crew stocked northern pike into Shaw Pond and assisted with Atlantic salmon fry stocking.

The Aquatic Biologist attended Watershed Coordinating meetings for the Housatonic, Hoosic, Westfield and Farmington Rivers. Fisheries staff spent a significant amount of time conducting a comprehensive evaluation of the Housatonic River. This included surveys of fish populations, temperature monitoring, and river access. At the same time, the Aquatic Biologist worked with personnel from *MassWildlife's* Westboro office to develop changes in management and regulation for the Housatonic River and surrounding watershed. These included development of a Catch and Release proposal and a target fish community profile.

The Aquatic Biologist participated in the environmental review process including restoration projects on the Hoosic River and dam removal on Yokum Brook.

The District Manager monitored construction of a boat access ramp at Lake Ashmere, reconstruction of the Decker Canoe Access site at the Housatonic Valley WMA and confirmed installation of signage at both sites.

Members of the District staff continued their efforts to eradicate the invasive water chestnut.

Wildlife

District wildlife staff conducted a comprehensive census of beaver populations in the Western District and assisted teams from U. Mass in a beaver telemetry monitoring program. Staffers Gola and Lamb made a spectacular rescue of a beaver that had fallen into a 10' deep x 10' wide sinkhole at Natural Bridge State Park. The sinkhole was at the edge of a 30' cliff. Gola and Lamb captured the beaver by lowering a Hancock trap baited with poplar. As the beaver stepped into the trap, he was knocked off balance onto the pan which triggered the trap to close over him.

Wildlife Manager Tony Gola conducted woodcock (1), ruffed grouse (4), waterfowl (3) and eagle (1) censuses. He also collected tissue from black bear and fisher for DNA testing.

District staff conducted *MassWildlife's* winter deer-collaring and telemetry monitoring program and one District staffer, Joe Kirvin, coordinated the Paraplegic Deer Hunt in northern Berkshire County.

Three District staffers (Gola, Lamb & Shampang), presented workshops on birding and tracking for Becoming an Outdoors Woman (BOW), in Lenox. They also rescued a deer that had fallen into a recently-poured concrete foundation at a house site in Becket. The deer was immobilized, lifted out, and placed in nearby woods to recover.

Other

- Wildlife Manager Tony Gola conducted a rare plants inventory on four WMAs for *Carex sterilis*, *Cardamine pretensis* var. *palustris*, *Cypripedium parviflorum*, *Blephilia ciliate* and others. He also monitored and mowed invasive plant black swallow-wort (*Cynanchum louiseae*) at Knightville Dam WMA, and served as a member of the Framingham-based New England Plant Conservation Program.

- Gola conducted a breeding bird census on the Hy Fox WMA. This census consists of listening at 100 three-minute point count stations plotted over 1000 acres.

- Working with land agent Peter Milanese, he developed computer-generated topographic maps of over a dozen Wildlife Conservation Easement Areas for use by members of the public.

- Staffers manned an information booth for Americorps students as part of Project WILD and advised an Eagle Scout on pursuing the BSA's coveted Hornaday Medal

Technical Assistance

District Manager Keefe responded to three (3) black bear depredation kills, removing teeth for aging purposes and disposing of carcasses, and presented a slide show on black bears at the Stockbridge Garden Center. He was also called on to euthanize a badly emaciated black bear found in Becket.

Staff attempts to collar a yearling cow moose in Lee were unsuccessful. About a week later, the animal was found dead of unknown causes.

The District Manager represented *MassWildlife* at the monthly meetings of the Berkshire and Hampshire County Leagues and represented the agency at numerous meetings of the Monterey Selectmen as they discussed access issues related to Lake Garfield. He also worked closely with local legislators and with *MassWildlife* administrators as they addressed the issue of snowmobile access to WMAs.

Outreach

The Aquatic Biologist presented data and information to the Taconic Chapter of Trout Unlimited, the Lake and Pond Association of Western Massachusetts, and Ashfield Rod & Gun Club.

The Aquatic Biologist and technicians performed numerous outreach activities including participation in an after school program and instruction at an educational ice-fishing derby. They also staffed the booth at the Springfield Sportsmen's Show.

District Personnel

Northeast District

Chuck Bell, *District Supervisor*
Erik Amati, *Wildlife Biologist*
Peter Jackson, *Aquatic Biologist* (ret. 3/15/02)
Frank O'Meara, *Martin Burns WMA Supervisor*
Bob Desrosiers, *Wildlife Technician*
Sue Ostertag, *Secretary*
John Sheedy, *Wildlife Technician* (to 3/15/02)
Acting Aquatic Biologist (from 3/15/02)
Walter Tynan, *Wildlife Technician*
Steve Wright, *Wildlife Technician*
Dennis McNamara, *Land Acquisition Agent*

Southeast District

Tom O'Shea, *Southeast District Supervisor*
Richard Turner, *Wildlife Manager*
Steve Hurley, *Fisheries Manager*
(*acting District Manager* 07/01/2002 – 08/5/2002)
Ed Kraus, *Wildlife Technician*
Salvatore Paterno, *Wildlife Technician*
Jeff Breton, *Wildlife Technician*
Daniel Fortier, *Wildlife Technician*
Camie Marsh, *Secretary*
Joan Pierce, *Land Acquisition Agent*

Central District

Bill Davis, *District Supervisor*
Vacant, *Wildlife Biologist*
Mark Brideau, *Aquatic Biologist*
Bob Chapin, *Wildlife Technician*
Brian Guerin, *Wildlife Technician*
Paul Leboeuf, *Wildlife Technician*
Priscilla MacAdams, *Secretary*
Paul Orrizzi, *Wildlife Technician*
Vacant, *Land Acquisition Agent*

Connecticut Valley District

Ralph Taylor, *District Supervisor*
David Fuller, *Wildlife Biologist*
David Basler, *Aquatic Biologist*
Barbara Bourque, *Clerk*
Adam Davies, *Wildlife Technician*
Gary Galas, *Wildlife Technician*
Rick Gamelin, *Wildlife Technician*
James Wright, *Wildlife Technician*
Will Steinmetz, *Land Acquisition Agent*

Western District

Tom Keefe, *District Supervisor*
Anthony Gola, *Wildlife Biologist*
Andrew Madden, *Aquatic Biologist*
Dale Beals, *Wildlife Technician*
Elna Castonguay, *Clerk*
Joseph Kirvin, *Wildlife Technician*
Nancy Lamb, *Wildlife Technician*
Jerry Shampang, *Wildlife Technician*
Peter Milanesi, *Land Acquisition Agent*

WILDLIFE LANDS

William J. Minior
Chief of Wildlife Lands

The end result of this year's land acquisition effort was somewhat disappointing. Our Lands Committee had geared up for a banner year with apparently adequate funding and a substantial number of target projects, only to have the program gutted by budget cuts half way through the year. Fortunately, *MassWildlife* was up to speed early, and was able to complete 29 acquisitions prior to the end of January. Only three parcels were acquired thereafter. Twenty five hundred and sixty three acres were protected statewide at a cost of approximately 2.43 million dollars. Although the Central District listed the most closings in FY 03, the Western District with 1225 acres protected the most acreage.

The North Quabbin (NQ) project was winding down, but it still accounted for nearly half of all recordings. This included substantial acreage in the Central and Connecticut Valley Districts. Acquisitions in the NQ area occurred in five distinct areas, Tully Mountain, Tully River, Millers River, Lawrence Brook, and the Orange WMAs. Most of the NQ parcels are protected through CR's that allow compatible public uses including hunting; however a significant number of parcels were acquired in fee.

Fourteen Conservation Easements were utilized to protect approximately 1,075 acres of property in FY 03. The largest CE was granted by the Great Trails Council, Inc, of the Boy Scouts of America. It involved 505 acres of land abutting the Fisk Meadow WMA in the Town of Chesterfield. Coincidentally, the Massachusetts Junior Conservation Camp will be held on this property in future years. The smallest CE was a five acre tract gift abutting the McKinstry Brook WMA in the Town of Sturbridge. This is one of the few CE's that does not include public access. CE's continue to become an increasingly more important part of land protection in the Commonwealth.

Direct assistance by a non-profit organization was provided on the North Quabbin projects as well as the Krause parcel in Westport. Indirect assistance through correspondence, negotiations and due diligence was also provided by various organizations.

The 32 closings completed in FY 03 comprised the smallest number of closings since 1999. The primary reason was budget cuts and we can only hope that budget allocations for land protection in 04 will be higher. *MassWildlife's* FY 03 efforts increased the total area protected to approximately 135,171 acres statewide.

Fiscal Year 2003

Western District

Expended	\$923,000.00
Acreage	1,225.4
Cost/acre	\$753.23

Valley District

Expended	\$211,260.00
Acreage	201.7
Cost/acre	\$1,047.40

Central District

Expended	\$1,115,000.00
Acreage	908.3
Cost/acre	\$1,227.57

Northeast District

Expended	\$0.00
Acreage	0.4
Cost/acre	\$0.59

Southeast District

Expended	\$180,300.00
Acreage	228.0
Cost/acre	\$790.79

TOTAL EXPENDED: \$2,429,560.00

TOTAL ACREAGE ACQUIRED: 2,563.4

AVERAGE COST PER ACRE: \$947.79

The above figures include departmental acquisitions. It should be noted that the acreage figures and costs of those properties acquired with FY 03 funds and all property RECORDED in FY 03 between 8/1/02 and 7/1/03 are included herein. Ancillary costs are not included.

WESTERN DISTRICT

The Western District completed seven acquisitions in six different areas. Of the 1,225 acres protected, 720 acres were acquired in fee, with the remaining 505 acres being Conservation Easements. The largest fee acquisition was a 553 acre addition to our Farmington River Wildlife Management Area (WMA) in the Towns of Otis and Becket. This large area provides a mixed habitat with substantial wetlands for a variety of species including moose. The Great Trails Council of the Boy Scouts of America conveyed a Conservation Easement on approximately 505 acres and the fee on 36 acres of land abutting DFW's Fisk Meadow WMA. This tract is under a multi-year agreement for hosting the Massachusetts Junior Conservation Camp beginning in August of 2003.

Other valuable acquisitions include an 11 acre gift addition to the Hinsdale Flats WMA, a 64 acre addition to the Fox Den WMA, and a 56 acre addition to the Peru WMA.

VALLEY DISTRICT

The Valley District completed four acquisitions in FY 03 protecting slightly more than 200 acres. Two acquisitions are located in the Town of Orange and are part of the North Quabbin initiative. One represented a 78 acre CE addition to the Tully Mountain WMA, and the other a 59 acre addition to the Tully River WMA. A 35 acre addition to the Palmer WMA provides valuable upland habitat and a potential link between existing protected parcels. The Valley District was also the recipient of a 37 acre Aquifer Land Acquisition parcel in the Town of Pelham, courtesy of DEP funding.

CENTRAL DISTRICT

Over 900 acres were protected in the Central District in FY 04 at a cost of approximately 1.1 million dollars. Four hundred and fifty acres were protected through easements and the remaining 460 acres were acquired in fee. Land was acquired in seven towns representing additions to seven different WMAs.

Eleven acquisitions were in the North Quabbin area and basically represented the end of this land protection initiative. Eight of these additions were in the Town of Royalston and are considered additions to the Birch Hill WMA. Other North Quabbin additions include 27 acres to the Millers River WMA and 9 acres to the Tully River area.

The McKinstry Brook WMA increased in size from 226 acres to 348 acres because of four acquisitions. Three of the four acquisitions are CEs, but all include public access with the exception of a small 5 acre gift. This is an exciting area with a diverse wildlife habitat and potential for expansion. The Division of Capital Asset Management (DCAM) transferred the care and control on a 77 acre tract in the Town of Spencer on the Seven Mile River to DFW, insuring the continued trout stocking and fishing use of this valuable tract.

NORTHEAST DISTRICT

Land protection in the Northeast District continues to be most difficult and FY 03 proved to be no exception. Although no parcels or interests therein were acquired, several parcels in the district were identified and approved by the Realty Committee and due diligence was at least partially conducted. Because most of these tracts were not highly developable, they should still be available in FY 04 and hopefully can be protected through acquisition. Middlesex County title examiners were apparently overwhelmed as bids on DFW projects were difficult to obtain. This did have a direct affect on our ability to complete projects in FY 03, however these projects are almost ready to go and pending funding could be acquired in FY 04.

SOUTHEAST DISTRICT

Land acquisition efforts in the Southeast District were also sharply curtailed by budget cuts. Several potential projects were dropped and will hopefully not be lost before sufficient funding becomes available.

Four acquisitions were completed in the Southeast District in FY 03 adding approximately 228 acres of permanently protected open space to existing holdings. Two fee acquisitions added 55 acres to the Copicut WMA, a major component of the huge Southeast Bioreserve.

The Massachusetts Land Conservation Trust assisted as third party middleman in the acquisition of a Conservation Easement on the Krause property on Angeline Brook in Westport. This is a cold water stream which holds native brook trout. Other parcels in this rich riparian corridor are also slated for protection.

From a Heritage perspective, one of the most significant acquisitions was the transfer of care and control from DCAM to DFW of approximately 122 acres of MA Highway land located on both sides of Route 6 in Provincetown. This transfer included fourteen tracts that form a fairly unbroken corridor along both sides of Route 6 with several of the tracts abutting existing protected open space including *MassWildlife's* Clapp Pond area. One of these tracts was slated to be an elderly care facility/housing but was deemed inappropriate because of existing rare and endangered species. The local residents strongly supported the environmental protection of these highway parcels and were quite influential in the ultimate protection of the area. Additional due diligence was conducted by the District on other potential land protection sites being evaluated for possible future protection.

Land Agents

Peter Milanese, *Western District*

Bill Steinmetz, *Connecticut Valley District*

Phil Truesdell, *Central District*

Dennis McNamara, *Northeast District*

Joan Pierce, *Southeast District*

Western District

Wildlife Management Areas: 31	Acres	Tract #
Agawam Lake	779.8	254
Becket	239.6	60
Chalet	6,437.1	86
Cummington	194.0	240
Day Mountain	332.4	264
Eugene Moran	1,462.4	91
Farmington River	1,241.4	211
Fisk Meadows	1120.8	88
Fox Den	3,770.6	100
Green River	489.2	125
Hancock	204.0	123
Hinsdale Flats	1,489.5	89
Hiram H. Fox (formerly Canada Hill)	2,951.0	48
Hop Brook	424.8	112
Housatonic Valley	817.9	67
John J. Kelly	267.0	85
Jug End*	1,233.8	191
Knightville	721.0	244
Lilly Pond	281.7	255
Maple Hill	345.1	148
Mica Mill Brook	812.0	243
Mount Plantain	672.4	241

Mount Tekoa	1,261.0	231
Otis	83.5	124
Peru (Inc. Tracy Pd.)	4,729.5	30 & 113
Powell Brook	224.0	115
Savoy	1,282.8	64
Stafford Hill	1,591.6	56
Taconic Mountain	157.3	232
Three Mile Pond	1,095.5	181
Walnut Hill	812.0	190
37,479.7 acres		

*Jointly owned and managed with DEM

Wildlife Conservation Easements: 11

Alford Spring	640	269-1
Ashfield	101	247-1
Berkshire Plateau	220.4	261-1
Blanford	986	249-1, 2 & 3
Chesterfield	491	248-1 & 2
Dalton Fire District	2,568	253-1
Goshen	194	251-1
Huntington	78	250-1
New Marlborough	239	246-1
Sandisfield	692	245-1, 2 & 3
Tyringham	320	252-1
6,486.4		

River Access Areas: 4

Hoosic River	5.9	213
Housatonic River	27.5	103
Konkopot River	8.8	114
Westfield River (W)	373.0	94
415.2		

Wildlife Sanctuaries: 2

E. Howe Forbush	268.0	16
Grace A. Robson	69.5	24
337.5 acres		

Wildlife District: 1

District Headquarters	2.1	13
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Natural Heritage Areas: 7

Bullock Ledge	15.5	212
Dolomite Ledges	198.3	227
Fairfield Brook	203.3	226
Jug End Fen	38.8	147
Kampoosa Fen	72.0	173
Lanesboro	88.6	233
Nordeen Marsh	22.9	102
639.4		

Forest: 1

Windsor	110.0	116
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TOTAL WESTERN DISTRICT 45,470.3 acres

Valley District

Wildlife Management Areas: 27	Acres	Tract #
Catamount	413.0	119
Coy Hill(V)	201.6	221
East Mountain	241.5	202
Facing Rock	1,556.1	179
Herman Covey***	1,475.1	49
Honey Pot	227.0	174
Lake Warner	94.8	180
Leadmine(V)	344.0	170
Leyden	359.0	200
Millers River(V)	65.84	A62

Montague	1,449.6	118
Montague Plains	1,493.0	234
Mount Toby	255.5	222
Orange	1,534.2	229
Palmer	1,017.3	178
Pauchaug Brook*	161.3	74
Poland Brook	618.7	70
Satan's Kingdom**	1,867.9	107
Southampton	130.9	262
Tully Mountain	1,187.4	225
Tully River(V)	59.0	272
Wales	207.1	172
Warwick	172.0	126
Wendell	585.7	144
Whately	340.6	182
Whately Great Swamp	297.5	235
Williamsburg	88.0	127
16,443.7 acres		

*WMA and Connecticut River Access

**Acreage includes 402.5 acres of CR

***Combination-Hatchery (McLaughlin), WMA and District Hdqtrs.

Wildlife Conservation Easements: (3)

Amherst/Pelham ALA	36.9	274
Ludlow Reservoir	1750.0	271
North Quabbin CRs		257
New Salem	59.0	
Tully River	250.0	
2,095.9		

Islands (Connecticut River): 2

Shepherd's Island	15.0	80
Sunderland Islands(2)	9.0	189
24.0		

Fish Hatcheries: 4

Bitzer	150.6	7
McLaughlin (inc. in Herman Covey WMA)		
Reed	301.0	8
Sunderland	47.7	9
499.3		

Game Farm: 1

Wilbraham*	137.2	4
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*Turned over to Town in 99. CR retained on 137.2 acres.

River Access: 9

Connecticut River	70.8	117
Deerfield River	20.5	201
Green River(V)	29.5	185
Mill River	23.0	239
Sawmill River	51.0	176
Sibley Brook	13.39	152
Tully Brook	77.0	177
Ware River(V)	14.0	A63
Westfield River(V)	76.8	111
376.0		

Pond Access: 3

Little Alum Pond	0.5	128
Lake Lorraine (PAB)	0.26	129
Lake Rohunta	2.52	209
3.28		

Natural Heritage Areas: 5

Rainbow Beach	30.9	142
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Mt. Toby Highlands NHA	100.0	159
Mt. Tom	72.7	238
Darwin Scott Memorial	27.3	157
Honey Pot NHA	<u>131.4</u>	175
	362.3	

TOTAL VALLEY DISTRICT 19,941.7 acres

Central District

Wildlife Management Areas: 40	Acres	Tract #
Ashby	48.5	134
Bennett	281.2	A77
Birch Hill	3,753.0	50
Bolton Flats	1,127.3	90
Breakneck Brook	1,409.0	158
Coy Hill***	549.2	221
E. Kent Swift	200.5	84
Fish Brook	221.0	130
Four Chimneys	200.0	77
High Ridge*	2,325.2	98
Lackey Pond	150.5	165
Lawrence Brook	947.5	108
Leadmine(C)	296.0	170
Martha B. Deering	181.6	237
McKinstry Brook	348.3	184
Merrill Pond (System)	729.0	10
Millers River(C)**	3,365.6	62
Mine Brook	710.5	258
Moose Brook	495.3	132
Moose Hill	567.1	59
Muddy Brook	906.0	167
Oakham	690.6	153
Palmer***	208.0	178
Phillipston	3,411.3	31
Popple Camp	1,161.0	A31
Poutwater Pond (formerly North Street)	378.0	133
Prince River	749.0	113
Quaboag River	1,673.6	55
Quacumquasit	179.9	131
Quisset	507.1	196
Raccoon Hill	416.0	151
Richardson	467.2	106
Savage Hill	1,109.7	150
Thayer Pond	131.0	171
Tully Mountain	119.5	225
Tully River(C)	9.0	272
Ware River(C)	291.4	63
Westboro****	894.6	35
Winimsett	651.1	61
Wolf Swamp	<u>913.9</u>	217
32,774.1 acres		

*Management and control under DFW 1,673.7 acres

DFW owned in fee 282.0 acres

**Acreage includes 15.72 acre CR

*** Listed and managed under Connecticut Valley District

**** 467 acres added from a 97 DCAM transfer

Wildlife Conservation Easements: (2)

North Quabbin CRs		257
Phillipston (Secret Lake)	212.0	
Tully River	<u>6.6</u>	
	218.6	

Wildlife Sanctuaries: 2

Susan B. Minns	140.0	20
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Watatic Mountain	<u>100.0</u>	25
	240.0	

River Access Areas: 5

Five Mile River (includes 17 acre CR)	195.5	120
Natty Brook	95.2	220
Quinapoxet River	32.0	66
Seven Mile River	77.0	275
West & Blackstone Rivers	<u>28.0</u>	76
	427.7	

Natural Heritage Areas: 3

Podunk Marsh	15.0	104
Clinton Bluff NHA	42.0	154
Quag Pond Bog	<u>31.0</u>	197
	88.0	

Conservation Restriction: 5

Carter Pond	280.0	155
Burnshirt River	5.64	160
Hunting Hills*	53.7	183
Quabbin	28.0	161
Stillwater River	<u>29.0</u>	162
	396.3	

*Part of Hunting Hill WMA in NE Dist.

Marshes: 1

Quinsigamond Marsh	59.0	156
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Pond Access: 6

Cusky Pond	23.75	163
Fisherville Pond	1.6	166
Glen Echo Lake	1.0	149
Mossy Pond	16.1	267
South Meadow Pond	0.25	266
Sputtermill Pond Area	<u>58.5</u>	164
	101.2	

Forest: 2

Hamilton	70.0	75
Northboro	<u>88.8</u>	51
	158.8	

TOTAL CENTRAL DISTRICT 34,463.7 acres

Northeast District

Wildlife Management Areas: 10	Acres	Tract #
Ashby	931.0	134
Crane Pond	2,235.6	38
Hunting Hills*	356.4	183
Martin H. Burns	1,554.5	37
Mulpus Brook	177.7	203
Nissitissit River	364.9	71
Pantry Brook	410.9	29
Salisbury Marsh	395.0	
Squannacook River**	1,045.8	53
William Forward	<u>2,122.5</u>	36 & 82
	9,594.3	

*Includes 53.7 acre CR in CD

**21 acres title vested in DEM

Wildlife Sanctuaries: 5

Carr Island	110.5	18
Egg Rock	2.0	17

J.C. Phillips	391.0	15	Red Brook	400.0	260
Milk Island	29.0	19	Rochester	70.0	57
Ram Island	<u>20.0</u>	23	Rocky Gutter	3,038.7	68
	552.5		Taunton River	179.0	219
			West Meadows	<u>221.9</u>	34
Game Farm: 1				20,431.0	
Ayer	96.9	1			
Wildlife District: 1			Wildlife Conservation Easements: 4		
District Headquarters	1.9	11	Acushnet River	30.2	263
			Angeline Brook	50.7	273
Pond System: 1			Camp Cachalot	789.0	223
Flint Pond	81.9	28	Santuit Pond	<u>293.0</u>	268
				1,162.9	
Forest: 2			Wildlife Sanctuaries: 4		
Acton	36.0	207	Billingsgate Island	0.5	14
Townsend	<u>60.0</u>	33	Penikese Island	60.0	21
	96.0		Ram Island	2.0	22
			Tarpaulin Cove	<u>4.5</u>	93
Pond Access: 4				67.0	
Knops Pond	0.6	52			
Mascopic Lake	0.3	65	Wildlife District: 1		
Baddacook Pond	0.16	A52	District Headquarters	23.8	12
Long Sought For Pond	1.0	143			
	2.06		Fish Hatcheries: 1		
			Sandwich	60.0	5
Salt Marsh: 1			Game Farm: 1		
North Shore	335.65	47 & 58	Sandwich	133.0	3
Stream Access: 6			Salt Marsh: 5		
Concord River	4.7	97	Brayton Point	2.2	169
Ipswich River	1.8	204	Chase Garden Creek	56.4	205
Nashua River	68.5	110	English	191.5	146
Trapfall Brook	45.4	109	Fox Island	82.5	192
Sudbury River*	139.1	121	South Shore	<u>22.4</u>	69
Weymouth Back River**	<u>16.4</u>	135		355.0	
	275.9		Stream Access: 5		
Natural Heritage Areas: 4			Childs River	0.2	193
Boxboro Station	25.5	188	Mashpee River	56.5	78
Eagle Island	5.0	199	Nemasket River	0.5	122
Elbow Meadow	132.8	101	Quashnet River**	426.0	32
Hauk Swamp	<u>55.0</u>	206	Taunton River	<u>8.9</u>	219
	218.3			492.1	
TOTAL NORTHEAST DISTRICT 11,255.3 acres					

*Held jointly with D.E.M.

**Departmental acquisition

* NHESP priority area-Departmental taking

** 360 acres of Quashnet held jointly with DEM

SOUTHEAST DISTRICT Southeast District

Wildlife Management Areas: 18	Acres	Tract #
Burrage Pond	1,638.0	265
Copicut	3,762.1	141
Dartmoor Farms	473.0	236
Erwin Wilder	450.0	A83
Frances A. Crane	1,912.8	27
Gosnold	3.5	96
Haskell Swamp	2,787.7	218
Hockomock Swamp	4,453.7	83
Hyannis Ponds *	357.0	187
Meetinghouse Swamp	109.0	214
Noquochoke	204.6	208
Peterson Swamp	250.0	81
Purchade Brook	120.0	215

Pond/Coastal Access: 12

Agawam Mill Pond	1.2	216
Bakers Pond	1.7	79
Bearse Pond	5.8	72
Clapps Pond	68.4	87
Cooks Pond	3.0	73
Dogfish Bar Beach (PAB)	2.4	210
Lake Snipatuit	0.5	92
Sandy Point	0.2	54
Scorton Creek	5.5	228
Spectacle Pond	0.3	224
Triangle Pond	81.9	256
Wakeby Pond	<u>15.9</u>	242
	186.8	

Military Lands: 7

Dillingham Lot	37.0	
Fisk Forestdale Lot	117.0	46

Hog Pond Lot	26.2	42
Lawrence Pond lot	10.0	43
Mashpee Pond Lot	25.0	40
Poponneset Beach	2.0	41
Springhill Lot	<u>7.0</u>	44
	224.2	

Hatchery Land: 1

No. Attleboro Hatchery	36.5	99
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Marsh Management: 1

Eastham Area	7.4	136
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Fisheries & Wildlife Area: 3

Muddy Pond	72.0	95
Provincetown Rte.6 Corridor	122.0	276
South Barrier Beach (Leland)	<u>99.5</u>	194
	293.5	

Natural Heritage Areas: 11

Grassy Pond	59.4	168
Grassy Pond Dennis	7.2	230
Harlow/Cooks Pond	51.9	145
Head of the Plains	2.0	138
Katama Plains *	18.5	140
Mashpee Pine Barrens	193.2	105
Miacomet Heath	3.8	186
Olivers Pond	12.0	139
Sly Pond	192.0	137
South Triangle Pond	10.3	198
Thad Ellis	<u>1.5</u>	195
	556.7	

TOTAL SOUTHEAST DISTRICT 24,029.4 acres

Total Acreage Area by Area Type (Through FY 03)

Wildlife Management Areas: 126	116,722.8 acres
Wildlife Sanctuaries: 13	1,197.0
Fish Hatcheries: 5	559.3
Game Farms: 3	367.1
Streambank: 29	1,986.9
Salt Marsh: 6	690.6
Lake, Pond & Coastal Access: 25	293.4
Fisheries & Wildlife Areas: 3	293.5
NHESP Areas: 29	1,864.8
Conservation Restriction/Easement: 25	10,370.1
(Some CR's are included in WMAs)	
Other*: 21	<u>825.6</u>
GRAND TOTAL	135,171.1

**Includes: Pond Systems, Military Lands, Forest Areas, Wildlife Districts, Islands, Hatchery Land, MDC/F&W Areas and Marsh Management Areas.*

Above figures include departmental acquisitions.



Photo by Pat Swain, NHESP

Wildlife habitat must be preserved and often managed in order to conserve rare and common wildlife species.

FEDERAL AID PROGRAM ADMINISTRATION

Kristin McCarthy,
Federal Aid & Grants Coordinator

Program Objectives: *To implement the Division of Fisheries and Wildlife's Federal Aid program, acting through the Deputy Director, including overview of documentation, reporting, compliance with acts and regulations, and other requirements for administration of federal grants, as well as serving as liaison between the grantee (MassWildlife) and the Region 5 office of the U.S. Fish and Wildlife Service (FWS), grant administrator for the U.S. Department of the Interior.*

Federal Aid in Wildlife Restoration (Pittman-Robinson)

The Division's apportionment of Federal Aid in Wildlife Restoration (Pittman-Robinson) funds, more commonly known as "PR" funds, was \$2,044,342.00 and an increase from last year's apportionment. These funds are available for wildlife restoration projects and hunter education. Seven projects were reimbursed with these funds. Projects included wildlife research, hunter education, wildlife population trends and harvest surveys, waterfowl research and management, wildlife habitat management, program coordination, and a land acquisition project.

In accordance with Section 10 of the Wildlife and Sport Fish Restoration Programs Improvement Act of 2000 (Public Law 106-408, 11/1/2000), \$225,000.00 was made available to Massachusetts for hunter education enhancements. This money is intended to supplement, not replace, existing hunter education monies. This year's Section 10 funding was available for one year only and it could not be used to fund any activities other than hunter education program enhancements.

Federal Aid in Sport Fish Restoration Act (Dingell- Johnson and Wallop-Breaux)

The State's Federal Aid in Sport Fish Restoration Act (Dingell-Johnson and Wallop-Breaux) reimbursement, more commonly referred to as "D-J", was \$2,652,413.00 and represents a decrease from last year's apportionment. These funds were divided as follows: The Division's Public Access Board, which is responsible for constructing and maintaining motorboat access facilities, received \$397,861.95 (15%); and the balance of \$2,254,551.05 was divided equally (\$1,127,275.50 each) between the Division of Marine Fisheries and the Division of Fisheries and Wildlife. Nineteen grants were reimbursed with D-J and W-B funds; the Public Access Board has four boating access projects, the Division of Marine Fisheries conducts approximately ten fisheries

projects, and MassWildlife has five projects. MassWildlife's D-J and W-B projects include aquatic resource education, anadromous fish restoration, and two program coordination projects. MassWildlife also utilizes these funds for hatchery operations, hatchery maintenance and distribution of hatchery fish.

The Endangered Species Act of 1973 (Section 6)

MassWildlife continues to receive minimal Endangered Species Act funding. Our FY 2003 apportionment of \$27,600.00 was a decrease from last year's apportionment. Section 6 funds were used to partially reimburse two endangered species recovery projects: bald eagle and piping plover.

Wildlife Conservation and Restoration Program (WCRP)

The Wildlife Conservation and Restoration Program (WCRP) is a program established by Congress through Title IX of the Commerce, Justice and State Appropriations Act of 2001. WCRP amends the Pittman-Robertson Act to include a new sub-account for "Wildlife Conservation and Restoration" from which funds are to be allocated by formula to the State fish and wildlife agencies to address the unmet needs for a diverse array of wildlife and associated habitats, for wildlife conservation, conservation education, and wildlife associated recreation, under the terms and conditions defined in the Title. Statutory authorization for appropriation is for FY2001, thus providing a one-year funding source in the form of reimbursements to States for approved wildlife projects.

To be eligible for funding a State must agree to develop and implement a Wildlife Conservation Strategy within five years. Massachusetts' commitment to develop a wildlife strategy under WCRP was submitted and approved on May 25, 2001, but still requires the submittal of an actual Wildlife Conservation Strategy.

A total of \$737,272.00 in federal funding was available (at a 75% reimbursement rate) for obligation through September 30, 2003. In 2002 and 2003 MassWildlife obligated the WCRP funds on two projects. The first project, titled Protecting Massachusetts' Natural Heritage, was funded at \$375,000.00 federal share or \$500,000.00 in total costs through June 30, 2002. The remaining WCRP balance of \$362,272.00 was obligated to the Northland Land Acquisition.

State Wildlife Grants (SWG)

SWG funds are designated through the annual U.S. Department of Interior and Related Agencies Appropriations Act. The U.S. Fish and Wildlife Service apportions the funds on a formula basis. States must use SWG allocations to fund the development and implementation of programs that benefit wildlife and their habitat, including species that are not hunted or fished. Any activities that meet these criteria are eligible for funding. Consistent with the law, priority for use of these funds is placed on those species with the greatest conservation need, taking into consideration the relative level of funding available for the conservation of those species. In addition, a state cannot use SWG to fund projects associated with wildlife education, wildlife law enforcement activities, or wildlife-associated recreation.

MassWildlife's FY 2002 apportionment of \$1,182,241.00 in federal funding was available for obligation until September 30, 2003. We successfully obligated our entire FY 2002 apportionment prior to the September deadline. We also obligated a portion of our FY 2003 apportionment of \$878,643.00. *MassWildlife* funded five projects under the State Wildlife Grant Program. Projects included fish community research, biodiversity impact review, biodiversity inventory and research, biodiversity conservation mapping and planning, and land acquisition. SWG funds were also used to initiate our Comprehensive Wildlife Conservation Plan Development project. Like WCRP, in order to establish eligibility for SWG funding the Division committed to developing a Comprehensive Wildlife Conservation Plan by October 1, 2005. Our commitment to develop this Wildlife Conservation Plan under SWG was submitted and approved on April 10, 2002.

Landowner Incentive Program (LIP)

The U.S. Department of Interior and Related Agencies Act of 2002 allocated \$40 million from the Land and Water Conservation Fund for the US Fish and Wildlife Service to establish and administer a new Land Owner Incentive Program. The service awarded grants to states for programs that enhance, protect, or restore habitats that benefit federally listed, proposed, or candidate species, or other at-risk species on private lands. *MassWildlife* was awarded \$1,080,000.00 through a competitive grant process. Plans to fund projects under this program are in development.

Other Matters

Other Federal Aid Coordinator's responsibilities include responding to questionnaires, public inquiries, DFW personal property inventory management, overview of projects performance and financial reporting, Federal Aid database management and cost tracking, project assistance (both field and office), conducting field visits, and serving as liaison between U.S. Fish and Wildlife Service Federal Aid personnel and *MassWildlife*.

MAINTENANCE / DEVELOPMENT

Gary Zima
Senior Planner

MassWildlife development projects enable us to maintain, upgrade and improve our state-wide facilities. The following are highlights of projects completed in FY03:

Major emphasis in FY03 was committed to the remediation of the Westminster landfill and the removal of six underground storage tanks at the High Ridge Wildlife Management Area (WMA) in Westminster, MA.

Numerous improvements were made to the Hunter Education Building at the High Ridge WMA. An upgraded subsurface sewage disposal system was the first project completed for the building. A new steam boiler was installed to upgrade the heating system. A replacement flat roof on the back side of the building was the third upgrade.

The Lake Dennison Firing Range study continues at the Birch Hill Wildlife Management Area in Winchendon. The environmental sampling, analyses and final report for "lead" and "total lead" was completed. The report generated by this study outlines the laboratory results and presents recommendations for the next phase of the project which will be the actual cleanup.

In the Western Wildlife District, a new roof was installed at the district headquarters on Hubbard Avenue in Pittsfield.

LEGISLATIVE REPORT

Jack Buckley
Deputy Director

During Fiscal Year 2003 the following legislation affecting the management of Fisheries and Wildlife in the Commonwealth was enacted.

Chapter 266

AN ACT AUTHORIZING CERTAIN CONVEYANCES OF LAND TO ESTABLISH THE SOUTHEASTERN MASSACHUSETTS BIORESERVE

Approved: August 10, 2002

Summary: This act authorizes the transfer of approximately 300 acres of land from the Department of Environmental Management to the City of Fall River for the development of a business park in exchange for a conservation restriction on approximately 3,000 acres of city owned watershed land. This transfer represents one of the final requirements necessary for the creation of the Southeastern Massachusetts Bioreserve. The Bioreserve is an almost 15,000 acre joint holding of Division of Fisheries and Wildlife, Department of Environmental Management, City of Fall River, and the Trustees of the Reservations to be managed for biological diversity, recreation, and education.

Chapter 397

AN ACT FURTHER REGULATING THE USE OF CROSSBOWS IN THE COMMONWEALTH

Approved December 11, 2002

Summary: Amends current law restricting the use of crossbows by clarifying the category of individual permitted to use a crossbow to "a person who is permanently disabled such that the person cannot operate a conventional bow and arrow."

PERSONNEL REPORT

Peter Burke
Personnel Officer

New Hires

NAME	TITLE	DATE	TYPE OF POSITION	COMMENT
Leigh Roscoe	Laborer I	07/01/02	Seasonal	19 weeks
Jill Moravec	Scientist	04/28/03	contract tern program	16 weeks
Jamie Nydam	Student Intern	04/28/03	contract tern program	16 weeks
Heather Ziel	Scientist	04/28/03	contract tern program	16 weeks
Jeremy Hatch	Scientist	05/11/03	contract tern program	16 weeks
Katherine Maguire	Scientist	05/11/03	contract tern program	16 weeks
Douglas Shoemaker	Scientist	05/11/03	contract tern program	16 weeks
Matthew Withroder	Scientist	05/11/03	contract tern program	16 weeks

Promotions

Thomas O'Shea	District Fish & Game Supervisor	07/01/02	Permanent	from Game Biologist II
Robert Deblinger	Deputy Director	06/29/03	Permanent	from Asst. Dir. - Wildlife

Transfers

Stephen Foster	Game Culturst II	09/22/02	Permanent	from game farm to Hunter Ed.
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Demotion

John O'Leary	Aquatic Biologist III	03/05/03	Permanent	voluntary from Envro. Analyst V
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Reallocations

Mary Cavaliere	Receiving Teller I	05/11/03	Permanent	2 Grade incr. from Clerk III
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Terminations

Martha Jorz	Laborer I	07/06/02	Seasonal	termination
Matthew Barr	Laborer I	07/13/02	Seasonal	termination
Hector Martinez	Laborer I	07/13/02	Seasonal	termination
Matthew Osborne	Laborer I	07/13/02	Seasonal	termination
Stacey Thibault	Laborer I	07/13/02	Seasonal	termination
Christopher Wellen	Laborer I	07/13/02	Seasonal	termination
Jason Johnson	Laborer II	09/27/02	Seasonal	termination
Kevin Pelosky	Laborer I	09/27/02	Seasonal	termination
Robert Thomasian	Laborer II	09/27/02	Seasonal	termination
James Clark	Laborer II	11/12/02	Seasonal	termination
Leigh Roscoe	Laborer I	11/02/02	Seasonal	termination
James Oehler	Program Coordinator	01/03/03	Contract	resigned
James Casey	Aquatic Biologist III	02/01/03	Permanent	resigned
Kelly Worley	Administrative Assistant I	03/01/03	Permanent	resigned
Christopher Thurlow	District Fish & Game Supervisor	04/01/03	Permanent	retired
Douglas Shoemaker	Scientist	06/02/03	Contract	resigned
Amy Burnham	Program Coordinator	06/30/03	Contract	contract not renewed
Matthew Burne	Scientist	06/30/03	Contract	contract not renewed
Frances Garretson	Scientist	06/30/03	Contract	contract not renewed

FINANCIAL REPORT

Financial Staff

Stephen Henry,
Assistant Director of Administration and Finance

Mary Cavaliere

Gail Gibson

Lillian Hew

Yunus Khalifa

Kerry Meagher

Carl Lui

Elizabeth Sienczyk

Helen Yung

How the Sportsmen's Dollar Was Spent

Inland Fish and Game Fund

July 1, 2002 to June 30, 2003

PROGRAMS/ASSESSMENTS	EXPENDITURES	PERCENTAGES
Administration:		
Administration	\$1,436,108.19	
Information-Education	\$689,600.28	
Total	\$2,125,708.47	24%
Fisheries and Wildlife Programs:		
Hatcheries	\$1,327,383.34	
Game Farm	\$348,731.40	
Cooperative Units	\$50,678.86	
Fisheries and Wildlife Management	\$2,691,353.18	
Total	\$4,418,146.78	50%
Other Programs:		
*Natural Heritage & Endangered Species Program	\$134,206.77	
Land Acquisitions	\$82,570.98	
Waterfowl Management Program	\$40,517.00	
Hunter Safety Program	\$464,986.02	
Total	\$722,280.77	8%
Other Assessments:		
Pensions	\$796,758.00	
Group Insurance and Other Fringe Benefits	\$838,420.00	
Operating Transfer	\$13,133.00	
Lease Costs 251 Causeway	\$6,483.98	
Total	\$1,654,794.98	18%
TOTAL EXPENDITURES	\$8,920,931.00	

*22.3% of total expenditures charged to the Inland Fish and Game Fund

Summary

Revenues, Expenditures and Fund Equity

Natural Heritage & Endangered Species Fund

July 1, 2002 to June 30, 2003

REVENUES

Nongame Wildlife Tax Checkoff Donations	\$223,578.00
Sales	\$14,137.00
Federal Aid Reimbursements	\$85,420.00
Direct Donations	\$39,250.00
Interest	\$2,869.00
<i>TOTAL REVENUES:</i>	<u>\$365,254.00</u>

EXPENDITURES

*Natural Heritage and Endangered Species Program	\$214,851.00
Fringe Benefit Costs	\$34,984.00
<i>TOTAL EXPENDITURES:</i>	<u>\$249,835.00</u>

TOTAL FUND EQUITY: **\$301,094.00**

*35.7% of total expenditures charged to Natural Heritage Fund

Other Funds and Programs Expenditures (Division Wide)

July 1, 2002 to June 30, 2003

TRUST FUNDS:

Bald Eagle Trust I	\$479.69
Tern Restoration Trust	\$210,631.76
<i>TOTAL EXPENDITURES</i>	<u>\$211,111.45</u>

CAPITAL OUTLAY FUNDS:

Heritage Ecological Restoration	\$1,900.90
Upland Habitat Restoration	\$145,633.80
Upland Habitat Management	\$201,753.76
<i>TOTAL EXPENDITURES</i>	<u>\$349,288.46</u>

Summary Revenue and Fund Equity Inland Fish and Game Fund

July 1, 2002 to June 30, 2003

DEPARTMENTAL REVENUES:	Amount
Fishing,Hunting, and Trapping Licenses	\$4,231,387.77
Archery Stamps	\$132,620.00
Trap Registrations	\$6,466.00
Waterfowl Stamps, Administration	\$8,090.35
Waterfowl Stamps, Ducks Unlimited	\$8,072.00
Waterfowl Stamps, Other	\$18,756.00
Wildlands Stamps	\$592,791.25
Antlerless Deer Permits	\$194,065.95
Bear Permits	\$13,180.00
Turkey Permits	\$72,675.00
Special Licenses,Tags and Posters	\$61,298.61
Magazine Subscriptions	\$101,746.76
Sales, Other	\$76,382.20
Fines and Penalties	\$92,500.00
Rents	\$20,837.60
Prior Year Refunds	\$773.92
Miscellaneous Income	\$9,009.01
NSF Charge	\$1,090.00
Debt Collection	\$ —
Total	\$5,641,742.42

FEDERAL AID REIMBURSEMENTS:	
Dingell-Johnson (Fisheries)	\$415,399.20
Pittman-Robertson (Wildlife)	\$874,263.91
Indirect Cost Reimbursements	\$546,237.29
Total	\$1,835,900.40

TAXES:	
Gasoline Tax Apportionment	\$891,874.00

OTHER FINANCIAL SOURCES:	
Reimbursement for Half-Price Licenses	\$81,529.75
Investment Earnings	\$55,757.43
Total	\$137,287.18

TOTAL REVENUE	\$8,506,804.00
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FUND EQUITY AS OF JUNE 30, 2003	\$5,833,000.00
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License and Stamp Sales

July 1, 2002 to June 30, 2003

Type of License/Stamp	Unit Cost	Quantity	Amount
Resident Citizen Fishing	\$22.50	80,603	\$1,813,567.50
Resident Citizen Minor Fishing	6.50	3,440	22,360.00
Resident Citizen Fishing (Age 65-69)	11.25	3,350	37,687.50
Resident Cit. Fishing (Over 70, etc.)	FREE	9,796	0.00
Non-Res. Citizen/Alien Fishing	32.50	5,957	193,602.50
Non-Res. Citizen/Alien Fishing (3 day)	18.50	1,741	32,208.50
Resident Fishing (3 day)	7.50	736	5,520.00
Non-Resident (Citizen) Minor Fishing	8.50	211	1,793.50
Duplicate Fishing	2.50	1,000	2,500.00
Quabbin 1-Day Fishing	5.00	838	4,190.00
Resident Citizen Trapping	30.50	183	5,581.50
Resident Citizen Minor Trapping	6.50	1	6.50
Resident Citizen Trapping (Age 65-69)	15.25	13	198.25
Duplicate Trapping	2.50	7	17.50
Trap Registration	5.00	221	1,105.00
Resident Citizen Hunting	22.50	23,670	532,575.00
Resident Citizen Hunting (Age 65-69)	11.25	730	8,212.50
Resident Citizen Hunting (Paraplegics)	FREE	197	0.00
Resident Alien Hunting	22.50	69	1,552.50
Non-Res. Cit./Alien Hunting (Big Game)	94.50	1,686	159,327.00
Non-Res. Cit./Alien Hunting (Sm. Game)	60.50	684	41,382.00
Resident (Citizen) Minor Hunting	6.50	995	6,467.50
Duplicate Hunting	2.50	524	1,310.00
Resident Citizen Sporting	40.00	27,082	1,083,280.00
Resident Citizen Sporting (Age 65-69)	20.00	1,746	34,920.00
Resident Citizen Sporting (Over 70)	FREE	8,537	0.00
Duplicate Sporting	2.50	1,123	2,807.50
Total License Sales (GROSS)		175,140	\$3,992,172.25
Type of Stamp			
Archery Stamps	5.10	23,276	118,707.60
Primitive Firearm Stamps	5.10	22,718	115,861.80
Wildlands Stamps	5.00	151,424	757,120.00
Waterfowl Stamps, Administration	5.00	5,708	28,540.00
Waterfowl Stamps, Ducks Unlimited	5.00	1,902	9,510.00
Waterfowl Stamps, Other	5.00	1,902	9,510.00
Total Stamp Sales (GROSS)		206,930	\$1,039,249.40
Fees Retained by Clerks	(32,463.70)		
Refunds	(773.92)		
TOTAL	(33,237.62)		
Total License/Stamp Sales (NET)			\$4,998,184.03

APPENDIX I

Statewide Fisheries Survey and Inventory

Statewide Fisheries Survey and Inventory FY03 Results. The watershed, waterbody name, Stream and River Inventory System (SARIS) or Pond and Lake Inventory System (PALIS) number, and Town in which the sample was taken.

Table 1. Statewide Fisheries Survey and Inventory FY 03 Results

Sample ID	Saris / Palis	Waterbody Name	Date	Town
798	1100500	Hoosic River	8/14/2002	Williamstown
795	1100500	Hoosic River	7/23/2002	Williamstown
800	1100575	Buxton Brook	8/8/2002	Williamstown
644	1100585	Flora Glen Brook	8/8/2002	Williamsburg
787	1100650	Green River (1)	7/30/2002	Williamstown
642	1100725	Green River (W.B.)	9/12/2002	Hancock
794	1100850	Paull Brook	9/10/2002	Williamstown
797	1100925	Hoosic River (N.B.)	7/23/2002	North Adams
643	1101150	Tunnel Brook	7/30/2002	North Adams
799	1101400	Dry Brook	7/22/2002	Cheshire
796	1101500	McDonald Brook	7/22/2002	Cheshire
641	1202150	Kinderhook Creek	9/11/2002	Hancock
673	2103450	Housatonic River	7/26/2002	Great Barrington
624	2103450	Housatonic River	7/16/2002	Sheffield
619	2103450	Housatonic River	7/17/2002	Lee
623	2103450	Housatonic River	7/17/2002	Great Barrington
625	2103450	Housatonic River	7/17/2002	Lee
631	2103450	Housatonic River	8/1/2002	Stockbridge
633	2103450	Housatonic River	7/25/2002	Great Barrington
634	2103450	Housatonic River	7/16/2002	Lee
674	2103450	Housatonic River	7/26/2002	Lenoxdale
645	2103450	Housatonic River	9/19/2002	Great Barrington
671	2103450	Housatonic River	9/19/2002	Lee
675	2103450	Housatonic River	10/11/2002	Glendale
635	2103450	Housatonic River	7/25/2002	Lee
679	2103525	Konkapot River	8/19/2002	New Marlboro
670	2103525	Konkapot River	7/31/2002	New Marlboro
649	2103950	Green River (2)	8/13/2002	Great Barrington
669	2103950	Green River (2)	8/12/2002	Great Barrington
629	2104100	Williams River	8/1/2002	West Stockbridge
630	2104100	Williams River	8/13/2002	Great Barrington
683	2104100	Williams River	8/19/2002	
640	2104275	Furnace Brook	9/5/2002	Richmond
646	2104300	Mohawk Brook	9/18/2002	Glendale
616	2104325	Larrywaug Brook	7/19/2002	Stockbridge
621	2104325	Larrywaug Brook	7/19/2002	Stockbridge
682	2104625	Hop Brook	8/20/2002	Tyringham
628	2104675	Merry Brook	8/7/2002	Tyringham
627	2104775	Goose Pond Brook	8/19/2002	Lee
676	2104800	Greenwater Brook	8/19/2002	Lee
626	2105200	Ashley Brook	9/5/2002	Pittsfield
680	2105275	Housatonic River (E.B.)	8/20/2002	Pittsfield
636	2105275	Housatonic River (E.B.)	7/11/2002	Hinsdale
622	2105400	Wahconah Falls Brook	7/18/2002	Dalton
618	2105400	Wahconah Falls Brook	7/18/2002	Dalton
677	2105475	Windsor Brook	8/20/2002	Windsor
647	2105500	Tyler Brook	8/30/2002	Windsor
678	2105525	Cady Brook	8/20/2002	Hinsdale
681	2105550	Cleveland Brook	8/20/2002	Windsor
648	2105600	Welch Brook	8/30/2002	Hinsdale
617	2105775	West Branch - Housatonic R.	7/11/2002	Pittsfield

Sample ID	Saris / Palis	Waterbody Name	Date	Town
650	2105900	Churchill Brook	8/27/2002	Pittsfield
620	2106025	Housatonic River (S.W.B.)	7/11/2002	Pittsfield
759	3417125	Scantic River	7/15/2002	Monson
777	3417125	Scantic River	7/17/2002	Hampden
771	3417150	Watchaug Brook	7/17/2002	East Longmeadow
783	3417200	West Brook	8/17/2002	Hampden
773	3417225	Big Brook	7/16/2002	Hampden
768	3417250	East Brook	7/15/2002	Hampden
767	3417275	Temple Brook	7/16/2002	Hampden
782	3417300	Rockadundee Brook	7/15/2002	Hampden
778	3417325	Still Brook	7/29/2002	Agawam
756	3417350	Philo Brook	7/29/2002	Agawam
781	3417375	Rasperry Brook	7/22/2002	Longmeadow
772	3417400	Longmeadow Brook	7/24/2002	Longmeadow
775	3417425	Three Mile Brook	7/29/2002	Agawam
775	3417425	Threemile Brook	7/29/2002	Agawam
761	3417450	Worthington Brook	7/25/2002	Agawam
776	3417475	Fourmile Brook	7/25/2002	Agawam
770	3417500	Tarkill Brook	7/29/2002	Agawam
774	3417525	Wheel Meadow Brook	7/22/2002	Longmeadow
779	3417550	Cooley Brook	7/22/2002	Longmeadow
763	3417575	Entry Dingle Brook	7/24/2002	Springfield
780	3417600	Pecousic Brook	7/24/2002	Springfield
757	3417675	Schneelock Brook	7/25/2002	Springfield
760	3417725	Piper Brook	7/30/2002	West Springfield
747	3417750	Bagg Brook	7/31/2002	West Springfield
762	3417750	Bagg Brook	7/30/2002	West Springfield
766	3417775	Goldine Brook	7/31/2002	West Springfield
769	3417800	Schoolhouse Brook	7/31/2002	West Springfield
811	3417850	Buttery Brook	8/12/2002	South Hadley
758	3417925	Stony Brook	8/8/2002	South Hadley
807	3417950	Leaping Well Brook	8/12/2002	South Hadley
754	3418000	Bachelor Brook	8/7/2002	South Hadley
753	3418025	Elmer Brook	8/7/2002	South Hadley
752	3418050	Ingraham Brook	8/9/2002	Granby
755	3418075	Turkey Hill Brook	8/9/2002	Granby
750	3418100	Weston Brook	8/9/2002	Belchertown
786	3418125	Lampson Brook	8/8/2002	Belchertown
743	3418175	Manhan River	8/13/2002	Westhampton
784	3418175	Manhan River	8/21/2002	Southampton
785	3418175	Manhan River	8/21/2002	Southampton
813	3418400	Manhan River (N.B.)	8/22/2002	Westhampton
806	3418450	Sodom Brook	8/22/2002	Westhampton
746	3418475	Rice Brook	8/22/2002	Westhampton
810	3418525	Tripple Brook	8/14/2002	Southampton
745	3418550	Potash Brook	8/15/2002	Southampton
744	3418575	Moose Brook	8/14/2002	Southampton
749	3418600	Red Brook	8/14/2002	Southampton
812	3418625	Brickyard Brook	8/20/2002	Easthampton
751	3418625	Brickyard Brook	8/13/2002	Westfield
812	3418625	Brickyard Brook	8/20/2002	Easthampton
751	3418625	Brickyard Brook	8/13/2002	Westfield
765	3418650	Alder Meadow Brook	8/13/2002	Southampton
808	3418675	Sacket Brook	8/13/2002	Southampton
748	3418725	Breakneck Brook	8/20/2002	Southampton
809	3418775	Blue Meadow Brook	8/15/2002	Southampton
814	3418825	Mill River (1)	8/20/2002	Leeds
764	3419525	Scarboro Brook	8/7/2002	Belchertown
793	3419900	West Brook	8/8/2002	Hatfield
792	3421075	Fourmile Brook	8/16/2002	Northfield
789	3626275	Sevenmile River	7/18/2002	Spencer
791	3626275	Sevenmile River	7/18/2002	Spencer
706	5233625	Ten Mile River	7/16/2002	Seekonk
707	5233675	Seven Mile River	7/17/2002	North Attleboro

Sample ID	Saris / Palis	Waterbody Name	Date	Town
728	5233725	Speedway Br. (Thatcher Br.)	9/9/2002	Attleboro
718	5233750	Bungay River	8/5/2002	North Attleboro
721	6235100	Assonet River	8/9/2002	Freetown
709	6235125	Rattlesnake Brook	7/22/2002	Freetown
710	6235125	Rattlesnake Brook	7/22/2002	Freetown
719	6235225	Cedar Swamp River	8/6/2002	Lakeville
722	6235225	Cedar Swamp River	8/12/2002	Lakeville
713	6235235	Pierce Brook	7/25/2002	Lakeville
714	6235245	Cedar Swamp Brook	7/26/2002	Lakeville
708	6235250	Holloway Brook	7/25/2002	Lakeville
731	6235925	Dam Lot Brook	9/13/2002	Raynham
727	6235960	Dean Brook	8/29/2002	Raynham
724	6236000	Spring Brook	8/14/2002	Taunton
730	6236025	Thompson Brook	9/13/2002	Taunton
715	6236095	Leonard Washburn Brook	7/30/2002	Lakeville
725	6236125	Snows Brook	8/23/2002	Bridgewater
726	6236175	Sawmill Brook	8/23/2002	Bridgewater
723	6236400	Bates Brook	8/13/2002	Lakeville
717	6236750	Raven Brook	8/1/2002	Middleboro
711	6236950	Satucket River	7/24/2002	East Bridgewater
712	6236960	UNT To Satucket River	7/24/2002	Bridgewater
729	6237400	South Brook	9/10/2002	Bridgewater
716	6237475	Hockomock River	7/31/2002	West Bridgewater
687	7239050	Charles River	7/25/2002	Franklin
686	7239050	Charles River	7/24/2002	Bellingham
691	7239050	Charles River	7/30/2002	Newton, Waltham
701	7239050	Charles River	8/5/2002	Bellingham
695	7239050	Charles River	8/16/2002	Wellesley
694	7239050	Charles River	8/13/2002	Watertown
692	7239050	Charles River	7/31/2002	Watertown
816	7239050	Charles River	9/4/2002	Bellingham
693	7239050	Charles River	8/13/2002	Newton, Watertown
688	7239050	Charles River	7/26/2002	Dover
698	7239200	Stony Brook (1)	8/28/2002	Weston
699	7239575	Trout Brook	8/27/2002	Dover
697	7239625	Fuller Brook	8/28/2002	Wellesley
705	7239925	Stop River	8/27/2002	Medfield
703	7240175	Chicken Brook	8/27/2002	Medway
702	7240200	Mine Brook (1)	8/5/2002	Franklin
817	7240275	Hopping Brook	9/4/2002	Holliston
704	7240275	Hopping Brook	8/8/2002	Medway
815	7240275	Hopping Brook	9/4/2002	Bellingham
804	7341075	Pine Tree Brook	7/3/2002	Milton
685	7341650	Mine Brook (2)	7/9/2002	Medfield
790	7442650	Old Swamp River	7/24/2002	Weymouth
667	8143500	Nashua River	9/12/2002	Clinton
666	8143500	Nashua River	9/12/2002	Lancaster
585	8143500	Nashua River	7/30/2002	Lancaster
609	8144275	Mulpus Brook	7/11/2002	Lunenburg
659	8144275	Mulpus Brook	8/12/2002	Lunenburg
591	8144400	Bowers Brook	7/8/2002	Ayer
600	8144525	Catacoonamuag Brook	7/11/2002	Lunenburg
598	8144600	Easter Brook	7/12/2002	Lunenburg
584	8144625	Still River	7/12/2002	Bolton
589	8144650	Nashua River - North Branch	7/31/2002	Lancaster
657	8144650	Nashua River - North Branch	8/9/2002	Leominster
664	8144650	Nashua River - North Branch	8/15/2002	Fitchburg
663	8144650	Nashua River - North Branch	8/15/2002	Fitchburg
658	8144650	Nashua River - North Branch	8/9/2002	Fitchburg
594	8144650	Nashua River - North Branch	7/31/2002	Fitchburg
588	8144650	Nashua River - North Branch	7/30/2002	Lancaster
587	8144750	Wekepeke Brook	7/18/2002	Lancaster
662	8144750	Wekepeke Brook	8/13/2002	Sterling
586	8144750	Wekepeke Brook	7/18/2002	Sterling

Sample ID	Saris / Palis	Waterbody Name	Date	Town
583	8144760	Unt To Wekepeke Brook	7/19/2002	Sterling
661	8144800	Fall Brook	8/13/2002	Leominster
660	8144825	Monoosnuc Brook	8/12/2002	Leominster
605	8144950	Phillips Brook	8/1/2002	Fitchburg
608	8144950	Phillips Brook	8/1/2002	Westminster
612	8144950	Phillips Brook	8/5/2002	Ashburnham
610	8144975	Laws Brook	8/5/2002	Westminster
611	8145000	Brown Brook	7/25/2002	Ashburnham
590	8145025	Flag Brook	8/5/2002	Westminster
596	8145040	Burnt Mill Pond Brook	7/25/2002	Westminster
592	8145070	Wyman Pond Brook	7/2/2002	Westminster
607	8145075	Whitman River	7/29/2002	South Ashburnham
599	8145075	Whitman River	7/29/2002	Westminster
603	8145075	Whitman River	7/29/2002	South Ashburnham
665	8145090	Ut (Willow Brook)	9/6/2002	South Ashburnham
582	8145100	Goodrich Brook	7/22/2002	South Lancaster
668	8145125	South Meadow Brook	7/22/2002	Clinton
737	8450300	Powwow River	7/11/2002	Amesbury
738	8450325	Back River (2)	7/11/2002	Amesbury
739	8450350	Lucy Brook	7/11/2002	Amesbury
736	8450550	Johnson Brook	7/12/2002	Groveland
740	9152975	Dow Brook	7/15/2002	Ipswich
735	9153000	Bull Brook	7/15/2002	Ipswich
741	9153325	Wheeler Brook	7/16/2002	Georgetown
742	9153400	Penn Brook	7/16/2002	Georgetown
732	9253750	Howlett Brook	7/17/2002	Topsfield
734	9253850	Fish Brook	7/16/2002	Boxford
733	9253925	Boston Brook	7/17/2002	Middleton
805	9354525	Smallpox Brook	7/12/2002	Salisbury
803	9354550	Meader Brook	7/11/2002	Salisbury
802	9354725	Alewife Brook	7/15/2002	Essex
720	9559550	Spring Brook	8/8/2002	Lakeville

Massachusetts Coldwater Fisheries Resources

Table 2. List of Coldwater Fisheries Resources that meet at least one of the following criteria:

1. The presence of a reproducing salmonid population; or
2. The presence of one of the following non-salmonid coldwater fish species:
slimy sculpin (*Cottus cognatus*)
longnose sucker (*Catostomus catostomus*); or
3. The presence of Atlantic salmon (with the exception of the Connecticut and Merrimack River mainstems and waters stocked by *MassWildlife* with broodstock Atlantic salmon); or
4. Listing as a water stocked with Atlantic salmon as coordinated by the Atlantic Salmon Restoration Effort; or
5. Regional biologist's input indicates a year-round trout fishery that is managed as a CFR; or
6. Temperatures that do not generally exceed 68 degrees Fahrenheit throughout the year as defined in DEP water quality standards.

(Note: UT = Unnamed Tributary)

Waterbody Name	Watershed	Saris/Palis	Waterbody Name	Watershed	Saris/Palis
Abbott Brook	Westfield	3210250	Angeline Brook	Buzzards Bay	9560000
Adams Brook	Connecticut	3419550	Ararat Brook	Blackstone	5133015
Albee Brook	Deerfield	3315125	Arm Brook	Westfield	3208700
Albee River	Deerfield	3314125	Ashley Brook	Housatonic	2105200
Alder Meadow Brook	Connecticut	3418650	Ashley Hill Brook	Hudson	1302925
Alford Brook	Housatonic	2104025	Asnebumskit Brook	Nashua	8145500
Allen Brook	Deerfield	3313125	Atherton Brook	Chicopee	3626700
Amethyst Brook	Connecticut	3419675	Avery Brook	Deerfield	3315025

Waterbody Name	Watershed	Saris/Palis	Waterbody Name	Watershed	Saris/Palis
Axtell Brook	Blackstone	5132450	City Brook	Hudson	1302875
Bacon Brook	Blackstone	5131625	Clam River	Farmington	3107125
Bailey Brook	Millers	3523925	Clark Brook	Deerfield	3314775
Barry Brook	Westfield	3208650	Clesson Brook	Deerfield	3314750
Bartlett Brook	Westfield	3212025	Cleveland Brook	Housatonic	2105550
Bashbish Brook	Hudson	1302800	Coal Mine Brook	Blackstone	5132550
Basin Brook	Deerfield	3315550	Cobb Brook	Nashua	8145675
Basset Brook	Taunton	6236100	Cobb Brook	Chicopee	3626775
Bassett Brook	Connecticut	3418325	Cobbler Brook	Merrimack	8450500
Bassett Brook	Hudson	1101425	Cold River	Deerfield	3315675
Bear River	Deerfield	3313950	Cold Spring Brook	Blackstone	5132075
Bear Swamp Outflow	Deerfield	3316265	Cold Spring Brook	Blackstone	5132650
Bearden Brook	Westfield	3209975	Coles Brook	Westfield	3210525
Beartown Brook (W.B.)	Housatonic	2104550	Collar Brook	Millers	3523200
Beaver Brook	Millers	3523600	Conant Brook	Chicopee	3625500
Bedlam Brook	Westfield	3209500	Cone Brook	Housatonic	2104125
Bell Brook	Chicopee	3627875	Content Brook	Shawsheen	8349150
Bennett Brook	Housatonic	2105650	Cook Allen Brook	Blackstone	5132150
Bently Brook	Hudson	1202225	Cooley Brook	Deerfield	3314900
Benton Brook	Farmington	3107375	County Brook	Deerfield	3316150
Bigelow Brook	Chicopee	3627350	Cranberry River	Chicopee	3626300
Birch Brook	Hudson	1100600	Creamery Brook	Deerfield	3313825
Blackwater Brook	Islands	9763750	Cronin Brook	Blackstone	5132625
Blodgett Mill Brook	Chicopee	3625675	Cushman Brook	Connecticut	3420200
Blue Meadow Brook	Connecticut	3418775	Cushman Brook	Westfield	3210350
Bow Brook	Nashua	8144550	Danforth Brook	Concord	8247275
Boyce Brook	Millers	3523400	Danforth Brook (2)	Chicopee	3627675
Bozrah Brook	Deerfield	3315325	Daniels Brook	Housatonic	2105925
Bradley Brook	Westfield	3209800	Day Brook	Westfield	3210775
Bread And Cheese Brook	Buzzards Bay	9560150	Dead Branch	Westfield	3211225
Breakneck Brook	Connecticut	3418725	Dean Brook	Connecticut	3419600
Broad Brook	Hudson	1100525	Deep Brook	Merrimack	8451550
Broad Brook (1)	Connecticut	3418300	Depot Brook	Westfield	3210600
Broad Brook (2)	Chicopee	3625350	Dickenson Brook	Westfield	3208975
Bronson Brook	Westfield	3211550	Dimmock Brook	Farmington	3107400
Brown Brook	Nashua	8145000	Dix Brook	Charles	7240225
Buck River	Farmington	3107225	Doolittle Brook	Connecticut	3420225
Burnt Mill Pond Brook	Nashua	8145040	Dragon Brook	Deerfield	3313875
Burrow Brook	Chicopee	3627850	Drakes Brook	Deerfield	3314000
Bush Brook	Westfield	3208625	Drowned Land Brook	Westfield	3212375
Buxton Brook	Hudson	1100575	Dry Brook	Connecticut	3421150
Cadwell Creek	Chicopee	3626575	Dry Brook	Hudson	1101400
Cady Brook	Housatonic	2105725	Dunbar Brook	Deerfield	3316425
Cady Brook	Housatonic	2105525	Dunhams Brook	Buzzards Bay	9559975
Camel Brook	Chicopee	3626825	East Branch Green River	Hudson	1100800
Canesto Brook	Chicopee	3628050	East Brook	Connecticut	3417250
Cascade Brook	Deerfield	3316325	East Oxbow Brook	Deerfield	3314925
Cat Brook	North Coastal	9355050	East Wachusett Brook	Nashua	8145875
Catacoonamuag Brook	Nashua	8144525	Easter Brook	Nashua	8144600
Center Brook	Deerfield	3212350	Eel River	South Coastal	9458000
Center Brook	Blackstone	5131975	Egypt Brook	Chicopee	3626950
Centerville Brook	Blackstone	5132300	Ellinwood Brook	Millers	3522850
Chaffins Brook	Nashua	8145450	Elmer Brook	Connecticut	3418025
Chapel Brook	Deerfield	3313800	Emerson Brook	Blackstone	5131700
Cherry Brook	Charles	7239250	Factory Brook	Westfield	3210475
Chickley River	Deerfield	3315425	Fall Brook	Nashua	8144800
Childs Brook	Westfield	3211600	Fall River	Connecticut	3420925
Churchill Brook	Housatonic	2105900	Fall River	Farmington	3107325

Waterbody Name	Watershed	Saris/Palis	Waterbody Name	Watershed	Saris/Palis
Falls River	Connecticut	3420950	Hoosic River	Hudson	1100500
Fallulah Brook	Nashua	8144850	Hoosic River (N.B.)	Hudson	1100925
Fife Brook	Deerfield	3316350	Hoosic River (S.B.)	Hudson	1101110
First Brook	Deerfield	3315050	Hop Brook	Concord	8247925
Fish Brook	Millers	3523225	Hop Brook	Blackstone	5131250
Fivemile River	Chicopee	3626400	Hop Brook	Housatonic	2104625
Flagg Brook	Concord	8247225	Hop Brook	Chicopee	3627000
Flat Brook	Housatonic	2104225	Hop Brook	Concord	8247600
Ford Brook	Westfield	3211875	Hopper Brook	Hudson	1100675
Fords Brook	Taunton	6236260	Housatonic River	Housatonic	2103450
Fort River	Connecticut	3419425	Housatonic R. (E.B.)	Housatonic	2105275
Foskett Mill Stream	Chicopee	3625550	Housatonic R. (S.W.B.)	Housatonic	2106025
Foundry Brook	Deerfield	3314300	Howard Brook	Concord	8247525
Fourmile Brook	Connecticut	3421075	Howlett Brook	Ipswich	9253750
Fox Brook	Blackstone	5131400	Hoxie Brook	Hudson	1101350
Freeland Brook	Westfield	3209900	Hubbard Brook (1)	Housatonic	2103750
Freeman's Brook	Quinebaug	4129280	Hubbard Brook (2)	Farmington	3107550
French River	French	4230075	Hudson Brook	Hudson	1101000
Fuller Brook	Chicopee	3625075	Indian Head Brook	South Coastal	9456875
Fuller Brook	Westfield	3210975	Ironwork Brook	Housatonic	2103700
Furnace Brook	Housatonic	2104275	Jabish Brook	Chicopee	3626550
Gates Brook	Nashua	8145250	Jacks Brook	Millers	3522400
Geer Brook	Westfield	3210500	Jackstraw Brook	Concord	8248475
Gibbs Brook	Westfield	3209950	Jacoby Brook	Housatonic	2106100
Glen Brook	Deerfield	3313225	Johnson Brook	Westfield	3208450
Glendale Brook	Westfield	3210900	Joslin Brook	Chicopee	3628225
Goddard Brook	Connecticut	3420625	Karner Brook	Housatonic	2103900
Goldine Brook	Connecticut	3417775	Kearney Brook	Westfield	3211625
Goldmine Brook	Westfield	3210175	Kellog Brook	Westfield	3208400
Goodrich Brook	Nashua	8145100	Keyup Brook	Millers	3522375
Goose Pond Brook	Housatonic	2104775	Kidder Brook	Connecticut	3421725
Gore Brook	Hudson	1101625	Kinderhook Creek	Hudson	1202150
Gravelly Brook	Ipswich	9253725	King Brook	Deerfield	3315525
Great Brook	Westfield	3208375	Kinne Brook	Westfield	3210800
Great Brook	Concord	8247175	Kinsman Brook	Deerfield	3314450
Green River	Deerfield	3316025	Kirby Brook	Buzzards Bay	9560125
Green River	Deerfield	3312925	Kitchen Brook	Hudson	1101525
Green River (1)	Hudson	1100650	Konkapot River	Housatonic	2103525
Green River (2)	Housatonic	2103950	Lampson Brook	Connecticut	3418125
Green River (W.B.)	Hudson	1100725	Laws Brook	Nashua	8144975
Greenwater Brook	Housatonic	2104800	Legate Hill Brook	Deerfield	3315375
Griffin Brook	Westfield	3210225	Leonard Washburn Br.	Taunton	6236095
Gulf Brook	Nashua	8143675	Little River	Westfield	3211100
Gulf Brook	Deerfield	3315800	Little River	Westfield	3208725
Gulf Brook	Millers	3523500	Locke Brook	Nashua	8144225
Hamant Brook	Quinebaug	4129275	Longmeadow Brook	Connecticut	3417400
Hannum Brook	Connecticut	3418375	Lulu Cascade Brook	Housatonic	2105850
Hatchet Brook	Quinebaug	4129200	Lyons Brook	Millers	3522175
Hawkes Brook	Deerfield	3313900	Malden Brook	Nashua	8145300
Hawks Brook	Deerfield	3313625	Manhan River	Connecticut	3418175
Hayward Brook	Concord	8248000	Manhan River (N.B.)	Connecticut	3418400
Heath Brook	Deerfield	3315275	Manning Brook	Deerfield	3315775
Hemlock Brook	Hudson	1100550	Marsh Brook	Housatonic	2104375
Henkes Brook	Taunton	6235650	Marshfield Fairgrounds		
Hinsdale Brook	Deerfield	3313175	Brook	South Coastal	9457160
Hog Brook	Concord	8247325	Mashpee River	Cape Cod	9662775
Hog Hollow Brook	Deerfield	3314776	Mason Brook	Nashua	8144125
Hollow Brook	Quinebaug	4129475	Maxwell Brook	Deerfield	3315200

Waterbody Name	Watershed	Saris/Palis	Waterbody Name	Watershed	Saris/Palis
May Brook	Housatonic	2106125	Parker Brook	Chicopee	3628010
May Brook	Quinebaug	4129550	Pauchaug Brook	Connecticut	3421525
May Hollow Brook	Westfield	3208335	Pearl Hill Brook	Nashua	8144200
Maynard Brook	Chicopee	3626475	Pearl Hill Brook	Nashua	8144875
Mcdonald Brook	Hudson	1101500	Pecks Brook	Hudson	1101375
Mcgarry Brook	Taunton	6236085	Peebles Brook	Westfield	3209350
Mckinstry Brook	Quinebaug	4129175	Pelham Brook	Deerfield	3316075
Meadow Brook	Westfield	3211925	Peters River	Blackstone	5131125
Merry Brook	Housatonic	2104675	Phelps Brook	Westfield	3212275
Mill Brook	Chicopee	3625950	Phillips Brook	Nashua	8144950
Mill Brook	Housatonic	2105100	Pierce Brook	Buzzards Bay	9560065
Mill Brook	Westfield	3211950	Pine Brook	Concord	8247950
Mill Brook (1)	Islands	9763550	Pleasant Brook	Chicopee	3628000
Mill Brook (1)	Westfield	3211950	Poland Brook	Deerfield	3313750
Mill Brook (1)	Deerfield	3313075	Pond Brook	Westfield	3208600
Mill Brook (2)	Connecticut	3421450	Pond Brook	Westfield	3209375
Mill Brook (2)	Deerfield	3315175	Pond Brook	Farmington	3107575
Mill Brook (3)	Deerfield	3315450	Pond Brook	Westfield	3211050
Mill River (1)	Connecticut	3418825	Poor Farm Brook	Blackstone	5132575
Mill River (2)	Connecticut	3419825	Popple Camp Brook	Chicopee	3627375
Mill River (3)	Connecticut	3420175	Potash Brook	Westfield	3209725
Mill River (E.B.)	Connecticut	3419150	Potter Brook	French	4230310
Mill River (N.B.)	Connecticut	3417700	Potter Brook	Deerfield	3316225
Mill River (W.B.)	Connecticut	3419225	Powdermill Brook	Westfield	3208575
Miller Brook	Hudson	1101275	Pratt Brook	Chicopee	3627825
Miller Brook	Westfield	3208325	Pratts Brook	Taunton	6236265
Millers Brook	Connecticut	3421375	Prescott Brook	Chicopee	3626925
Millers River	Millers	3522150	Prince River	Chicopee	3627900
Miscoe Brook	Charles	7240250	Puddingshear Brook	Taunton	6236075
Miscoe Brook	Blackstone	5132025	Quashnet River	Cape Cod	9662925
Miscoe Brook (2)	Blackstone	5131950	Quick Stream	Blackstone	5131225
Moccasin Brook	Chicopee	3627275	Quinapoxet River	Nashua	8145325
Mohawk Brook	Connecticut	3420400	Raven Brook	Taunton	6236750
Mohawk Brook	Housatonic	2104300	Red Brook	Connecticut	3418600
Moose Brook	Connecticut	3418575	Reed Brook	Deerfield	3316275
Moose Meadow Brook	Westfield	3209700	Rice Brook	Connecticut	3418475
Mormon Hollow Brook	Millers	3522225	Rice Brook	Deerfield	3315300
Muddy Brook	Blackstone	5131300	Riceville Brook	Millers	3522900
Mulpus Brook	Nashua	8144275	Riiska Brook	Farmington	3106925
Munn Brook	Westfield	3208825	Roaring Brook	Hudson	1100750
Muschopauge Brook	Nashua	8145625	Roaring Brook	Islands	9763800
Nagog Brook	Concord	8246900	Roaring Brook	Connecticut	3420125
Natty Pond Brook	Chicopee	3628150	Roaring Brook (1)	Westfield	3210000
Naultaug Brook	Chicopee	3625850	Roaring Brook (1)	Connecticut	3420250
Nissitissit River	Nashua	8143575	Roaring Brook (2)	Westfield	3210125
Noanet Brook	Charles	7239550	Rockadundee Brook	Connecticut	3417300
Norcross Hill Brook	Millers	3523875	Rocky Brook	Quinebaug	4129025
North Brook	Deerfield	3315500	Rocky Brook	Nashua	8145925
North Brook	Concord	8247375	Rogers Brook	Connecticut	3419375
North River	Deerfield	3314100	Ruddock Brook	Deerfield	3314875
North River, East Branch	Deerfield	3314275	Sacket Brook	Connecticut	3418675
Notch Brook	Hudson	1100900	Sackett Brook	Housatonic	2105175
Old Swamp River	Boston Harbor	7442650	Sanderson Brook	Westfield	3210200
O'neil Brook	Chicopee	3625775	Sawmill Brook	Housatonic	2105050
Osgood Brook	Millers	3522425	Sawmill River	Connecticut	3420550
Otis Pratt Brook	Taunton	6236150	Scanlon Brook	Nashua	8145800
Otis Wait Brook	Westfield	3210450	Scantic River	Connecticut	3417125
Paint Mill Brook	Islands	9763775	Scarboro Brook	Connecticut	3419525

Waterbody Name	Watershed	Saris/Palis	Waterbody Name	Watershed	Saris/Palis
Schenob Brook	Housatonic	2103775	Taylor Brook	Chicopee	3625725
Schneelock Brook	Connecticut	3417675	Taylor Brook	Farmington	3107000
Schoolhouse Brook	Connecticut	3417800	Temple Brook	Connecticut	3417275
Scott Brook	Blackstone	5133125	Templeton Brook	Millers	3524125
Seaverns Brook	Charles	7239300	Terry Brook	Taunton	6235150
Second Brook	Deerfield	3315000	Third Brook	Deerfield	3314975
Secum (Sechum) Brook	Housatonic	2105950	Thompson Brook	Hudson	1100775
Seekonk Brook	Housatonic	2103975	Three Mile Brook	Connecticut	3417425
Sevenmile River	Chicopee	3626275	Threemile Brook	Connecticut	3417425
Sewell Brook	Blackstone	5132600	Thunder Brook	Hudson	1101550
Shaker Mill Brook	Westfield	3210625	Tiasquam River	Islands	9763600
Shales Brook	Farmington	3107525	Tiffany Brook	Westfield	3209550
Shattuck Brook	Connecticut	3421000	Tinkerville Brook	Blackstone	5131500
Shaw Brook	Westfield	3212150	Todd Brook	Deerfield	3316050
Sheperd Brook	Deerfield	3314850	Tophet Brook	Hudson	1101250
Sherman Brook	Hudson	1100875	Tower Brook	Deerfield	3316575
Shingle Brook	Deerfield	3313850	Tower Brook	Westfield	3211700
Shipee Brook	Deerfield	3316200	Town Brook	Housatonic	2106000
Silva Brook	Chicopee	3627225	Trapfall Brook	Nashua	8144250
Silver Brook	Farmington	3107150	Traphole Brook	Boston Harbor	7341525
Silver Brook, (N. B.)	Farmington	3107175	Tripple Brook	Connecticut	3418525
Slocum Brook	Farmington	3106975	Trout Brook	Westfield	3211025
Sluice Brook	Deerfield	3314075	Trout Brook	Charles	7239575
Smith Brook	Housatonic	2106075	Trout Brook (2)	Nashua	8145350
Smith Brook	Deerfield	3314800	Tubwreck Brook	Boston Harbor	7341700
Snell Creek	Buzzards Bay	9560075	Tufts Branch	Quinebaug	4129050
Sodom Brook	Connecticut	3418450	Tufts Brook	Chicopee	3625700
Sougegan River (S.B.)	Merrimack	8451850	Tully Brook	Millers	3523425
South Brook	Hudson	1101475	Tully Brook	Millers	3523250
South Meadow Brook	Nashua	8145125	Tully River (E.B.)	Millers	3523275
South River	Deerfield	3313650	Tully River (W.B.)	Millers	3523175
South Wachusett Brook	Nashua	8145650	Tunnel Brook	Hudson	1101150
Spring Brook	Buzzards Bay	9559550	Turkey Brook	Chicopee	3625650
Spring Brook	Blackstone	5131325	Turkey Hill Brook	Chicopee	3626325
Spring Brook	Taunton	6236000	Turkey Hill Brook	Connecticut	3418075
Squannacook River	Nashua	8143950	Tuttle Brook	Deerfield	3316250
Stage Brook	Westfield	3209850	Twelve Mile Brook	Chicopee	3625200
Steamburg Brook	Blackstone	5132175	Tyler Brook	Housatonic	2105500
Steele Brook	Deerfield	3316100	Umpachene River	Housatonic	2103575
Steep Bank Brook	Westfield	3212325	UT To Wyman Pond	Nashua	8145060
Stevens Brook	Westfield	3211575	UT To Carpenter Res.	Blackstone	5132126
Stevens Brook	Quinebaug	4129500	Underhill Brook	Chicopee	3626975
Still River	Nashua	8144625	Underwood Brook	Deerfield	3314650
Stillwater River	Nashua	8145700	Unkety Brook	Nashua	8143525
Stones Brook	Westfield	3211825	UT Assabet River	Concord	8247260
Stoney Brook	Chicopee	3627325	UT Center Brook	Blackstone	5131976
Stony Brook (1)	Charles	7239200	UT To A-1 Site	Concord	8247628
Sucker Brook	Chicopee	3626025	UT To A-1 Site	Concord	8247627
Swift River	Westfield	3211775	UT To Wekepeke Brook	Nashua	8144760
Swift River	Chicopee	3626525	Upper Branch	Deerfield	3314825
Swift River (E.B.)	Chicopee	3627200	UT E. Branch Tully River	Millers	3523290
Swift River (M.B.)	Chicopee	3627125	UT Raccoon Hill Br.	Chicopee	3627295
Swift River (N.B.)	Westfield	3211800	UT To Center Brook	Blackstone	5131995
Swift River (W.B.)	Chicopee	3626800	UT To Hog Brook	Concord	8247327
Taftt Pond Brook	Blackstone	5131925	UT (Argella Brook)	Merrimack	8450555
Tatnuck Brook	Blackstone	5133050	UT (Bennetts Brook)	Merrimack	8451860
Taylor Brook	Deerfield	3316125	UT (Carlson Brook)	Nashua	8145080
Taylor Brook	Deerfield	3314425	UT (Chaffin Brook)	Nashua	8145445

Waterbody Name	Watershed	Saris/Palis	Waterbody Name	Watershed	Saris/Palis
UT (Conant Brook)	Chicopee	3625520	Washington Mt. Brook	Housatonic	2104975
UT (Dicket Brook)	Chicopee	3626785	Watts Brook	Westfield	3211150
UT (Douglas Woods Br.)	Blackstone	5132420	Wekepeke Brook	Nashua	8144750
UT (Felton Brook)	Housatonic	2105010	Welch Brook	Housatonic	2105600
UT (Flat Pond Brook)	Nashua	8144010	Wellington Brook	French	4230325
UT (Hamant Brook)	Quinebaug	4129276	West Branch Brook	Westfield	3211525
UT (Keenan Brook)	Quinebaug	4129060	West Branch Brook	Deerfield	3314600
UT (Lemerise Brook)	Nashua	8145081	West Branch North River	Deerfield	3314375
UT (Mckinstry Brook)	Quinebaug	4129192	West Brook	Connecticut	3417200
UT (Monoosuc Brook)	Nashua	8144840	West Brook	Connecticut	3419900
UT (Nourse Brook)	Concord	8248530	West Brook	Housatonic	2104575
UT (Pearl Hill Brook)	Nashua	8144215	West Brook (2)	Millers	3523025
UT (Pepper Mill Brook)	Chicopee	3627480	West Brook (3)	Blackstone	5132525
UT (Pudding Mill Brook)	Chicopee	3626560	West River	Blackstone	5131800
UT (Snell Creek)	Buzzards Bay	9560072	Westfield Brook	Westfield	3212050
UT (Swift River E.B.)	Chicopee	3627210	Westfield River (E.B.)	Westfield	3211030
UT (Swift River E.B.)	Chicopee	3627205	Westfield River (M.B.)	Westfield	3210725
UT (Thomas & Palmer)	Housatonic	2104085	Westfield River (W.B.)	Westfield	3210075
UT (Trapfall Brook)	Nashua	8144255	Weston Brook	Connecticut	3418100
UT (Ware River E.B.)	Chicopee	3628260	Whetstone Brook	Millers	3522450
UT (Westfield Wb)	Westfield	3210460	Whitcomb Brook	Deerfield	3316300
UT (Willow Brook)	Nashua	8145090	White Brook	Westfield	3208300
UT Cowan Brook	Hudson	1101060	Whitman River	Nashua	8145075
UT E. Meadow River	Merrimack	8450520	Wilder Brook	Deerfield	3314950
UT Hop Brook	Concord	8247830	Wilder Brook	Millers	3523950
UT Parmenter Brook	Concord	8247840	Willard Brook	Nashua	8144175
UT Wrack Meadow Brook	Concord	8247440	Windsor Brook	Housatonic	2105475
Valley Brook	Farmington	3107700	Windsor Jambs Brook	Westfield	3212200
Wahconah Falls Brook	Housatonic	2105400	Winimusset Brook	Chicopee	3627750
Wales Brook	Quinebaug	4129325	Worcester Brook	Nashua	8145600
Walker Brook	Westfield	3210300	Worthington Brook	Connecticut	3417450
Wards Stream	Westfield	3211175	Wright Brook	Hudson	1302850
Warren Brook	Blackstone	5132000	Yokum Brook	Westfield	3210550
Warren Tannery Brook	Nashua	8145525	Yokun Brook	Housatonic	2105075

