Appendix A

Relevant Laws

Emergency Wetland Resources Act of 1986

This Act authorized the purchase of wetlands from Land and Water Conservation Fund moneys, removing a prior prohibition on such acquisitions. The Act also requires the Secretary to establish a National Wetlands Priority Conservation Plan, requires the States to include wetlands in their Comprehensive Outdoor Recreation Plans, and transfers to the Migratory Bird Conservation Fund amount equal to import duties on arms and ammunition.

Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended

Public Law 93-205, approved December 28, 1973, repealed the Endangered Species Conservation Act of December 5, 1969 (P.L. 91-135, 83 Stat. 275). The 1969 act had amended the Endangered Species Preservation Act of October 15, 1966 (P.L. 89-669, 80 Stat. 926). The 1973 Endangered Species Act provided for the conservation of ecosystems upon which threatened and endangered species of fish, wildlife, and plants depend, both through Federal action and by encouraging the establishment of State programs. The Act:

- Authorizes the determination and listing of species as endangered and threatened;
- Prohibits unauthorized taking, possession, sale, and transport of endangered species;
- Provides authority to acquire land for the conservation of listed species, using land and water conservation funds;
- Authorizes establishment of cooperative agreements and grants-in-aid to States that establish and maintain active and adequate programs for endangered and threatened wildlife and plants;
- Authorizes the assessment of civil and criminal penalties for violating the Act or regulations; and
- Authorizes the payment of rewards to anyone furnishing information leading to arrest and conviction for any violation of the Act of any regulation issued thereunder.

Executive Order 11988, Floodplain Management

The purpose of this Executive Order, signed May 24, 1977, is to prevent Federal agencies from contributing to the "adverse impacts associated with occupancy and modification of floodplains" and the "direct or indirect support of floodplain development." In the course of fulfilling their respective authorities, Federal agencies "shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains.

Fish and Wildlife Improvement Act of 1978

This act was passed to improve the administration of fish and wildlife programs and amends several earlier laws, including the Refuge Recreation Act, the National Wildlife Refuge Administration Act, and the Fish and Wildlife Act of 1956. It authorizes the Secretary to accept gifts and bequests of real and personal property on behalf of the United States. It also authorizes the use of volunteers on Service projects and appropriations to carry out volunteer programs.

Historic Preservation Acts

There are various laws for the preservation of historic sites and objects.

Antiquities Act (16 USC 431 - 433) – The Act of June 8, 1906, (34 Stat. 225) authorizes the President to designate as National Monuments objects or areas of historic or scientific interest on lands owned or controlled by the United States. The Act required that a permit be obtained for examination of ruins, excavation of archaeological sites and the gathering of objects of antiquity on lands under the jurisdiction of the Secretaries of Interior, Agriculture, and Army, and provided penalties for violations.

Archaeological Resources Protection Act (16 U.S.C. 470aa - 470ll) -- Public Law 96-95, approved October 31, 1979, (93 Stat. 721) largely supplanted the resource protection provisions of the Antiquities Act for archaeological items.

This Act established detailed requirements for issuance of permits for any excavation for or removal of archaeological resources from Federal or Indian lands. It also established civil and criminal penalties for the unauthorized excavation, removal, or damage of any such resources; for any trafficking in such resources removed from Federal or Indian land in violation of any provision of Federal law; and for interstate and foreign commerce in such resources acquired, transported or received in violation of any State or local law.

Public Law 100-588, approved November 3, 1988, (102 Stat. 2983) lowered the threshold value of artifacts triggering the felony provisions of the Act from $5,000 to $500, made attempting to commit an action prohibited by the Act a violation, and required the land managing agencies to establish public awareness programs regarding the value of archaeological resources to the Nation.

Archeological and Historic Preservation Act (16 USC 469-469c) -- Public Law 86-523, approved June 27, 1960, (74

Stat. 220) as amended by Public Law 93-291, approved May 24, 1974, (88 Stat. 174) to carry out the policy established by the Historic Sites Act (see below), directed Federal agencies to notify the Secretary of the Interior whenever they find a Federal or Federally assisted, licensed or permitted project may cause loss or destruction of significant scientific, prehistoric or archaeological data. The Act authorized use of appropriated, donated and/or transferred funds for the recovery, protection and preservation of such data.

Historic Sites, Buildings and Antiquities Act (16 USC 461-462, 464-467) -- The Act of August 21, 1935, (49 Stat. 666) popularly known as the Historic Sites Act, as amended by Public Law 89-249, approved October 9, 1965, (79 Stat. 971) declared it a national policy to preserve historic sites and objects of national significance, including those located on refuges. It provided procedures for designation, acquisition, administration and protection of such sites. Among other things, National Historic and Natural Landmarks are designated under authority of this Act. As of January, 1989, 31 national wildlife refuges contained such sites.

National Historic Preservation Act of 1966 (16 U.S.C. 470-470b, 470c-470n) -- Public Law 89-665, approved October 15, 1966, (80 Stat. 915) and repeatedly amended, provided for preservation of significant historical features (buildings, objects and sites) through a grant-in-aid program to the States. It established a National Register of Historic Places and a program of matching grants under the existing National Trust for Historic Preservation (16 U.S.C. 468-468d).

The Act established an Advisory Council on Historic Preservation, which was made a permanent independent agency in Public Law 94-422, approved September 28, 1976 (90 Stat. 1319). That Act also created the Historic Preservation Fund. Federal agencies are directed to take into account the effects of their actions on items or sites listed or eligible for listing in the National Register.

As of January, 1989, 91 historic sites on national wildlife refuges have been placed on the National Register.

Land and Water Conservation Fund Act of 1948

This act provides funding through receipts from the sale of surplus federal land, appropriations from oil and gas receipts from the outer continental shelf, and other sources for land acquisition under several authorities. Appropriations from the fund may be used for matching grants to states for outdoor recreation projects and for land acquisition by various federal agencies, including the Fish and Wildlife Service.

Migratory Bird Conservation Act of 1929 (16 U.S.C. 715-715d, 715e,715f-715r)

This Act established the Migratory Bird Conservation Commission which consists of the Secretaries of the Interior (chairman), Agriculture, and Transportation, two members from the House of Representatives, and an ex-officio member from the state in which a project is located. The Commission approves acquisition of land and water, or interests therein, and sets the priorities for acquisition of lands by the Secretary for sanctuaries or for other management purposes. Under this Act, to acquire lands, or interests therein, the state concerned must consent to such acquisition by legislation. Such legislation has been enacted by most states.

Migratory Bird Hunting and Conservation Stamp Act (16 U.S.C. 718-718j, 48 Stat. 452), as amended

The "Duck Stamp Act," as this March 16, 1934, authority is commonly called, requires each waterfowl hunter 16 years of age or older to possess a valid Federal hunting stamp. Receipts from the sale of the stamp are deposited in a special Treasury account known as the Migratory Bird Conservation Fund and are not subject to appropriations.

National and Community Service Act of 1990 (42 USC 12401; 104 Stat. 3127)

Public Law 101-610, signed November 16, 1990, authorizes several programs to engage citizens of the U.S. in full- and/or part-time projects designed to combat illiteracy and poverty, provide job skills, enhance educational skills, and fulfill environmental needs. Several provisions are of particular interest to the U.S. Fish and Wildlife Service.

American Conservation and Youth Service Corps -- As a Federal grant program established under Subtitle C of the law, the Corps offers an opportunity for young adults between the ages of 16-25, or in the case of summer programs, 15-21, to engage in approved human and natural resources projects which benefit the public or are carried out on Federal or Indian lands.

To be eligible for assistance, natural resources programs will focus on improvement of wildlife habitat and recreational areas, fish culture, fishery assistance, erosion, wetlands protection, pollution control and similar projects. A stipend of not more than 100 percent of the poverty level will be paid to participants. A Commission established to administer the Youth Service Corps will make grants to States, the Secretaries of Agriculture and Interior and the Director of ACTION to carry out these responsibilities.

National and Community Service Act -- Will make grants to States for the creation of full-time and/or part-time programs for citizens over 17 years of age. Programs must be designed to fill unmet educational, human, environmental, and public safety needs. Initially, participants will receive post-employment benefits of up to $1000 per year for part-time and $2500 for full-time participants.

Thousand Points of Light -- Creates a nonprofit Points of Light Foundation to administer programs to encourage citizens and institutions to volunteer in order to solve critical social issues, and to discover new leaders and develop institutions committed to serving others.

National Environmental Policy Act of 1969 (P.L. 91-190, 42 U.S.C. 4321-4347, January 1, 1970, 83 Stat. 852) as amended by P.L. 94-52, July 3, 1975, 89 Stat. 258, and P.L. 94-83, August 9, 1975, 89 Stat. 424).

Title I of the 1969 National Environmental Policy Act (NEPA) requires that all Federal agencies prepare detailed environmental impact statements for "every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment."

The 1969 statute stipulated the factors to be considered in environmental impact statements, and required that Federal agencies employ an interdisciplinary approach in related decision-making and develop means to ensure that unquantified environmental values are given appropriate consideration, along with economic and technical considerations.
Title II of this statute requires annual reports on environmental quality from the President to the Congress, and established a Council on Environmental Quality in the Executive Office of the President with specific duties and functions.

National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee) as amended

This Act defines the Refuge System as including wildlife refuges, areas for protection and conservation of fish and wildlife which are threatened with extinction, wildlife ranges, game ranges, wildlife management areas, and waterfowl production areas. The Secretary is authorized to permit any use of an area provided such use is compatible with the major purposes for which such area was established. The purchase consideration for rights-of-way go into the Migratory Bird Conservation Fund for the acquisition of lands. By regulation, up to 40% of an area acquired for a migratory bird sanctuary may be opened to migratory bird hunting unless the Secretary finds that the taking of any species of migratory game birds in more than 40% of such area would be beneficial to the species. The Act requires an Act of Congress for the divestiture of lands in the system, except (1) lands acquired with Migratory Bird Conservation Commission funds, and (2) lands can be removed from the system by land exchange, or if brought into the system by a cooperative agreement, then pursuant to the terms of the agreement.

National Wildlife Refuge System Improvement Act of 1997

Public Law 105-57, amends the National Wildlife System Act of 1966 (16 U.S.C. 668dd-ee), providing guidance for management and public use of the Refuge System. The Act mandates that the Refuge System be consistently directed and managed as a national system of lands and waters devoted to wildlife conservation and management.

The Act establishes priorities for recreational uses of the Refuge System. Six wildlife-dependent uses are specifically named in the Act: hunting, fishing, wildlife observation and photography, and environmental education and interpretation. These activities are to be promoted on the Refuge System, while all non-wildlife dependant uses are subject to compatibility determinations.

A compatible use is one which, in the sound professional judgement of the Refuge Manger, will not materially interfere with or detract from fulfillment of the Refuge System Mission or refuge purpose(s).

As stated in the Act, "The mission of the System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans."

The Act also requires development of a comprehensive conservation plan for each refuge and management of each refuge consistent with the plan. When writing CCP, planning for expanded or new refuges, and when making management decisions, the Act requires effective coordination with other Federal agencies, state fish and wildlife or conservation agencies, and refuge neighbors. A refuge must also provide opportunities for public involvement when making a compatibility determination or developing a CCP.

North American Wetlands Conservation Act (103 Stat. 1968; 16 U.S.C. 4401-4412)

Public Law 101-233, enacted December 13, 1989, provides funding and administrative direction for implementation of the North American Waterfowl Management Plan and the Tripartite Agreement on wetlands between Canada, U.S. and Mexico.

The Act converts the Pittman-Robertson account into a trust fund, with the interest available without appropria-

tion through the year 2006 to carry out the programs authorized by the Act, along with an authorization for annual appropriation of over $20 million plus an amount equal to the fines and forfeitures collected under the Migratory Bird Treaty Act.

Available funds may be expended, upon approval of the Migratory Bird Conservation Commission, for payment of not to exceed 50 percent of the United States share of the cost of wetlands conservation projects in Canada, Mexico, or the United States (or 100 percent of the cost of projects on Federal lands). At least 50 percent and no more than 70 percent of the funds received are to go to Canada and Mexico each year.

A North American Wetlands Conservation Council is created to recommend projects to be funded under the Act to the Migratory Bird Conservation Commission. The Council is to be composed of the Director of the Service, the Secretary of the National Fish and Wildlife Foundation, a State fish and game agency director from each Flyway, and three representatives of different nonprofit organizations participating in projects under the Plan or the Act. The Chairman of the Council and one other member serve ex officio on the Commission for consideration of the Council's recommendations.

The Commission must justify in writing to the Council and, annually, to Congress, any decisions not to accept Council recommendations.

Oil Pollution Act of 1990

Public Law 101-380 (33 U.S.C. 2701 et seq.; 104 Stat. 484) established new requirements and extensively amended the Federal Water Pollution Control Act (33 U.S.C. 1301 et. seq.) to provide enhanced capabilities for oil spill response and natural resource damage assessment by the Service. It required Service consultation on developing a fish and wildlife response plan for the National Contingency Plan, input to Area Contingency Plans, review of Facility and Tank Vessel Contingency Plans, and to conduct damage assessments associated with oil spills.

One aspect of particular interest to the Service involves the identification of ecologically snesitive areas and the preparation of scientific monitoring and evaluation plans. Research conducted by the Service is to be directed and coordinated byt the National Wetland Research Center.

National Wildlife Refuge System Centennial Act of 2000

This act paves the way for a special, nationwide outreach campaign. The law calls for a Centennial Commission of distinguished individuals to work with partners in carrying out the outreach campaign. The law also calls for a long-term plan to address the major operations, maintenance, and construction needs of the Refuge System.

These centennial activities will help broaden visibility, strengthen partnerships, and fortify facilities and programs for wildlife and habitat conservation and recreation. They will build a stronghold of support for the National Wildlife Refuge System to sustain it in a new era of both challenge and opportunity.

Refuge Recreation Act of 1962

This Act authorizes the Secretary of the Interior to administer refuges, hatcheries, and other conservation areas for recreational use, when such uses do not interfere with the area's primary purposes. It authorizes construction and maintenance of recreational facilities and the acquisition of land for incidental fish and wildlife oriented recreational development or protection of natural resources. It also authorizes the charging of fees for public uses.

Refuge Revenue Sharing Act (16 U.S.C. 715s)

Section 401 of the Act of June 15, 1935, (49 Stat. 383) provided for payments to counties in lieu of taxes, using revenues derived from the sale of products from refuges.

Public Law 93-509, approved December 3, 1974, (88 Stat. 1603) required that moneys remaining in the fund after payments be transferred to the Migratory Bird Conservation Fund for land acquisition under provisions of the Migratory Bird Conservation Act.

Public Law 95-469, approved October 17, 1978, (92 Stat. 1319) expanded the revenue sharing system to include National Fish Hatcheries and Service research stations. It also included in the Refuge Revenue Sharing Fund receipts from the sale of salmonid carcasses. Payments to counties were established as:

1) on acquired land, the greatest amount calculated on the basis of 75 cents per acre, three-fourths of one percent of the appraised value, or 25 percent of the net receipts produced from the land; and

2) on land withdrawn from the public domain, 25 percent of net receipts and basic payments under Public Law 94-565 (31 U.S.C. 1601-1607, 90 Stat. 2662), payment in lieu of taxes on public lands.

This amendment also authorized appropriations to make up any difference between the amount in the Fund and the amount scheduled for payment in any year. The stipulation that payments be used for schools and roads was removed, but counties were required to pass payments along to other units of local government within the county which suffer losses in revenues due to the establishment of refuges.

Transfer of Certain Real Property for Wildlife Conservation purposes Act of 1948

This Act provides that upon determination by the Administrator of the General Services Administration, real property no longer needed by a Federal agency can be transferred, without reimbursement, to the Secretary of the Interior if the land has particular value for migratory birds, or to a State agency for other wildlife conservation purposes.

Rehabilitation Act of 1973 (29 U.S.C. 794)as amended

Title 5 of P.L. 93-112 (87 Stat. 355), signed October 1, 1973, prohibits discrimination on the basis of handicap under any program or activity receiving Federal financial assistance.

The Volunteer and Community Partnership Act

The Volunteer and Community Partnership Act of 1998 brings recognition and additional authorities to the volunteer program and community partnerships, as well as supports education programs. Under this Act, refuges can now more easily conduct business with community partners under the auspices of the newly authorized and streamlined administrative processes. Leveraging Federal dollars and staff, refuge managers can operate and construct services through cooperative agreements, deposit donations in individual accounts at the refuge, and match donations.

Youth Conservation Corps Act (16 U.S.C. 1701-1706, 84 Stat. 794)

Public Law 91-378, approved August 13, 1970, declares the YCC pilot program a success and establishes permanent programs within the Departments of Interior and Agriculture for young adults who have attained the age of 15, but not the age of 19, to perform specific tasks on lands and waters administered under jurisdiction of these Secretaries. Within the Fish and Wildlife Service, YCC participants perform various tasks on National Wildlife Refuges, National Fish Hatcheries, research stations, and other facilities.

The legislation also authorizes the Secretary of Interior and the Secretary of Agriculture to establish a joint grant program to assist States employing young adults on non-Federal public lands and waters throughout the U.S.

Requires the Secretaries of Interior and Agriculture to prepare a joint report to the President and Congress prior to April 1 of each year.

Wilderness Act of 1964

Public Law 88-577, approved September 3, 1964, directed the Secretary of the Interior, within 10 years, to review every roadless area of 5,000 or more acres and every roadless island (regardless of size) within national wildlife refuges and national parks for inclusion in the National Wilderness Preservation System.

Appendix B

Compatibility Determinations

Compatibility Determination

Use: Environmental Education and Interpretation

Refuge Names: Assabet River, Great Meadows and Oxbow National Wildlife Refuges

Establishing Authority: Assabet River National Wildlife Refuge was established in 2001 under an Act authorizing the transfer of Certain Real Property for wildlife, or other purposes. (16 U.S.C. 667b).

Great Meadows National Wildlife Refuge was established May 3,1944 under the authority of the Migratory Bird Conservation Act (16 U.S.C. § 715d) and Refuge Recreation Act (16 U.S.C. § 460k-1)

Oxbow National Wildlife Refuge was established in 1974 under an Act authorizing the transfer of Certain Real Property for wildlife, or other purposes. (16 U.S.C. 667b).

Refuge Purpose(s)

Assabet River's purpose is its"...particular value in carrying out the national migratory bird management program." (16 U.S.C. 667b-d, as amended)

Great Meadows purposes:

- "...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." (16 U.S.C. § 715d),
- "... suitable for -- incidental fish and wildlife-oriented recreational development," (16 U.S.C. § 460k-1),
- "the protection of natural resources," (16 U.S.C. § 460k-1),
- "and the conservation of threatened or endangered species..." (16 U.S.C. § 460k-1)

Oxbow's purpose is its "...particular value in carrying out the national migratory bird management program." (16 U.S.C. 667b-d, as amended)

National Wildlife Refuge System Mission

To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

Description of Proposed Use

Assabet River Refuge is currently closed to the public. The proposed action in the CCP includes opening the refuge to numerous environmental education and interpretation opportunities. Great Meadows and Oxbow refuges both have active environmental education programs

Environmental education includes activities which seek to increase public knowledge and understanding of wildlife and the importance of habitat protection and management. Typical activities include teacher or staff-guided on-site field trips, off-site programs in classrooms, and nature study, such as teacher and student workshops and curriculum-structured instruction, and interpretation of wildlife resources. The refuge also leads an Urban Education program which offers these programs to students from the Boston and Worcester schools.

Interpretation includes those activities and supporting infrastructure that explain management activities, fish and wildlife resources, ecological processes, and cultural history among other topics to public users. Programs and activities may be developed, sponsored and supervised by the Friends of Assabet River Refuge and Friend of Oxbow Refuge.

Access to the refuge for these activities is achieved through walking, snowshoeing or cross-country skiing.

Under the proposed action, on and off site environmental education programs and interpretive programs, assistance with teacher workshops, and informational kiosks would be offered at Assabet River Refuge. The proposed action also includes interpretive materials on the trails. A visitor contact station would be built to support refuge programs Map 2-2.

Under the proposed action for Great Meadows, the refuge we would continue the current activities plus develop curriculum for grades k-12, provide accredited teacher workshops, expand the urban education program, use the dike and proposed outdoor classroom for environmental education, install four new kiosks, develop a self-guided canoe trail with interpretive brochures, increase interpretive facilities to hunters and anglers, develop environmental education partnerships and allow private groups to conduct programs on refuge with the required permits and agreement. A new visitor contact station would be built at Concord to support these proposed programs. Additionally, a visitor center for the Complex would be built in a prime location to offer educational and interpretive programs to the greater Boston area (Maps 2-10-2-13).

Under the proposed action for Oxbow the refuge would continue the activities above plus provide additional volunteer led interpretive and education programs on the refuge. Additionally, the Urban Education Program may be expanded to other regional school systems. An annual teacher workshop, refuge-specific EE curriculum, and refuge-sponsored interpretive and educational events on the refuge are also proposed. The Proposed Action would include placing three additional kiosks on the refuge as well as self- guided interpretive walking and canoe trails. Additionally, a visitor contact station would be built in a prime location to offer educational and interpretive programs to the greater Boston area (Maps 2-19 and 2-20).

Availability of Resources

Alternative B (the Proposed Action) proposes the following to improve the educational and interpretive programs for the public. See Appendix E for recurring cost estimates and duration of the proposed projects.

Assabet River Refuge	
Interpretive and educational programs (cost of 2 Park Rangers)	$214,000
Construction of visitor contact station	*to be determined*
Provide Refuge Visitor Contact Station support, administrative programs and services	$107,000
Construction and maintenance of three new kiosks (plus three off-site kiosks)	$70,000
Equip and operate visitor contact station	$280,000
Outdoor Recreation Planner	$133,000
The proposed action includes hiring additional law enforcement staff who would be assisting with monitoring these programs.	
Great Meadows Refuge	
Expand Urban Education (including current costs)	$55,000
Develop wildlife demonstration and educational curriculum	$123,000
Interpretive brochures (trail guides, pamphlets, species lists, etc.)	$10,000
Staff new visitor contact station at Concord	$100,000
Visitor center for Complex- equipment and operation of the new center	*to be determined*
Interpret Wild and Scenic River through brochures, kiosks and new programs	$70,000

Oxbow Refuge

Planning and implementation of wildlife oriented public use and outreach programs	$133,000
Interpretive and educational programs (cost of Park Rangers)	$214,000
Construction of visitor contact station	*to be determined*
Provide refuge visitor contact station support, administrative programs and services	$107,000
Construction and maintenance of three new kiosks	$45,000
Exhibits and operation visitor contact station	$95,000

The proposed action include hiring additional law enforcement staff who would be assisting with monitoring these programs.

Anticipated Impacts of the Use

On-site activities by teachers and students using trails and environmental education sites may impose low-level impacts such as trampling of vegetation, removing vegetation, littering and temporary disturbance to wildlife. In the event of persistent disturbance to habitat or wildlife the activity will be restricted or discontinued.

Placement of kiosks may impact small areas of vegetation. Kiosks will be placed where minimal disturbance will occur.

Providing additional interpretive and educational brochures and materials may result in an increase knowledge of the refuge and its resources. This awareness and knowledge may improve the willingness of the public to support refuge programs, resources, and compliance with regulations.

There will be impacts from building a new visitor contact station. These impacts will be analyzed in an appropriate NEPA compliant environmental document after the sites for the buildings are determined.

See Chapter 4. Environmental Consequences for further discussion.

Public Review and Comment

During the scoping phase of the Comprehensive Conservation Planning process we held open houses at Maynard, Sudbury, Concord, Ayer and Harvard, requested comments through a newsletter, and held an open comment period of four months, with an additional comment period in the spring of 2001. Draft copies of the CCP/EA will be distributed during a 30 day comment period and an additional meeting will be held to collect public comments, written and verbal, on the draft plan, including all Compatibility Determinations.

Determination

Use is not compatible ___.

Use is Compatible with the following stipulations _X_.

The following stipulations are required to ensure compatibility

Activities will be held in areas where minimal impact will occur. Periodic evaluation of sites and programs will be conducted to assess if objectives are being met and to prevent site degradation. If evidence of unacceptable adverse impacts appear, the location(s) of activities will be rotated with secondary sites, curtailed or discontinued. The known presence of a threatened or endangered species will preclude the use of an area until the Refuge Manager determines otherwise.

Special use permits will be issued to organizations conducting environmental education or interpretive tours or activities. A fee may be charged for the special use permit. The areas used by such tours will be closely monitored to evaluate the impacts on the resource; if adverse impacts appear, the activity will

be moved to secondary locations or curtailed or discontinued. Specific conditions may apply depending upon the requested activity and will be addressed through the special use permit.

Guidelines to ensure the safety of all participants will be issued in writing to the teacher or group leader responsible for the activities and will be reviewed before the activity begins.

Law enforcement patrol of public use areas should continue to minimize the above-mentioned types of violations. The current "Refuge open ½ hour before sunrise to ½ hour after sunset" regulation restricts entry after daylight hours, and should be maintained along with "Public Use Restricted to Trails Only".

Justification

The National Wildlife Refuge System Improvement Act of 1997 (P.L. 105-57) identifies six legitimate and appropriate uses of wildlife refuges; environmental education, interpretation, hunting, fishing, wildlife observation and wildlife photography. These priority public uses are dependent upon healthy wildlife populations. Where these uses are determined to be compatible, they are to receive enhanced consideration over other uses in planning and management.

Environmental education and interpretation activities generally support Refuge purposes and impacts can largely be minimized (Goff et al., 1988). The minor resource impacts attributed to these activities are generally outweighed by the benefits gained by educating present and future generations about refuge resources. Environmental education is a public use management tool used to develop a resource protection ethic within society. While it targets school age children, it is not limited to this group. This tool allows us to educate refuge visitors about endangered and threatened species management, wildlife management and ecological principles and communities. A secondary benefit of environmental education is that it instills an 'ownership' or 'stewardship' ethic in visitors and most likely reduces vandalism, littering and poaching; it also strengthens Service visibility in the local community. Environmental education (outdoor classroom) is listed in the Refuge Manual (U.S. Fish and Wildlife Service, 1985) as the highest priority visitor use activity throughout the National Wildlife Refuge System.

These activities will not materially interfere with or detract from the mission of the National Wildife Refuge System or the purposes for which the refuge was established.

Signature: Refuge Manager: _____
(Name/Title/Signature/Date)

Concurrence: Regional Chief, National Wildlife Refuge System:

_____
(Name/Title/Signature/Date)

Mandatory 10-to 15-year Re-evaluation Date:

Compatibility Determination

Use: Wildlife Observation and Photography

Refuge Names: Assabet River, Great Meadows and Oxbow National Wildlife Refuges

Establishing Authority: Assabet River National Wildlife Refuge was established in 2001 under an Act authorizing the transfer of Certain Real Property for wildlife, or other purposes. (16 U.S.C. 667b).

Great Meadows National Wildlife Refuge was established May 3,1944 under the authority of the Migratory Bird Conservation Act (16 U.S.C. § 715d) and Refuge Recreation Act (16 U.S.C. § 460k-1)

Oxbow National Wildlife Refuge was established in 1974 under an Act authorizing the transfer of Certain Real Property for wildlife, or other purposes. (16 U.S.C. 667b).

Refuge Purpose(s)

Assabet River's purpose is its"...particular value in carrying out the national migratory bird management program." (16 U.S.C. 667b-d, as amended)

Oxbow's purpose is its "...particular value in carrying out the national migratory bird management program." (16 U.S.C. 667b-d, as amended)

Great Meadows purposes:

- "...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." (16 U.S.C. § 715d),
- "... suitable for -- incidental fish and wildlife-oriented recreational development," (16 U.S.C. § 460k-1),
- "the protection of natural resources," (16 U.S.C. § 460k-1),
- "and the conservation of threatened or endangered species..." (16 U.S.C. § 460k-1)

National Wildlife Refuge System Mission

To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

Description of Proposed Use

Assabet River National Wildlife Refuge is currently not open to the public. Oxbow National Wildlife Refuge has 2.5 miles of trails, one canoe launch and a parking area. Great Meadows offers trails, an observation platform, and wildlife observation and photography opportunities. Access to the Refuges for this activity is achieved through walking, snowshoeing or cross-country skiing. Wildlife observation and photography include walking on open and established trails to observe and/or photograph the natural environment.

Alternative B (the Proposed Action) for Assabet River includes opening approximately 15 miles of trails for wildlife observation, photography and interpretive opportunities. These trails will be opened in phases (See Map 2-2). Additionally, a wildlife viewing platform and photo blind will be constructed.

Alternative B (the Proposed Action)for Great Meadows includes re-establishing a parking area at Heard Pond, creating photo blinds at three sites within the refuge, increasing directional signage to all public use areas, and creating habitat demonstration areas to explain management and observe wildlife (See Maps 2-10- 2-13).

Alternative B (the Proposed Action) for Oxbow includes opening five to six miles of trails on the portion of the Refuge North of Route 2. Two additional canoe launchs and landing areas are also proposed along with parking areas off Jackson Road and North of Shirley Road. A viewing platform and other public use programs are proposed as well (See Map 2-19).

Availability of Resources

Alternative B (the Proposed Action) proposes the following wildlife observation and photography opportunities for the public. See Appendix E for recurring cost estimates and duration of the proposed projects.

Assabet River Refuge

Construct, Improve and Maintain Accessible Visitor Trails, Wildlife Viewing Platforms, Photography Blinds	$180,000
Demolish Buildings (certain areas cannot be open before this project is complete)	$1,900,000
Rehab Gates	$41,400
Repair Roads	$145,000
Remove Obstacle Course	$36,300
Develop and maintain parking areas and gates	$108,000

The proposed action includes hiring additional law enforcement staff who would be assisting with monitoring these programs.

Great Meadows Refuge

Improve public use infrastructure including: trails system, construction of observation platforms and photo blinds	$118,000
Provide accessible wildlife dependent recreation opportunities & interpretation	264,000

Oxbow Refuge

Construct, Improve and Maintain Visitor Trails, Wildlife Viewing Platforms, Photography Blinds	$180,000
Design and Construct Accessible Interpretive Trail	$80,000
Develop and maintain parking areas and canoe launches	$120,000

The proposed action includes hiring additional law enforcement staff who would be assisting with monitoring these programs.

Anticipated Impacts on Refuge Purpose

We predict that the impacts of wildlife observation and photography uses to be minimal. Possible impacts include disturbing wildlife, removing or trampling of plants, littering, vandalism and entrance into closed areas. We will not be creating new trails, rather improving existing trails. There will be some removal of vegetation to place the observation platforms and photo blinds. In the event of persistent disturbance to habitat or wildlife the activity will be restricted or discontinued. Little energy will be expended by wildlife leaving areas of disturbance.

See Chapter 4. Environmental Consequences for further discussion.

Public Review and Comment

During the scoping phase of the Comprehensive Conservation Planning process we held open houses at Maynard, Sudbury, Concord, Ayer and Harvard, requested comments through a newsletter, and held an open comment period of four months, with an additional comment period in the spring of 2001. Draft copies of the CCP/EA will be distributed during a 30 day comment period and an additional meeting will be held to collect public comments, written and verbal, on the draft plan, including all Compatibility Determinations.

Determination

Use is not compatible ___.

Use is Compatible with the following stipulations _X_.

The following stipulations are required to ensure compatibility

Law enforcement patrol of public use areas should minimize the above-mentioned types of violations. The current "Refuge open ½ hour before sunrise to ½ hour after sunset" regulation restricts entry after daylight hours, and should be maintained along with "Public Use Restricted to Trails Only".

Special use permits are required for organizations conducting wildlife observation and photography activities on the refuge. A fee may be charged for the special use permit. The areas used by such tours will be closely monitored to evaluate the impacts on the resource; if adverse impacts appear, the activity will be moved to secondary locations or curtailed entirely. Specific conditions may apply depending upon the requested activity and will be addressed through the special use permit.

Commercial photography is subject to a special use permit and commercial photographers will be charged a fee. The fee is dependent on size, scope and impact of the proposed activitiy.

Periodic evaluations will be done on trails to assess visitor impacts on the habitat. If evidence of unacceptable adverse impacts appear, these uses will be curtailed, relocated or discontinued. Refuge regulations will be posted and enforced. Closed areas will be established, posted and enforced. The known presence of any threatened or endangered species likely to be disturbed by trail activity will preclude use of that site as a trail.

All photographers must follow refuge regulations. Photographers in closed areas must follow the conditions outlined in the special use permit which normally include notification of refuge personnel each time any activities occur in closed areas. Use of a closed area should be restricted to inside blinds to reduce disturbance to wildlife. No baits or scents may be used. At the end of each session, the blind must be removed. All litter will be removed daily.

Justification

The National Wildlife Refuge System Improvement Act of 1997 (P.L. 105-57) identifies six legitimate and appropriate uses of wildlife refuges; wildlife observation and wildlife photography, environmental education, interpretation, hunting, and fishing. These priority public uses are dependent upon healthy wildlife populations. Where these uses are determined to be compatible, they are to receive enhanced consideration over other uses in planning and management.

The majority of visitors to the refuge are there to view the wildlife and upland, wetland, and grassland habitat areas. Some visit to develop an understanding of natural or cultural history. This visitation is in accordance with a wildlife-oriented activity and is an acceptable secondary use. There will be some visitor impacts from this activity, such as trampling vegetation (Kuss and Hall, 1991) and disturbance to wildlife near trails (Klein, 1989 and Burger, 1981), but the knowledge, appreciation and understanding of management gained by visitors will provide support for the Service. The long-term benefits gained through wildlife observation and photography activities outweigh the impacts listed above.

These activities will not materially interfere with or detract from the mission of the National Wildife Refuge System or the purposes for which the refuge was established.

Signature: Refuge Manager: _____
(Name/Title/Signature/Date)

Concurrence: Regional Chief, National Wildlife Refuge System:

_____
(Name/Title/Signature/Date)

Mandatory 10-to 15-year Re-evaluation Date:

Compatibility Determination

Use: Hunting - White-tailed Deer Hunting , Upland Hunting, Waterfowl Hunting

Refuge Names: Assabet River, Great Meadows and Oxbow National Wildlife Refuges

Establishing Authority: Assabet River National Wildlife Refuge was established in 2001 under an Act authorizing the transfer of Certain Real Property for wildlife, or other purposes. (16 U.S.C. 667b).

Great Meadows National Wildlife Refuge was established May 3,1944 under the authority of the Migratory Bird Conservation Act (16 U.S.C. § 715d) and Refuge Recreation Act (16 U.S.C. § 460k-1)

Oxbow National Wildlife Refuge was established in 1974 under an Act authorizing the transfer of Certain Real Property for wildlife, or other purposes. (16 U.S.C. 667b).

Refuge Purpose(s)

Assabet River's purpose is its"...particular value in carrying out the national migratory bird management program." (16 U.S.C. 667b-d, as amended)

Great Meadows purposes:

- "...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." (16 U.S.C. § 715d),
- "... suitable for -- incidental fish and wildlife-oriented recreational development," (16 U.S.C. § 460k-1),
- "the protection of natural resources," (16 U.S.C. § 460k-1),
- "and the conservation of threatened or endangered species..." (16 U.S.C. § 460k-1)

Oxbow's purpose is its "...particular value in carrying out the national migratory bird management program." (16 U.S.C. 667b-d, as amended)

National Wildlife Refuge System Mission

To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

Description of Proposed Use

Upland Game Birds and Turkey

This activity involves the taking of upland game birds, classified as American woodcock, common snipe, ring-necked pheasant, turkey, and ruffed grouse. All applicable State hunting regulations are in force on the refuge. Hunting will be by shotgun only and only non-toxic shot is to be used, except for turkey. The use or possession of alcoholic beverages while hunting is strictly prohibited. Access to the refuge for this activity is through walking, cross-country skiing or snowshoeing. Cutting of vegetation is prohibited. The use of unleashed dogs is permitted only while under the control of individuals actively engaged in hunting. Turkey will be taken only in the State spring season.

Upland game bird hunting is currently not allowed at Assabet River, but is proposed under Alternative B. No upland game bird hunting is allowed at Great Meadows and this activity is not proposed under Alternative B.

Areas open to hunting at Oxbow NWR now are south of Route 2 and west of B&M rail line (Map 2-20). Additional areas proposed include north of Route 2 and south of Hospital Road, the westerly side of the Nashua River, and north of Shirley Road (Map 2-20).

White-tail deer

Archery, shotgun and primitive firearm deer hunting opportunities would be provided on portions of the refuge in accordance with Massachusetts State regulations and requirements. A limited special season will be provided for physically handicapped hunters. At Assabet River Refuge, selected roads on the refuge would be open for vehicle traffic and roads on the refuge will allow us to provide handicapped accessible deer hunting opportunities from several of these access routes. Only portable stands are allowed and no tree spiking is permitted.

White-tailed deer may be taken by shotgun, archery and primitive firearms at Assabet River Refuge according to the Massachusetts regulations for the open season. See Map 2-2 for proposed hunting areas at Assabet River Refuge. Access to the refuge for this activity is achieved through walking or snowshoeing.

Archery would be the only acceptable means of taking deer on Great Meadows Refuge. Only portable stands are allowed and no tree spiking is allowed. Open seasons will adhere to Massachusetts State deer hunting regulations. See Map 2-10, 2-11, 2-12, 2-13 for proposed hunting areas at Great Meadows Refuge. Access to the refuge for this activity is achieved through walking, snowshoeing or cross-country skiing.

Archery, shotgun and primitive firearm deer hunting opportunities would be provided on portions of Oxbow Refuge in accordance with Massachusetts State regulations and requirements. Portions of the refuge located south of Route 2, except the "Watt Farm" addition would be open for all three deer seasons. The Watt Farm would be open for the archery season only. The portions of the refuge from Route 2 underpass to Hospital Road would be open for the archery season only. The portion of the Refuge from Hospital Road to Shirley Road would not be open for hunting. The portion of the refuge located on the Westerly side of the Nashua River north of Shirely Road would be open for all three deer season, an the portion of the refuge on the easterly side of the Nashua River in this area would be opne only for the archery season (See Map 2-20). A limited special season will be provided for physically handicapped hunters.

Waterfowl Hunting

Waterfowl hunting involves the use of calls and decoys to bring in waterfowl. Dogs and canoes may be used in areas to retrieve downed birds. No permanent blinds are allowed. Waterfowl hunting activities will be conducted according to State regulations and restrictions.

Several areas of Great Meadows Refuge would be opened to hunting of waterfowl under the proposed action. On the Sudbury River, they are south of Sherman Bridge to Framingham; north of the Rt. 225 bridge to the refuge boundary in Billerica; and south of Rt. 117 at Lees Bridge. On Heard Pond in Wayland, waterfowl may be hunted from Refuge land (the waters of Heard Pond are governed by regulations of the Commonwealth of Massachusetts, MassWildlife, formerly the Division of Fisheries, Wildlife and Environmental Law Enforcement). See Maps 2-10- 2-13 for proposed hunting areas at Great Meadows Refuge.

Under the proposed action, waterfowl hunting would be open at Oxbow Refuge. Waterfowl hunting would be restricted to the Nashua River south of Route 2 (See Map 2-20).

Upland Small Game

This activity involves the taking of small mammals, gray squirrel and cottontail rabbit. These animals are taken through traditional means with shotguns only; only non-toxic shot is to be used. Access to the refuge for the activity is achieved through walking, snowshoeing or cross-country skiing. At Assabet River Refuge, open seasons will adhere to Federal and Massachusetts State upland small mammal hunting regulations under the Proposed Action.

At Oxbow Refuge areas south of Route 2 and west of B&M rail line are currently open to upland small game hunting. The Proposed Action (Alternative B) identifies additional areas including land north of Route 2 and south of Hospital Road, the westerly side of the Nashua River, and north of Shirley Road. Open Seasons will adhere to Federal and Massachusetts State deer hunting regulations (See Map 2-20).

Availability of Resources

Alternative B (the Proposed Action) proposes hunt programs for the public. See Appendix E for recurring cost estimates and duration of the proposed projects.

The costs involved in offering this wildlife dependent activity is minimal. Hunting on the refuge will be by annual permit. The refuge will be collecting an annual fee of $10 dollars for small game/upland game birds, $15 for deer hunting or a $20 fee for all hunting seasons on the refuge. One fee is valid for all the refuges in the Complex open to hunting. Fee money collected will help recover costs for funding the program. The Proposed Action includes hiring full time law enforcement officers who will assist with managing priority public uses including the hunt program and will assist in refuge habitat projects.

Anticipated Impacts on Refuge Purpose

The impacts of allowing hunting may include disturbance of non-target species in the course of tracking deer, trampling of vegetation, possible creation of unauthorized trails by hunters, littering and possible vandalism and subsequent erosion.

White-tailed deer number about 90,000 in Massachusetts. In some areas, deer density is as high as 25-30 deer per square mile. Many landowners suffer landscape damage due to deer on a regular basis, transmission of Lyme disease becomes a significant issue with large numbers of deer, starvation is a possibility when deer numbers are high as food supplies dwindle in bad weather and deer-vehicle collisions become more common and problematic.

For a more detailed analysis of the impacts of hunting on these refuges, please refer to Chapter 4, Environmental Consequences.

Public Review and Comment

During the scoping phase of the Comprehensive Conservation Planning process we held open houses at Maynard, Sudbury, Concord, Ayer and Harvard, requested comments through a newsletter, and held an open comment period of four months, with an additional comment period in the spring of 2001. Draft copies of the CCP/EA will be distributed during a 30 day comment period and an additional meeting will be held to collect public comments, written and verbal, on the draft plan, including all Compatibility Determinations.

Determination:

Use is not compatible ___.

Use is Compatible with the following stipulations _X_.

The following stipulations are required to ensure compatibility

Law enforcement personnel will ensure that hunters on refuge lands are in possession of a valid Massachusetts State hunting license and refuge permit and that safety standards are strictly adhered to while hunters are on refuge lands. Waterfowl hunters must have a Federal Duck Stamp. Areas open to hunting will be monitored closely to evaluate the impacts of hunting to the resource. The use of baits is prohibited on refuge lands.

Enforcement of federal and state hunting and fishing regulations will be accomplished through patrols by refuge law enforcement officers. Enforcement patrols may also be conducted by State Conservation Officers. The frequency of patrols will be determined by hunter use, the level of compliance observed

during patrols, and information obtained from participants, visitors and other sources. Refuge brochures and hunter orientation prior to the hunting seasons will emphasize safety considerations and the protection of wildlife species found on the refuge. Examples of refuge regulations that would apply to hunting include: access to closed areas of the refuge will be strictly enforced; permanent blinds are not permitted on the refuge. (50 CFR, 27.92) all hunting materials, deer stands, and flagging must be removed at the end of each hunting day; no one shall insert a nail, screw, spike, wire, or other ceramic, metal, or other tree-damaging object into a tree, or may hunt from a tree into which such an object has been inserted. (50 CFR 32.2 (i)); no discharge of a projectile from any bow within 150 feet of any public road or 500 feet of any building; "The unauthorized distribution of bait and the hunting over bait is prohibited on wildlife refuge areas" (50 CFR, 32.2 (h)); the use or possession of toxic shot is prohibited except when hunting deer or turkey; hunters are permitted on the refuge from one half hour before legal sunrise to one half hour after legal sunset; no night hunting will be allowed on the refuge; all firearms must be unloaded outside of legal State hunting hours; the use of all terrain vehicles (ATV's) on refuge land is prohibited; training of dogs on the refuge is not permitted. (50 CFR, 27.91); no open fires are permitted in accordance with 50 CFR 27.95; pre-hunt scouting of the refuge is allowed, however carrying of loaded guns is not permissible during pre-hunt scouts; hunters must wear in a conspicuous manner on head, chest, and back, a minimum of 400 square inches of solid-colored hunter orange clothing or material, except when hunting waterfowl or turkey; the use or possession of alcoholic beverages while hunting is prohibited. (50 CFR, 32.2 (j)); in accordance with State regulations, all hunters are required to hold valid Massachusetts State hunting licenses, permits, and stamps. (50 CFR, 32.2 (a)); hunters will be required to obtain permits to hunt on the refuge; check stations will not be established on the refuge at this time.

Waterfowl hunting is permitted from motorized and non-motorized boats (boat must not be under power) on the Sudbury River and from the banks of the River over River waters. Enforcement will be necessary to ensure compliance with refuge and State regulations regarding hunting of waterfowl. Cutting of vegetation is prohibited. The use of unleashed dogs is permitted only while under the control of individuals actively engaged in hunting.

Justification

The National Wildlife Refuge System Improvement Act of 1997 (P.L. 105-57) identifies six legitimate and appropriate uses of wildlife refuges; hunting, environmental education, interpretation, fishing, wildlife observation and wildlife photography. These priority public uses are dependent upon healthy wildlife populations. Where these uses are determined to be compatible, they are to receive enhanced consideration over other uses in planning and management.

Hunting of white-tailed deer, upland game birds, upland small game and waterfowl on Assabet River Refuge is justified within refuge objectives by providing wildlife-oriented recreation and promoting appreciation of wildlife and the outdoors. Recreational hunting is also a valid means of population control and can serve to keep wildlife populations in check.

These activities will not materially interfere with or detract from the mission of the National Wildife Refuge System or the purposes for which the refuge was established.

Signature: Refuge Manager: _____
(Name/Title/Signature/Date)

Concurrence: Regional Chief, National Wildlife Refuge System:

_____
(Name/Title/Signature/Date)

Mandatory 10-to 15-year Re-evaluation Date:

Compatibility Determination

Use: Fishing

Refuge Names: Assabet River, Great Meadows and Oxbow National Wildlife Refuges

Establishing Authority: Assabet River National Wildlife Refuge was established in 2001 under an Act authorizing the transfer of Certain Real Property for wildlife, or other purposes. (16 U.S.C. 667b).

Great Meadows National Wildlife Refuge was established May 3,1944 under the authority of the Migratory Bird Conservation Act (16 U.S.C. § 715d) and Refuge Recreation Act (16 U.S.C. § 460k-1)

Oxbow National Wildlife Refuge was established in 1974 under an Act authorizing the transfer of Certain Real Property for wildlife, or other purposes. (16 U.S.C. 667b).

Refuge Purpose(s)
Assabet River's purpose is its"...particular value in carrying out the national migratory bird management program." (16 U.S.C. 667b-d, as amended)

Great Meadows purposes:
- "...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." (16 U.S.C. § 715d),
- "... suitable for -- incidental fish and wildlife-oriented recreational development," (16 U.S.C. § 460k-1),
- "the protection of natural resources," (16 U.S.C. § 460k-1),
- "and the conservation of threatened or endangered species..." (16 U.S.C. § 460k-1)

Oxbow's purpose is its "...particular value in carrying out the national migratory bird management program." (16 U.S.C. 667b-d, as amended)

National Wildlife Refuge System Mission:
To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

Description of Proposed Use:
Fishing activities include: shore or bank fishing, and fishing from a boat or canoe. Access to the refuge for this activity is achieved through walking, snowshoeing, cross-country skiing, or by canoe. Fishing at Assabet River Refuge will be catch and release only, is allowed only in Puffer Pond and "no live bait" will be used. Ice fishing is not permitted on the refuge. In addition, fishing will be im compliance with all other portions of the State Regulations. Alternative B proposes up to four designated areas for fishing on Puffer Pond and at least one of the four sites will be accessible to handicapped anglers. Wetland pools are closed to public access.

Fishing opportunities at Great Meadows Refuge include both shore and bank fishing. Refuge pools are not open to fishing.

Fishing activities at Oxbow include shore or bank fishing and fishing from a boat or canoe. Access to the refuge for this activity is achieved through walking, snowshoeing, cross-country skiing, or by motorized or non-motorized boat. Fishing at Oxbow Refuge is currently only allowed only on the Nashua River (See Map 2-19). In addition, fishing on the refuge will be in compliance with all other portions of the State Regulations. Alternative B proposes up to four designated areas for fishing from

the banks of the Nashua River and at least one of the four sites will be accessible to handicapped anglers. Wetland pools will remain closed to public access

Availability of Resources:
Costs for this activity are small. Costs which may occur include maintenance costs to trails and access roads as well as law enforcement personnel costs. The proposed action include hiring additional law enforcement staff who would be assisting with monitoring these programs.

Assabet River Refuge
Estimated cost for developing accessible hunting and fishing opportunities $60,000

Great Meadows Refuge
Costs which may occur include maintenance costs to trails and access roads as well as law enforcement personnel costs. The Proposed Action includes hiring a law enforcement officer support wildlife dependent recreation. Additionally the urban education program includes fishing opportunities which also requires interpretive staff time and assistance

Oxbow Refuge
The proposed action includes hiring additional law enforcement staff who would be assisting with monitoring these programs.

Anticipated Impacts on Refuge Purpose:
The designated areas for fishing may need stabilization to prevent erosion before being opened and or to curb erosion after use of these areas has begun. Potential and actual refuge impacts include trampling vegetation, creation of unauthorized trails and subsequent erosion or over-harvesting. Some disturbance of roosting and feeding shorebirds probably occurs (Burger, 1981) but is considered minimal. Discarded fishing line and other fishing litter can entangle migratory birds and cause injury and death (Gregory, 1991). Additionally, litter impacts the visual experience of refuge visitors (Marion and Lime, 1986). Several enforcement issues involving fishing also impact the refuge including illegal taking of fish (undersized, over limit), littering, illegal fires at night, and disorderly conduct.

For a more detailed analysis of the impacts of fishing, please refer to Chapter 4 Environmental Consequences.

Public Review and Comment
During the scoping phase of the Comprehensive Conservation Planning process we held open houses at Maynard, Sudbury, Concord, Ayer and Harvard, requested comments through a newsletter, and held an open comment period of four months, with an additional comment period in the spring of 2001. Draft copies of the CCP/EA will be distributed during a 30 day comment period and an additional meeting will be held to collect public comments, written and verbal, on the draft plan, including all Compatibility Determinations.

Determination:
Use is not compatible ___.

Use is Compatible with the following stipulations _X_.

The following stipulations are required to ensure compatibility:
The designated areas for fishing may need stabilization to prevent erosion before being opened and or to curb erosion after use of these areas has begun. Adequate funding to provide seasonal law enforcement presence at night will be required during the peak fishing season (April through October).

Enforcement will help to curb illegal fires, disorderly conduct and littering. Enforcement will also help to ensure that fishing regulations are observed, reduce creation of unauthorized trails and serve as a direct contact to the fishing public. Public meetings with local fishing clubs and interested parties will also be required to reinforce refuge regulations. If these measures do not curb illegal activities, other measures will be implemented to control activities and fishermen.

Law enforcement patrol of public use areas should minimize the above-mentioned types of violations. The current "Refuge open ½ hour before sunrise to ½ hour after sunset" regulation restricts entry after daylight hours, and should be maintained along with "Public Use Restricted to Trails Only".

Justification:

The National Wildlife Refuge System Improvement Act of 1997 (P.L. 105-57) identifies six legitimate and appropriate uses of wildlife refuges; fishing, environmental education, interpretation, hunting, wildlife observation and wildlife photography. These priority public uses are dependent upon healthy wildlife populations. Where these uses are determined to be compatible, they are to receive enhanced consideration over other uses in planning and management.

Fishing is a wildlife-oriented activity that provides substantial recreational opportunities to the public (U.S. Fish and Wildlife Service, 1992 and U.S. Fish and Wildlife Service, 1997). Fishing is a traditional form of outdoor recreation.

These activities will not materially interfere with or detract from the mission of the National Wildife Refuge System or the purposes for which the refuge was established.

Signature: Refuge Manager: _____
(Name/Title/Signature/Date)

Concurrence: Regional Chief, National Wildlife Refuge System:

_____
(Name/Title/Signature/Date)

Mandatory 10-to 15-year Re-evaluation Date:

Compatibility Determination

Use: Other Permitted Uses - Natural History Tours

Refuge Names: Assabet River, Great Meadows and Oxbow National Wildlife Refuges

Establishing Authority: Assabet River National Wildlife Refuge was established in 2001 under an Act authorizing the transfer of Certain Real Property for wildlife, or other purposes. (16 U.S.C. 667b).

Great Meadows National Wildlife Refuge was established May 3,1944 under the authority of the Migratory Bird Conservation Act (16 U.S.C. § 715d) and Refuge Recreation Act (16 U.S.C. § 460k-1)

Oxbow National Wildlife Refuge was established in 1974 under an Act authorizing the transfer of Certain Real Property for wildlife, or other purposes. (16 U.S.C. 667b).

Refuge Purpose(s)
Assabet River's purpose is its"...particular value in carrying out the national migratory bird management program." (16 U.S.C. 667b-d, as amended)

Great Meadows purposes:
- "...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." (16 U.S.C. § 715d),
- "... suitable for -- incidental fish and wildlife-oriented recreational development," (16 U.S.C. § 460k-1),
- "the protection of natural resources," (16 U.S.C. § 460k-1),
- "and the conservation of threatened or endangered species..." (16 U.S.C. § 460k-1)

Oxbow's purpose is its "...particular value in carrying out the national migratory bird management program." (16 U.S.C. 667b-d, as amended)

National Wildlife Refuge System Mission:
To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

Description of Proposed Use:
This activity consists of a group of people with a leader or guide walking or driving on Refuge property on established trails learning about plant and wildlife species, natural processes and wetlands. These tours may also be birding trips. Participants gain an extra understanding and appreciation for the Refuge and the environment.

Availability of Resources:
Before groups may conduct tours on the refuge they must obtain a special use permit. The cost of preparing the special use permits for the Eastern Massachusetts NWR Complex is estimated at approximately $500 per year. Maintenance of the trails and facilities will also include costs.

Anticipated Impacts on Refuge Purpose:
The impacts associated with this activity are trampling of vegetation, littering, possible vandalism and temporary disturbance to wildlife in the area of the group. These impacts are minor in light of the appreciate and knowledge gained by participants in these activities. The known presence of a threatened or endangered species will preclude the use of an area until the Refuge Manager determines otherwise.

Public Review and Comment

During the scoping phase of the Comprehensive Conservation Planning process we held open houses at Maynard, Sudbury, Concord, Ayer and Harvard, requested comments through a newsletter, and held an open comment period of four months, with an additional comment period in the spring of 2001. Draft copies of the CCP/EA will be distributed during a 30 day comment period and an additional meeting will be held to collect public comments, written and verbal, on the draft plan, including all Compatibility Determinations.

Determination:

Use is not compatible ___.

Use is Compatible with the following stipulations _X_.

The following stipulations are required to ensure compatibility:

Special use permits will be issued to the organization conducting the tour/activity for each activity. A fee may be charged for the special use permit. The areas used by such tours will be closely monitored to evaluate the impacts on the resource; if adverse impacts appear, the activity will be moved to secondary locations or curtailed entirely. Specific conditions may apply depending upon the requested activity and will be addressed through the special use permit.

Law enforcement patrol of public use areas should minimize the above-mentioned types of violations. The current "Refuge open ½ hour before sunrise to ½ hour after sunset" regulation restricts entry after daylight hours, and should be maintained along with "Public Use Restricted to Trails Only".

Justification:

The National Wildlife Refuge System Improvement Act of 1997 (P.L. 105-57) identifies six legitimate and appropriate uses of wildlife refuges; environmental education, interpretation, hunting, fishing, wildlife observation and wildlife photography. These priority public uses are dependent upon healthy wildlife populations. Where these uses are determined to be compatible, they are to receive enhanced consideration over other uses in planning and management.

Natural history activities generally support refuge purposes and impacts can largely be minimized. The minor resource impacts attributed to these activities are generally outweighed by the benefits gained by educating present and future generations about refuge resources. Natural history activities are a public use management tool used to develop a resource protection ethic within society. This tool allows us to educate Refuge visitors about endangered and threatened species management, wildlife management and ecological principles and communities. A secondary benefit of natural history activities is that it instills an 'ownership' or 'stewardship' ethic in visitors and most likely reduces vandalism, littering and poaching; it also strengthens Service visibility in the local community. Environmental education through natural history activities is listed in the Refuge Manual (U.S. Fish and Wildlife Service, 1985) as the highest priority visitor activity throughout the National Wildlife Refuge System.

These activities will not materially interfere with or detract from the mission of the National Wildife Refuge System or the purposes for which the refuge was established.

Signature: Refuge Manager: _____
(Name/Title/Signature/Date)

Concurrence: Regional Chief, National Wildlife Refuge System:

_____
(Name/Title/Signature/Date)

Mandatory 10-to 15-year Re-evaluation Date:

Compatibility Determination

Use: Other Permitted Uses - Cultural History Tours

Refuge Names: Assabet River National Wildlife Refuge

Establishing Authority: Assabet River National Wildlife Refuge was established in 2001 under an Act authorizing the transfer of Certain Real Property for wildlife, or other purposes. (16 U.S.C. 667b).

Refuge Purpose(s)
"...particular value in carrying out the national migratory bird management program." (16 U.S.C. 667b-d, as amended)

National Wildlife Refuge System Mission:
To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

Description of Proposed Use:
This activity consists of a group of people with a leader or guide walking or driving on refuge property on established trails learning about the cultural history of the area, including Revolutionary War ties, farming communities and the former military presence

Availability of Resources:
Before groups may conduct tours on the refuge they must obtain a special use permit. The cost of preparing the special use permits for the Complex is estimated at approximately $500 per year. Maintenance of the trails and facilities will also include costs.

Anticipated Impacts on Refuge Purpose:
The impacts associated with this activity are trampling of vegetation, littering, possible vandalism and temporary disturbance to wildlife in the area of the group. These impacts are minor in light of the appreciate and knowledge gained by participants in these activities. The known presence of a threatened or endangered species will preclude the use of an area until the Refuge Manager determines otherwise.

Public Review and Comment
During the scoping phase of the Comprehensive Conservation Planning process we held an open house at Maynard and Sudbury, requested comments through a newsletter, and held an open comment period of four months, with an additional comment period in the spring of 2001. Draft copies of the CCP/EA will be distributed during a 30 day comment period and an additional meeting will be held to collect public comments, written and verbal, on the draft plan, including all Compatibility Determinations.

Determination:
Use is not compatible ___.

Use is Compatible with the following stipulations _X_.

The following stipulations are required to ensure compatibility:
Special use permits will be issued to the organization conducting the tour/activity for each activity. A fee may be charged for the special use permit. The areas used by such tours will be closely monitored to evaluate the impacts on the resource; if adverse impacts appear, the activity will be moved to secondary locations or curtailed entirely. Specific conditions may apply depending upon the requested activity and will be addressed through the special use permit.

Law enforcement patrol of public use areas should minimize the above-mentioned types of violations. The current "Refuge open ½ hour before sunrise to ½ hour after sunset" regulation restricts entry after daylight hours, and should be maintained along with "Public Use Restricted to Trails Only".

Justification:

The National Wildlife Refuge System Improvement Act of 1997 (P.L. 105-57) identifies six legitimate and appropriate uses of wildlife refuges; environmental education, interpretation, hunting, fishing, wildlife observation and wildlife photography. These priority public uses are dependent upon healthy wildlife populations. Where these uses are determined to be compatible, they are to receive enhanced consideration over other uses in planning and management.

Cultural history activites allow visitors to both learn about the prior historical/cultural uses of an area and hopefully gain an appreciation for the refuge purpose and lands on which these activities take place. Impacts can largely be minimzed. The minor resource impacts attributed to these activities are generally outweighed by the benefits gained by educating present and future gerenations about refuge resources.

These activities will not materially interfere with or detract from the mission of the National Wildife Refuge System or the purposes for which the refuge was established.

Signature: Refuge Manager: _____
(Name/Title/Signature/Date)

Concurrence: Regional Chief, National Wildlife Refuge System:

_____
(Name/Title/Signature/Date)

Mandatory 10-to 15-year Re-evaluation Date:

Compatibility Determination

Use: Snowshoeing and cross country skiing

Refuge Names: Assabet River, Great Meadows and Oxbow National Wildlife Refuges

Establishing Authority: Assabet River National Wildlife Refuge was established in 2001 under an Act authorizing the transfer of Certain Real Property for wildlife, or other purposes. (16 U.S.C. 667b).

Great Meadows National Wildlife Refuge was established May 3,1944 under the authority of the Migratory Bird Conservation Act (16 U.S.C. § 715d) and Refuge Recreation Act (16 U.S.C. § 460k-1)

Oxbow National Wildlife Refuge was established in 1974 under an Act authorizing the transfer of Certain Real Property for wildlife, or other purposes. (16 U.S.C. 667b).

Refuge Purpose(s)
Assabet River's purpose is its"...particular value in carrying out the national migratory bird management program." (16 U.S.C. 667b-d, as amended)

Great Meadows purposes:
- "...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." (16 U.S.C. § 715d),
- "... suitable for -- incidental fish and wildlife-oriented recreational development," (16 U.S.C. § 460k-1),
- "the protection of natural resources," (16 U.S.C. § 460k-1),
- "and the conservation of threatened or endangered species..." (16 U.S.C. § 460k-1)

Oxbow's purpose is its "...particular value in carrying out the national migratory bird management program." (16 U.S.C. 667b-d, as amended)

National Wildlife Refuge System Mission:
To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

Description of Proposed Use:
This use would facilitate wildlife observation, wildlife photography, and interpretive programs during winter months. The trail systems are not plowed, because of the cost and because of the habitat disturbance plowing would entail. The use simply involves foot-travel over the surface of the snow with the use of snowshoes and cross country skis on the refuge trail systems. The trail systems are are shown in the alternative sections of Chapter 2 for the Assabet River, Great Meadows and Oxbow refuges Draft EA/CCP. Maps showing these trail systems are also included in each of the Refuge Brochures for Assabet River, Great Meadows and Oxbow refuges.

Availability of Resources:
Maintenance of the trails and facilities include costs. These costs are not directly related to showshoeing or cross country skiing. Costs for activities that are facilitated by these methods of locomotion are discussed under their respective compatibility determinations.

Anticipated Impacts on Refuge Purpose:
Snowshoeing and cross country skiing as conducted on Assabet River, Great Meadows and Oxbow refuges has no adverse impact on the management of migratory birds or other wildlife species. These activities will only be done in coordination with wildlife-dependent recreation. These will likely create similar disturbances as people walking on the trails.

Public Review and Comment
During the scoping phase of the Comprehensive Conservation Planning process we held open houses at Maynard, Sudbury, Concord, Ayer and Harvard, requested comments through a newsletter, and held an open comment period of four months, with an additional comment period in the spring of 2001. Draft copies of the CCP/EA will be distributed during a 30 day comment period and an additional meeting will be held to collect public comments, written and verbal, on the draft plan, including all Compatibility Determinations.

Determination:
Use is not compatible ___.

Use is Compatible with the following stipulations _X_.

The following stipulations are required to ensure compatibility:
Snowshoers and cross country skiers will utilize only established trails and other areas open to the public and not venture into closed areas. The current "refuge open ½ hour before sunrise to ½ hour after sunset" regulation restricts entry after daylight hours, and should be maintained along with "Public Use Restricted to Trails Only".

Justification:
The National Wildlife Refuge System Improvement Act of 1997 (P.L. 105-57) identifies six legitimate and appropriate uses of wildlife refuges; environmental education, interpretation, hunting, fishing, wildlife observation and wildlife photography. These priority public uses are dependent upon healthy wildlife populations. Where these uses are determined to be compatible, they are to receive enhanced consideration over other uses in planning and management.

Snowshoeing and cross country skiing are to be used only as a means to facilitate the priority public uses identified above.

These activities will not materially interfere with or detract from the mission of the National Wildife Refuge System or the purposes for which the refuge was established.

Signature: Refuge Manager: _____
(Name/Title/Signature/Date)

Concurrence: Regional Chief, National Wildlife Refuge System:

_____
(Name/Title/Signature/Date)

Mandatory 10-to 15-year Re-evaluation Date:

Compatibility Determination

Use: Canoeing

Refuge Names : Assabet River, Great Meadows and Oxbow National Wildlife Refuges

Establishing Authority: Assabet River National Wildlife Refuge was established in 2001 under an Act authorizing the transfer of Certain Real Property for wildlife, or other purposes. (16 U.S.C. 667b).

Great Meadows National Wildlife Refuge was established May 3,1944 under the authority of the Migratory Bird Conservation Act (16 U.S.C. § 715d) and Refuge Recreation Act (16 U.S.C. § 460k-1)

Oxbow National Wildlife Refuge was established in 1974 under an Act authorizing the transfer of Certain Real Property for wildlife, or other purposes. (16 U.S.C. 667b).

Refuge Purpose(s)
Assabet River's purpose is its"...particular value in carrying out the national migratory bird management program." (16 U.S.C. 667b-d, as amended)

Great Meadows purposes:

- "...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." (16 U.S.C. § 715d),
- "... suitable for — incidental fish and wildlife-oriented recreational development," (16 U.S.C. § 460k-1),
- "the protection of natural resources," (16 U.S.C. § 460k-1),
- "and the conservation of threatened or endangered species..." (16 U.S.C. § 460k-1)

Oxbow's purpose is its "...particular value in carrying out the national migratory bird management program." (16 U.S.C. 667b-d, as amended)

National Wildlife Refuge System Mission:
To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

Description of Proposed Use:
Canoeing on Puffer Pond at Assabet River, along the Nashua River at Oxbow and along the Sudbury and Concord Rivers at Great Meadows Refuge is compatible. Canoeing on these refuges is only allowed on the rivers and Puffer Pond, not in refuge wetland pools or other ponds. This use would facilitate wildlife observation, photography, environmental education, interpretative programs and fishing.

Availability of Resources:
The costs of facilities associated with facilitating canoeing are discussed under the compatibility determinations for the respective wildlife dependent public uses. These costs are also included in Appendix E of the Comprehensive Conservation Plan for the Assabet River, Great Meadows and Oxbow refuges. Existing facilities at Great Meadows and Assabet River Refuges would be used. Minor improvements and maintenance would be accomplished by refuge staff and volunteers from the Friends of the Assabet River Refuge. At Oxbow Refuge, two additional canoe launches and parking areas may be constructed. The estimated cost of these facilities is $120,000.

Anticipated Impacts on Refuge Purpose:
Canoeing at Assabet River, Great Meadows and Oxbow refuges will be monitored to ensure the activity will not have adverse impact on wildlife habitat, or the management of migratory birds and other wildlife species. This activity will facilitate wildlife-dependent recreation.

Public Review and Comment
During the scoping phase of the Comprehensive Conservation Planning process we held open houses at Maynard, Sudbury, Concord, Ayer and Harvard, requested comments through a newsletter, and held an open comment period of four months, with an additional comment period in the spring of 2001. Draft copies of the CCP/EA will be distributed during a 30 day comment period and an additional meeting will be held to collect public comments, written and verbal, on the draft plan, including all Compatibility Determinations.

Determination:
Use is not compatible ___.

Use is Compatible with the following stipulations _X_.

The following stipulations are required to ensure compatibility:
Canoers will utilize only established trails and other areas open to the public and not venture into closed areas. The current "refuge open ½ hour before sunrise to ½ hour after sunset" regulation restricts entry after daylight hours, and should be maintained along with "Public Use Restricted to Trails Only".

Justification:
The National Wildlife Refuge System Improvement Act of 1997 (P.L. 105-57) identifies six legitimate and appropriate uses of wildlife refuges; environmental education, interpretation, hunting, fishing, wildlife observation and wildlife photography. These priority public uses are dependent upon healthy wildlife populations. Where these uses are determined to be compatible, they are to receive enhanced consideration over other uses in planning and management.

Canoeing is to be used only as a means to facilitate the priority public uses identified above.

These activities will not materially interfere with or detract from the mission of the National Wildlife Refuge System or the purposes for which the refuge was established.

Signature: Refuge Manager: _____
(Name/Title/Signature/Date)

Concurrence: Regional Chief, National Wildlife Refuge System:

_____
(Name/Title/Signature/Date)

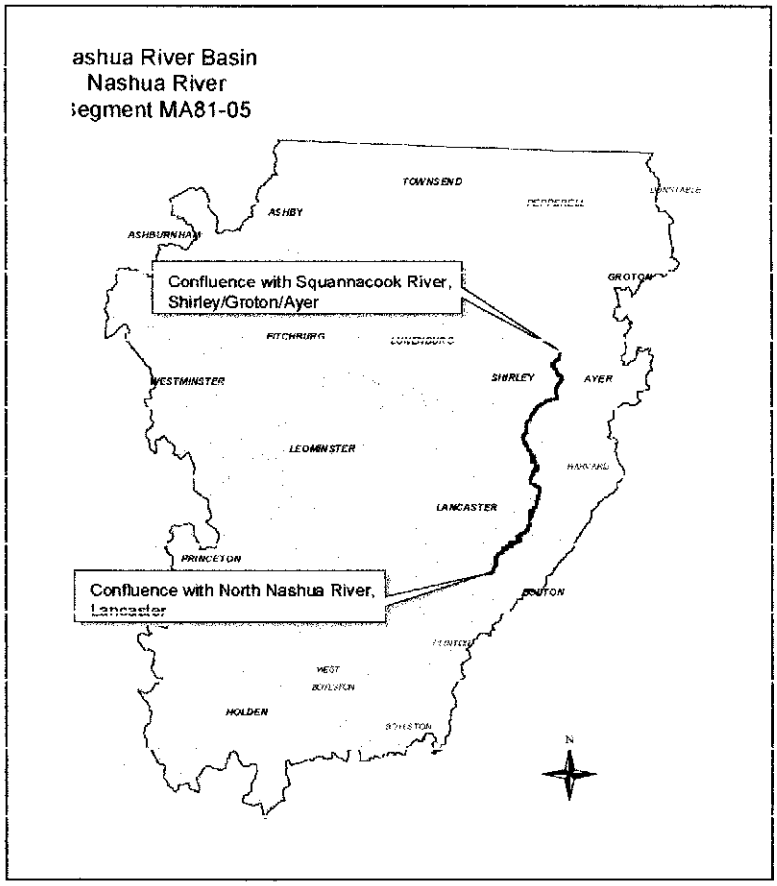
Mandatory 10-to 15-year Re-evaluation Date:

Appendix C

Oxbow NWR 1998 Draft Water Quality Assessment Report

NASHUA RIVER (SEGMENT MA81-05)

Location: Confluence with North Nashua River, Lancaster to confluence with Squannacook River, Shirley/Groton/Ayer.
Segment Length: 13.5 miles.
Classification: Class B, Warm Water Fishery.



Land-use estimates for the subwatershed (map inset, gray shaded area):

Forest	63%
Residential	13%
Agriculture	7%

NRWA conducted water quality monitoring in 1996 at five stations and one station in 1997 on this segment of the Nashua River. Fecal coliform bacteria, pH or DO samples were collected on multiple occasions during 1996 (NRWA 1997 and 11 January 2000).

WITHDRAWALS AND DISCHARGES

NPDES:
MA0033824 MCI Shirley. The facility was discharging to the mainstem Nashua River during the 1998 survey MCI Shirley began its connection to the Devens WWTP in August 1998 and completed its connection in January 1999 (Kimball 2000).

MA0100013 Ayer is permitted (permit issued July 2000) to discharge treated effluent via outfall #001 to the Nashua River. The facility's permitted average monthly flow is 1.79 MGD. The permit limit for whole effluent toxicity is $LC_{50} \geq 100\%$. In August 1998 EPA conducted a compliance inspection of this facility. They noted that the total phosphorus concentration in the Ayer effluent was 25.8 mg/L (Kundarauskas 1998). The recently issued permit includes an average monthly TP limit of 1.0 mg/L. Ammonia nitrogen concentrations ranged between BDL and 11.6 mg/L while TRC ranged from BDL to 0.32 mg/L (TOXTD database).

USE ASSESSMENT

AQUATIC LIFE

Biology

The 1998 DWM RBP III survey was conducted downstream from McPhearson Road railroad bridge, Ayer/Shirley (station NM23B, Appendix C). This sampling station was located at the downstream end of this segment. The benthic macroinvertebrate data were found to be 48% comparable to the regional reference station (SL00) which is located on the Stillwater River (sampled upstream from Crowley Rod, West Boylston). This degree of comparability indicates moderate impairment.

The DWM phytoplankton sample analysis revealed the presence of some *Ulothix* sp. as well as a lot of bacteria (Appendix D). Sewage fungus was found at Ice House Dam Pond along with *Euglena* sp. and *Scenedesmus* sp. These genera are commonly found in areas of organic enrichment. Some fibers that looked like paper waste were also present in the sample.

Habitat and flow

Flow was measured by DWM at two stations (NM21, and NM25) between May and October 1998 (Appendix B, Table B3). Flow ranged from 36.3 to 92.5 cfs at the upstream station (NM21) and from 74.5 to an estimated high of 349 cfs at NM25.

Toxicity

Ambient

Ayer WWTP collects Nashua River water (where railroad tracks cross the Nashua River at McPhearson Road) for use as dilution water in their whole effluent toxicity tests. Between March 1996 and March 2000, survival of *C. dubia* exposed (48-hour) to the river water was not less than 80%.

Effluent

Ayer WWTP also conducted 16 effluent toxicity tests on *C. dubia* between March 1996 and March 2000. The LC_{50}'s were all $\geq$ 100% effluent.

Sediment

EPA conducted a Nashua River acute sediment toxicity study in the spring of 1999 (McDonald 1999). Four stations were sampled in the segment of the Nashua River (NR1-upstream of railroad bridge, Harvard/Lancaster; NR2-downstream boat landing in the Oxbow National Wildlife Refuge; NR3-upstream of Ice House Dam; NR4-adjecent to Devens abandoned airstrip) on 16 March 1999, soon after ice-out. Eight ten-organism replicate toxicity tests (10-day exposure) were run on both *Hyallela azteca* and, *Chironomus tentans* (Table 6). Artificial sediment was utilized as the control.

Table 6. EPA sediment toxicity data, Nashua River (segment MA81-05).

Station Name	Survival *H. azteca* (average)	Survival *C. tentans* (average)
Control	83%	94%
NR1	75%	78%
NR2	66%	88%
NR3	89%	81%
NR4	98%	71%

Chemistry – water

Dissolved oxygen, temperature, pH, turbidity, suspended solids, ammonia-nitrogen, phosphates, were measured by DWM once per month at four stations (NM21, NM21A, ICEHSEDM, and NM25/A) and on six occasions between May and October 1998 (Appendix B, Table B1). Ayer WWTP collects dilution water for their whole effluent toxicity where railroad tracks cross the Nashua River at McPhearson Road and conducted on 12 occasions. Results from both the DWM survey (Appendix B, Table B5 and B6) and the TOXTD database are summarized below. EPA deployed a YSI 6000 meter between 10 and 13 August 1998 in the Nashua River upstream of the Ice House Dam (MA DEP 1998).

DO

DWM DO readings were $\geq$ 6.3 mg/L and 67% saturation at all four stations, although these data do not represent worse case (pre-dawn) conditions (Appendix B, Table B5). The minimum diurnal DO was 6.1 mg/L (MA DEP 1998).

Temperature

The maximum temperature measured by DWM was 23.5°C (Appendix B, Table B5). NRWA temperature measurements were within the same range as the DWM survey data (NRWA 1997).

pH

Instream pH measurements by DWM ranged from 6.3 to 7.2 SU. Out of the 24 measurements, three were below 6.5 SU representing wet weather conditions. Measurements of pH reported in the Ayer WWTP toxicity testing reports were within the same range as DWM survey data as were the NRWA data (NRWA 1997).

Turbidity

Laboratory turbidity measurements collected by DWM ranged from 1.6 to 3.1NTU. Hydrolab measurements when taken were higher, ranging from 4 to 12 NTU.

Suspended Solids

DWM suspended solid concentrations did not exceed 8.8 mg/L. Measurements of suspended solids reported in the Ayer WWTP toxicity testing reports were all BDL with one exception (14 mg/L).

Ammonia-Nitrogen

DWM suspended ammonia-nitrogen concentrations did not exceed 0.11 mg/ L with the highest concentrations at the most upstream station. Ammonia (as N) from the Ayer WWTP toxicity testing reports ranged between BDL and 0.55 mg/L.

Phosphorus

DWM total phosphorus concentrations did not exceed 0.25 mg/L. The highest concentrations were at the most upstream station.

Total Residual Chlorine

The Ayer WWTP toxicity testing reports indicated that TRC was BDL.

Hardness

DWM hardness measurements ranged from 17 to 62 mg/L. Measurements of hardness reported in the Ayer WWTP toxicity testing reports were in the same range.

Chemistry – sediment

Sediment quality data were also reported in the EPA sediment toxicity study - spring of 1999 (McDonald 1999). Sediment samples were analyzed for grain size, TOC, simultaneously extracted metals-SEM, acid volatile solids-AVS, cyanide and total metals. When the bulk sediment concentrations were compared to guidance in Persaud *et al.* (1993), no exceedances of the S-EL occurred at stations NR1, NR2 and NR4 although the concentrations of Cd, Cr, Cu, Pb, Zn, and Hg exceeded the L-ELs. At station NR3, however, the concentration of Ni exceeded the L-EL and Cd, Cr, Cu, Pb, Zn, and Hg exceeded their S-ELs. Cyanide was not detected in any of the samples.

The bioavailability of certain divalent metals is a function of the binding capacity of the sediment. The analysis of SEM-AVS was conducted to evaluate bioavailability and therefore potential toxicity of the sediments. It should be noted that even though station NR3 had the highest divalent metal concentration, it also showed strongly negative values for SEM-AVS, indicating a large binding capacity and low potential for toxicity.

Based on a moderately impacted benthic community, degraded sediment quality, sediment toxicity, and slightly elevated nutrients (phosphorus), the *Aquatic Life Use* in this segment of the Nashua River is assessed as non-support.

PRIMARY CONTACT AND SECONDARY CONTACT

Fecal coliform bacteria samples were collected by DWM at the same stations and dates as described above with the exception of the ICEHSEDM site (Chemistry-water section). Upstream of the MCI Shirley discharge (stations NM21 and NM21A) fecal coliform bacteria counts were ≤200 cfu/100mL under dry weather sampling conditions. During wet weather sampling, the fecal coliform bacteria counts were higher (maximum of 3,500 cfu/100mL) (Appendix B, Table B7). Samples collected downstream from the Ayer WWTP discharge (NM25/A) ranged from 49 to 2,000 cfu/100mLs, the highest during wet weather, although one dry weather sample exceeded 400 cfu/100mLs (1,200 cfu/100mLs on 22 July 1998). NRWA fecal coliform bacteria levels were generally low (NRWA 1997).

Based on the fecal coliform bacteria data and best professional judgement, both the *Primary* and *Secondary Contact Recreational* uses are assessed as support in the upper 10.6 mile reach of this segment. Aesthetic quality degradation (objectionable turbidity and sewage odors), including and downstream from the Ice House Dam Impoundment, and elevated fecal coliform bacteria counts (dry

weather conditions) result in both recreational uses being assessed as non-support in the lower 2.9 mile reach.

AESTHETICS

Observations of the river upstream of the Ice House Dam Impoundment indicated high aesthetic quality. This reach of the mainstem Nashua River includes the Oxbow National Wildlife Refuge. However, the aesthetics quality of the "Ice House Dam impoundment" was described as having objectionable turbidity (Kimball 2000). DWM's habitat assessment also noted a sewage odor and instream turbidity near the McPhearson Road railroad bridge.

Upstream of the Ice House Dam Impoundment the *Aesthetics Use* is assessed as support. Based on the objectionable instream turbidity in the impoundment and turbidity and sewage odors downstream of the impoundment, the *Aesthetics Use* is assessed as non-support for the lower 2.9 mile reach.

Nashua River (MA81-05) Use Summary Table

Designated Uses		Status	Causes		Sources	
			Known	Suspected	Known	Suspected
Aquatic Life		NON-SUPPORT	metals, unknown toxicity, nutrients		municipal point sources, contaminated sediments	
Fish Consumption		NOT ASSESSED				
Primary Contact		SUPPORT 10.6 miles NON-SUPPORT 2.9 miles	pathogens, turbidity, odor		municipal point source, urban runoff	
Secondary Contact		SUPPORT 10.6 miles NON-SUPPORT 2.9 miles	turbidity, odor		municipal point source	
Aesthetics		SUPPORT 10.6 miles NON-SUPPORT 2.9 miles	turbidity, odor		municipal point source	

RECOMMENDATIONS - NASHUA RIVER (MA81-05)

- Identify WMA withdrawals in this segment of the Nashua River's subwatershed. Evaluate compliance with registration and/or permit limits. Determine potential impacts of withdrawals on streamflow/habitat

- Since MCI Shirley connected to the Devens WWTP, fecal coliform bacteria sampling should be conducted in this segment of the Nashua River to reevaluate the status of the *Primary Contact Recreational Use*.

- The Town of Ayer is under enforcement orders to update its wastewater management plan (Kimball 2000). An industrial pretreatment program will be needed because of a number of food processing industries that discharge to the town's WWTF. The town is considering an upgrade of the plant with a groundwater discharge as well as the possibility of regionalization with Devens. The Devens Group has contracted for a new 3.0 MGD WWTF that discharges to the groundwater. The facility will be expandable by an additional 4.0 MGD which will discharge to the Nashua River and will service parts of Shirley (including the MCI facility) and possibly Ayer.

- Continue to monitor nutrient concentrations in this segment of the Nashua River and evaluate NPDES facility's compliance with their effluent TP limit (1.0 mg/L). Evaluate the results of the water quality models and reports being developed for the Nashua River Basin TMDL. Utilize these tools to evaluate present and/or future conditions under different scenarios, the need for additional monitoring (e.g., nutrient, suspended solids) and subsequent control strategies (point source and/or non-point source) (Hartman 2000).

- Because of the evidence of benthic community impairment in the Nashua River, additional monitoring should be conducted to evaluate causes and sources of impairment. This investigation should include biological monitoring (benthic macroinvertebrate and fish), sediment quality characterization (physico/chemical and toxicity testing), instream toxicity testing, fecal coliform bacteria monitoring (wet/dry) and water quality monitoring to include site specific contaminants of concern.

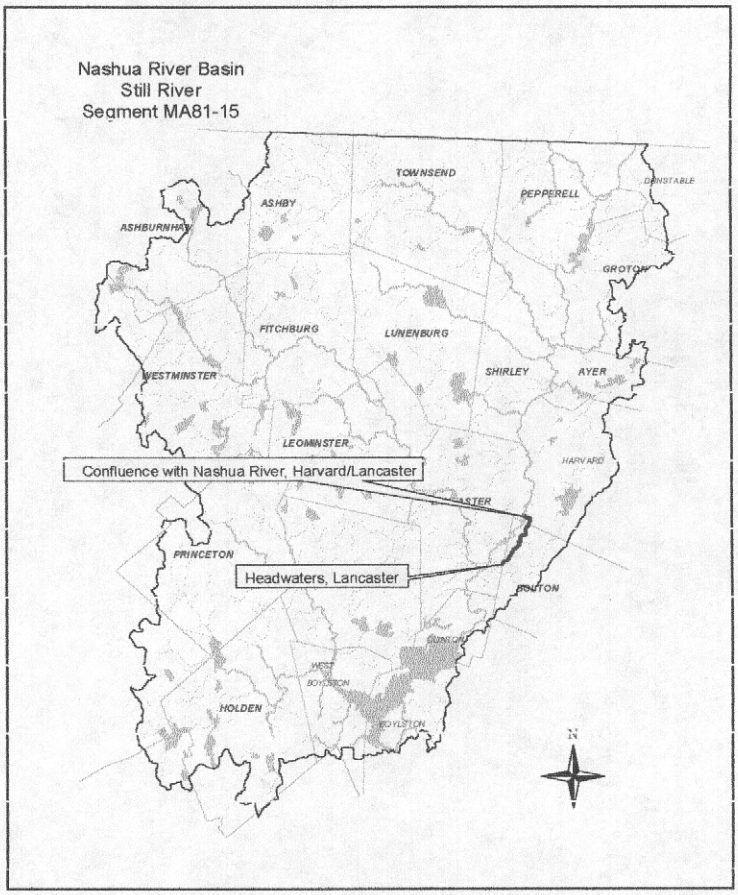
- Work with the NRWA to implement their Future Actions (NRWA 1997).

STILL RIVER (SEGMENT MA81-15)

Location: Headwaters, Lancaster to confluence with Nashua River, Harvard, Leominster
Segment Length: 3.1 miles.
Classification: Class B.

No land-use estimates were available for the Still River subwatershed.

NRWA conducted water quality monitoring in 1996 at one station on this segment of the Still River. Fecal coliform bacteria, pH or DO samples were collected on multiple occasions during 1996 (NRWA 1997).



USE ASSESSMENT

Not enough quality assured sampling has been conducted and limited current final data/information was available, therefore all uses for Still Brook (Segment MA81-15) are currently not assessed.

Still River (Segment MA81-15) Use Summary Table

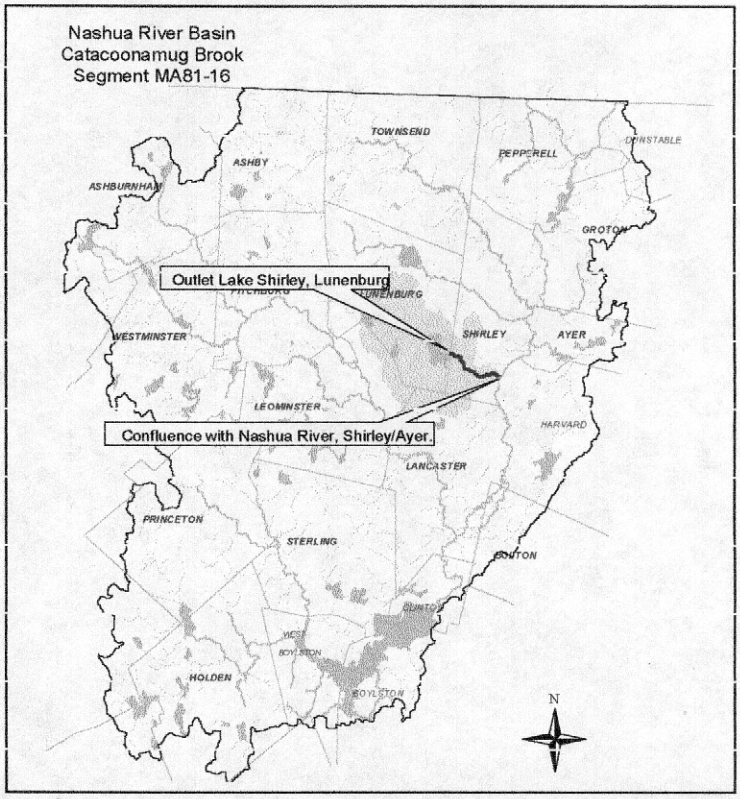
Aquatic Life	Fish Consumption	Primary Contact	Secondary Contact	Aesthetics

RECOMMENDATIONS - STILL BROOK (SEGMENT MA81-15)

- Identify WMA withdrawals in the Still Brook subwatershed. Evaluate compliance with registration and/or permit limits. Determine potential impacts of withdrawals on streamflow/habitat

CATACOONAMUG BROOK (SEGMENT MA81-16)

Location: Outlet Lake Shirley, Lunenburg to confluence with Nashua River, Shirley/Ayer.
Segment Length: 2.5 miles.
Classification: Class B.



Land-use estimates for the subwatershed (map inset, gray shaded area):

Forest	54%
Residential	15%
Agriculture	11%

A shoreline survey of Catacoonamug Brook from Route 2a to Flat Hills Rd was conducted by the Catacunemaug Brook Stream Team in June 1999. Their shoreline survey indicated that the overall condition of the brook was good. According to the stream team, the brook is a wonderful resource for the town of Lunenburg and provides excellent riparian, wildlife and aquatic habitat. Threats to the brook include, storm drain discharges, road runoff, agricultural practices, and construction activities (Catacunemaug Brook Stream Team 1999).

NRWA conducted water quality monitoring in 1996 and 1997 at five stations on Catacoonamug Brook. Fecal coliform bacteria, pH or DO samples were collected on multiple occasions during both years (NRWA 1997 and 11 January 2000).

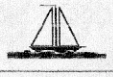
WITHDRAWALS AND DISCHARGES

WMA:
The Shirley Water District is permitted (9P221127001) to withdraw 0.3 MGD of groundwater from Catacoonamug and Patterson wells (Appendix F, Table F2). Their actual withdrawals averaged 0.3 MGD in 1998 (Kimball 2000).

USE ASSESSMENT

Not enough quality assured sampling has been conducted and limited current final data/information was available, therefore all uses for Catacoonamug Brook (Segment MA81-16) are currently not assessed.

Catacoonamug Brook (Segment MA81-16) Use Summary Table

Aquatic Life	Fish Consumption	Primary Contact	Secondary Contact	Aesthetics
				

RECOMMENDATIONS - CATACOONAMUG BROOK (SEGMENT MA81-16)

- Identify other WMA withdrawals in the Catacoonamug Brook subwatershed. Continue to evaluate compliance with registration and/or permit limits. Determine potential impacts of withdrawals on streamflow/habitat.

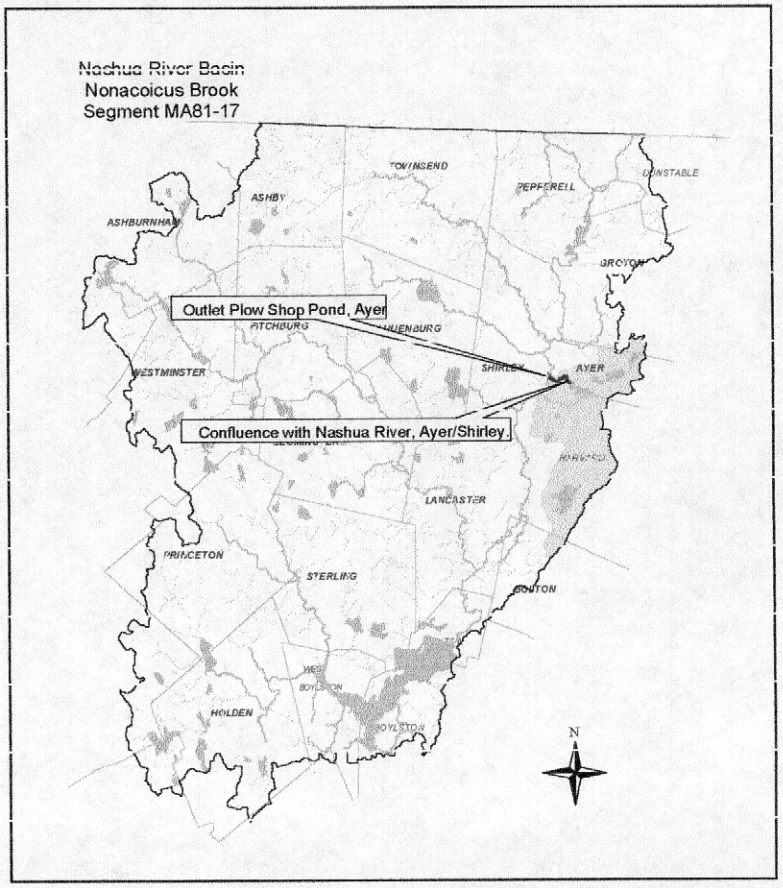
- Work with the Catacunemaug Brook Stream Team to implement their short/long-term project plans.

NONACOICUS BROOK (SEGMENT MA81-17)

Location: Outlet Plow Shop Pond, Ayer to confluence with Nashua River, Ayer/Shirley.
Segment Length: 1.5 miles.
Classification: Class B.

Land-use estimates for the subwatershed (map inset, gray shaded area):

Forest	50%
Open Land	16%
Residential	15%



NRWA conducted water quality monitoring in 1997 and 1998 at one station each year on this segment of the Nonacoicus Brook. Fecal coliform bacteria, pH or DO samples were collected on multiple occasions during both years (NRWA 11 January 2000).

USE ASSESSMENT

Not enough quality assured sampling has been conducted and limited current final data/information was available, therefore all uses for Nonacoicus Brook (Segment MA81-17) are currently not assessed.

Nonacoicus Brook (Segment MA81-17) Use Summary Table

Aquatic Life	Fish Consumption	Primary Contact	Secondary Contact	Aesthetics

RECOMMENDATIONS - NONACOICUS BROOK (SEGMENT MA81-17)

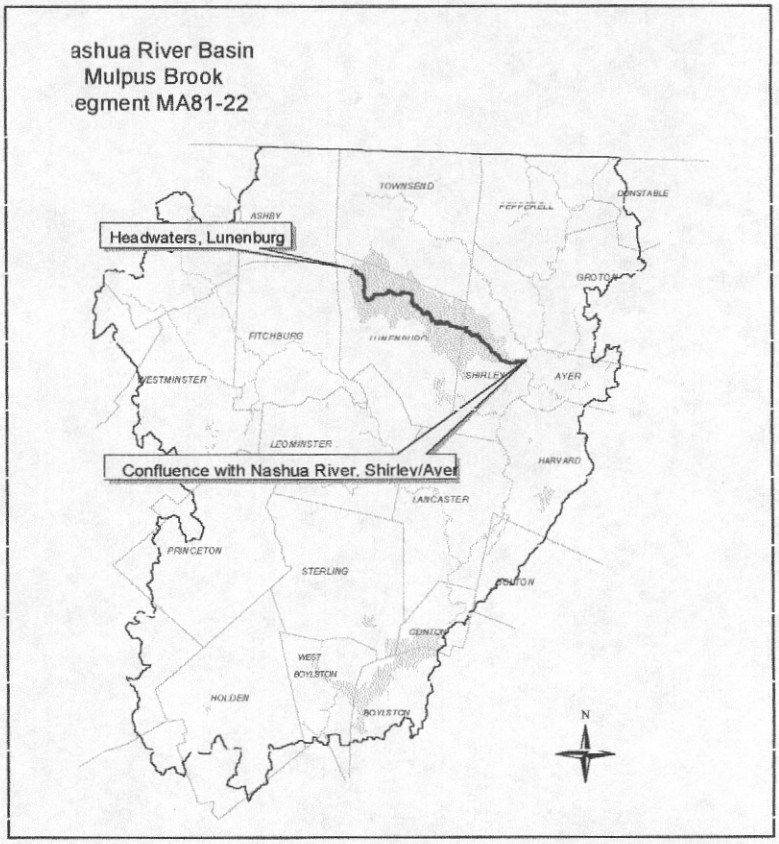
- Identify WMA withdrawals in the Nonacoicus Brook subwatershed. Evaluate compliance with registration and/or permit limits. Determine potential impacts of withdrawals on streamflow/habitat.

MULPUS BROOK (SEGMENT MA81-22)

Location: Headwaters, Lunenburg to confluence with Nashua River, Shirley/Ayer
Segment Length: 11.85 miles.
Classification: Class B.

Land-use estimates for the subwatershed (map inset, gray shaded area):

Forest	68%
Residential	12%
Agriculture	8%



USE ASSESSMENT

No sampling has been conducted and no current data/information was available, therefore all uses for Mulpus Brook (Segment MA81-22) are currently not assessed.

Mulpus Brook (Segment MA81-22) Use Summary Table

Aquatic Life	Fish Consumption	Primary Contact	Secondary Contact	Aesthetics

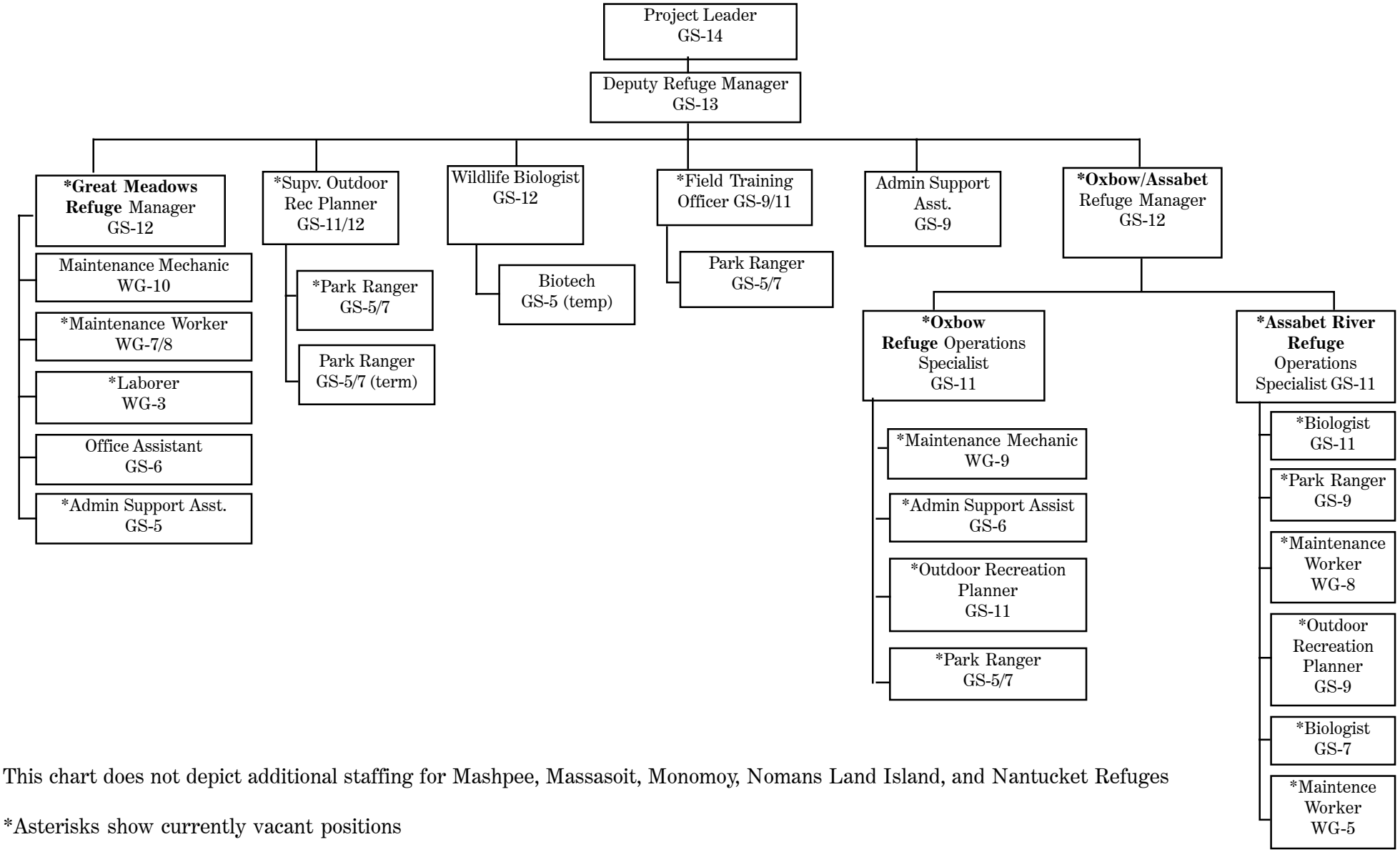
RECOMMENDATIONS - MULPUS BROOK (SEGMENT MA81-22)

- Identify WMA withdrawals in the Mulpus Brook subwatershed. Evaluate compliance with registration and/or permit limits. Determine potential impacts of withdrawals on streamflow/habitat.

Appendix D

Staffing Charts

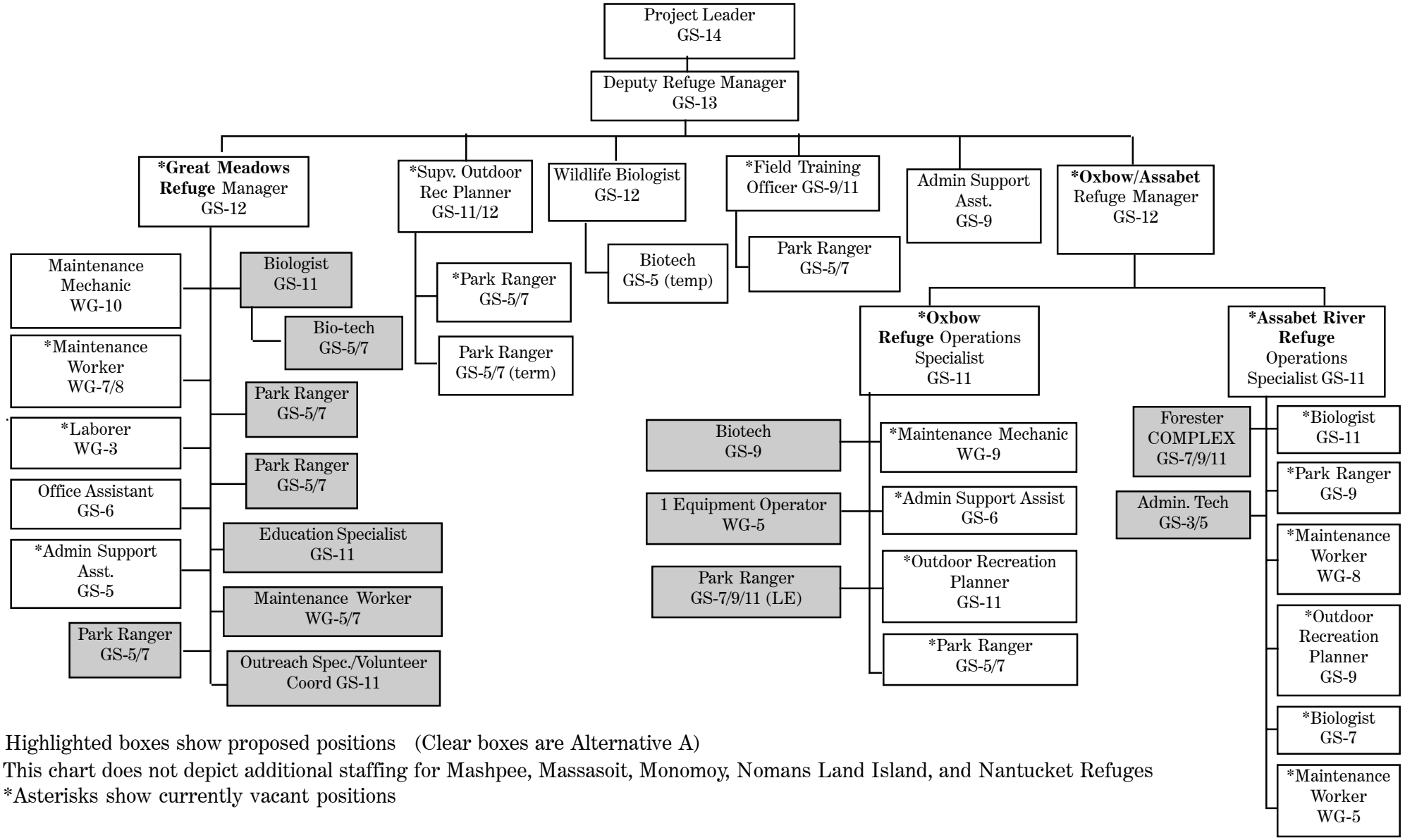
Eastern Massachuestts National Wildlife Refuge Complex
Assabet River, Great Meadows and Oxbow National Wildlife Refuges
Staffing Chart for Alternative A: Status Quo



This chart does not depict additional staffing for Mashpee, Massasoit, Monomoy, Nomans Land Island, and Nantucket Refuges

*Asterisks show currently vacant positions

Eastern Massachuestts National Wildlife Refuge Complex
Assabet River, Great Meadows and Oxbow National Wildlife Refuges
Staffing Chart for Alternative B: Proposed Action

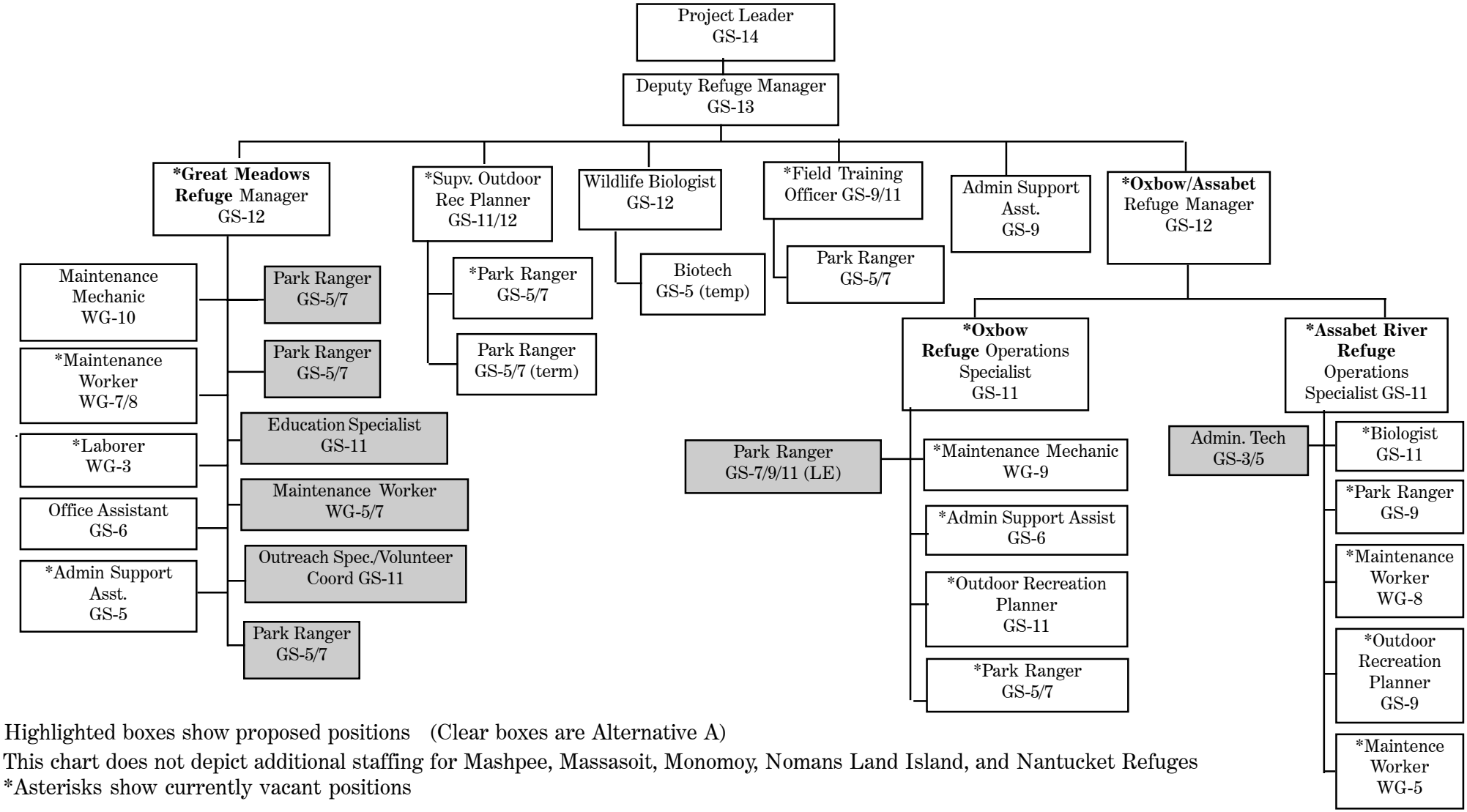


Highlighted boxes show proposed positions (Clear boxes are Alternative A)

This chart does not depict additional staffing for Mashpee, Massasoit, Monomoy, Nomans Land Island, and Nantucket Refuges

*Asterisks show currently vacant positions

Eastern Massachuestts National Wildlife Refuge Complex
Assabet River, Great Meadows and Oxbow National Wildlife Refuges
Staffing Chart for Alternative C



Highlighted boxes show proposed positions (Clear boxes are Alternative A)

This chart does not depict additional staffing for Mashpee, Massasoit, Monomoy, Nomans Land Island, and Nantucket Refuges

*Asterisks show currently vacant positions

Appendix E

Refuge Operations Needs System (RONS) and Management Maintenance System (MMS)

Refuge Operations Needs System (RONS) and Management Maintenance System (MMS)

The Refuge Operations Needs System (RONS) lists refuge projects over $20,000. The Management Maintenance System (MMS) identifies maintenace needs on refuges. Projects on both lists are prioritized and initated as funding becomes available. Funding is allocated through the Service's Northeast Regional Office and is based on Congressional appropriation to the Service.

Project: This list includes projects currently in the RONS database and projects proposed in the CCP alternatives.

FTE: Full Time Staffing Equivalent. One FTE equals one person working full time for one whole year; seasonal employees are considered 0.5 FTE. (Note: staff are often "shared" by multiple RONS projects)Cost, year 1: Estimated costs incurred during the first year of a project - typically higher than recurring costs, due to construction, equipment purchase, or other start-up expenses.

Cost, recurring: Estimated average annual project cost for subsequent years; includes recurring salary and maintenance costs.

Project duration: Estimated length of time for each project. Since this CCP will be revised in 15 years, the "maximum project duration" is 15 years, even though some projects may continue into the next planning cycle

Table E-1. Proposed projects currently in the RONS database and additional projects proposed (Alternative B and C) for Assabet River NWR.

Project Title Assabet River NWR	**Staffing** (FTEs)	**Startup** Cost x$1000	**Recurring** Cost x$1000	**Duration** (years)	**Alt A.**	**Alt B.**	**Alt C**
Provide Refuge supervision management, planning, programs, administration and maintenance	GS 12 Refuge Mgr.	145	80	14		x	x
Oversee Refuge management, planning, programs, administration and maintenance	GS 11 Refuge Ops Spec.	139	74	15	x	x	x
Provide wildlife and habitat management planning, implementation and evaluation	GS 11 Refuge Biol.	133	68	15	x	x	x
Collect essential biological data to efficiently manage the Refuge	GS 7 Biol.	114	49	15	x	x	
Develop and Implement a Forestry Management Plan	GS 11 Forester	133	68			x	
Provide planning and implementation of wildlife-oriented pubic use programs	GS 11 Outdoor Rec Planner	133	68	14	x	x	x
Conduct Interpretive and Educational programs	GS 5 Park Ranger	107	42	13		x	x
Provide Refuge visitor protection and law enforcement	GS 7 (LE) Park Ranger	114	49	15	x	x	x

Table E-1. Proposed projects currently in the RONS database and additional projects proposed (Alternative B and C) for Assabet River NWR continued.

Project Title **Assabet River NWR**	**Staffing** (FTEs)	**Startup** Cost x$1000	**Recurring** Cost x$1000	**Duration** (years)	**Alt A.**	**Alt B.**	**Alt C**
Provide Refuge maintenance and facilities repair	WG 8 Maint. Worker	118	53	15	x	x	x
Provide habitat restoration and maintenance and facilities repair	WG 5 Maint. Worker	110	45	15	x	x	x
Provide Refuge Visitor Contact Station support, administrative programs and visitor services	Admin. Tech.	107	42	13		x	x
Demolish Dilapidated Buildings and Restore Habitat	0	264	0	1		x	x
Equip and Operate Assabet River NWR Visitor Contact Station	0	280	30	20		x	x
Establish Bat Resting Habitat	0	30	2	3	x	x	x
Increase Accessible Hunting and Fishing Opportunity	0	60	10	2		x	x
Design, Construct and Maintain Accessible Interpretive Trails, Wildlife Viewing Platforms and Photography Blinds	0	180	20	15		x	x
Restore and Maintain Wetland Habitat	0	50	10	15	x	x	
Identify and Map Exotic and Invasive Species Occurrence	0	57	4	4		x	
Control Exotic and Invasive Species	0	118	53	5		x	
Develop and Maintain Parking Areas and Refuge Gates	0	108	8	14		x	x
Develop and Implement FMP	0	76	28	10		x	
Maintain and Restore Grassland Habitat	0	80	15	15	x	x	
Maintain and Restore Forest Habitat	0	65	15	15	x	x	
Conduct Essential Migratory Bird Surveys	0	30	8	15	x	x	x

Table E-1. Proposed projects currently in the RONS database and additional projects proposed (Alternative B and C) for Assabet River NWR continued.

Project Title Assabet River NWR	Staffing (FTEs)	Startup Cost x$1000	Recurring Cost x$1000	Duration (years)	Alt A.	Alt B.	Alt C
Conduct Herptile and Invertebrate Surveys	0	25	8	15	x	x	x
Inventory and Evaluate Status of Key Wildlife Species	0	55	55	2		x	x
Develop Habitat Inventory and Management Plan	0	50	12	2		x	x
Conduct Cultural Resources Overview of Refuge	0	80	8	3		x	
Construct and Maintain Three On-Site Interpretive Kiosks	0	45	4	15		x	x
With Partners, Construct and Maintain Three Off-Site Interpretive Kiosks	0	25	2	15		x	x

Total Costs by Alternative for Assabet River Refuge	Alternative A	Alternative B	Alternative C
Startup Costs	$1,141,000	$3,031,000	$2,258,000
Recurring Costs	$464,000	$930,000	$680,000

Table E-2. Proposed projects currently in the RONS database and additional projects proposed (Alternative B and C) for Great Meadows NWR.

Project Title Great Meadows NWR	**Staffing** (FTEs)	**Startup** Cost x$1000	**Recurring** Cost x$1000	**Duration** (years)	**Alt A.**	**Alt B.**	**Alt C**
Refuge oversight and partnership development	GS12 Manager	145	80	15	x	x	x
Water Chestnut Control of an Exotic species (contractor)	0	72	20	15		x	x
Restore Drained Wetlands	0	88	5	15		x	x
Manage Habitat (planning, monitoring,& inventory)	GS1 Biologist 1 GS5 Biotech (seasonal)	150	80	15		x	
Effects of Low-Flying Airplanes on Wildlife		70	5	5	x	x	x
Survey Mussels on a Wild and Scenic River	0	48	8	4	x	x	x
Implement Sound Wildlife Management Practices	0	58	8	3	x	x	
Restoring Native Plants & Wildlife	0	73	8	10	x	x	
Conducting Reptile, Invertebrate, & Amphibian Surveys in a Wild and Scenic River	0	55	10	3	x	x	x
Using Technology to Map Exotic Plants on Great Meadows NWR	0	67	2	3		x	x
Grassland/Old Field Restoration and Management	0	98	8	15	x	x	
Collect Baseline Data and Develop Inventory Plans	GS 7 Biotech	114	49	15		x	
Implement an Urban Environmental Education Program	0	55	15	15	x	x	x

Table E-2. Proposed projects currently in the RONS database and additional projects proposed (Alternative B and C) for Great Meadows NWR continued.

Project Title Great Meadows NWR	Staffing (FTEs)	Startup Cost x$1000	Recurring Cost x$1000	Duration (years)	Alt A.	Alt B.	Alt C
Provide Accessible Wildlife Dependent Recreation Opportunities & Interpretation (trails, signs)	0	86	5	15		x	x
Improve Public Use Infrastructure Including: Trails System, Construction of Observation Platforms & Photo Blinds	WG8 Maintenance worker	118	53	15		x	x
Develop Wildlife Demonstration and Educational Curriculum	GS9 interpreter	123	58	15		x	x
Improve Refuge Pamphlets, Trail Guides, Species Checklists, Viewing Guides & Other Literature	0	10	10	15	x	x	x
Enhance Public Service Capabilities-Provide Planning and Data Management in Support of Visitor Services *	GS5office assistant	107	42	15	x	x	x
Maintenance at New Visitor Contact Station at Highest Public Use Area (Concord)	WG3 Maintenance	110	45	15		x	
Increase Biological & Public Outreach Through Expanded Volunteer	0	0	7	15	x	x	x
Enhance Volunteer Program Coordination	GS11 Volunteer Coordinator	133	68	15		x	x
Develop Boston Airport Outreach materials	0	92	13	15		x	x
Conduct Public Use Impact Study	0	92	5	10		x	x
Interpret Wild and Scenic River through brochures. Kiosk and New Programs	0	70	15	15	x	x	x
Conduct Cultural Resources	0	40	5	3		x	
Protect Museum Artifacts	0	77	5	15	x	x	x

Table E-2. Proposed projects currently in the RONS database and additional projects proposed (Alternative B and C) for Great Meadows NWR continued.

Project Title Great Meadows NWR	Staffing (FTEs)	Startup Cost x$1000	Recurring Cost x$1000	Duration (years)	Alt A.	Alt B.	Alt C
Educate MA Residents-Equip and Operate New Visitor Center	GS11 Educator GS7& GS5 Interpreter WG6 Maintenance	459	209	15		x	x
Enhance Protection of Refuge Property	0	44	3	15		x	x
Manage Wildlife and Non-Wildlife Dependent Use	GS7 Law Enforcement	114	49	15		x	x
Boundary Identification and Protection	0	45	5	15		x	x

Total Costs by Alternative for Great Meadows Refuge	Alternative A	Alternative B	Alternative C
Startup Costs	$866,000	$2,655,000	$2,245,000
Recurring Costs	$221,000	$906,000	$804,000

Table E-3. Proposed projects currently in the RONS database and additional projects proposed (Alternative B and C) for Oxbow NWR.

Project Title Oxbow NWR	Staffing (FTEs)	Startup Cost x$1000	Recurring Cost x$1000	Duration (years)	Alt A.	Alt B.	Alt C
Provide Refuge supervision management, planning, programs, administration and maintenance	GS 12 Refuge Mgr.	145	80	15	x	x	x
Provide Refuge management, administration, habitat restoration, and maintenance	GS 11 Refuge Ops Spec.	133	68	15	x	x	x
Provide wildlife and habitat management planning, implementation and evaluation	GS 11 Refuge Biol	133	68	15	x	x	x
Collect essential biological data to efficiently manage the Refuge	GS 9 Biol. Tech.	123	58	15		x	
Provide planning and implementation of wildlife-oriented public use and outreach programs	GS 11 Outdoor Rec. Planner	133	68	15	x	x	x
Provide Refuge visitor protection and law enforcement	GS 7 (LE) Park Ranger	114	49	15	x	x	x
Provide Refuge visitor protection and law enforcement	GS 7 (LE Park Ranger)	114	49	15		x	x
Provide habitat restoration and maintenance and facilities repair	WG 5 Maint. Worker	110	45	15	x	x	
Provide Refuge maintenance and facilities repair	WG 8 Maint. Worker	118	53	15		x	
Provide Refuge Visitor Contact Station support, administrative programs and visitor services	GS 5 Admin Tech.	107	42	13	x	x	x
Assessment & Monitoring of Hasardous Waste Landfills at Oxbow	0	21	0	0		x	
Identify and Map Exotic and Invasive Species Occurrence	0	57	5	3	x	x	x

Table E-3. Proposed projects currently in the RONS database and additional projects proposed (Alternative B and C) for Oxbow NWR continued.

Project Title Oxbow NWR	**Staffing** (FTEs)	**Startup** Cost x$1000	**Recurring** Cost x$1000	**Duration** (years)	**Alt A.**	**Alt B.**	**Alt C**
Inventory and Evaluate Status of Key Wildlife Species	0	55	55	2		x	x
Develop Habitat Inventory and Management Plan	0	50	12	2		x	x
Conduct Cultural Resources Overview of Refuge	0	40	5	3		x	
Conduct Wetland Habitat Restoration and Maintenance	0	72	15	15	x	x	
Conduct Upland Habitat Restoration and Maintenance	0	143	25	15		x	
Increase Security Through New Gates	0	28	14	2	x	x	x
Construct, Improve and Maintain Visitor Trails, Wildlife Viewing Platforms, Photography Blinds	0	180	20	15	x	x	x
Construct and Maintain Three On-Site Interpretive Kiosks	0	45	4	15		x	
With Partners, Construct and Maintain Three Off-Site Interpretive Kiosks	0	25	2	15		x	
Construct Exhibits and Operate Visitor Contact Station	0	95	25	2		x	x
Restore and Maintain Grassland Habitat	0	25	6	15		x	
Design and Construct Accessible Interpretive Trail	0	80	15	3		x	x
Provide for Seasonal Employee/ Volunteer Housing	0	225	15	13		x	x
Survey of Mussels on the Nashua River	0	30	5	5		x	
Conduct Essential Migratory Bird Surveys for Sound Management	0	43	8	15	x	x	x
Reptile, Amphibian, and Invertebrate Surveys	0	45	10	5	x	x	

Table E-3. Proposed projects currently in the RONS database and additional projects proposed (Alternative B and C) for Oxbow NWR continued.

Project Title Oxbow NWR	Staffing (FTEs)	Startup Cost x$1000	Recurring Cost x$1000	Duration (years)	Alt A.	Alt B.	Alt C
Exotic and Invasive Species Control	0	85	25	8		x	
Develop and Maintain Parking Areas and Canoe Launches	0	120	12	15	x	x	x

Total Costs by Alternative for Oxbow Refuge	Alternative A	Alternative B	Alternative C
Startup Costs	$1,420,000	$2,808,000	$1,812,000
Recurring Costs	$504,000	$907,000	$605,000

Table E-4. Projects currently backlogged in the Maintenance Mangement System (MMS) for Assabet River, Great Meadows and Oxbow NWRs.

Project #	Project Name	Refuge	Cost Estimate ($1,000)
99014A	Demolish 10 structures (Phase 1) at	Assabet River NWR	$500
00014	Repair 8 miles of roads at Assabet	Assabet River NWR	$147
99018	Remove two metal storage facilities	Assabet River NWR	$42
99014B	Demolish 9 facilities (phase II)	Assabet River NWR	$500
99014C	Demolish 9 facilities (phase III)	Assabet River NWR	$500
01001	Remove 10 miles asphalt roads	Assabet River NWR	$310
00005	Visitor Contact Station	Assabet River NWR	$1,300
98525	Replace 1987 John Deer 555 Backhoe	Assabet River NWR	$94
01002	Rehabilitate Military Gates	Assabet River NWR	$41
98516	Replace Concord Gates	Great Meadows NWR	$30
00004	Replace 13' Boston Whaler	Great Meadows NWR	$25
98518	Replace International tractor	Great Meadows NWR	$95
99004	Replace 1978 Mack Dump truck	Great Meadows NWR	$145
99029	Rehab. restrooms at VC/HQ	Great Meadows NWR	$51.8
98513	Resurface 1.5 mile dike	Great Meadows NWR	$202
93019	Replace exhibits at VC	Great Meadows NWR	$151
00010	Replace 19" Boston Whaler & motor	Great Meadows NWR	$25
99003	Replace 1981 tractor	Great Meadows NWR	$78
99019	Replace VC exhibits (phase II)	Great Meadows NWR	$158
00002	Replace deteriorated 20-year old boat	Great Meadows NWR	$26
00007	Repair and reconstruct dike and water control structures	Great Meadows NWR	$48
00008	Replace 6 exterior door	Great Meadows NWR	$41
99002	Replace 1992 Chevy S-10	Great Meadows NWR	$31

Table E-4. Projects currently backlogged in the Maintenance Mangement System (MMS) for Assabet River, Great Meadows and Oxbow NWRs.

Project #	Project Name	Refuge	Cost Estimate ($1,000)
00012	Replace Lowboy Tractor Trailer	Great Meadows NWR	$75
98511	Replace Roof (Quarters #1)	Great Meadows NWR	$41
00016	Rehab (2) 100 acre impoundments	Great Meadows NWR	$367
93020	Replace Strand Barn	Great Meadows NWR	$409
93018	Replace storage facility	Great Meadows NWR	$89
99028	Replace 1989 Dodge 4x4	Great Meadows NWR	$32
99006	Replace 8 foot rotary mower	Great Meadows NWR	$9
94023	Replace doors and equipment at Concord shop	Great Meadows NWR	$20
98522	Replace kiosks in Sudbury	Great Meadows NWR	$25
00009	Replace 1983 John Deere 550 bulldozer	Great Meadows NWR	$178
98512	Replace doors on Strand barn	Great Meadows NWR	$30
98519	Replace observation blind	Great Meadows NWR	$30
00015	Replace Custom Flatbed	Great Meadows NWR	$48
00011	Replace 1983 JD Road Grader	Great Meadows NWR	$173
00017	Replace 1987 Road Tractor	Great Meadows NWR	$94
98017	New Visitor Contact Station at Concord Unit	Great Meadows NWR	$1,300
00013	Construct new Refuge Complex Visitor Center	Great Meadows NWR	$4,500
01005	Replace 1997 Dodge Caravan	Great Meadows NWR	$28
01007	Replace 1998 Ford Taurus Wagon	Great Meadows NWR	$27
01008	Replace 1999 Dodge Pick-up Truck	Great Meadows NWR	$27
01010	Replace 2000 Dodge 3/4-ton Pick-up Truck	Great Meadows NWR	$26
01011	Replace 1996 Ford Ranger Pick-up Truck	Great Meadows NWR	$21
01014	Replace Woodchuck Woodchipper	Great Meadows NWR	$19
01016	Replace 2000 18' Jon Boat	Great Meadows	$9
02001	Replace Severely Deterioriated Storage/Shop	Great Meadows	$120

Table E-4. Projects currently backlogged in the Maintenance Mangement System (MMS) for Assabet River, Great Meadows and Oxbow NWRs.

Project #	Project Name	Refuge	Cost Estimate ($1,000)
00005	Pave road and relocate parking	Oxbow NWR	$10
00003	Rehab canoe launch	Oxbow NWR	$20
00007	Repair visitor foot trail	Oxbow NWR	$36
00006	Resurface Tank Road	Oxbow NWR	$62
00004	Replace Refuge access gates	Oxbow NWR	$48
00002	Repair 1 mile power line trail	Oxbow NWR	$36
01003	Remove building foundations	Oxbow NWR	$41
00001	Construct Visitor Contact Station and office	Oxbow NWR	$1,300
010014	Replace Chevrolet Blazer	Oxbow NWR	$27
00005	Repair, Pave Entrance Rd., Relocate Restroom	Oxbow NWR	$223

TOTAL Backlog for Assabet River Refuge **$3,816**

TOTAL Backlog for Great Meadows Refuge **$8,866**

TOTAL Backlog for Oxbow Refuge **$1,803**

Appendix F

Species List

Table F-1. Fish at Assabet River NWR

Scientific Name	Common Name	Status	Reference
Micropterus salmonoides	Largemouth Bass		MDFW, 1997
Esox niger	Chain Pickerel		MDFW, 1997
Ictalurus natalis	Yellow Bullhead		MDFW, 1997
Ictalurus nebulosus	Brown Bullhead		MDFW, 1997
Lepomis gibbosus	Pumpkinseed		MDFW, 1997
Lepomis auritus	Redbreast Sunfish		MDFW, 1997
Lepomis macrochirus	Bluegill		MDFW, 1997
Perca flavecens	Yellow Perch		MDFW, 1997
Pomoxis nigromaculatus	Black Crappie		MDFW, 1997
Catostomus commersoni	White Sucker		MDFW, 1997
Notemigonus crysoleucas	Golden Shiner		MDFW, 1997
Semotilus corporalis	Fallfish		MDFW, 1997
Anguilla rostrata	American Eel		MDFW, 1997
Erimyzon oblongus	Creek Chubsucker		MDFW, 1997
PUFFER POND:			
Micropterus salmonoides	Largemouth Bass		U.S. Army, 1992
Esox niger	Chain Pickerel		U.S. Army, 1992
Ictalurus nebulosus	Brown Bullhead		U.S. Army, 1992
Lepomis gibbosus	Pumpkinseed		U.S. Army, 1992
Lepomis macrochirus	Bluegill		U.S. Army, 1992
Perca flavecens	Yellow Perch		U.S. Army, 1992
Pomoxis nigromaculatus	Black Crappie		U.S. Army, 1992
Cyprinus carpio	Common Carp		U.S. Army, 1992
Notemigonus crysoleucas	Golden Shiner		U.S. Army, 1992

Table F-2. Birds at Assabet River NWR

Scientific Name	Common Name	Status	Reference
Ardea herodias	Great Blue Heron		Lockwood 1999 & 2000
Branta canadensis	Canada Goose		Lockwood 1999 & 2000
Anas platyrhynchos	Mallard		Lockwood 1999 & 2000
Aix sponsa	Wood Duck		Lockwood 2000
Mergus merganser	Common Merganser		Lockwood 1999
Accipiter striatus	Sharp-shinned Hawk	SC	Lockwood 1999
Buteo platypterus	Broad-winged Hawk		Lockwood 2000
Buteo jamaicensis	Red-tailed Hawk		Lockwood 1999 & 2000
Circus cyaneus	Northern Harrier		Plagge 2000
Falco sparverius	American Kestrel		Lockwood 1999
Cathartes aura	Turkey Vulture		Lockwood 1999
Accipiter cooperii	Cooper's Hawk	SC	Lockwood 1999
Haliaeetus leucocephalus	Bald Eagle	FT-SE	Aneptek, 1991
Buteo lineatus	Red Shouldered hawk		Aneptek, 1991; Lockwood 2000
Bonasa umbellus	Ruffed Grouse		Lockwood 1999 & 2000
Meleagris gallopavo	Wild Turkey		Lockwood 1999 & 2000
Phasianus colchicus	Ring-necked Pheasant		Meyer & Montemerlo 1995
Porzana carolina	Sora Rail		Aneptek, 1991
Charadrius vociferus	Killdeer		Lockwood 1999
Scolopax minor	American woodcock		Plagge 2000
Gallinago gallinago	Common snipe		Aneptek, 1991

Scientific Name	Common Name	Status	Reference
Larus argentatus	Herring Gull		Lockwood 1999
Accipiter gentilis	Northern Goshawk		Hawkwatch 2001
Actitis macularia	Spotted Sandpiper		Lockwood 2000 & 2001
Aegolius acadicus	Northern Saw-whet Owl		Lockwood 2000 & 2001
Anas rubripes	American Black Duck		Lockwood 2000 & 2001
Aythya collaris	Ring-necked Duck		Lockwood 2000 & 2001
Bucephala clangula	Common Goldeneye		Lockwood 2000 & 2001
Butorides virescens	Green Heron		Lockwood 2000 & 2001
Chordeiles minor	Common Nighthawk		Lockwood 2001b
Cistothorus palustris	Marsh Wren		Hart 2001
Conotopus cooperi	Olive-sided Flycatcher		Lockwood 2001b
Cygnus olor	Mute swan		Lockwood 2000 & 2001
Empidonax minimus	Least Flycatcher		Lockwood 2000 & 2001
Falco columbarius	Merlin		Hawkwatch 2001
Falco peregrinus	Peregrine Falcon	SE-FE	Hawkwatch 2001
Geothlypis trichas	Common Yellowthroat		Lockwood 1999 & 2000
Ixobrychus exilis	Least Bittern	SE	Lockwood 2001a
Lanius excubitor	Northern Shrike		Lockwood 2000 & 2001
Larus delawarensis	Ring-billed Gull		Lockwood 2000 & 2001
Lophodytes cucullatus	Hooded Merganser		Lockwood 2000 & 2001
Nycticorax nycticorax	Black Crowned Night Heron		Lockwood 2000 & 2001
Oxyura jamaicensis	Ruddy Duck		Lockwood 2000 & 2001
Pandion haliaetus	Osprey		Hawkwatch 2001
Passerculus sandwichensis	Savannah Sparrow		Lockwood 2000 & 2001
Passerella iliaca	Fox Sparrow (migrant)		Lockwood 1999
Phalacrocorax auritus	Double Crested Cormorant		Lockwood 2000 & 2001
Polioptila caerulea	Blue-gray Gnatcatcher		Lockwood 1999 & 2000
Rallus limicola	Virginia Rail		Lockwood 2001a
Rallus elegans	King Rail	ST	Lockwood 2001a
Vireo gilvus	Warbling Vireo		Lockwood 2000 & 2001
Zenaida macroura	Mourning Dove		Lockwood 1999 & 2000
Columba livia	Rock Dove		Lockwood 1999
Chaetura pelagica	Chimney Swift		Lockwood 1999 & 2000
Ceryle alcyon	Belted Kingfisher		Lockwood 1999
Bubo virginianus	Great Horned Owl		Lockwood 1999
Strix varia	Barred Owl		Lockwood 1999
Caprimulgus vociferus	Whip-poor-will		Aneptek,1991 Meyer & Montemerlo 1995: Plagge 2000
Archilochus colubris	Ruby-throated Hummingbird		Lockwood 2000
Ceryle alcyon	Belted Kingfisher		Lockwood 2000
Melanerpes carolinus	Red-bellied Woodpecker		Lockwood 1999 & 2000
Picoides villosus	Hairy Woodpecker		Lockwood 1999 & 2000
Picoides pubescens	Downy Woodpecker		Lockwood 1999 & 2000
Colaptes auratus	Northern Flicker		Lockwood 1999 & 2000
Dryocopus pileatus	Pileated Woodpecker		Lockwood 2000
Contopus virens	Eastern Wood-Pewee		Lockwood 1999 & 2000
Sayornis phoebe	Eastern Phoebe		Lockwood 1999 & 2000
Myiarchus crinitus	Great Crested Flycatcher		Lockwood 1999 & 2000
Empidonax alnorum	Alder Flycatcher		Lockwood 2000
Empidonax traillii	Willow Flycatcher		Lockwood 2000
Empidonax flaviventris	Yellow-bellied Flycatcher		Lockwood 2000
Tyrannus tyrannus	Eastern Kingbird		Lockwood 1999 & 2000
Cyanocitta cristata	Blue Jay		Lockwood 1999 & 2000
Corvus brachyrhynchos	American Crow		Lockwood 1999 & 2000
Tachycineta bicolor	Tree Swallow		Lockwood 1999 & 2000
Riparia riparia	Bank Swallow		Lockwood 1999 & 2000

Scientific Name	Common Name	Status	Reference
Hirundo rustica	Barn Swallow		Lockwood 1999 & 2000
Stelgidopteryx serripennis	N. Rough-winged Swallow		Lockwood 2000
Parus atricapillus	Black-capped Chickadee		Lockwood 1999 & 2000
Parus bicolor	Tufted Titmouse		Lockwood 1999 & 2000
Sitta canadensis	Red-breasted Nuthatch		Lockwood 1999 & 2000
Sitta carolinensis	White-breasted Nuthatch		Lockwood 1999 & 2000
Certhia americana	Brown Creeper		Lockwood 1999 & 2000
Troglodytes aedon	House Wren		Lockwood 1999
Troglodytes troglodytes	Winter Wren		Lockwood 1999 & 2000
Troglodytes ludovicianus	Carolina Wren		Lockwood 1999
Sialia sialis	Eastern Bluebird		Lockwood 1999 & 2000
Catharus fuscescens	Veery		Lockwood 1999 & 2000
Catharus guttatus	Hermit Thrush		Lockwood 1999 & 2000
Hylocichla mustelina	Wood Thrush		Lockwood 1999 & 2000
Seiurus aurocapillus	Ovenbird		Lockwood 1999 & 2000
Turdus migratorius	American Robin		Lockwood 1999 & 2000
Dumetella carolinensis	Gray Catbird		Lockwood 1999 & 2000
Mimus polyglottos	Northern Mockingbird		Lockwood 1999 & 2000
Toxostoma rufum	Brown Thrasher		Lockwood 1999 & 2000
Regulus satrapa	Golden-crowned Kinglet		Lockwood 1999
Regulus calendulasatrapa	Ruby-crowned Kinglet (migrant)		Lockwood 1999 & 2000
Sturnus vulgaris	European Starling		Lockwood 1999
Bombycilla cedrorum	Cedar Waxwing		Lockwood 1999 & 2000
Vermivora pinus	Blue-winged Warbler		Lockwood 1999
Vermivora ruficapilla	Nashville Warbler		Lockwood 1999
Parula americana	Northern Parula	ST	Lockwood 1999 & 2000
Dendroica petechia	Yellow Warbler		Lockwood 1999 & 2000
Dendroica pensylvanica	Chestnut-sided Warbler		Lockwood 1999
Dendroica magnolia	Magnolia Warbler		Lockwood 1999
Dendroica caerulescens	Black-throated Blue Warbler		Lockwood 1999 & 2000
Dendroica coronata	Yellow-rumped Warbler (Myrtle)		Lockwood 1999 & 2000
Dendroica virens	Black-throated Green Warbler		Lockwood 1999 & 2000
Dendroica fusca	Blackburnian Warbler		Lockwood 1999
Dedroica pinus	Pine Warbler		Lockwood 1999 & 2000
Dendroica discolor	Prairie Warbler		Lockwood 1999 & 2000
Dendroica castanea	Bay-breasted Warbler		Lockwood 1999
Dendroica striata	Blackpoll Warbler	SC	Lockwood 1999
Mniotilta varia	Black-and-white Warbler		Lockwood 1999 & 2000
Setophaga ruticilla	American Redstart		Lockwood 1999
Seiurus noveboracensis	Northern Waterthrush		Lockwood 1999 & 2000
Geothlypis trichas	Common Yellowthroat		Lockwood 1999 & 2000
Wilsonia canadensis	Canada Warbler		Lockwood 1999
Vireo solitarius	Blue-headed (solitary) Vireo		Lockwood 1999 & 2000
Vireo olivaceus	Red-eyed Vireo		Lockwood 1999 & 2000
Vermivora celata	Tennessee Warbler (migrant)		Lockwood 1999

Table F-3. Mammals at Assabet River NWR

Scientific Name	Common Name	Status	Reference
Sorex cinereus	Masked shrew		Thomas 1992
Blarina brevicauda	Northern short-tailed shrew		Thomas 1992
Sylvilagus floridanus	Eastern cottontail		Thomas 1992
Tamias striatus	Eastern chipmunk		Thomas 1992
Tamiasciurus hudsonicus	Red squirrel		Plagge 2000
Glaucomys sabrinus volans	(Northern or Southern) flying Squirrel		Lockwood 2000
Sciurus carolinensis	Eastern gray squirrel		Thomas 1992
Castor canadensis	American beaver		Thomas 1992
Peromyscus leucopus	White-footed mouse		Thomas 1992
Microtus pennsylvanicus	Meadow vole		Thomas 1992
Clethrionomys gapperi	Southern red-backed vole		Thomas 1992
Zapus hudsonius	Meadow jumping mouse		Thomas 1992
Procyon lotor	Common raccoon		Thomas 1992
Mustela vison	America mink		Thomas 1992
Lutra canadensis	Northern river otter		Thomas 1992
Mephitis mephitis	Striped skunk		Thomas 1992
Odocoileus virginiana	White-tailed deer		Thomas 1992; Plagge 2000
Canis latrans	Coyote		Meyer & Montemerlo 1995
Marmota monax	Woodchuck		Aneptek, 1991
Erethizon dorsatum	Common porcupine		Aneptek, 1991
Martes pennanti	Fisher		Aneptek, 1991
Lynx rufus	Bobcat		Aneptek, 1991
Ondatra zibethicus	Common muskrat		Preliminary Proposal 1992
Vulpes fulva	Red Fox		Aneptek, 1991
Alces alces	Moose		Lockwood 2000

Table F-4. Amphibians at Assabet River NWR

Scientific Name	Common Name	Status	Reference
Bufo americanus	American toad		Meyer & Montemerlo 1995; Plagge 2000
Rana catesbeiana	Bull frog		Meyer & Montemerlo 1995; Plagge 2000
Rana clamitans melanota	Green frog		Meyer & Montemerlo 1995; Plagge 2000
Rana palustris	Pickerel frog		Meyer & Montemerlo 1995; Plagge 2000
Hyla c. crucifer	Spring peeper		Meyer & Montemerlo 1995; Plagge 2000
Rana sylvatica	Wood frog		Meyer & Montemerlo 1995; Plagge 2000
Hyla versicolor	Gray Tree Frog		Plagge 2000
Notophthalmus var. vurudescens	Eastern spotted newt		Meyer & Montemerlo 1995
Ambystoma laterale	Blue spotted salamander	SC	Meyer & Montemerlo 1995
Ambystoma maculatum	Spotted Salamander		Deflorio 2001
Plethodon cinereus	Red backed salamander		Meyer & Montemerlo 1995

Table F-5. Reptiles at Assabet River NWR

Scientific Name	Common Name	Status	Reference
Chelydra serpentina	Snapping Turtle		Deflorio 2001
Lampropeltis triangulum	Milk Snake		Prior 2001
Coluber c. constrictor	Northern black racer		Meyer & Montemerlo 1995
Thamnophis s. sirtalis	Eastern garter snake		Meyer & Montemerlo 1995
Nerodia sipedon sipedon	Northern water snake		Meyer & Montemerlo 1995
Diadophis punctatus edwardsi	Northern ringneck snake		Meyer & Montemerlo 1995
Clemmys guttata	Spotted turtle	SC	Meyer & Montemerlo 1995
Chrysemys p. picta	Eastern painted turtle		Meyer & Montemerlo 1995

Table F-6. Moths at Assabet River NWR

MONA#	Scientific Name	References
625F	*Oreta rosea form "irrorata"*	Mello & Peters 1992
6273	*Itame pustularia*	Mello & Peters 1992
6340	*Semiothisa minorata*	Mello & Peters 1992
6342	*Semiothisa bisignata*	Mello & Peters 1992
6570	*Aethalura intertexta*	Mello & Peters 1992
6597	*Ectropis crepuscularia*	Mello & Peters 1992
6638	*Eufidonia nototaria*	Mello & Peters 1992
6654	*Hypagyrtis unipunctata*	Mello & Peters 1992
6667	*Lomographa vestaliata*	Mello & Peters 1992
6720	*Lytrosis unitaria*	Mello & Peters 1992
6796	*Campaea perlata*	Mello & Peters 1992
6812	*Homochlodes fritillaria*	Mello & Peters 1992
6815	*Gueneria similaria*	Mello & Peters 1992
6823	*Metarranthis angularia*	Mello & Peters 1992
6837	*Probole alienaria*	Mello & Peters 1992
6964	*Tetracis cachexiata*	Mello & Peters 1992
6974	*Patelene olyzonaria*	Mello & Peters 1992
7009	*Nematocampa limbata*	Mello & Peters 1992
7071	*Chlorochlamys chloroleucaria*	Mello & Peters 1992
7139	*Cyclophora pendulinaria*	Mello & Peters 1992
7159	*Scopula limboundata*	Mello & Peters 1992
7206	*Eulithis explanata*	Mello & Peters 1992
74XX	*Eupithecia spp.*	Mello & Peters 1992
7698	*Malacosoma disstria*	Mello & Peters 1992
7701	*Malacosoma americanum*	Mello & Peters 1992
7715	*Dryocampa rubicunda*	Mello & Peters 1992
7758	*Actias luna*	Mello & Peters 1992
7886	*Darapsa pholus*	Mello & Peters 1992
8129	*Pyrrharctia isabella*	Mello & Peters 1992
8133	*Spilosoma latipennis*	Mello & Peters 1992
8140	*Hyphantria cunea*	Mello & Peters 1992
8188	*Apantesis figurata*	Mello & Peters 1992
8316	*Orgyia leucostigma*	Mello & Peters 1992
8318	*Lymantria dispar*	Mello & Peters 1992
8322	*Idia americalis*	Mello & Peters 1992
8323	*Idia aemula*	Mello & Peters 1992
8326	*Idia rotundalis*	Mello & Peters 1992
8328	*Idia julia*	Mello & Peters 1992
8329	*Idia diminuendis*	Mello & Peters 1992
8334	*Idia lubricalis*	Mello & Peters 1992
8347	*Zanclognatha obscuripennis*	Mello & Peters 1992
8355	*Chytolita morbidalis*	Mello & Peters 1992
8357	*Hormisa absorptalis*	Mello & Peters 1992
8387	*Renia sobrialis*	Mello & Peters 1992
8397	*Palthis angulalis*	Mello & Peters 1992
8442	*Bomolocha baltimoralis*	Mello & Peters 1992
8490	*Pangrapta decoralis*	Mello & Peters 1992
8491	*Ledaea perditalis*	Mello & Peters 1992
8697	*Zale minerea*	Mello & Peters 1992
8704	*Zale helata*	Mello & Peters 1992
8707	*Zale metatoides*	Mello & Peters 1992
8717	*Zale horrida*	Mello & Peters 1992
8727	*Parallelia bistriaris*	Mello & Peters 1992

Table F-7. Butterflies/Dragonflies at Assabet River NWR

Scientific Name	Common Name	Reference
Aeshna canadensis	Canada Darner	Walton 2001
Aeshna constricta	Lance tipped Dragonfly	Walton 2001
Anax junius	Green Darner	Walton 2001
Celithemis elisa	Calico Pennant	Lockwood 2001
Cercyonis pegala	Common Wood Nymph	Walton 2001
Coenonympha tullia	Common Ringlet	Walton 2001
Coenonympha tullia inornata	Inornate Ringlet	Walton 2001
Colias eurytheme	Orange Sulpher	Walton 2001
Colinas philodice	Clouded Sulpher	Walton 2001
Danaus plexippus	Monarch Catapillar	Walton 2001
Dorocordulia lepida	Petite Emerald	Lockwood 2001
Dromogomphus spinosus	Black-shrouded Spiny Legs	Lockwood 2001
Erythemis simplicicollis	Eastern Pond Hawk	Walton 2001
Everes comyntas	Eastern Tailed-blue	Walton 2001
Hesperia leonardus	Leonard's Skipper	Walton 2001
Leucorrhinia frigida	Frosted Whiteface	Lockwood 2001
Libellula cyanae	Spangled Skimmer	Walton 2001
Libellula incesta	Slaty Skimmer	Walton 2001
Libellula lucuosa	Widow Skimmer	Lockwood 2001
Libellula lydia	Common Whitetail	Lockwood 2001
Libellula pulchella	Twelve-spotted Skimmer	Lockwood 2001
Libellula quadrimaculata	Four-spotted Skimmer	Lockwood 2001
Limenitis archippus	Viceroy	Walton 2001
Lycaena phlaeas	American Copper	Walton 2001
Pachydiplax longipennis	Blue Dasher	Lockwood 2001
Perithemis tenera	Eastern Amberwing	Lockwood 2001
Phyciodes tharos	Pearl Crescent	Walton 2001
Pieris rapae	Cabbage White	Walton 2001
Polites peckius	Peck's Skipper	Walton 2001
Pompeius verna	Little Glassywing	Walton 2001
Speyeria cybele	Great Spangled Fritillary	Walton 2001
Sympetrum sp.	Meadow Hawk Dragonfly	Walton 2001
Sympetrum obtrusum	White-faced Meadowhawk	Lockwood 2001
Sympetrum rubicundulum/int	Ruddy/Cherry-faced Meadowhawk	Lockwood 2001
Sympetrum vicimum	Yellow-legged Meadowhawk	Lockwood 2001
Vanessa atalanta	Red Admiral	Walton 2001

Table F-8. Vascular Plants at Assabet River NWR

Key to "status" column notations

FE Federally Endangered
FT Federally Threatened
SE State (MA) Endangered
ST State (MA) Threatened
SC State (MA) Special Concern
WL State (MA) Watch List Species

PTERIDOPHYTES (Ferns and fern allies)

Equisetaceae

Equisetum arvense L.	Common Horsetail
Equisetum fluviatile L.	Water Horsetail
Equisetum sylvaticum L.	Wood Horsetail

Scientific Name	Common Name	Status
Lycopodiaceae		
Lycopodium clavatum L.	Staghorn Clubmoss	
Lycopodium dendroideum Michx.	Northern Tree Clubmoss	
Lycopodium digitatum Dill. ex A.Braun (= *L. flabelliforme*)	Running Pine	
Lycopodium lucidulum Michx.	Shining Clubmoss	
Lycopodium tristachyum Pursh	Northern Ground Pine	
Ophioglossaceae		
Botrychium dissectum Spreng.	Cut-Leaf Grape Fern	
Osmundaceae		
Osmunda cinnamomea L.	Cinnamon Fern	
Osmunda claytoniana L.	Interrupted Fern	
Osmunda regalis L. var. *spectabilis* (Willd.) Gray	Royal Fern	
Polypodiaceae (includes Aspleniaceae, Cyatheaceae)		
Asplenium platyneuron (L.) B.S.P. var. *platyneuron*	Ebony Spleenwort	
Athyrium filix-femina (L.) Roth subsp. *asplenioides* (Michx.) Hulten (= *A. filix-femina* var. *michauxii*)	Lady Fern	
Dennstaedtia punctilobula (Michx.) T.Moore	Hay Scented Fern	
Dryopteris cristata (L.) Gray	Crested Wood Fern	
Dryopteris intermedia (Willd.) Gray (= *D. spinulosa* var. *intermedia*)	Common Wood Fern	
Dryopteris marginalis (L.) Gray	Marginal Wood Fern	
Onoclea sensibilis L.	Sensitive Fern	
Polypodium virginianum L. (= *P. vulgare*)	Common Polypody	
Polystichum acrostichoides (Michx.) Schott	Christmas Fern	
Pteridium aquilinum (L.) Kuhn var. *latiusculum* (Desv.) Underw. ex A.Heller	Bracken Fern	
Thelypteris noveboracensis (L.) Nieuwl.	New York Fern	
Thelypteris simulata (Davenp.) Nieuwl.	Massachusetts Fern	
Thelypteris thelypteroides (Michx.) J.Holub (= *T. palustris, Dryopteris thelypteris*)	Marsh Fern	
Woodwardia virginica (L.) J.E.Smith (= *Anchistea virginica*)	Virginia Chan Fern	
GYMNOSPERMS (Cone Bearing Plants)		
Pinaceae (includes Cupressaceae)		
Chamaecyparis thyoides (L.) BSP.	Atlantic White Cedar	
Juniperus communis L.	Common Juniper	
Juniperus virginiana L.	Eastern Red Cedar	
Larix laricina (DuRoi) K.Koch	American Larch	
Picea abies (L.) Karst.	Norway Spruce	
Picea mariana (Mill.) B.S.P.	Black Spruce	
Pinus resinosa Soland. in Ait.	Red PineWL	
Pinus rigida Mill.	Pitch Pine	
Pinus strobus L.	White Pine	
Pinus sylvestris L.	Scotch Pine	
Tsuga canadensis (L.) Carriere	Northern Hemlock	
Taxaceae		
Taxus baccata L.	English Yew	
ANGIOSPERMS (Flowering Plants)		
MONOCOTYLEDONEAE (Monocots)		
Alismataceae		
Alisma subcordatum Raf.	American Water Plantain	
Sagittaria engelmanniana J.G.Smith subsp. *Engelmanniana*	Engelmann's Arrowhead	

Scientific Name	Common Name	Status
Sagittaria latifolia Willd. var. *latifolia*	Broad-Leaved Arrowhead	
Araceae		
Arisaema triphyllum (L.) Schott subsp. *Triphyllum* (= *A. triphyllum* var. *triphyllum*, *A. atrorubens*)	Jack-in-the-Pulpit	
Calla palustris L.	Water Arum	
Peltandra virginica (L.) Kunth	Arrow Arum	
Symplocarpus foetidus (L.) Salisb.	Skunk Cabbage	
Commelinaceae		
Commelina communis L. var. *ludens* (Miq.) C.B.Clarke	Deceiving Asiatic Dayflower	
Cyperaceae		
Bulbostylis capillaris (L.) C.B.Clarke	Sand Rush	
Carex annectens (Bickn.) Bickn. var. *xanthocarpa* (Kuekenth.) Wiegand	Yellow-Fruited Sedge	
Carex blanda Dewey	Woodland Sedge	
Carex brevior (Dewey) Mackenz. ex Lunell	Shorter Sedge	
Carex bromoides Schkuhr	Brome-Like Sedge	
Carex brunnescens (Pers.) Poir.	Brownish Sedge	
Carex bullata Schkuhr	Button Sedge	
Carex canescens L. var. *canescens*	Common Silvery Sedge	
Carex canescens L. var. *disjuncta* Fernald	Separated Silvery Sedge	
Carex cephalophora Muhl. ex Willd.	Oval-Headed Sedge	
Carex comosa Boott	Bottlebrush Sedge	
Carex crinita Lam.	Fringed Sedge	
Carex debilis Michx. var. rudgei L.H.Bailey	White-Edged Sedge	
Carex digitalis Willd. var. *digitalis*	Slender Wood Sedge	
Carex disperma Dewey	Soft-Leaved Sedge	
Carex emmonsii Dewey (= *C. nigromarginata* var. *minor)*	Emmon's Sedge	
Carex foenea Willd. var. *foenea* (= *C. siccata*)	Hay Sedge	
Carex gracillima Schweinitz	Graceful Sedge	
Carex gynandra Schweinitz (= *C. crinita* var. *gynandra*)	Nodding Sedge	
Carex howei MacKenz.	Howe's Sedge	
Carex intumescens Rudge var. *intumescens*	Bladder Sedge	
Carex lacustris Willd.	Lake-Bank Sedge	
Carex lanuginosa Michx. (= *C. lasiocarpa* var. *latiflora*)	Wooly Sedge	
Carex lasiocarpa Ehrh. var. *americana* Fernald	Slender Sedge	
Carex lonchocarpa Willd. (= *C. smalliana, C. folliculata*)	Long Sedge	
Carex lupulina Muhl. ex Willd.	Hop Sedge	
Carex lurida Wahlenb.	Lurid Sedge	
Carex mesochorea MacKenz.(= *C. cephalophora* var. *mesochorea*)	Midland Sedge	SE
Carex normalis MacKenz.	Larger Straw Sedge	
Carex oligosperma Michx.	Few-Seeded Sedge	ST
Carex pallescens L.	Pale Sedge	
Carex pensylvanica Lam.	Pennsylvania Sedg	
Carex radiata (Wahlenb.) Small (= *C. convoluta, C. rosea*)	Stellate Sedge	
Carex rostrata J.Stokes	Umbel-Like Sedge	
Carex scoparia Schkuhr ex Willd.	Pointed Broom Sedge	
Carex X stipata Muhl. ex Willd. var. *stipata*	Awl-Fruited Sedge	
Carex stricta Lam. var. *stricta*	Tussock Sedge	
Carex swanii (Fernald) MacKenz.	Swan's Sedge	
Carex tribuloides Wahlenb.	Blunt Broom Sedge	
Carex trisperma Dewey	Three-Fruited Sedge	
Carex vestita Willd.	Velvet Sedge	
Carex vulpinoidea Michx.	Fox Sedge	
Cyperus dentatus Torr.	Toothed Cyperus	

Scientific Name	Common Name	Status
Cyperus erythrorhizos Muhl.	Red-Rooted Cyperus	
Cyperus filiculmis Vahl	Slender Cyperus	
Cyperus rivularis Kunth (= *C. bipartitus*)	Shining Cyperus	
Cyperus strigosus L.	Straw-Colored Cyperus	
Dulichium arundinaceum (L.) Britton	Three-Way Sedge	
Eleocharis obtusa (Willd.) J.A.Schultes var. *obtusa*	Blunt Spikerush	
Eleocharis olivacea Torr.	Bright Green Spike Rush	
Eleocharis smallii Britton	Small's Spikerush	
Eleocharis tenuis (Willd.) J.A.Schultes var. *tenuis*	Slender Spikerush	
Eriophorum virginicum L.	Tawny Cottongrass	
Fimbristylis autumnalis (L.) Roem. & J.A.Schultes	Slender Fimbristylis	
Rhynchospora alba (L.) Vahl	White Beakrush	
Rhynchospora capitellata (Michx.) Vahl	Small-Headed Beakrush	
Scirpus cyperinus (L.) Kunth	Woolgrass	
Scirpus georgianus R.M.Harper (= *S. atrovirens* var. *georgianus*)	Georgia Dark-Green Bulrush	
Scirpus validus Vahl	Soft-Stem Bulrush	
Gramineae (= Poaceae)		
Agropyron repens (L.) Beauv. var. *repens* (= *A. leersianum*)	Quackgrass	
Agrostis perennans (Walter) Tuckerman var. *perennans*	Autumn Bent	
Agrostis scabra Willd. var. *scabra*	Hairgrass	
Agrostis tenuis Sibth. var. *tenuis*	Rhode Island Bent	
Alopecurus aequalis Sobol. var. *aequalis*	Short-Awn Foxtail	
Alopecurus pratensis	Meadow Foxtail	
Andropogon gerardii Vitman var. *gerardii*	Big Bluestem	
Anthoxanthum odoratum L.	Sweet Vernalgrass	
Aristida dichotoma Michx.	Poverty Grass	
Aristida oligantha Michx.	Prairie Three-Awn	
Brachyelytrum erectum (Schreb.) Beauv. var. *septentrionale* W.K.Babel (= *B. septentrionale*)	Bearded Short-Husk	
Bromus inermis Leyss. var. *inermis*	Smooth Brome	
Calamagrostis canadensis (Michx.) Beauv. var. *canadensis*	Bluejoint Grass	
Calamagrostis cinnoides W.Barton nomen superfl.	Reedgrass	
Cinna arundinacea L. var. *arundinacea*	Stout Woodreed	
Dactylis glomerata L. var. *glomerata*	Orchard Grass	
Danthonia spicata (L.) Beauv. ex Roem. & J.A.Schultes	Common Wild Oatgrass	
Deschampsia flexuosa (L.) Trin.	Common Hairgrass	
Dichanthelium acuminatum (Swartz) Gould & C.A.Clark (= *Panicum acuminatum*) var. *implicatum* (Scribn.) Gould & C.A.Clark (= *Panicum auburne, P.implicatum, P. lanuginosum* var. *implicatum, P. meridionale*)	Slender-Stemmed Panic Grass	
Dichanthelium acuminatum (Swartz) Gould & C.A.Clark (= *Panicum acuminatum*) var. *lindheimeri* (Nash) Gould & C.A.Clark (= *Panicum lindheimen*)	Lindheimer's Panic Grass	
Dichanthelium clandestinum (L.) Gould (= *Panicum clandestinum*)	Deer-Tongue Grass	
Dichanthelium depauperatum (Muhl.) Gould (= *Panicum depauperatum*)	Poverty Panic Grass	
Dichanthelium dichotomum (L.) Gould (= *Panicum dichotomum*) var. *dichotomum*	Forked Panic Grass	
Dichanthelium linearifolium (Scribn.) Gould (= *Panicum linearifolium*)	Low White-Haired Panic Grass	
Dichanthelium oligosanthes (J.A.Schultes) Gould var. *scribnerianum* (Nash) Gould (= Panicum oligosanthes var. scribnerianum, P. scribnerianum)	Scribner's Panic Grass	
Dichanthelium sabulorum (Lam.) Gould & C.A.Clark var. thinium (A.Hitchc. & Chase) Gould & C.A.Clark (= Panicum columbianum)	American Panic Grass	
Dichanthelium sphaerocarpon (Elliott) Gould var. *sphaerocarpon* (= *Panicum sphaerocarpon*)	Round-Fruited Panic Grass	
Digitaria ischaemum (Schreb.) Schreb. ex Muhl. var. *ischaemum*	Smooth Crabgrass	

Scientific Name	Common Name	Status
Digitaria sanguinalis (L.) Scop.	Tall Crabgrass	
Echinochloa muricata (Beauv.) Fernald var. *muricata*	Barnyard Grass	
Eragrostis capillaris (L.) Nees	Lacegrass	WL
Eragrostis pectinacea (Michx.) Nees Comb-Like	Lovegrass	
Eragrostis spectabilis (Pursh) Steud.	Purple Lovegrass	
Festuca arundinacea Schreb. (= *F. elatior*)	Reed Fescue	
Festuca rubra L. var. *commutata Gaudin*	Chewing's Fescue	
Festuca rubra L. var. *rubra*	Red Fescue	
Festuca tenuifolia Sibth. (= *F. capillata*)	Hair Fescue	
Glyceria acutiflora Torr.	Sharp-Scaled Mannagrass	
Glyceria canadensis (Michx.) Trin. var. *canadensis*	Rattlesnake Grass	
Glyceria obtusa (Muhl.) Trin.	Blunt Mannagrass	
Glyceria striata (Lam.) A.Hitchc. var. *striata*	Fowl Mannagrass	
Leersia oryzoides (L.) Swartz	Rice Cutgrass	
Leersia virginica Willd. var. *ovata* (Poir.) Fernald	White Grass	
Lolium perenne L. var. *multiflorum* (Lam.) R.Parnell (= *L. multiflorum*)	Awned Ryegrass	
Lolium perenne L. var. *perenne*	Perennial Ryegrass	
Muhlenbergia frondosa (Poir.) Fernald	Wirestem Muhly	
Muhlenbergia mexicana (L.) Trin.	Satingrass	
Muhlenbergia schreberi J.F.Gmel. var. *schreberi*	Nimblewill	
Muhlenbergia uniflora (Muhl.) Fernald	One-Flowered Muhly	
Panicum capillare L. var. *capillare*	Witchgrass	
Panicum dichotomiflorum Michx. var. *dichotomiflorum*	Common Smooth Panic Grass	
Panicum dichotomiflorum Michx. var. *geniculatum* (A.Wood) Fernald	Bent Smooth Panic Grass	
Panicum philadelphicum Bernh. ex Nees var. *philadelphicum*	Philadelphia Panic-grass (Wood Witchgrass)	SC
Panicum rigidulum Bosc ex Nees (= *P. agrostoides*)	Red Top Panic Grass	
Paspalum setaceum Michx. var. *muhlenbergii* (Nash) D.Banks (= *P. ciliatifolium var. muhlenbergii, P. pubescens*)	Slender Beadgrass	
Phalaris arundinacea L. (= *P. arundinacea* var. *picta*)	Reed Canary Grass	
Phleum pratense L. var. *nodosum* (L.) Huds.	Knotty Timothy	
Phleum pratense L. var. *pratense*	Common Timothy	
Phragmites australis (Cav.) Trin. ex Steud. (= *P. communis*)	Common Reed	
Poa angustifolia L.	Slender-Leaved Bluegrass	
Poa annua L. var. *annua*	Annual Bluegrass	
Poa compressa L.	Canada Bluegrass	
Poa pratensis L.	Kentucky Bluegrass	
Puccinellia fernaldii (A.Hitchc.) E.G.Voss (= *Glyceria fernaldii*)	Fernald's Mannagrass	
Schizachyrium scoparium (Michx.) Nash (= *Andropogon scoparius*) var. *frequens* (F.T.Hubb.) Gould (= *A. scoparius* var. *septentrionalis*) Frequent	Little Bluestem	
Schizachyrium scoparium (Michx.) Nash (= *Andropogon scoparius*) var. *scoparium*	Common Little Bluestem	
Secale cereale L.	Rye	
Setaria glauca (L.) Beauv. (=*S. lutescens*)	Yellow Foxtail	
Setaria viridis (L.) Beauv.	Green Foxtail	
Spartina pectinata Link var. *pectinata*	Prairie Cordgrass	
Iridaceae		
Iris X germanica L.	Fleur-de-Lis	
Iris pseudacorus L.	Yellow Iris	
Iris versicolor L.	Blue Flag	
Sisyrinchium atlanticum Bickn.	Eastern Blue-Eyed Grass	
Sisyrinchium montanum Greene	Montane Blue-Eyed Grass	
Juncaceae		
Juncus brevicaudatus Anon.	Narrow-Panicled Rush	
Juncus bufonius L. var. *bufonius*	Toad Rush	

Scientific Name	Common Name	Status
Juncus canadensis J.Gay	Marsh Rush	
Juncus effusus L. var. *solutus* Fernald & Wiegand	Soft Rush	
Juncus greenei Oakes & Tuckerman	Greene's Rush	
Juncus marginatus Rostk. var. *marginatus*	Grass Rush	
Juncus pelocarpus E.Meyer	Brown-Fruited Rush	
Juncus secundus Beauv.	Secund Rush	
Juncus tenuis Willd. var. *tenuis* (= *J. tenuis* var. *antholatus*)	Path Rush	
Luzula multiflora (Ehrh. ex Hoffm.) Lej. (= *L. campestris* var. *multiflora*)	Field Woodrush	
Lemnaceae		
Lemna minor L.	Lesser Duckweed	
Spirodela polyrhiza (L.) Schleid.	Giant Duckweed	
Wolffia columbiana Karst.	Watermeal	
Liliaceae (includes Smilacaceae)		
Asparagus officinalis L.	Asparagus	
Clintonia borealis (Ait.) Raf.	Corn Lily	
Convallaria majalis L. var. *majalis*	Lily-of-the-Valley	
Erythronium umbilicatum C.R.Parks & J.W.Hardin (= *E. americanum*)	Trout Lily	
Hemerocallis fulva (L.) L.	Yellow Day Lily	
Hemerocallis lilioasphodelus L. (= *H. flava*)	Orange Day Lily	
Hosta ventricosa (Salisb.) Stearn	Plantain Lily	
Lilium canadense L. subsp. *canadense*	Canada Lily	
Lilium tigrinum Ker-Gawl.	Tiger Lily	
Maianthemum canadense Desf. var. *canadense*	False Lily-of-the-Valley	
Medeola virginiana L.	Indian Cucumber Root	
Muscari botryoides (L.) Mill.	Grape Hyacinth	
Ornithogalum umbellatum L.	Star-of-Bethlehem	
Polygonatum biflorum (Walter) Elliott var. *biflorum*	Common Solomon's Seal	
Polygonatum pubescens (Willd.) Pursh	Hairy Solomon's Seal	
Scilla nonscripta (L.) Hoffmanns. & Link (= *Endymion non-scriptus*)	English Bluebell	
Smilacina racemosa (L.) Desf. var. *cylindrata*	Fernald Cylindrical False Solomon's Seal	
Smilacina racemosa (L.) Desf. var. *racemosa*	Common False Solomon's Seal	
Smilax herbacea L.	Carrion Flower	
Smilax rotundifolia L. var. *rotundifolia*	Common Greenbrier	
Trillium cernuum L.	Nodding Trillium	
Uvularia sessilifolia L.	Sessile-Leaved Bellwort	
Yucca filamentosa L. var. *smalliana* (Fernald) H.E.Ahles	Spanish Bayonet	
Orchidaceae		
Cypripedium acaule Ait.	Pink Lady's Slipper	
Epipactis helleborine (L.) Crantz	Helleborine	
Goodyera pubescens (Willd.) R.Br.	Downy Rattlesnake Plantain	
Goodyera tesselata Loddig.	Checkered Rattlesnake Plantain	
Platanthera grandiflora (Bigel.) Lindl. (= *Habenaria fimbriata*, *P. fimbriata*)	Large Purple Fringed Orchid	
Platanthera lacera (Michx.) G.Don (= *Habenaria lacera*)	Ragged Fringed Orchid	
Spiranthes cernua (L.) L.C.Rich.	Nodding Lady's Tresses	
Pontederiaceae		
Pontedaria cordata L. var. *cordata*	Pickerelweed	
Potamogetonaceae (= Zosteraceae)		
Potamogeton diversifolius Raf. (= *P. capillaceus*)	Rafinesque's Pondweed	
Potamogeton pusillius L. var. *pusillus* (= *P. pusillus* var. *minor*)	Small Pondweed	
Potamogeton spirillus Tuckerman (= *P. dimorphus*)	Spiral Pondweed	
Sparganiaceae		
Sparganium americanum Nutt.	Nuttall's Bur-Reed	
Typhaceae		
Typha X glauca Godr.	Glaucous Cattail	

Scientific Name	Common Name	Status
Typha latifolia L.	Broad-Leaf Cattail	
Ulmaceae (= Celtidaceae)		
Ulmus americana L.	American Elm	
Ulmus glabra Huds.	Witch Elm	
Ulmus parvifolia Jacq.	Chinese Elm	
Xyridaceae		
Xyris torta J.E.Smith	Slender Yellow-Eyed Grass	
DICOTYLEDONEAE (Dicots)		
Aceraceae		
Acer platanoides	Norway Maple	
Acer rubrum r*ubrum* var. *rubrum*	Red Maple	
Acer saccharum Marshall subsp. s*accharum* var. *saccharum*	Sugar Maple	
Aizoaceae (includes Molluginaceae)		
Mollugo verticillata L.	Carpetweed	
Amaryliidaceae		
Hypoxis hirsuta (L.)	Coville Stargrass	
Narcissus poeticus L.	Poet's Narcissus	
Narcissus pseudonarcissus L.	Daffodil	
Anacardiaceae		
Rhus copallinum L. var. *copallinum*	Winged Sumac	
Rhus glabra L.	Smooth Sumac	
Rhus typhina L.	Staghorn Sumac	
Toxicodendron radicans (L.) Kuntze (= *Rhus radicans*)	Poison Ivy	
Toxicodendron vernix (L.) Kuntze (= *Rhus vernix*)	Poison Sumac	
Apocynaceae		
Apocynum androsaemifolium L.	Spreading Dogbane	
Apocynum cannabinum L.	Indian Hemp	
Vinca minor L.	Common Periwinkle	
Aquifoliaceae		
Ilex laevigata (Pursh) Gray	Smooth Winterberry	
Ilex verticillata (L.) Gray	Common Winterberry	
Nemopanthus mucronatus (L.) Trelease	Mountain Holly	
Araliaceae		
Aralia hispida Ventenat	Bristly Sarsaparilla	
Aralia nudicaulis L.	Wild Sarsaparilla	
Hedera helix L.	English Ivy	
Asclepiadaceae		
Asclepias exaltata L.	Poke Milkweed	
Asclepias incarnata L. var. *pulchra* (Ehrh.) Pers.	Swamp Milkweed	
Asclepias syriaca L. var. *syriaca*	Common Milkweed	
Cynanchum nigrum (L.) Pers.	Black Swallowwort	
Balsaminaceae		
Impatiens capensis Meerb.Spotted	Touch-Me-Not	
Berberidaceae		
Berberis thunbergii DC.	Japanese Barberry	
Berberis vulgaris L.	Common Barberry	
Betulaceae (= Corylaceae)		
Alnus rugosa (DuRoi) Spreng.	Speckled Alder	
Alnus serrulata (Dryand. in Ait.) Willd.	Smooth Alder	
Betula alleghaniensis Britton (= *B. lutea*)	Yellow Birch	
Betula lenta L.	Black Birch	
Betula papyrifera Marshall var. *papyrifera*	Paper Birch	
Betula populifolia Marshall	Gray Birch	
Corylus americana Walter var. *americana*	American Hazelnut	

Scientific Name	Common Name	Status
Bignoniaceae		
Campsis radicans (L.) Seem.	Trumpet Creeper	
Catalpa speciosa (Warder ex Barney) Warder ex Engelm	Catawba Tree	
Boraginaceae		
Myosotis scorpioides L.	True Forget-Me-Not	
Campanulaceae (includes Lobeliaceae)		
Campanula aparinoides Pursh	Marsh Bellflower	
Campanula rapunculoides L.	Creeping Bellflow	
Lobelia cardinalis L. subsp. *cardinalis* var. *cardinalis*	Cardinal Flower	
Lobelia inflata L.	Indian Tobacco	
Lobelia spicata Lam. var. *spicata*	Pale-Spiked Lobelia	
Caprifoliaceae		
Diervilla lonicera Mill.	Bush Honeysuckle	
Lonicera X bella Zabel	Bella Honeysuckle	
Lonicera japonica Thunb.	Japanese Honeysuckle	
Lonicera morrowii Gray	Morrow Honeysuckle	
Sambucus canadensis L. var. *canadensis*	Black Elderberry	
Viburnum acerifolium L.	Maple-Leaf Viburnum	
Viburnum cassinoides L.	Wild Raisin	
Viburnum lentago L.	Nannyberry	
Viburnum recognitum Fernald var. *recognitum*	Arrowwood	
Caryophyllaceae		
Cerastium semidecandrum L.	Small Mouse-Ear Chickweed	
Cerastium vulgatum L.	Common Mouse-Ear Chickweed	
Dianthus armeria L.	Deptford Pink	
Gypsophila muralis L.	Baby's Breath	
Saponaria officinalis L.	Bouncing Bet	
Silene pratensis (Rafn) Gren. & Godr. (= *Lychnis alba*)	White Campion	
Spergularia rubra (L.) J. & K.Presl	Common Sand Spurry	
Stellaria calycantha (Ledeb.) Bong. (= *S. borealis*)	Northern Starwort	WL
Stellaria graminea L.	Common Stitchwort	
Stellaria media (L.) Villars	Common Chickweed	
Celastraceae		
Celastrus orbiculata Thunb.	Asiatic Bittersweet	
Celastrus scandens L.	American Bittersweet	
Euonymus alatus (Thunb.) Siebold	Winged Spindle Tree	
Ceratophyllaceae		
Ceratophyllum demersum L.	Coontail	
Chenopodiaceae		
Chenopodium album L. var. *album*	Lamb's-Quarters	
Chenopodium album L. var. *lanceolatum* (Muhl. ex Willd.) Coss. & Germ. (= *C. lanceolatum*)	Lanceolate Pigweed	
Cistaceae		
Helianthemum bicknellii Fernald	Hoary Frostweed	
Helianthemum canadense (L.) Michx.	Long-Branched Frostweed	
Lechea intermedia Leggett ex Britton	Large-Podded Pinweed	
Lechea maritima Leggett ex B.S.P. var. *maritima*	Beach Pinweed	
Lechea tenuifolia Michx. var. *tenuifolia*	Slender Pinweed	
Lechea villosa Elliott	Hairy Pinweed	
Clethraceae		
Clethra alnifolia L. var. *alnifolia*	Sweet Pepperbush	
Compositae (= Asteraceae)		
Achillea millefolium L.	Common Yarrow	
Ambrosia artemisiifolia L. var. *elatior* (L.) Descourt.	Ragweed	

Scientific Name	Common Name	Status
Anaphalis margaritacea (L.) Benth. & J.D.Hook var. *margaritacea*	Pearly Everlasting	
Antennaria neglecta Greene var. *attenuata* (Fernald) Cronq. (= *A. brainerdii, A. neodioica*)	Attenuate Pussytoes	
Antennaria neglecta Greene var. *randii* (Fernald) Cronq. (= *A. canadensis*)	Rand's Pussytoes	
Arctium minus Bernh.	Common Burdock	
Artemisia vulgaris L.	Common Mugwort	
Aster acuminatus Michx.	Whorled Wood Aster	
Aster cordifolius L. var. *cordifolius*	Blue Wood Aster	
Aster divaricatus L.	White Wood Aster	
Aster dumosus L. var. *dumosus*	Bushy Aster	
Aster ericoides L. var. *ericoides*	Heath Aster	
Aster lateriflorus (L.) Britton var. *pendulus* (Ait.) Burgess	Calico Aster	
Aster linariifolius L.	Stiff-Leaf Aster	
Aster macrophyllus L.	Big-Leaf Aster	
Aster novae-angliae L.	New England Aster	
Aster novi-belgii L. var. *novi-belgii*	New York Aster	
Aster puniceus L. var. *puniceus*	Purple-Stemmed Aster	
Aster umbellatus Mill. var. *umbellatus*	Flat-Top White Aster	
Aster undulatus L.	Wavy-Leaf Aster	
Aster vimineus Lam. var. *vimineus*	Small White Aster	
Bidens cernua L. var. *cernua*	Bur Marigold	
Bidens connata Muhl. ex Willd. var. *petiolata* (Nutt.) Farw.	Swamp Beggar-Ticks	
Bidens discoidea (Torr. & Gray) Britton	Small Beggar-Ticks	WL
Bidens frondosa L. var. *frondosa*	Common Beggar-Ticks	
Bidens tripartita L.	European Beggar-Ticks	
Centaurea maculosa Lam.	Spotted Knapweed	
Cichorium intybus L.	Chicory	
Cirsium vulgare (Savi) Tenore	Bull Thistle	
Conyza canadensis (L.) Cronq. var. *canadensis* (= *Erigeron canadensis*)	Horseweed	
Erechtites hieraciifolia (L.) Raf. ex DC. var. *hieraciifolia*	Pilewort	
Erigeron annuus (L.) Pers.	Annual Daisy Fleabane	
Erigeron pulchellus Michx. var. *pulchellus*	Robin's Plantain	
Erigeron strigosus Muhl. ex Willd. var. *strigosus*	Strigose Daisy Fleabane	
Eupatoriadelphus dubius (Willd. Ex Poir.) R.M.King & H. Rob (=*Eupatorium dubium*)	Purple Boneset	
Eupatorium perfoliatum L. var. *perfoliatum*	Thoroughwort	
Filaginella uliginosa (L.) Opiz (= Gnaphalium uliginosum)	Low Cudweed	
Galinsoga quadriradiata Ruiz & Pavon (= *G. ciliata*)	Ciliate Quickweed	
Gnaphalium obtusifolium L. var. *obtusifolium*	Sweet Everlasting	
Hieracium aurantiacum L.	Orange Hawkweed	
Hieracium canadense Michx. var. *fasciculatum* (Pursh) Fernald (= *H. kalmii*)	Canada Hawkweed	
Hieracium flagellare Willd.	Whiplash Hawkweed	
Hieracium florentinum All. (= *H. piloselloides*)	King Devil	
Hieracium paniculatum L.	Panicled Hawkweed	
Hieracium pilosella L.	Mouse-Ear Hawkweed	
Hieracium pratense Tausch	Field Hawkweed	
Hieracium scabrum Michx. var. *scabrum*	Rough Hawkweed	
Krigia virginica (L.) Willd.	Dwarf Dandelion	
Lactuca biennis (Moench) Fernald	Blue Lettuce	
Lactuca canadensis L. var. *latifolia* Kuntze	Wild Lettuce	
Leontodon autumnalis L. var. *autumnalis*	Fall Dandelion	
Leucanthemum vulgare Lam. (= *Chrysanthemum leucanthemum*)	Ox-Eye Daisy	
Liatris borealis Nutt.	New England Blazing Star	SC
Matricaria chamomilla L.	Wild Chamomile	
Prenanthes trifoliata (Cass.) Fernald var. *trifoliata*	Gall-of-the-Earth	

Scientific Name	Common Name	Status
Rudbeckia serotina Nutt. non Sweet var. *serotina*	Black-Eyed Susan	
Senecio aureus L.	Golden Ragwort	
Solidago bicolor L.	White Goldenrod	
Solidago caesia L.	Blue-Stem Goldenrod	
Solidago canadensis L. var. *canadensis*	Canada Goldenrod	
Solidago gigantea Ait. var. *gigantea*	Common Late Goldenrod	
Solidago juncea Ait.	Early Goldenrod	
Solidago nemoralis Ait. var. *nemoralis*	Gray Goldenrod	
Solidago nuttallii Greene (= *S. graminifolia var. nuttallii*)	Nuttall's Flat-Top Goldenrod	
Solidago odora Ait. var. *odora*	Sweet Goldenrod	
Solidago puberula Nutt. var. *puberula*	Downy Goldenrod	
Solidago rugosa Mill. subsp. *Aspera* var. *villosa* (Pursh) Fernald	Villose Rough Goldenrod	
Solidago rugosa Mill. subsp. *Rugosa* var. *rugosa*	Common Rough Goldenrod	
Solidago uliginosa Nutt. var. *uliginosa*	Swamp Goldenrod	
Tanacetum vulgare L.	Tansy	
Taraxacum officinale G.H.Weber	Common Dandelion	
Tragopogon dubius Scop.	Goat's Beard	
Tussilago farfara L.	Coltsfoot	
Convolvulaceae (includes Cuscutaceae)		
Calystegia sepium (L.) R.Br. subsp. *Sepium (= Convolvulus sepium)*	Hedge Bindweed	
Cuscuta cephalanthi Engelm.	Buttonbush Dodder	
Cuscuta compacta Juss. ex Choisy var. *compacta*	Compact Dodder	
Cuscuta gronovii Willd. ex J.A.Schultes var. *gronovii*	Gronovious' Dodder	
Cornaceae (includes Nyssaceae)		
Cornus alternifolia L.F.	Alternate-Leaved Dogwood	
Cornus amomum Mill. subsp. *amomum*	Silky Dogwood	
Cornus canadensis L.	Bunchberry	
Cornus florida L.	Flowering Dogwood	
Cornus foemina Mill. subsp. *racemosa* (Lam.) J.S.Wilson (= *C. racemosa*)	Gray Dogwood	
Nyssa sylvatica Marshall var. *sylvatica*	Black Gum	
Crassulaceae		
Sedum purpureum (L.) J.A.Schultes	Purple Live-Forever	
Sedum spurium M.Bieb.	Two-Row Stonecrop	
Cruciferae (= Brassicaceae)		
Barbarea vulgaris R.Br. in W.T.Ait.	Yellow Cress	
Cardamine pensylvanica Muhl. ex Willd. var. *pensylvanica*	Pennsylvania Bittercress	
Erysimum cheiranthoides L. subsp. *Cheiranthoides*	Wormseed Mustard	
Lepidium campestre (L.) R.Br. in W.T.Ait.	Cow Cress	
Lepidium densiflorum Schrad. var. *densiflorum*	Bird's Peppergrass	
Lepidium virginicum L. var. *virginicum*	Wild Peppergrass	
Droseraceae		
Drosera intermedia Hayne	Narrow-Leaf Sundew	
Drosera rotundifolia L. var. *rotundifolia*	Round-Leaf Sundew	
Elaeagnaceae		
Elaeagnus umbellata Thunb.	Asiatic Silverberry	
Ericaceae		
Chamaedaphne calyculata (L.) Moench	Leatherleaf	
Epigaea repens L.	Trailing Arbutus	
Gaultheria procumbens L.	Wintergreen	
Gaylussacia baccata (Wangenh.) K.Koch	Black Huckleberry	
Gaylussacia frondosa (L.) Torr. & Gray var. *frondosa*	Dangleberry	
Kalmia angustifolia L.	Sheep Laurel	
Kalmia latifolia L.	Mountain Laurel	
Leucothoe racemosa (L.) Gray	Swamp Sweetbells	

Scientific Name	Common Name	Status
Lyonia ligustrina (L.) DC. var. *ligustrina*	Maleberry	
Rhododendron canadense (L.) B.S.P.	Rhodora	
Rhododendron viscosum (L.) Torr. var. *viscosum*	Swamp Azalea	
Vaccinium angustifolium Ait.	Late Lowbush Blueberry	
Vaccinium corymbosum L. (= *V. atrococcum*)	Highbush Blueberry	
Vaccinium macrocarpon Ait.	Large Cranberry	
Vaccinium oxycoccos L.	Small Cranberry	
Vaccinium vacillans Torr. var. *vacillans*	Early Lowbush Blueberry	
Euphorbiaceae		
Acalypha rhomboidea Raf. Rhombic	Three-Seeded Mercury	
Euphorbia cyparissias L.	Cypress Spurge	
Euphorbia maculata L. (= *E. supina, Chamaesycemaculata*)	Spotted Spurge	
Fagaceae		
Castanea dentata (Marshall) Borkh.	American Chestnut	
Fagus grandifolia Ehrh.	American Beech	
Fagus sylvatica L.	European Beech	
Quercus alba L.	White Oak	
Quercus bicolor Willd.	Swamp White Oak	
Quercus coccinea Muenchh.	Scarlet Oak	
Quercus ilicifolia Wangenh.	Scrub Oak	
Quercus prinoides Willd.	Dwarf Chestnut Oak	
Quercus rubra L.	Red Oak	
Quercus velutina Lam.	Black Oak	
Gentianaceae		
Bartonia virginica (L.) B.S.P.	Bartonia	
Geraniaceae		
Geranium maculatum L.	Wild Geranium	
Guttiferae (= Hypericaceae, Clusiaceae)		
Hypericum boreale (Britton) Bickn.	Northern St. John's-Wort	
Hypericum canadense L. Common	Canadian St. John's-Wort	
Hypericum dissimulatum Bickn.	Disguised St. John's-Wort	
Hypericum ellipticum Hook.	Pale St. John's-Wort	
Hypericum gentianoides (L.)	B.S.P. Pineweed	
Hypericum mutilum L.	Dwarf St. John's-Wort	
Hypericum perforatum L.	Common St. John's Wort	
Hypericum punctatum Lam.	Spotted St. John's Wort	
Triadenum virginianum (L.) Raf. (= *Hypericum virginianum*)	Common Marsh St. John's-Wort	
Halorrhagidaceae (includes Myriophyllaceae)		
Myriophyllum humile (Raf.) Morong	Low Water Milfoil	
Proserpinaca palustris L. var. *crebra* Fernald & Griscom	Mermaid Weed	
Hamamelidaceae		
Hamamelis virginiana L.	Witch Hazel	
Hippocastanaceae		
Aesculus hippocastanum L.	Horsechestnut	
Juglandaceae		
Carya glabra (Mill.) Sweet var. *glabra*	Common Pignut Hickory	
Carya ovalis (Wangenh.) Sarg. var. *ovalis*	Sweet Pignut Hickory	
Carya ovata (Mill.) K.Koch var. *ovata*	Shagbark Hickory	
Juglans cinerea L.	Butternut	
Labiatae (= Lamiaceae)		
Ajuga reptans L.	Bugle	
Glecoma hederacea L.	Ground Ivy	
Lamium purpureum L.	Purple Dead-Nettle	
Leonurus cardiaca L.	Motherwort	
Lycopus americanus Muhl. ex W.Barton var. *americanus*	Cut-Leaved Water Horehound	
Lycopus uniflorus Michx.	Northern Water Horehound	

Scientific Name	Common Name	Status
Lycopus virginicus L.	Bugleweed	
Mentha arvensis L. var. *glabrata* (Benth.) Fernald (= *M. arvensis* var. *villosa f. glabrata*)	Glabrate Field Mint	
Prunella vulgaris L. subsp. *lanceolata* (W.Barton) Hulten (= *P. vulgaris* var. l*anceolata*)	Lanceolate Heal-All	
Prunella vulgaris L. subsp. *vulgaris* (= *P. vulgaris* var. *vulgaris*)	Common Heal-All	
Pycnanthemum muticum (Michx.) Pers.	Short Toothed Mountain Mint	
Pycnanthemum tenuifolium Schrad.	Narrow-Leaved Mountain Mint	
Scutellaria galericulata L. var. *galericulata* (= *S. epilobifolia*)	Common Skullcap	
Scutellaria laterifolia L.	Mad-Dog Skullcap	
Thymus serpyllum L.	Wild Thyme	
Trichostema dichotomum L.	Blue Curls	
Lauraceae		
Sassafras albidum (Nutt.) Nees	Sassafras	
Leguminosae (= Fabaceae; includes Caesalpiniaceae, Papilionaceae)		
Amphicarpaea bracteata (L.) Fernald var. *bracteata*	Hog Peanut	
Apios americana Medik. var. *americana*	Groudnut	
Baptisia tinctoria (L.) R.Br. var. *tinctoria*	Wild Indigo	
Desmodium canadense (L.) DC.	Giant Tick Trefoil	
Desmodium dillenii Darl.	Dillen's Tick Trefoil	
Desmodium glutinosum (Muhl. ex Willd.) A.Wood	Sticky Tick Trefoil	
Desmodium paniculatum (L.) DC. var. *paniculatum*	Panicled Tick Trefoil	
Lespedeza capitata Michx.	Round-Headed Bush Clover	
Lespedeza hirta (L.) Hornem. subsp. *Hirta*	Hairy Bush Clover	
Medicago sativa L.	Alfalfa	
Melilotus alba Medik.	White Sweet Clover	
Robinia hispida L.	Bristly Locust	
Robinia pseudo-acacia L. var. *pseudo-acacia*	Black Locust	
Tephrosia virginiana (L.) Pers. var. *virginiana*	Goat's-R ue	
Trifolium arvense L.	Rabbit's-Foot Clover	
Trifolium aureum Pollich (= *T. agrarium*)	Yellow Clover	
Trifolium dubium Sibth.	Least Hop Clover	
Trifolium hybridum L.	Alsike Clover	
Trifolium pratense L.	Red Clover	
Trifolium repens L.	White Clover	
Vicia cracca L.	Cow Vetch	
Vicia tetrasperma (L.) Moench	Lentil Vetch	
Wisteria macrostachya (Torr. & Gray) Nutt. ex B.Rob & Fernald	Kentucky Wisteria	
Lentibulariaceae		
Utricularia gibba L.	Cone-Spur Bladderwort	
Utricularia intermedia Hayne	Flat-Leaved Bladderwort	
Utricularia macrorhiza Leconte (= *U. vulgaris*)	Common Bladderwort	
Utricularia purpurea Walter	Purple Bladderwort	
Utricularia radiata Small	Small Floating Bladderwort	
Lythraceae		
Decodon verticillatus (L.) Elliott	Water Willow	
Lythrum salicaria L.	Purple Loosestrife	
Melastomataceae		
Rhexia virginica L.	Meadow-Beauty	
Moraceae (includes Cannabaceae)		
Humulus japonicus Siebold & Zuccar.	Japanese Hops	
Morus alba L.	White Mulberry	
Myricaceae		
Myrica aspleniifolia L. (= *Comptonia peregrina*)	Sweet Fern	
Myrica gale L.	Sweet Gale	
Myrica pensylvanica Loiseleur	Northern Bayberry	

Scientific Name	Common Name	Status
Nymphaceae (includes Cabombaceae)		
Brasenia schreberi J.F.Gmel.	Water Shield	
Nuphar luteum L.Sibth. & J.E.Smith subsp. *variegatum* (Engelm. ex G.W.Clinton) E.O.Beal (= *N. variegatum*)	Yellow Lotus	
Nymphaea odorata Soland. in Ait. var. *odorata*	White Water Lily	
Oleaceae		
Forsythia viridissima Lindl.	Golden Bells	
Fraxinus americana L.	White Ash	
Syringa vulgaris L.	Lilac	
Onagraceae		
Circaea lutetiana L. subsp. *canadensis* (L.) Aschers. & Magnus (= *C. quadrisulcata*)	Common Enchanter's Nightshade	
Epilobium ciliatum Raf. subsp. *glandulosum* (Lehm.) P.C.Hoch (= *E. adenocaulon, E. glandulosum*)	Northern Willow-Herb	
Epilobium leptophyllum Raf.	Narrow-Leaved Willow-Herb	
Ludwigia palustris (L.) Elliott	Water Purslane	
Oenothera biennis L.	Common Evening Primrose	
Orobanchaceae		
Orobanche uniflora L. subsp. *uniflora* var. *uniflora*	One-Flowered Cancer Root	
Oxalidaceae		
Oxalis stricta L. (= *O. europea*)	Yellow Wood Sorre	
Papaveraceae		
Chelidonium majus L.	Greater Celandine	
Phytolaccaceae		
Phytolacca americana L.	Pokeweed	
Plantaginaceae		
Plantago aristata Michx.	Bracted Plantain	
Plantago lanceolata L.	English Plantain	
Plantago major L. var. *major*	Common Plantain	
Plantago rugelii Decne.	Pale Plantain	
Polemoniaceae		
Phlox subulata L. var. *subulata*	Moss Phlox	
Polygalaceae		
Polygala paucifolia Willd.	Fringed Milkwort	
Polygala sanguinea L.	Field Milkwort	
Polygonaceae		
Polygonella articulata (L.) Meisn.	Jointweed	
Polygonum arifolium L var. *pubescens* (R.Keller) Fernald	Halbeard-Leaved Tearthumb	
Polygonum aviculare L.	Prostrate Knotweed	
Polygonum careyi Olney	Carey's Pinkweed	
Polygonum cuspidatum Siebold & Zuccar.	Japanese Knotweed	
Polygonum hydropiper L.	Common Smartweed	
Polygonum hydropiperoides Michx.	Mild Water Pepper	
Polygonum pensylvanicum L.	Pennsylvania Pinkweed	
Polygonum persicaria L.	Lady's Thumb	
Polygonum punctatum Elliott var. *leptostachyum* Small nomen superfl.	Slender-Spiked Dotted Smartweed	
Polygonum punctatum Elliott var. *punctatum*	Common Dotted Smartweed	
Polygonum sagittatum L.	Arrow-Leaved Tearthumb	
Polygonum scandens L. var. *scandens*	Climbing False Buckwheat	
Rheum rhaponticum L. (= *R. rhabarbarum*)	Rhubarb	
Rumex acetosella L.	Sheep Sorrel	
Rumex crispus L.	Curly Dock	
Rumex obtusifolius L. subsp. *obtusifolius*	Bitter Dock	
Rumex orbiculatus Gray	Great Water Dock	
Primulaceae		
Lysimachia ciliata L.	Fringed Loosestrife	

Scientific Name	Common Name	Status
Lysimachia hybrida Michx.	Hybrid Loosestrife	
Lysimachia nummularia L.	Moneywort	
Lysimachia quadrifolia L.	Whorled Loosestrife	
Lysimachia terrestris (L.) B.S.P.	Swamp Candles	
Trientalis borealis Raf.	Starflower	
Pyrolaceae (includes Monotropaceae)		
Chimaphila maculata (L.) Pursh var. *maculata*	Spotted Wintergreen	
Chimaphila umbellata (L.) W.Barton var. *cisatlantica* Blake	Pipsissewa	
Hypopitys monotropa Crantz (= *Hypopithys monotropa, Monotropa hypopitys*)	Pinesap	
Monotropa uniflora L.	Indian Pipe	
Pyrola chlorantha Swartz (= *P. virens*)	Greenish-Flowered Wintergreen	
Pyrola elliptica Nutt.	Shinleaf	
Pyrola rotundifolia L. var. *americana* (Sweet) Fernald (= *P. americana*)	Round-Leaf American Wintergreen	
Ranunculaceae		
Anemone quinquefolia L.	Wood Anemone	
Aquilegia canadensis L.var. *canadensis*	Red Columbine	
Caltha palustris L.	Marsh Marigold	
Clematis virginiana L.	Virgin's Bower	
Coptis trifolia (L.) Salisb. (= *C. groenlandica*)	Goldthread	
Ranunculus acris L.	Common Buttercup	
Ranunculus bulbosus L.	Bulbous Buttercup	
Ranunculus recurvatus Poir. var. *recurvatus*	Hooked Buttercup	
Ranunculus septentrionalis Poir. (= *R. hispidus* var. *caricetorum*)	Swamp Buttercup	
Thalictrum pubescens Pursh (= *T. polygamum*)	Tall Meadow Rue	
Thalictrum thalictroides (L.) A.Eames & B.Boivin (= *Anemonella thalictroides*)	Rue Anemone	
Rhamnaceae		
Ceanothus americanus L. var. *americanus*	New Jersey Tea	
Rhamnus cathartica L.	Common Buckthorn	
Rhamnus frangula L.	European Buckthorn	
Rosaceae		
Agrimonia gryposepala Wallr.	Tall Hairy Agrimony	
Amelanchier arborea (Michx.F.) Fernald (= *A. laevis*)	Shadbush	
Amelanchier canadensis (L.) Medik.	Serviceberry	
Aronia melanocarpa (Michx.) Elliott (= *Pyrus melanocarpa*)	Black Chokeberry	
Aronia prunifolia (Marshall) Rehd. (= *Pyrus floribunda*)	Purple Chokeberry	
Crataegus flabellata (Bosc ex Spach) K.Koch (= *C. macrosperma*)	Variable Hawthorn	
Crataegus succulenta Schrad. ex Link	Long-Spined Hawthorn	
Fragaria virginiana Duchesne subsp. Virginiana (= *F. virginiana* var. *virginiana*)	Wild Strawberry	
Geum canadense Jacq.	White Avens	
Malus floribunda Siebold ex VanHoutte	Showy Crabapple	
Malus pumila (L.) Mill. (= *Pyrus malus*)	Common Apple	
Potentilla argentea L.	Silvery Cinquefoil	
Potentilla canadensis L. var. *canadensis*	Dwarf Cinquefoil	
Potentilla norvegica L.	Rough Cinquefoil	
Potentilla recta L.	Sulphur Cinquefoil	
Potentilla simplex Michx. var. *calvescens* Fernald	Balding Old-Field Cinquefoil	
Potentilla simplex Michx. var. *simplex*	Common Old-Field Cinquefoil	
Prunus americana Marshall	American Plum	
Prunus pensylvanica L.F.	Pin Cherry	
Prunus persica (L.) Batsch	Peach	
Prunus serotina Ehrh. var. *serotina*	Black Cherry	
Prunus virginiana L.	Choke Cherry	
Pyrus communis L.	Domestic Pear	
Rosa carolina L.	Pasture Rose	

Scientific Name	Common Name	Status
Rosa gallica L.	French Rose	
Rosa multiflora Thunb.	Multiflora Rose	
Rosa palustris Marshall	Swamp Rose	
Rosa virginiana Mill.	Wild Rose	
Rubus allegheniensis T.Porter var. *allegheniensis*	Northern Blackberry	
Rubus alumnus L.H.Bailey	Nursling Blackberry	
Rubus flagellaris Willd.	Prickly Dewberry	
Rubus hispidus L. var. *obovalis (*Michx.) *Fernald*	Obovate Running Swamp Blackberry	
Rubus occidentalis L.	Black Raspberry	
Rubus plicatifolius W.H.Blanch.	Plaited-Leaved Dewberry	
Rubus pubescens Raf. var. *pubescens*	Dwarf Raspberry	
Rubus strigosus Michx. var. *strigosus* (= *R. idaeus var.strigosus*)	Red Raspberry	
Rubus trifrons W.H.Blanch.	Three-Leaved Dewberry	
Sorbus aucuparia L.	European Mountain Ash	
Spiraea latifolia (Ait.) Borkh. var. *latifolia*	Meadowsweet	
Spiraea nipponica	Nippon Spiraea	
Spiraea prunifolia Siebold & Zuccar var. *prunifolia*	Bridal Wreath	
Spiraea tomentosa L. var. *tomentosa*	Steeplebush	
Rubiaceae		
Cephalanthus occidentalis L.	Buttonbush	
Galium aparine L.	Cleavers	
Galium asprellum Michx.	Rough Bedstraw	
Galium circaezans Michx. var. *hypomalacum* Fernald	Wild Licorice	
Galium mollugo L.	White Bedstraw	
Galium palustre L.	Ditch Bedstraw	
Galium tinctorium L. subsp. *Tinctorium* (= *G. tinctoriumvar. tinctorium*)	Wild Madder	
Galium triflorum Michx.	Sweet-Scented Bedstraw	
Houstonia caerulea L. var. *caerulea* (= *Hedyotis caerulea*)	Bluets	
Mitchella repens L.	Partridgeberry	
Salicaceae		
Populus alba L.	White Poplar	
Populus deltoides W.Bartram ex Marshall subsp. *Deltoides* (= *P. deltoides* var. *deltoides*)	Cottonwood	
Populus grandidentata Michx.	Big-Tooth Aspen	
Populus nigra L.	Lombardy Poplar	
Populus tremula L. subsp. *tremuloides* (Michx.) Loeve & Loeve (= *P. tremuloides, P. tremulavar. tremuloides*)	Quaking Aspen	
Salix bebbiana Sarg.	Bebb's Willow	
Salix discolor Muhl.	Pussy Willow	
Salix humilis Marshall	Prairie Willow	
Salix nigra Marshall	Black Willow	
Salix petiolaris J.E.Smith (= *S. gracilis*)	Slender Willow	
Salix sericea Marshall	Silky Willow	
Salix rigida Muhl.	Stiff Willow	
Santalaceae		
Comandra umbellata (L.) Nutt. subsp. *umbellata*	Bastard Toadflax	
Sarraceniaceae		
Sarracenia purpurea L. var. *purpurea*	Pitcher Plant	
Saxifragaceae (includes Grossulariaceae, Hydrangeaceae)		
Chrysosplenium americanum Schweinitz	Water Carpet	
Ribes hirtellum Michx.	Northern Gooseberry	
Scrophulariaceae		
Agalinis paupercula (Gray) Britton var. *paupercula* (= *Gerardia paupercula*)	Small-Flowered Gerardia	
Chelone glabra L. var. *glabra*	Turtleheads	

Gratiola aurea Pursh	Golden Hedge Hyssop
Linaria canadensis (L.) Dum.Cours.	Blue Toadflax
Linaria vulgaris Mill.	Butter-and-Eggs
Lindernia dubia (L.) Pennell var. *dubia*	False Pimpernel
Melampyrum lineare Desr. var. *americanum* (Michx.) Beauverd	Cow Wheat
Mimulus ringens L. var. *ringens*	Common Monkeyflower
Verbascum thapsus L.	Common Mullein
Veronica arvensis L.	Corn Speedwell
Veronica officinalis L.	Common Speedwell
Veronica scutellata L.	Marsh Speedwell
Veronica serpyllifolia L. subsp. *serpyllifolia*	Thyme-Leaf Speedwell
Simaroubaceae	
Ailanthus altissima (Mill.) Swingle	Tree-of-Heaven
Solanaceae	
Physalis heterophylla Nees var. *ambigua* (Gray) Rydb.	Clammy Ground Cherry
Solanum americanum Mill. var. *americanum*	American Nightshade
Solanum carolinense L. var. *carolinense*	Horse Nettle
Solanum dulcamara L.	Bittersweet
Solanum nigrum L.	Black Nightshade
Styracaceae	
Halesia carolina L.	Silverbell Tree
Tiliaceae	
Tilia americana L.	American Basswood
Umbelliferae (= Apiaceae)	
Cicuta bulbifera L.	Water Hemlock
Cicuta maculata L.	Spotted Cowbane
Daucus carota L.	Queen Anne's Lace
Hydrocotyle americana L.	Pennywort
Zizia aurea (L.) W.Koch	Golden Alexanders
Urticacea	
Boehmeria cylindrica (L.) Swartz var. *cylindrica*	False Nettle
Pilea pumila (L.) Gray	Clearweed
Urtica dioica L. subsp. *Dioica*	Stinging Nettle
Verbenaceae	
Verbena hastata L var. *hastata*	Blue Vervain
Verbena urticifolia L. var. *urticifolia*	White Vervain
Violaceae	
Viola conspersa Reichenb.	Dog Violet
Viola cucullata Ait.	Common Violet
Viola fimbriatula J.E.Smith	Northern Downy Violet
Viola lanceolata L. subsp. *Lanceolata* (= *V. lanceolata var. lanceolata*)	Lance-Leaf Violet
Viola pallens (Banks) Brainerd (= *V. macloskeyivar. pallens*)	Sweet White Violet
Viola pedata L.	Bird Foot Violet
Viola septentrionalis Greene	Northern Blue Violet
Vitaceae	
Parthenocissus quinquefolia (L.) Planch.	Virginia Creeper
Parthenocissus vitacea (Knerr) A.Hitchc. (= *P. inserta*)	Thicket Creeper
Vitis aestivalis Michx. var. *argentifolia* (Munson) Fernald	Summer Grape
Vitis labrusca L.	Fox Grape

681	taxa 8
667	species
8	State Listed species
528	Native (78%)
151	Introduced (22%)
99	Additional Species likely to occur
32	Species uncommon in E.-Central MA

Table F-9. Mushrooms at Assabet River NWR

Scientific Name	Common Name	Status	References
Lenzites betulina	Gill Polypore		Riener 2001
Piptoporus betulinus	Birch Polypore		
Polyporus varius	Black-footed Polypore		
Pycnoporous cinnabarinus	Cinnabar Polypore		
Trametes versicolor	Turkey-tailed Polypore		
Trichapterum biforme	Violet-toothed Polypore		
Trametes hirsuta	Hairy Polypore		

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Codes Used in Species List

E - State endangered. Native species in imminent danger of extirpation from Massachusetts.

T - State threatened. Native species which are likely to become state endangered in the future if current trends in habitat loss or other detrimental factors remain unchanged.

SC - State concern. Native species which do not apply under the above categories but are additionally listed due to various factors or rarity and/or vulnerability.

Table F-10. Birds at Great Meadows NWR

Scientific Name	Common Name(s)	Status
Gaviidae (Loons)		
Gavia immer	common loon	SC
Gavia stellata	Red-throated loon	
Podicipedidae (Grebes)		
Podiceps auritus	horned grebe	
Podilymbus podiceps	pied-billed grebe	E
Phalacrocoracidae (Cormorants)		
Phalacrocorax auritus	double-crested cormorant	
Phalacrocorax carbo	Great cormorant	
Ardeidae (Herons, Egrets, and Bitterns)		
Botaurus lentiginosus	American bittern	E
Ixobrychus exilis	least bitternE	
Ardea herodias	great blue heron	
Ardea alba	great egret	
Egretta thula	snowy egret	
Egretta caerulea	little blue heron	
Bubulcus ibis	cattle egret	
Butorides virescens	green heron	
Nyticorax nyticorax	black-crowned heron	
Nyctanassa violacea	yellow-crowned night heron	
Threskiornithidae (Ibises and Spoonbills)		
Plegadis falcinellus	glossy ibis	
Gruidae (Cranes)		
Grus canadensis	Sandhill crane	
Anatidae (Ducks, Geese, and Swans)		
Cygnus olor	mute swan	
Chen caerulescens	snow goose	
Branta canadensis	Canada goose	
Aix sponsa	wood duck	
Anas crecca	green-winged teal	
Anas rubripes	American black duck	
Anas platyrhynchos	mallard	
Anas acuta	northern pintail	
Anas discors	blue-winged teal	
Anas clypeata	northern shoveler	
Anas strepera	gadwall	
Anas penelope	Eurasian wigeon	
Anas americana	American wigeon	
Aytha valisneria	canvasback	
Aytha americana	redhead	
Aytha collaris	ring-necked duck	
Aytha marila	greater scaup	
Aytha affinis	lesser scaup	
Bucephala albeola	bufflehead	
Bucephala clangula	common goldeneye	
Lophodytes cucullatus	hooded merganser	
Mergus merganser	common merganser	
Mergus serrator	red-breasted merganser	
Oxyura jamaicensis	ruddy duck	
Melanitta nigra	black scoter	
Cathartidae (New World Vultures)		
Cathartes aura	turkey vulture	
Accipitridae (Hawks, Eagles, Kites, Etc.)		
Pandion haliaetus	osprey	
Haliaetus leucocephalus	bald eagle	
Circus cyaneus	northern harrier	T
Accipiter striatus	sharp-shinned hawk	SC
Accipiter cooperi	Cooper's hawk	
Accipiter gentilis	northern goshawk	
Buteo lineatus	red-shouldered hawk	
Buteo platypterus	broad-winged hawk	
Buteo jamaicensis	red-tailed hawk	
Buteo lagopus	rough-legged hawk	
Falconidae (Falcons and Caracaras)		
Falco sparverius	American kestrel	
Falco columbarius	merlin	
Falco peregrinus	peregrine falcon	
Phasianidae (Grouse, Partridges, Pheasants, Turkeys and Quail)		
Phasianus colchicus	ring-necked pheasant	
Bonasa umbellus	ruffed grouse	
Colinus virginianus	northern bobwhite	
Meleagris gallopavo	wild turkey	
Rallidae (Rails, Gallinules and Coots)		
Coturnicops noveboracensis	yellow rail	
Rallus elegans	king rail	
Rallus limicola	Virginia rail	
Porzana carolina	sora	
Gallinula chloropus	common moorhen	
Fulica americana	American coot	
Scolopacidae (Sandpipers)		
Calidris minutilla	least sandpiper	
Calidris fusciollis	white-rumped sandpiper	
Calidris bairdii	Baird's sandpiper	
vabis melanotos	pectoral sandpiper	
Calidris alpina	dunlin	
Calidris himantopus	stilt sandpiper	
Bartramia longicauda	upland sandpiper	
Limnodromus griseus	short-billed dowitcher	
Tryngites subruficollis	buff-breasted sandpiper	
Limnodromus		
Calidris pusilla	semi-palmated sandpiper	
Tringa solitaria	solitary sandpiper	
Actitis macularia	spotted sandpiper	
Calidris mauri	Western sandpiper	
scolopaceus	long-billed dowitcher	
Gallinago gallinago	common snipe	
Charadriidae (Plovers and Lapwings)		
Pluvialis squatarola	black-bellied Plover	
Pluvialis dominica	American golden plover	
Charadrius semipalmatus	semi-palmated plover	
Charadrius vociferus	killdeer	
Tringa melanoleuca	greater yellowlegs	
Tringa flavipes	lesser yellowlegs	
Limosa haemastica	Hudsonian godwit	
Calidris alba	sanderling	

Scientific Name	Common Name(s)	Status
Sterna hirundo	common tern	
Sterna niger	black tern	
Columbidae (Pigeons and Doves)		
Columba livia	rock dove	
Zenaida macroura	mourning dove	
Cuculidae (Cuckoos and Allies)		
Coccyzus erythropthalmus	black-billed cuckoo	
Coccyzus americanus	yellow-billed cuckoo	
Strigidae (Typical Owls)		
Scolopax minor	American woodcock	
Phalaropus tricolor	Wilson's phalarope	
Phalaropus lobatus	red-necked phalarope	
Phalaropus fulicaria	red Phalarope	
Laridae (Gulls, Terns and Allies)		
Larus delawarensis	ring-billed gull	
Larus argentatus	herring gull	
Larus glaucoides	Iceland gull	
Larus hyperboreus	glaucous gull	
Larus marinus	great black-backed gull	
Otus asio	Eastern screech-owl	
Bubo virginianus	great horned owl	
Strix varia	barred owl	
Asio flammeus	short-eared owl	
Caprimulgidae (Goatsuckers)		
Chordeilis minor	common nighthawk	
Chordeilis vociferus	whip-poor-will	
Apodidae (Swifts)		
Chaetura pelagica	chimney swift	
Trochilidae (Hummingbirds)		
Archilochus colubris	ruby-throated hummingbird	
Alcedinidae (Kingfishers)		
Ceryle alycon	belted kingfisher	
Picidae (Woodpeckers)		
Melanerpes erythrocephalus	red-headed woodpecker	
Melanerpes carolinus	red-bellied woodpecker	
Sphyrapicus varius	yellow-bellied sapsucker	
Picoides pubescens	downy woodpecker	
Picoides villosus	hairy woodpecker	
Colaptes auratus	Northern flicker	
Dryocopus pileatus	pileated woodpecker	
Tyrannidae (Tyrant Flycatchers)		
Contopus cooperi	olive-sided flycatcher	
Contopus virens	Eastern pewee	
Empidonax virescens	Acadian flycatcher	
Empidonax flaviventris	yellow-bellied flycatcher	
Empidonax alnorum	alder flycatcher	
Empidonax traillii	willow flycatcher	
Sayornis phoebe	Eastern phoebe	
Miarchis crinitus	great crested flycatcher	
Tyrannus tyrannus	Eastern kingbird	
Laniidae (Shrikes)		
Lanius ludovicianus	loggerhead shrike	
Lanius excubitor	Northern shrike	
Vireonidae (Vireos)		
Vireo griseus	white-eyed vireo	
Vireo flavifrons	yellow-throated vireo	
Vireo solitarius	blue-headed vireo	
Vireo gilvus	warbling vireo	
Vireo olivaceus	red-eyed vireo	
Corvidae (Jays, Magpies, and Crows)		
Cyanocitta cristata	blue jay	
Cyanocitta cristata	blue jay	
Corvus brachyrhynchos	American crow	
Corvus ossifragus	fish crow	
Alaudidae (Larks)		
Eremophila alpestris	horned lark	
Hirundinidae (Swallows)		
Progne subis	purple martin	
Tachycineta bicolor	tree swallow	
Stelgidopteryx serripennis	Northern rough-winged swallow	
Riparia riparia	bank swallow	
Petrocheldion pyrrhonota	cliff swallow	
Hirundo rustica	barn swallow	
Paridae (Titmice)		
Poecile atricapillus	black-capped chickadee	
Baeolophus bicolor	tufted titmouse	
Sitiidae (Nuthatches)		
Sitta canadensis	red-breasted nuthatch	
Sitta carolinensis	white-breasted nuthatch	
Certhiidae (Creepers)		
Certhia americana	brown creeper	
Troglodytidae (Wrens)		
Troglodytes aedon	house wren	
Troglodytes troglodytes	winter wren	
Cistothorus platensis	sedge wren	
Cistothorus palustris	marsh wren	
Regulidae (Kinglets)		
Regulus satrapa	golden-crowned kinglet	
Regulus calendula	ruby-crowned kinglet	
Silviidae (Gnatcatchers)		
Polioptila caerulea	blue-gray gnatcatcher	
Sialia sialia	Eastern bluebird	
Catharus fuscescens	veery	
Catharus minimus	gray-cheeked thrush	
Catharus ustulatus	Swainson's thrush	
Catharus guttatus	hermit thrush	
Hylocichla mustelina	wood thrush	
Turdus migratorius	American robin	

Scientific Name	Common Name(s)	Status
Mimidae (Mimic Thrushes)		
Dumetella carolinensis	gray catbird	
Mimus polyglottos	Northern mockingbird	
Taxostoma rufum	brown thrasher	
Sturnidae (Starlings)		
Sturnus vulgaris	European starling	
Motacillidae (Wagtails and Pipits)		
Anthus rubescens	American pipit	
Bombycillidae (Waxwings)		
Bombycilla cedrorum	cedar waxwing	
Parulidae (Wood-warblers)		
Vermivora pinus	blue-winged warbler	
Vermivora chrysoptera	golden-winged warbler	
Vermivora peregrina	Tennessee warbler	
Vermivora ruficapilla	Nashville warbler	
Parula americana	Northern parula	
Dendroica petechia	yellow warbler	
Dendroica pensylvanica	chestnut-sided warbler	
Dendroica magnolia	magnolia warbler	
Dendroica tigrina	Cape May warbler	
Dendroica caerulescens	black-throated blue warbler	
Dendroica coronata	yellow-rumped warbler	
Dendroica virens	black-throated green warbler	
Dendroica fusca	blackburnian warbler	
Dendroica pinus	pine warbler	
Dendroica discolor	prairie warbler	
Dendroica palmarum	palm warbler	
Dendroica castanea	bay-breasted warbler	
Dendroica striata	blackpoll warbler	
Mniotilta varia	black-and-white warbler	
Setophaga ruticilla	American redstart	
Seiurus aurocapillus	ovenbird	
Seiurus noveboracensis	Northern waterthrush	
Oporornis agilis	Connecticut warbler	
Oporornis philadelphia	mourning warbler	
Geothlypis trichas	common yellowthroat	
Wilsonia pusilla	Wilson' s warbler	
Wilsonia canadensis	Canada warbler	
Icteria virens	yellow-breasted chat	
Thraupidae (Tanagers)		
Piranga olivacea	scarlet tanager	
Emberizidae (Warblers and Sparrows)		
Pipilo erythrophthalmus	Eastern towhee	
Spizella arborea	American tree sparrow	
Spizella passerina	chipping sparrow	
Spizella pusilla	field sparrow	
Pooecetes gramineus	vesper sparrow	
Passerculus sandwichensis	Savannah sparrow	
Ammodramus caudacutus	saltmarsh sharp-tailed sparrow	
Passerella iliaca	fox sparrow	
Melospiza melodia	song sparrow	
Melospiza lincolnii	Lincoln's sparrow	
Melospiza georgiana	swamp sparrow	
Zonotrichia albicollis	white-throated sparrow	
Zonotrichia leucophrys	white-crowned sparrow	
Junco hyemalis	dark-eyed junco	
Piectrophenax nivalis	snow bunting	
Cardinalidae (Cardinals and Allies)		
Cardinalis cardinalis	northern cardinal	
Pheuticus ludovicianus	rose-breasted Ggosbeak	
Passerina cyanea	indigo bunting	
Spiza americana	dickcissel	
Icteridae (Blackbirds, Orioles and Allies)		
Dolichonyx oryzivorus	bobolink	
Agelaius phoeniceus	red-winged blackbird	
Sturnella magna	eastern meadowlark	
Euphagus carolinus	rusty blackbird	
Quiscula quiscula	common grackle	
Molothrus ater	brown-headed cowbird	
Icterus spurius	orchard oriole	
Icterus galbula	northern oriole	
Pinicola enucleator	pine grosbeak	
Carpodacus purpureus	purple finch	
Carpodacus mexicanus	house finch	
Carduelis flammea	common redpoll	
Carduelis pinus	pine siskin	
Carduelis tristis	American goldfinch	
Coccothraustes vespertinus	evening grosbeak	
Passeridae (Old World Sparrows)		
Passer domesticus	house sparrow	

This list follows the format of the Checklist of the Birds of Massachusetts, compiled by Bradford G. Blodget, Massachusetts State Ornithologist. The state list follows, with modifications, the rules used by Bull (The Birds of the New York Area, Harper and Row, New York, 1964) in establishing a list of the birds of the New York City area. According to these rules as modified, a species is considered to be authentic for Massachusetts if at least one of the following three prerequisites is satisfied: 1) a specimen is collected; 2) a recognizable and definitive photograph or videotape taken, examined by at least three qualified observers and documented in the literature; or 3) an unambiguous sight record of an easily identifiable species corroborated by three or more observers with extensive field experience in Massachusetts and documented in the literature.

Table F-11. Butterflies at Great Meadows NWR

Scientific Name	Common Name(s)
Papilionidae (True Butterflies)	
Papilio polyxenes	black swallowtail
Papilio glaucus	Eastern tiger swallowtail
Papilio canadensis	Canadian tiger swallowtail
Papilio troilus	spicebush swallowtail
Pieridae	
Pieris rapae	cabbage white
Colias philodice	clouded sulphur
Colias eurytheme	orange sulphur
Lycaenidae	
Fineseca tarquinius	harvester
Lycaena hyllus	bronze copper
Lycaena epixanthe	bog copper
Satyrium titus	coral hairstreak
Satyrium acadium	Acadian hairstreak
Satyrium edwardsii	Edward's hairstreak
Satyrium calanus	banded hairstreak
Satyrium caryaevorum	hickory hairstreak
Satyrium liparops	striped hairstreak
Callophrys grineus	juniper hairstreak
Callophrys augustinus	brown elfin
Callophrys irus	frosted elfin
Callophrys henrici	Henry's elfin
Callophrys niphon	Eastern pine elfin
Strymon melinus	gray hairstreak
Everes comyntas	Eastern tailed-blue
Celastrina argiolus	spring azure
Glaucopsyche lygdamus	silvery blue
Nymphalidae	
Speyeria cybele	great spangled fritillary
Speyeria aphrodite	Aphrodite fritillary
Boloria selene	silver-bordered fritillary
Chlosyne harrisii	Harris' checkerspot
Phycoides tharos	pearl crescent
Euphydryas phaeton	Baltimore checkerspot
Polygonia interrogationis	
Polygonia comma	Eastern comma
Nymphalis vau-album	Compton tortoiseshell
Nymphalis antiopa	mourning cloak
Nymphalis milberti	Milbert's tortoiseshell
Vanessa atalanta	red admiral
Vanessa virginiensis	American lady
Vanessa cardui	painted lady
Junonia coenia	common buckeye
Limenitis archippus	viceroy
Satyrodes eurydice	eyed brown
Satyrodes appalachia	Appalachian brown
Megisto cymela	little wood-satyr
Coenonympha tullia	common ringlet
Cercyonis pegala	common wood-nymph
Danaus plexippus	monarch
Hesperiidae	
Epargyreus clarus	silver-spotted skipper
Thorybes bathyllus	southern cloudywing
Thorybes pylades	northern cloudywing
Erynnis icelus	dreamy duskywing
Erynnis brizo	sleppy duskywing
Erynnis juvenalis	Juvenal's duskywing
Erynnis horatius	Horace's duskywing
Erynnis baptisiae	wild indigo duskywing
Pholisora catullus	common sooty-wing
Carterocephalus palaemon	arctic skipper
Ancyloxypha numitor	least skipper
Thymelicus lineola	European skipper
Hesperia leonardus	Leonard's skipper
Hesperia metea	cobweb skipper
Hesperia sassaacus	Indian skipper
Polites peckius	Peck's skipper
Polites themistocles	tawny-edged skipper
Polites origenes	crossline skipper
Polites mystic	long dash
Wallengrenia egeremet	Northern broken-dash
Pompeius verna	little glassywing
Anatrytone logan	Delaware skipper
Poanes massasoit	mulberry wing
Poanes hobomok	Hobomok skipper
Poanes viator	broad-winged skipper
Euphyes conspicuus	black dash
Euphyes vestris	dun skipper
Artytonopsis hianna	dusted skipper
Amblyscirtes hegon	pepper and salt skipper

Table F-12. Invertebrates at Great Meadows NWR

Scientific Name	Common Name(s)
Sponges	
Trochospongilla horrida	
Radiospongilla crateriformis	
Ephydatia huelleri	
Euphapius fragilis	
Heteromeyehia Baileyi	
Flatworms	
Procotyla fluviatilis	
Dugesia tigriha	
Leeches	
Mooreobdella fervida	
Amhipods	
Crangonyx pseudogracilis	
Dragonflies/Damselflies	
Aeshna sp	Darner

Table F-13. Fish at Great Meadows NWR

Scientific Name	Common Name(s)
OSTEICHTHYES (Bony fishes)	
Salmonidae (trouts, whitefishes and graylings)	
Salmo gairdneri	rainbow trout
Salvelinus fontinalis	brook trout
Esocidae (pikes)	
Esox americanus americanus	redfin pickerel
Esox niger	chain pickerel
Esox lucius	northern pike
Cyprinidae (minnows and carps)	
Cyprinus carpio	common carp
Catostomidae (suckers)	
Catostomus commersoni	white sucker
Erimyson oblongus	creek chubsucker
Ictaluridae (freshwater catfishes)	
Ictalurus nebulosus	brown bullhead
Ictalurus punctatus	channel catfish
Anguillidae (freshwater eels)	
Anguilla rostrata	American eel
Centrarchidae (sunfishes)	
Enneacanthus obesus	banded sunfish
Lepomis gibbosus	pumpkinseed
Lepomis macrochirus	bluegill
Micropterus salmoides	largemouth bass
Pomoxis nigromaculatus	black crappie
Percidae (perches)	
Morone americana	white perch
Notemigonus crysoleucas	golden shiner
Perca flavescens	yellow perch

Table F-14. Reptiles at Great Meadows NWR

Scientific Name	Common Name(s)	Status
Testudines		
Chelydridae (Snapping Turtles)		
Chelydra serpentina	common snapping turtle	
Emydidae (Pond Turtles)		
Chrysemys picta	painted turtle	
Clemmys guttata	spotted turtle*	SC
Emydoidea blandingii	Blanding's turtle	T
Terrapene carolina	eastern box turtle*	SC
Sternotherus odoratus	common musk turtle	

Scientific Name	Common Name(s)	Status
Serpentes		
Colubridae (Harmless Snakes)		
Nerodia sipedon	northern water snake	
Thamnophis sirtalis	common garter snake	
Lampropeltis triangulum	Easern milk snake	

*:Species possibly present

Table F-15. Amphibians at Great Meadows NWR

Scientific Name	Common Name(s)	Status
CAUDATA		
Ambystomatidae (Mole Salamanders)		
Ambystoma laterale	blue-spotted salamander*	SC
Ambystoma maculatum	spotted salamander*	
Ambystoma opacum	marbled salamander*	T
Salamandridae (Newts)		
Notophthlamus viridescens	eastern newt*	
Plethodontidae (Lungless Salamanders)		
Desmognathus fuscus fuscus	northern dusky salamander *	
**Plethodon cinereus*	northern redback salamander *	
Hemidactylium scutatum	four-toed salamander*	SC
Eurycea bislineata	northern two-lined salamander*	

Scientific Name	Common Name(s)	Status
ANURA		
Pelobatidae (Spadefoot Toads)		
Scaphiopus holbrookii	eastern spadefoot	T
Bufonidae (True Toads)		
Bufo americanus	American toad	
Hylidae (True Tree Frogs)		
Pseudacccris crucifer	spring peeper	
Hyla versicolor	gray treefrog	
Ranidae (True Frogs)		
Rana catesbeiana	bullfrog	
Rana clamitans	green frog	
Rana palustris	pickerel frog	
Rana pipiens	northern leopard frog	
Rana sylvatica	wood frog	

*Species possibly present

Table F-16 Mammals at Great Meadows NWR

Scientific Name	Common Name(s)
Didelphidae (New World Opossums)	
Didelphis virginiana	Virginia opossum
Soricidae (Shrews)	
Sorex cinereus	masked shrew*
Blarina brevicauda	Northern short-tailed shrew*
Talpidae (Moles and Shrew-Moles)	
Parascalops breweri	hairy-tailed mole*
Scalopus aquaticus	Eastern mole*
Condylura cristata	star-nosed mole*
Vespertilionidae (Vesper Bats)	
Eptisicus fuscus	big brown bat*
Myotis lucifugus	little brown bat
Leporidae (Hares and Rabbits)	
Sylvilagus floridanus	Eastern cottontail
Sylvilagus transitionalis	New England cottontail*
Sciuridae (Tree Squirrels and Marmots)	
Marmota monax	woodchuck
Tamias striatus	Eastern chipmunk
Sciurus carolinensis	Eastern gray squirrel
Tamiasciurus hudsonicus	red Squirrel
Glaucomys sabrinus	Northern flying squirrel*
Glaucomys volans	Southern flying squirrel*
Castoridae (Beavers)	
Castor canadensis	American beaver
Muridae (Mice, Rats, Voles, and Lemmings)	
Clethrionomys gapperi	boreal redback vole*
Microtus pennsylvanicus	meadow vole *
Ondatra zibethicus	muskrat
Peromyscus leucopus	white-footed mouse
Canidae (Dogs, Foxes, and Wolves)	
Canis latrans	coyote
Urocyon cinereoargenteus	gray fox
Vulpes vulpes	red fox
Ursidae (Bears)	
Ursus americanus	black bear
Procyonidae (Raccoons, Coatis, and Ringtails)	
Procyon lotor	raccoon
Mustelidae (Weasels, Minks, Martens, and Otters)	
Lontra canadensis	Northern river otter
Mustela erminea	short-tailed weasel or ermine
Mustela frenata	long-tailed weasel
Martes pennanti	fisher
Mustela vison	American mink
Mephitidae (Skunks)	
Mephitis mephitis	striped skunk
Cervidae (Deer, Elk, and Moose)	
Odocoileus virginianus	white-tailed Deer
Alcesalces	moose
Vespertilionidae (Vesper Bats)	
Pipistrellus subflavus	eastern pipistrelle*
Muridae (Mice, Rats, Voles, and Lemmings)	
Peromyscus maniculatus	deer mouse*
Rattus rattus	black rat*
Zaporidae (Jumping Mice)	
Napaeozapus insignis	woodland jumping mouse*
Zapus hudsonicus	meadow jumping mouse*
Erethizontidae (New World Porcupines)	
Erethizon dorsatum	common porcupine

*Species possibly present

Nomenclature follows Jones, C. et al. (Revised checklist of North American mammals north of Mexico, 1997. Occ. Pap. Mus. Texas Tech. Univ. 173:1-21, 1997).

Table F-17. Plants at Great Meadows NWR

Scientific Name	Common Name(s)
PTERIDOPHYTES (Fern and Fern Allies)	
Dennstaedtiaceae	
Pteridium aqualinum	bracken fern
Dryopteridaceae	
Onoclea sensibilis	sensitive fern
Dennstaedia punctiluba	hay-scented fern
Lycopodiaceae	
Lycopodium spp.	clubmoss
Osmundaceae	
Osmunda cinnamomea	cinnamon fern
Osmunda regalis	royal fern
Osmunda claytoniana	interrupted fern
Polypodiaceae	
Polypodium vulgare	polypody
Thelypteridaceae	
Thelypteris novaboracensis	New York fern
Thelypteris palustris	marsh fern
GYMNOSPERMS (Cone-bearing Plants)	
Pinaceae	
Pinus strobus	white pine
Abies balsamea	balsalm fir
Tsuga canadensis	eastern hemlock
ANGIOSPERMS	
Dicotyledons (Flowering Plants)	
Aceraceae	
Acer rubrum	red maple
Acer saccharinum	silver maple
Acer platanoides	Norway maple
Acer negundo	box elder
Adoxaceae	
Viburnum recognitum	arrowood
Anacardiaceae	
Toxicodendron radicans	poison ivy
Rhus typhina	staghorn sumac
Rhus radicans	poison ivy
Apiaceae	
Peucedanum palustre	milk parsley
Cicuta maculata	spotted water hemlock
Cicuta bulbifera	water hemlock
Sium suave	water parsnip
Conioselinum chinense	Chinese hemlock parsley
Daucus carota	Queen Anne's-lace
Apocynaceae	
Apocynum androsaemifolium	spreading dogbane
Aquifoliaceae	
Ilex verticilatta	common winterberry
Nemopanthus mucronata	mountain holly
Araliaceae	
Aralia nudicaulis	wild sarsaparilla
Asclepiadaceae	
Asclepias incarnata	swamp milkweed
Asclepias exaltata	poke milkweed
Vinca minor	dwarf periwinkle
Asteraceae	
Achillea millefolium	yarrow
Ambrosia artemisifolia	ragweed
Antennaria plantaginifolia	woman's tobacco
Artemisia vulgaris	common mugwort
Aster acuminatus	whorled aster
Aster vimineus	small white aster
Aster puniceus	purple-stemmed aster
Bidens cernua	nodding bur marigold
Bidens frondosa	sticktights
Chrysanthemum leucanthemum	
Chrysosplenium americanum	
Cirsium vulgare	Bull thistle
Crepis tectorum	hawk's-beard
Erichtites hieracifolia	pilewort
Erigeron annus	daisy-fleabane or whitetop
Erigeron canadensis	horseweed
Erigeron strigosus	prarie fleabane
Eupatorium dubium	eastern Joe-pye weed
Eupatorium maculatum	spotted Joe-pye weed
Euthania graminifolia	grass-leaved goldenrod
Gnaphalium uliginosum	low cudweed
Helianthus annuus	sunflower
Hieracium pilosella	mouse-ear hawkweed
Hieracium pratense	field hawkweed
Krigia virginica	Virginia dwarf dandelion
Lactuca scariola	compass-plant
Lactuca canadensis	wild lettuce
Prenathes trifoliata	fall rattlesnake-root
Rudbeckia serotina	black eyed susan
Solidago rugosa	rough-leaved goldenrod
Solidago canadensis	Canada goldenrod
Solidago gigantea	giant goldenrod
Solidago graminifolia	narrow-leaved goldenrod
Solidago bicolor	silverod
Stachys tenuifolia	smooth hedge nettle
Tanacetum vulgare	common tansy
Taraxacum officinale	dandelion
Tragopogon pratensis	yellow goatsbeard
Balsaminaceae	
Impatiens capensis	orange lewelweed
Berberis thunbergii	Japanese barberry
Betulaceae	
Alnus incana var americana	speckled alder
Alnus rugosa	speckled alder
Betula papyrifera	white birch
Betula populifolia	gray birch
Carpinus caroliniana	ironwood
Corylus cornuta	beaked hazelnut
Cardamine pratensis	cuckoo flower
Boraginaceae	
Myotis scorpoides	water forget-me-not

Scientific Name	Common Name(s)
Brassicaceae	
Rorippa palustris var islandica	marsh yellowcress
Allaria officinalis	garlic mustard
Arabis laevigata	smooth rockcress
Barbarea vulgaris	common wintercress
Cardamine pennsylvanicum	Pennsylvania bittercress
Lepidium virginicum	virgina pepperweed
Lepidium campestre	field pepperweed
Lunaria annua	silver dollar
Rorippa islandica	northern yellow-cress
Campanulaceae	
Lobelia cardinalis	cardinal flower
Caprifoliaceae	
Lonicera morrowi	morrow honeysuckle
Diervillea lonicera	bush honeysuckle
Sambucus canadensis	common elderberry
Viburnum acerifolium	maple leaf viburnum
Viburnum dentatum var lucidum	northern or smotth arrowood
Caryophyllaceae	
Cerastium vulgatum	mouseear chickweed
Stellaria media	chickweed
Lychnis flos-cuculi	ragged robin
Lychnis alba	evening lychnis
Silene cucubalis	bladder campion
Silene caroliniana	wild pink
Celastraceae	
Celastrus orbiculata	Oriental bittersweet
Euonymus alatus	winged euonymus
Chenopodiaceae	
Chenopodium albus	pigweed
Clethraceae	
Clethra alnifolia	sweet pepperbush
Commelinaceae	
Commelina communis	Asiatic dayflower
Convovulaceae	
Calystegia sepia	hedge bindweed
Cornaceae	
Cornus amomum	swamp dogwood
Cornus stolonifera	red osier dogwood
Cucurbitaceae	
Echinocystis lobata	wild cucumber
Cupressaceae	
Juniperus virginiana	eastern redcedar
Cuscutaceae	
Cuscuta gronovii	swamp dodder
Eleagnaceae	
Elaeagnus angustifolium	autumn olive

Scientific Name	Common Name(s)
Ericaceae	
Chamaedaphe calyculata	leatherleaf
Gaultheria procumbens	teaberry
Kalmia angustifolia	sheep laurel
Kalmia latifolia	mountain laurel
Lyonia ligustrina	maleberry
Rhododendron viscosum	swamp azalea
Vaccinium angustifolia	low-bush blueberry
Vaccinium corymbosum	high-bush blueberry
Vaccinium macrocarpon	cranberry
Fabaceae	
Amorpha fruticosa	false indigo
Apios americana	groundnut
Baptisa tinctoria	wild indigo
Desmodium paniculatum	panicled tick-trefoil
Trifolium arvense	rabbit's foot clover
Trifolium pratense	red clover
Trifolium repens	white clover
Vicia cracca	tufted vetch
Robinia psuedoacacia	black locust
Malva neglecta	black medic
Fagaceae	
Castanea dentata	American chestnut
Quercus alba	white oak
Quercus bicolor	swamp white oak
Quercus rubra	red oak
Geraniaceae	
Geranium maculatum	wild geranium
Grossulariaceae	
Ribes sativum	garden red currant
Ribes rubrum	garden red currant
Hydrangeaceae	
Philadelphus pubescens	mock orange
Hypericaceae	
Hypericum perforatum	common St. Johnswort
Hypericum virginicum	marsh St. John's-wort
Iridaceae	
Crocus spp.	crocus
Iris pseudacorus	yellow flag
Iris prismatica	slender blue flag
Juglandaceae	
Carya spp.	hickory
Labiatae	
Scutellaria laterfolia	skullcap
Lamiaceae	
Lycopus virginicus	bugleweed
Ajuga reptans	carpet bugleweed
Glechoma hederacea	ground ivy
Lamium purpureum	purple deadnettle
Leonurus cardiaca	motherwort
Mentha arvensis	field mint
Teuchrium canadense	wood sage
Lycopus americanus	american water horehound

Scientific Name	Common Name(s)
Lauraceae	
Lindera benzoin	spice bush
Sassafras albidum	sassafras
Lythraceae	
Lythrum salicaria	purple loosestrife
Malvaceae	
Malva neglecta	common mallow
Hibiscus moscheutos	rose mallow
Moraceae	
Morus rubra	red mulberry
Morus alba	white mulberry
Myricaceae	
Myrica gale	sweet gale
Nelumbonaceae	
Nelumbo lutea	American lotus
Nyssaceae	
Nyssa sylvatica	tupelo
Nymphacaceae	
Nuphar lutea	spatterdock
Oleaceae	
Fraxinus americanus	white ash
Onagraceae	
Oenothera biennis	evening primrose
Circaea quaddrisculata	enchanter's nightshade
Epilobium coloratum	purpleleaf willow-herb
Ludwigia palustris	water purslane
Orchidaceae	
Cyprepedium acaule	pink lady's slipper
Epipactis helleborine	helleborine
Oxalidaceae	
Oxalis stricta	common yellow wood-sorrel
Oxalis europaea	yellow wood sorrel
Papaveraceae	
Chelidonium majus	celandine
Papilionaceae	
Melilotus alba	white melilot
Phytolaccaaceae	
Phytolacca americana	pokeweed
Plantaginaceae	
Plantago major	common plantain
Plantago lanceolata	buckhorn plantain

Scientific Name	Common Name(s)
Polygonaceae	
Polygonum arifolium	halberd-leaf tearthumb
Polygonum hydropiper	water pepper
Polygonum persicaria	lady's thumb
Polygonum sagittatum	arrow-leaved tearthumb
Polygonum scandens	climbing false buckwheat
Rumex acetosella	sheep- or red laurel
Rumex crispus	curly dock
Polygonum convolvulus	black bindweed
Polygonum pennsylvanicum	pennsylvania smartweed
Polygonum caespitosum	oriental ladys thumb
Polygonumla pathifolium	willow weed
Rumex obtusifoilius	broad-leaved dock
Primulaceae	
Lysimachia terestris	swamp candles
Lysimachia ciliata	firecracker
Lysimachia quadrifolia	whorled loosestrife
Lysimachia thrysaflora	tufted loosestrife
Lysimachia nummularia	golden pennywort
Trientalis borealis	starflower
Pryrolaceae	
Chimaphila maculata	striped pipissewa
Ranunculaceae	
Anemone quinquefolia	wood-anemone
Thalictrum pubescens	tall meadow-rue
Aquilegia spp	columbine
Coptis groenlandica	goldthread
Ranunculus abortivus	small-flowered crowfoot
Ranunculus acris	buttercup
Thalictrum polyganum	meadow rue
Rhamnaceae	
Rhamnus alnifolia	glossy buckthorn
Frangula alnifolia	alder leaf buckthorn
Rosaceae	
Aronia spp.	cherry
Potentilla recta	sulphur cinquefoil
Potentilla palustris	swamp cinquefoil
Potentilla canadensis	cinquefoil
Prunus virginiana	choke cherry
Prunus susquehana	susquehana sand cherry
Rosa virginiana	virginia rose
Rosa palustris	swamp rose
Rubus pubescens	wine raspberry
Rubus canadensis	dawrf rasberry
Rudbeckia serotina	hornless blackberry
Fragaria virginiana	wild strawberry
Geum spp.	avens
Malus sieboldii	Toringo crabapple
Malus spp.	crabapple
Potentilla norvegica	rough cinquefoil
Prunus serotina	black cherry
Rosa multiflora	multiflora rose
Rubus allegheniensis	common blackberry
Rubus hispidus	swamp dewberry
Rubus occidentalis	black raspberry

Scientific Name	Common Name(s)
Salicaceae	
Populus deltoides	cottonwood
Populus grandidentata	bigtoothed aspen
Populus tremuloides	quaking aspen
Salix spp.	willow
Scrophulariaceae	
Agalinus tenuifolia	slender gerardia
Gerardia spp.	gerardia
Gerardia purpurea	purple gerardia
Linaria canadensis	blue toad flax
Verbascum thapsus	snapdragon
Veronica officinalis	common gypsyweed
Veronica arvensis	corn speedwell
Smilacaceae	
Smilax herbacea	smooth carrion flower
Solanaceae	
Solanum dulcamara	climbing nightshade
Tiliaceae	
Tilia americana	american basswood
Trapaceae	
Trapa natans	water chestnut
Ulmaceae	
Ulmus americana	American elm
Ulmus minor	English Elm
Urticaceae	
Boehmeria cylindrica	false nettle
Urtica dioica	stinging nettle
Urtica procera	tall nettle
Verbenaceae	
Verbena hastata	blue vervain
Verbena urticifolia	white vervain
Violaceae	
Viola brittoniana	Britton's voilet
Viola lanceolata	bog white violet
Viola	violet
Vitaceae	
Parthenocissus quinquefolia	Virginia creeper or woodbine
Vitis labrusca	fox grape
MONOCTYLEDONS (Flowering Plants)	
Acoraceae	
Acorus americanus	sweet flag
Alismataceae	
Sagittaria latifolia	common arrowhead
Alisma triviale	Pursh northern water plantain
Araceae	
Peltandra virginica	arrow arum
Symplocarpus foetidus	skunk cabbage
Arisaema triphyllum	jack in the pulpit

Scientific Name	Common Name(s)
Cyperaceae	
Carex crinata	awned or fringed sedge
Carex scoparia	broom-sedge
Carex stricta	tussock-sedge
Carex lupilina	sedge
Carex intumescens	sedge
Carex gracillima	sedge
Carex pennsylvanica	sedge
Carex lurida	sedge
Carex flava	sedge
Carex tribuloides	sedge
Carex vul pinoidea	sedge
Cyperus strigosus	big straw-colored flatsedge
Dulichium arundinaceum	three way sedge
Elaeocharis palustris	common spike rush
Elaeocharis ovata	ovate spike rush
Scirpus acutus	bulrush
Scirpus sylvaticus	wood club-rush
Equisetaceae	
Equisetum fluviatile	horse tail rush
Juncaceae	
Juncus effusus	soft rush
Juncus tenius	path rush
Juncus	rush
Lemnaceae	
Lemna sp.	duckweed
Wolffia spp.	wolffia
Liliaceae	
Maianthemum canadense	Canada mayflower
Medeola virginaina	Indian cucumber root
Uvularia sessifolia	wild oats
Allium canadense	wild onion
Maianthemum stellatum	starry solomon's seal
Hemerocallis fulva	orange day lily
Convallaria majalis	lily of the valley
Polygonatum biflorum	small solomon's seal
Monotropaceae	
Monotropa uniflora	indian pipe
Poaceae	
Phragmites australis	common reed
Spartina pectinata	freshwater cord-grass
Zizania aquatica	wild rice
Echinochloa walteri	walter's-millet
Agropyron repens	quack grass
Bromus hordeaceus	soft brome
Bromus tectorum	cheat grass
Calamogrostis canadensis	blue joint reed grass
Lolilium perenne	rye grass
Panicum clandestinum	deer tongue grass
Phleum pratense	Timothy herd's grass
Dactylis glomerata	orchard grass
Digitaria sanguinalis	crab grass

Scientific Name	Common Name(s)
Potamogetonaceae	
Potamogeton natans	floating-leaved pondweed
Pontederiaceae	
Pontedaria cordata	pickerel-weed
Rubiaceae	
Galium aparine	goosegrass
Smilacaceae	
Smilax rotundifolia	common greenbriar
Sparganiaceae	
Sparganium eurycarpum	giant or broad-fruited bur-reed
Typhaceae	
Typha angustifolia	narrow-leaved cattail
Typha latifolia	broad-leaved cattail

KEY TO "STATUS" COLUMN NOTATIONS

FE Federally Endangered
FT Federally Threatened
SE State (MA) Endangered
ST State (MA) Threatened
SC State (MA) Special Concern
WL State (MA) Watch List Species

NAWCA North American Waterfowl Management Plan Priority Species
NGSMC US Fish & Wildlife Service Region 5 Nongame Species of Managemtent Concern
SRC US Fish & Wildlife Service Region 5 Species of Regional Concern

Table F-18 Fish at Oxbow NWR

Scientific Name	Common Name	References
Anquilla rostrata	American eel	Baseline Study 1993
Catostomus commersoni	White sucker	MDFW, 1974 & 1999; MADEP, 1993
Lepomis gibbosus	Pumpkinseed	MDFW, 1974 & 1999; MADEP, 1993
Lepomis macrochirus	Bluegill	MDFW, 1974 & 1999; MADEP, 1993
Micropterus salmoides	Largemouth bass	MDFW, 1974 & 1999; MADEP, 1993
Micropterus dolomieui	Smallmouth bass	MDFW, 1974 & 1999; MADEP, 1993
Pomoxis nigromacultus	Black crappie	MDFW, 1974 & 1999; MADEP, 1993
Carassius auratus	Goldfish	MDFW, 1974 & 1999; MADEP, 1993
Notemigonus crysoleucas	Golden shiner	MDFW, 1974 & 1999; MADEP, 1993
Notropis cornutus	Common shiner	MDFW, 1974 & 1999; MADEP, 1993
Notropis hudsonius	Spottail shiner	MDFW, 1974 & 1999; MADEP, 1993
Esox niger	Chain pickerel	MDFW, 1974 & 1999; MADEP, 1993
Esox americanus americanus	Redfin pickerel	MDFW, 1974 & 1999; MADEP, 1993
Ictalurus natalis	Yellow bullhead	MDFW, 1974 & 1999; MADEP, 1993
Ictalurus nebulosus	Brown bullhead	MDFW, 1974 & 1999; MADEP, 1993
Morone americana	White perch	MDFW, 1974 & 1999; MADEP, 1993
Perca flavescens	Yellow perch	MDFW, 1974 & 1999; MADEP, 1993
Oncorhynchus mykiss	Brook trout	MDFW, 1974 & 1999; MADEP, 1993
Salmo trutta	Brown Trout	MDFW, 1974 & 1999; MADEP, 1993
Salmo fontinalis	Rainbow Trout	MDFW, 1974 & 1999; MADEP, 1993
Rhinichtys catatactae	Longnose Dace	MDFW, 1974 & 1999; MADEP, 1993
Rhinichtys atratulus	Blacknose Dace	MDFW, 1974 & 1999; MADEP, 1993
Etheostoma olmstedi	Tesselated Darter	MDFW, 1974 & 1999; MADEP, 1993
Cottus cognatus	Slimy Sculpin	MDFW, 1974 & 1999; MADEP, 1993
Semotilus corporalis	Fallfish	MDFW, 1974 & 1999; MADEP, 1993
Enneacanthus obesus	Banded Sunfish	Friends of Oxbow 2000

Table F-19. Birds at Oxbow NWR

Scientific Name	Common Name	Status	References
Phalacrocorax auritus	Double-creasted cormorant		Friends of Oxbow 2000
Branta canadensis	Canada goose		Lockwood 2000; Friends of Oxbow 2000
Anas platyrhynchos	Mallard	NAWCA	Friends of Oxbow 2000; Lockwood - BBS 2000
Aix sponsa	Wood duck	NAWCA	Lockwood - BBS 2000; Friends of Oxbow 2000
Anus rubripes	American black duck	NAWCA	Friends of Oxbow 2000
Ardea herodias	Great Blue Heron	SRC	Friends of Oxbow 2000; Lockwood - BBS 2000
Butorides striatus	Green heron	SRC	Friends of Oxbow 2000
Nycticorax nycticorax	Black-crowned night heron		Friends of Oxbow 2000
Actitis macularia	Spotted sandpiper		Friends of Oxbow 2000
Tringa solitaria	Solitary sandpiper		Friends of Oxbow 2000
Charadrius vociferus	Killdeer		Lockwood - BBS 2000
Accipiter striatus	Sharp-shinned hawk		Friends of Oxbow 2000
Buteo jamaicensis	Red-tailed hawk		Friends of Oxbow 2000; Lockwood - BBS 2000
Buteo platypterus	Broad-winged hawk		Friends of Oxbow 2000
Falco sparverius	American kestrel	SRC	Friends of Oxbow 2000
Pandion haliaetus	Osprey		Friends of Oxbow 2000
Cathartes aura	Turkey vulture		Friends of Oxbow 2000
Bonasa umbellus	Ruffed grouse		Friends of Oxbow 2000
Phasianus colchicus	Ring-necked pheasant		Friends of Oxbow 2000
Scolopax minor	American woodcock	SRC	Plagge 2000; Friends of Oxbow 2000
Asio flammeus	Short-eared owl	NGSMC	Friends of Oxbow 2000
Zenaida macroura	Mourning dove		Friends of Oxbow 2000; Lockwood - BBS 2000
Columba livia	Rock dove		Friends of Oxbow 2000
Caprimulgus vociferus	Whip-poor-will	SRC	Plagge 2000; Lockwood - BBS 2000
Archilochus colubris	Ruby-throated hummingbird		Friends of Oxbow 2000
Megaceryle alcyon	Belted kingfisher		Friends of Oxbow 2000; Lockwood - BBS 2000
Colaptes auratus	Northern flicker	NGSMC	Friends of Oxbow 2000; Lockwood - BBS 2000
Picoides pubescens	Downy woodpecker		Friends of Oxbow 2000; Lockwood - BBS 2000
Picoides villosus	Hairy woodpecker		Friends of Oxbow 2000; Lockwood - BBS 2000
Contopus virens	Eastern Wood-pewee		Lockwood - BBS 2000
Myiarchus crinitus	Great crested flycatcher		Lockwood - BBS 2000
Empidonax minimus	Least flycatcher		Friends of Oxbow 2000
Empidonax traillii	Willow flycatcher		Lockwood - BBS 2000
Tyrannus tyrannus	Eastern kingbird		Friends of Oxbow 2000; Lockwood - BBS 2000
Tachycineta bicolor	Tree swallow		Friends of Oxbow 2000; Lockwood - BBS 2000
Hirundo rustica	Barn swallow		Friends of Oxbow 2000; Lockwood - BBS 2000
Chaetura pelagica	Chimney swift		Friends of Oxbow 2000
Sayornis phoebe	Eastern phoebe		Friends of Oxbow 2000; Lockwood - BBS 2000
Cyanocitta cristata	Blue jay		Friends of Oxbow 2000; Lockwood - BBS 2000
Corvus brachyrhynchos	American crow		Friends of Oxbow 2000; Lockwood - BBS 2000
Parus bicolor	Tufted titmouse		Friends of Oxbow 2000; Lockwood - BBS 2000
Parus atricapillus	Black-capped chickadee		Friends of Oxbow 2000; Lockwood - BBS 2000
Sitta carolinensis	White breasted nuthatch		Friends of Oxbow 2000; Lockwood - BBS 2000
Certhia americana	Brown creeper		Lockwood 2000
Thryothorus ludovicianus	Carolina Wren		Friends of Oxbow 2000
Troglodytes aedon	House Wren		Lockwood - BBS 2000

Scientific Name	Common Name	Status	References
Seiurus aurocapillus	Ovenbird		Friends of Oxbow 2000; Lockwood - BBS 2000
Catharus guttatus	Hermit Thrush		Lockwood - BBS 2000
Seiurus noveboracensis	Northern Waterthrush		Friends of Oxbow 2000
Bombycilla cedrorum	Cedar Waxwing		Friends of Oxbow 2000; Lockwood - BBS 2000
Dendroica pinus	Pine warbler		Friends of Oxbow 2000; Lockwood - BBS 2000
Mniotilta varia	Black and white warbler		Friends of Oxbow 2000; Lockwood - BBS 2000
Dendroica palmarum	Palm warbler		Friends of Oxbow 2000
Dendroica magnolia	Magnolia warbler		Friends of Oxbow 2000
Dendroica coronata	Myrtle warbler (Yellow-rumped)		Friends of Oxbow 2000; Lockwood 2000
Setophaga ruticilla	American redstart		Friends of Oxbow 2000; Lockwood - BBS 2000
Vireo solitarius	Blue headed (solitary) vireo		Lockwood 2000
Vireo gilvus	Warbling vireo		Friends of Oxbow 2000; Lockwood - BBS 2000
Vireo olivaceus	Red eyed vireo		Lockwood - BBS 2000
Vireo flavifrons	Yellow throated vireo		Lockwood - BBS 2000
Dendroica virens	Black-throated green warbler		Friends of Oxbow 2000; Lockwood - BBS 2000
Dendroica pensylvanica	Cheastnut-sided warbler		Friends of Oxbow 2000; Lockwood - BBS 2000
Vermivora pinus	Blue-winged warbler	NGSMC	Friends of Oxbow 2000; Lockwood 2000
Geothlypis trichas	Common Yellowthroat		Friends of Oxbow 2000; Lockwood - BBS 2000
Dendroica petechia	Yellow warbler		Friends of Oxbow 2000; Lockwood - BBS 2000
Wilsonia canadensis	Canada warbler		Friends of Oxbow 2000
Cardinalis cardinalis	Northern cardinal		Friends of Oxbow 2000; Lockwood - BBS 2000
Melospiza georgiana	Swamp sparrow	SRC	Friends of Oxbow 2000; Lockwood - BBS 2000
Melospiza melodia	Song sparrow		Friends of Oxbow 2000; Lockwood - BBS 2000
Zonotrichia leucophrys	White-crowned sparrow		Lockwood 2000
Zonotrichia albicollis	White-throated sparrow		Lockwood 2000; Friends of Oxbow
Spizella passerina	Chipping Sparrow		Lockwood - BBS 2000
Pipilo erythrophthalmus	Eastern towhee (Rufous-sided)		Friends of Oxbow 2000; Lockwood - BBS 2000
Carduelis tristis	American goldfinch		Friends of Oxbow 2000; Lockwood - BBS 2000
Agelaius phoeniceus	Red-winged blackbird		Friends of Oxbow 2000; Lockwood - BBS 2000
Euphagus carolinus	Rusty blackbird		Friends of Oxbow 2000
Molothrus ater	Brown-headed cowbird		Friends of Oxbow 2000; Lockwood - BBS 2000
Quiscalus quiscula	Common grackle		Friends of Oxbow 2000; Lockwood - BBS 2000
Carpodacus purpureus	Purple finch		Lockwood 2000
Sturnella magna	Eastern Meadowlark	NGSMC	Friends of Oxbow 2000
Icterus galbula	Baltimore Oriole (N. Oriole)		Friends of Oxbow 2000; Lockwood - BBS 2000
Piranga olivacea	Scarlert tanager		Friends of Oxbow 2000; Lockwood - BBS 2000
Pheucticus ludovicianus	Rose-breasted grosbeak		Friends of Oxbow 2000; Lockwood - BBS 2000

Table F-20. Mammals at Oxbow NWR

Scientific Name	Common Name	Status	References
Blarina brevicauda	Northern short-tailed shrew		Friends of Oxbow 2000
Scalopus aquiaticus	Eastern mole		Friends of Oxbow 2000
Tamias striatus	Eastern chipmunk		Friends of Oxbow 2000
Tamiasciurus hudsonicus	Red squirrel		Friends of Oxbow 2000
Sciurus carolinensis	Eastern gray squirrel		Friends of Oxbow 2000
Sylvilagus floridanus	Eastern Cottontail Rabbit		Friends of Oxbow 2000
Castor canadensis	American beaver		Plagge & Lockwood 2000; Friends of Oxbow 2000
Microtus pennsylvanicus	Meadow vole		Friends of Oxbow 2000
Microtus spp.	Vole spp.		Friends of Oxbow 2000
Ondatra zibethicus	Common muskrat		Baseline Study 1993; Friends of Oxbow 2000
Mus musculus	House mouse		Baseline Study 1993
Rattus noregicus	Norway rat		Baseline Study 1993
Napaeozapus insignis	Woodland jumping mouse		Baseline Study 1993
Erethizon dorsatum	Common porcupine		Baseline Study 1993
Canis latrans	Coyote		Friends of Oxbow 2000
Vulpes fulva	Red fox		Plagge & Lockwood 2000
Urocyon cinereoargenteus	Gray fox		McCarter, 2000
Procyon lotor	Common raccoon		Friends of Oxbow 2000
Mustela vison	American mink		Friends of Oxbow 2000
Lutra canadensis	Northern river otter		Friends of Oxbow 2000
Martes pennanti	Fisher		Friends of Oxbow 2000; Lockwood 2000
Lynx rufus	Bobcat		Baseline Study 1993; Friends of Oxbow 2000
Odocoileus virginiana	White-tailed deer		Friends of Oxbow 2000
Alces alces	Moose		Lockwood 2000
Eptesicus fuscus	Big brown bat		Baseline Study 1993; Friends of Oxbow 2000
Lasiurus borealis	Eastern red bat (*not positive ID)		Baseline Study 1993
Lasiurus cinereus	Hoary bat (*not positive ID)		Baseline Study 1993
Myotis lucifugus	Little brown bat		Baseline Study 1993; Friends of Oxbow 2000
Myotis keenii	Keen's myotis (*not positive ID)		Baseline Study 1993
Pipistrellus subflavus	Eastern pipistrelle (*not positive ID)		Baseline Study 1993

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Scientific Name	Common Name	Status	References
Didelphis virginiana	Virginia opossum		Thomas 1992
Sorex cinereus	Masked shrew		Thomas 1992
Sorex palustris	Common water shrew	SC	Thomas 1992
Parascalops breweri	Hairy-tailed mole		Thomas 1992
Condylura cristata	Star-nosed mole		Thomas 1992
Sylvilagus floridanus	Eastern cottontail		Thomas 1992
Lepus americanus	Snowshoe hare		Thomas 1992
Glaucomys volans	Southern flying squirrel		Thomas 1992
Marmota monax	Woodchuck		Thomas 1992
Peromyscus leucopus	White-footed mouse		Thomas 1992
Microtus pinetorum	Woodland vole (Pine vole)		Thomas 1992
Clethrionomys gapperi	Southern red-backed vole		Thomas 1992
Zapus hudsonius	Meadow jumping mouse		Thomas 1992
Ursus americanus	Black bear		Thomas 1992
Mustela erminea	Ermine		Thomas 1992
Mephitis mephitis	Striped skunk		Thomas 1992
Blarina brevicauda	Northern short-tailed shrew		Thomas 1992
Tamias striatus	Eastern chipmunk		Thomas 1992
Microtus pennsylvanicus	Meadow vole		Thomas 1992
Canis latrans	Coyote		Thomas 1992
Procyon lotor	Common raccoon		Thomas 1992

Scientific Name	Common Name	Status	References
Mustela vison	American mink		Thomas 1992
Lutra canadensis	Northern river otter		Thomas 1992
Odocoileus virginiana	White-tailed deer		Thomas 1992
Tamiasciurus hudsonicus	Red squirrel		Thomas 1992
Sciurus carolinensis	Eastern gray squirrel		Thomas 1992
Martes pennanti	Fisher		Thomas 1992

Table F-21. Reptiles at Oxbow NWR

Scientific Name	Common Name	Status	References
Coluber c. constrictor	Northern black racer		Baseline Study 1993
Diadophis punctatus	Northern ringneck snake		Baseline Study 1993
Elaphe guttata	Corn snake		Baseline Study 1993
Lampropeltis triangulum	Eastern milk snake		Baseline Study 1993
Nerodia s. sipedon	Northern water snake		Baseline Study 1993; Friends of Oxbow 2000
Opheodrys vernalis	Smooth green snake		Baseline Study 1993
Storeria dekayi	Northern brown snake		Baseline Study 1993
Storeria occipitomaculata	Northern redbelly snake		Baseline Study 1993
Thamnophis sauritus	Northern ribbon snake		Baseline Study 1993; Friends of Oxbow 2000
Thamnophis s. sirtalis	Common garter snake		Baseline Study 1993; Friends of Oxbow 2000
Chelydra serpentina	Snapping turtle		Baseline Study 1993; Friends of Oxbow 2000
Chrysemys picta	Painted turtle		Baseline Study 1993; Friends of Oxbow 2000
Clemmys guttata	Spotted turtle	SC	Baseline Study 1993
Clemmys insculpta	Wood turtle	SC	Baseline Study 1993
Terrapene carolina	Eastern box turtle	SC	Baseline Study 1993
Emydoidea blandingii	Blanding's turtle	ST	Baseline Study 1993; Friends of Oxbow 2000
Sternotherus odoratus	Stinkpot		Baseline Study 1993

Table F-22. Amphibians at Oxbow NWR

Scientific Name	Common Name	Status	References
Ambystoma laterale	Blue-spotted salamander	SC	Baseline Study 1993; Friends of Oxbow 2000
Ambystoma maculatum	Spotted salamander		Baseline Study 1993; Friends of Oxbow 2000
Bufo americanus	American toad		Baseline Study 1993; Friends of Oxbow 2000
Bufo woodhousei	Woodhouse's toad		Baseline Study 1993
Hyla crucifer	Spring peeper		Baseline Study 1993; Friends of Oxbow 2000
Hyla versicolor	Gray treefrog		Baseline Study 1993
Desmognathus fuscus	Dusky salamander		Baseline Study 1993
Eurycea bislineata	Two-lined salamander		Baseline Study 1993
Plethodon cinereus	Red Backed salamander		Baseline Study 1993
Rana catesbeiana	Bullfrog		Baseline Study 1993; Friends of Oxbow 2000
Rana clamitans	Green frog		Baseline Study 1993; Friends of Oxbow 2000
Rana palustris	Pickerel frog		Baseline Study 1993; Friends of Oxbow 2000
Rana pipiens	Northern leopard frog		Baseline Study 1993; Friends of Oxbow 2000
Rana sylvatica	Wood frog		Baseline Study 1993; Friends of Oxbow 2000
Notopthalmus viridescens	Red spotted newt		Baseline Study 1993; Friends of Oxbow 2000

Table F-23. Moths at Oxbow NWR

Scientific Name	Status	References
Drepana arcuata		Mello & Peters 1994
Drepana bilineata		Mello & Peters 1994
Oreta rosea		Mello & Peters 1994
Eumacaria latiferrugata		Mello & Peters 1994
Itame pustularia		Mello & Peters 1994
Semiothisa aemulitaria		Mello & Peters 1994
Semiothisa minorata		Mello & Peters 1994
Semiothisa bisignata		Mello & Peters 1992
Semiothisa granitata		Mello & Peters 1994
Glena cognataria		Mello & Peters 1994
Anacamptodes humaria		Mello & Peters 1994
Anavitrinelia pampinaria		Mello & Peters 1994
Ectropis crepuscularia		Mello & Peters 1994
Melanolophia signataria		Mello & Peters 1994
Eufidonia nototaria		Mello & Peters 1994
Erannis tiliaria		Mello & Peters 1994
Cabera variolaria		Mello & Peters 1994
Euchlaena serrata		Mello & Peters 1994
Campaea perlata		Mello & Peters 1994
Ennomos magnaria		Mello & Peters 1994
Petrophora subaequaria		Mello & Peters 1994
Homochlodes discoventa		Mello & Peters 1994
Metanema inatomaria		Mello & Peters 1994
Cepphis decoloraria		Mello & Peters 1994
Anagoga occiduaria		Mello & Peters 1994
Probole amicaria		Mello & Peters 1994
Plagodis serinaria		Mello & Peters 1994
Plagodis alcoolaria		Mello & Peters 1994
Besma endropiaria		Mello & Peters 1994
Eusarca confusaria		Mello & Peters 1994
Prochoerodes transversata		Mello & Peters 1994
Antepione thiosaria		Mello & Peters 1994
Nematocampa limbata		Mello & Peters 1994
Nemoria bistriaria		Mello & Peters 1994
Chlorochlamys chloroleucaria		Mello & Peters 1994
Cyclophora pendulinaria		Mello & Peters 1994
Scopula cacuminaria		Mello & Peters 1994
Scopula purata		Mello & Peters 1994
Scopula limboundata		Mello & Peters 1994
Eulithis diversilineata		Mello & Peters 1994
Thera juniperata		Mello & Peters 1994
Xanthorhoe lacustrata		Mello & Peters 1994
Orthonama obstipata		Mello & Peters 1994
Orthonama centrostrigaria		Mello & Peters 1994
Operophtera bruceata		Mello & Peters 1994
Heterophelps triguttaria		Mello & Peters 1994
Calledapteryx dryopterata		Mello & Peters 1994
Tolype velleda		Mello & Peters 1994
Tolype laricis		Mello & Peters 1994
Dryocampa rubicunda		Mello & Peters 1994
Callosamia promethea		Mello & Peters 1994
Sphinx gordius		Mello & Peters 1994
Paonias myops		Mello & Peters 1994
Pachysphinx modesta		Mello & Peters 1994
Clostera albosigma		Mello & Peters 1994
Costera inclusa		Mello & Peters 1994
Costera apicalis		Mello & Peters 1994
Nadata gibbosa		Mello & Peters 1994
Hyperaeschra georgica		Mello & Peters 1994
Peridea angulosa		Mello & Peters 1994
Peridea ferruginea		Mello & Peters 1994
Notodonta scitipennis		Mello & Peters 1994
Nerice bidentata		Mello & Peters 1994
Gluphisia septentrionis		Mello & Peters 1994
Macrurocampa marthesia		Mello & Peters 1994
Schizura badia		Mello & Peters 1994
Schizura unicornis		Mello & Peters 1994
Oligocentra semirufescens		Mello & Peters 1994
Oligocentra lignicolor		Mello & Peters 1994
Hypoprepia fucosa		Mello & Peters 1994
Holomelina aurantiaca		Mello & Peters 1994
Spilosoma congrua		Mello & Peters 1994
Spilosoma virginica		Mello & Peters 1994
Phragmatobia fuliginosa		Mello & Peters 1994
Apantesis carlotta		Mello & Peters 1994
Apantesis figurata		Mello & Peters 1994
Apantesis arge		Mello & Peters 1994
Halysidota tessellaris		Mello & Peters 1994
Cycnia oregonensis		Mello & Peters 1994
Cisseps fulvicollis		Mello & Peters 1994
Orgyia leucostigma		Mello & Peters 1994
Lymantria dispar		Mello & Peters 1994
Idia americalis		Mello & Peters 1994
Idia aemula		Mello & Peters 1994
Idia rotundalis		Mello & Peters 1994
Idia julia		Mello & Peters 1994
Idia diminuendis		Mello & Peters 1994
Idia lubricalis		Mello & Peters 1994
Zanclognatha protumnusalis		Mello & Peters 1992
Zanclognatha jacchusalis		Mello & Peters 1992
Zanclognatha ochreipennis		Mello & Peters 1992
Chytolita petrealis		Mello & Peters 1992
Hormisa absorptalis		Mello & Peters 1994
Hormisa litophora		Mello & Peters 1994
Hormisa bivittata		Mello & Peters 1994
Hormisa orciferalis		Mello & Peters 1994
Hormisa loiusiana		Mello & Peters 1994
Phalaenostola metonalis		Mello & Peters 1994
Phalaenostola larentioides		Mello & Peters 1994
Bleptina caradrinalis		Mello & Peters 1994
Renia factiosalis		Mello & Peters 1994
Renia flavipunctalis		Mello & Peters 1994
Lascoria ambigualis		Mello & Peters 1994
Palthis angulalis		Mello & Peters 1994
Palthis asopialis		Mello & Peters 1994
Rivula propinqualis		Mello & Peters 1994
Colobochyla interpuncta		Mello & Peters 1994
Melanoma aurinctaria		Mello & Peters 1994

Scientific Name	Status	References
Hypenodes caducus		Mello & Peters 1994
Hypenodes fractilinea		Mello & Peters 1994
Hypenodes palustris		Mello & Peters 1994
Hypenodes sombrus		Mello & Peters 1994
Dyspyralis puncticosta		Mello & Peters 1994
Bomolocha baltimoralis		Mello & Peters 1994
Lomanaltes eductalis		Mello & Peters 1994
Plathypena scabra		Mello & Peters 1994
Pangrapta decoralis		Mello & Peters 1994
Ledaea perditalis		Mello & Peters 1994
Metalectra discalis		Mello & Peters 1994
Gabara subnivosella		Mello & Peters 1994
Drasteria occulta		Mello & Peters 1994
Zale helata		Mello & Peters 1994
Zale horrida		Mello & Peters 1994
Parallelia bistriaris		Mello & Peters 1994
Caenurgina crassiuscula		Mello & Peters 1994
Caenurgina erechtea		Mello & Peters 1994
Catocala antinympha		Mello & Peters 1994
Catocala unijuga		Mello & Peters 1994
Catocala cara		Mello & Peters 1994
Catocala concumbens		Mello & Peters 1994
Catocala andromedae		Mello & Peters 1994
Catocala ultronia		Mello & Peters 1994
Pseudoplusia includens		Mello & Peters 1994
Autographa precationis		Mello & Peters 1994
Anagrapha falcifera		Mello & Peters 1994
Plusia putnami		Mello & Peters 1994
Plusia contexta		Mello & Peters 1994
Plusia venusta		Mello & Peters 1994
Baileya ophthalmica		Mello & Peters 1994
Lithacodia bellicula		Mello & Peters 1994
Lithacodia muscosula		Mello & Peters 1994
Lithacodia albidula		Mello & Peters 1994
Lithacodia carneola		Mello & Peters 1994
Homophoberia cristata		Mello & Peters 1994
Homophoberia apicosa		Mello & Peters 1994
Neotarache curvata		Mello & Peters 1994
Tarachidia candefacta		Mello & Peters 1994
Panthea pallescens		Mello & Peters 1994
Raphia frater		Mello & Peters 1994
Acronicta lepusculina		Mello & Peters 1994
Acronicta noctivaga		Mello & Peters 1994
Acronicta distans		Mello & Peters 1994
Acronicta oblinita		Mello & Peters 1994
Harrisimemna Trisignata		Mello & Peters 1994
Crymodes burgessi		Mello & Peters 1994
Eremobina hilli		Mello & Peters 1992
Oligia exhausta		Mello & Peters 1994
Oligia bridghami		Mello & Peters 1994
Oligia mactata		Mello & Peters 1994
Oligia illocata		Mello & Peters 1994
Meropleon diversicolor		Mello & Peters 1994
Lemmeria digitalis	WL	Mello & Peters 1992
Archanara oblonga		Mello & Peters 1992
Helotropha reniformis		Mello & Peters 1994
Papaipema impecuniosa		Mello & Peters 1994
Papaipema lysimachiae		Mello & Peters 1994
Papaipema speciosissima		Mello & Peters 1994
Papaipema inquaesita		Mello & Peters 1992
Papaipema birdi		Mello & Peters 1994
Bellura gortynoides		Mello & Peters 1994
Bellura obliqua		Mello & Peters 1994
Euplexia benesimils		Mello & Peters 1994
Phlogophora periculosa		Mello & Peters 1992
Nedra ramosula		Mello & Peters 1992
Fagitana littera		Mello & Peters 1994
Callopistria mollissima		Mello & Peters 1994
Amphipyra pyramidoides		Mello & Peters 1994
Amphipyra glabella		Mello & Peters 1994
Proxenus miranda		Mello & Peters 1994
Platyperigea multifera		Mello & Peters 1994
Platysenta videns		Mello & Peters 1994
Platysenta vecors		Mello & Peters 1994
Cosmia calami		Mello & Peters 1994
Xylena curvimacula		Mello & Peters 1994
Lithophane solidaginis		Mello & Peters 1994
Lithophane querquera		Mello & Peters 1994
Lithophane tepida		Mello & Peters 1994
Lithophane antennata		Mello & Peters 1994
Lithophane grotei		Mello & Peters 1994
Lithophane fagina		Mello & Peters 1994
Pyreferra hesperidago		Mello & Peters 1994
Eupsilia morrisoni		Mello & Peters 1994
Metaxaglaea semitaria		Mello & Peters 1994
Epiglaea decliva		Mello & Peters 1994
Epiglaea apiata		Mello & Peters 1994
Chaetaglaea tremula		Mello & Peters 1994
Chaetaglaea sericea		Mello & Peters 1994
Psectraglaea carnosa		Mello & Peters 1994
Eucirroedia pampina		Mello & Peters 1994
Sunira bicolorago		Mello & Peters 1994
Anathix ralla		Mello & Peters 1994
Xanthia togata		Mello & Peters 1994
Sutnya privata		Mello & Peters 1994
Cucullia convexipennis		Mello & Peters 1994
Lacanobia legitima		Mello & Peters 1994
Lacinipolia meditata		Mello & Peters 1994
Faronta diffusa		Mello & Peters 1994
Aletia oxygala		Mello & Peters 1994
Pseudaletia unipuncta		Mello & Peters 1992
Leucania linda		Mello & Peters 1992
Leucania multilinea		Mello & Peters 1994
Nephelodes minians		Mello & Peters 1994
Ulolonche modesta		Mello & Peters 1994
Agrotis vetusta		Mello & Peters 1994
Agrotis venerabilis		Mello & Peters 1994
Agrotis stigmosa		Mello & Peters 1994
Feltia jaculifera		Mello & Peters 1994
Feltia subgothica		Mello & Peters 1994
Feltia herilis		Mello & Peters 1994
Feltia geniculata		Mello & Peters 1994

Scientific Name Status	References
Longivesica messoria	Mello & Peters 1992
Euxoa velleripennis	Mello & Peters 1994
Euxoa tessellata	Mello & Peters 1992
Euxoa albipennis	Mello & Peters 1994
Euxoa violaris	Mello & Peters 1994
Euxoa bostoniensis	Mello & Peters 1994
Euxoa obeliscoides	Mello & Peters 1994
Orchopleura plecta	Mello & Peters 1994
Euagrotis illapsa	Mello & Peters 1994
Peridroma saucia	Mello & Peters 1994
Spaelotis clandestina	Mello & Peters 1994
Xestia adela	Mello & Peters 1994
Xestia dolosa	Mello & Peters 1994
Xestia smithii	Mello & Peters 1992
Xestia bicarnea	Mello & Peters 1992
Anomogyna elimata	Mello & Peters 1994
Anomogyna dilucida	Mello & Peters 1994
Eugraphe subrosea opacifrons	Mello & Peters 1994
Protolampra brunneicollis	Mello & Peters 1994
Euretagrotis perattenta	Mello & Peters 1994
Abagrotis alternata	Mello & Peters 1994
Rhynchagrotis cupida	Mello & Peters 1994
Derrima stellata	Mello & Peters 1994
Schinia spinosae	Mello & Peters 1992
Schinia lynx	Mello & Peters 1994
Schinia arcigera	Mello & Peters 1994

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Scientific Name	Common Name	Status	References
Acronicta americana	American dagger		Friends of Oxbow 2000
**Cosmia calami*	American dun-bar		Friends of Oxbow 2000
**Idia americalis*	American idia		Friends of Oxbow 2000
**Bomolocha baltimoralis*	Baltimore bomolocha		Friends of Oxbow 2000
Pantograpta limata	Basswood leafroller		Friends of Oxbow 2000
**Bleptina cardrinalis*	Bent-winged owlet		Friends of Oxbow 2000
Paonias excaecatus	Blinded sphinx		Friends of Oxbow 2000
Hemicleuca maia	Buck moth		Friends of Oxbow 2000
Melanolopha candaria	Canadian melanolophia		Friends of Oxbow 2000
Udea rubigalis	Celery leaftier		Friends of Oxbow 2000
Catocala blandula	Charming underwing		Friends of Oxbow 2000
**Schizura badia*	Chestnut chiizura		Friends of Oxbow 2000
**Peridea ferruginea*	Chocoloate prominent		Friends of Oxbow 2000
Chytonix palliatricula	Cloaked marvel		Friends of Oxbow 2000
**Gluphisia septentrionis*	Common gluphisia		Friends of Oxbow 2000
**Idia aemula*	Common Idia		Friends of Oxbow 2000
Petrophordae sp.	Common petrophora		Friends of Oxbow 2000
**Zanclognatha obscuripennis*	Dark zancolognatha		Friends of Oxbow 2000
**Pangrapta decoralis*	Decorated owlet		Friends of Oxbow 2000
Datana drexelli	Drexel's datana		Friends of Oxbow 2000
Malacosoma americanum	Eastern tent catapillar		Friends of Oxbow 2000
Ennomos subsignaria	Elm spanworm		Friends of Oxbow 2000
Hyphantria cunea	Fall webworm		Friends of Oxbow 2000
Pheosia rimosa	False sphinx		Friends of Oxbow 2000
Amolita fessa	Feeble grass moth		Friends of Oxbow 2000
Hydria prunivorata	Fergerson's scallop shell		Friends of Oxbow 2000
Bomolocha manalis	Flowing-line bomolocha		Friends of Oxbow 2000
Chrysanympha formosa	Formosa looper		Friends of Oxbow 2000

Scientific Name	Common Name	Status	References
**Renia flavipunctalis*	Fraternal renia		Friends of Oxbow 2000
**Probole amicaria*	Friendly probole		Friends of Oxbow 2000
Polia goddelli	Godells' arches		Friends of Oxbow 2000
Desmia funeralis	Grape leaf folder		Friends of Oxbow 2000
Aglossa cuprina	Grease moth		Friends of Oxbow 2000
**Nadata gibbosa*	Green oak caterpillar		Friends of Oxbow 2000
**Peridea angulosa*	Green oak caterpillar		Friends of Oxbow 2000
**Lymantria dispar*	Gypsy		Friends of Oxbow 2000
Harrisimemna trsignata	Harris's three spot		Friends of Oxbow 2000
Acronicta haesitata	Hesitant dagger		Friends of Oxbow 2000
Acronicta ovata	Hesitant dagger moth complex		Friends of Oxbow 2000
Nematocampa resistaria	Horned spanworm		Friends of Oxbow 2000
**Zale horrida*	Horrid zale		Friends of Oxbow 2000
Hemaris thysbe	Hummingbird moth		Friends of Oxbow 2000
Catocala ilia	Ilia underwing		Friends of Oxbow 2000
Phrrharetia isabella	Isabella tiger moth catapiller		Friends of Oxbow 2000
Phyllodesma americana	Lappet		Friends of Oxbow 2000
**Scopula limboundata*	Large lacked border		Friends of Oxbow 2000
**Prochoerodes transversata*	Large maple spanworm		Friends of Oxbow 2000
**Lithacodia muscosula*	Large mossy lithacodia		Friends of Oxbow 2000
Zeuzera pyrina	Leapord moth		Friends of Oxbow 2000
**Itame pustularia*	Lesser maple sapnworm		Friends of Oxbow 2000
Acronicta longa	Long-winged dagger		Friends of Oxbow 2000
**Ledaea perditalis*	Lost owlet		Friends of Oxbow 2000
**Parallelia bistriaris*	Maple looper		Friends of Oxbow 2000
Locmaeus bilineata	Marble prominent		Friends of Oxbow 2000
**Drepana bilineata*	Masked birch caterpillar		Friends of Oxbow 2000
Euchactias	Milkweed tiger moth caterpillar		Friends of Oxbow 2000
Schizura ipomoeae	Morning glory prominent		Friends of Oxbow 2000
Pero morrisonaria	Morrison's pero		Friends of Oxbow 2000
**Macrurocampa marthesia*	Mottled prominent		Friends of Oxbow 2000
Lapara bombycoides	Northern pine sphinx		Friends of Oxbow 2000
Lapara coniferarum	Northern sphnix		Friends of Oxbow 2000
Hetrocampa obliqua	Oblique heterocampa		Friends of Oxbow 2000
Zale orbliqua	Oblique zale		Friends of Oxbow 2000
Hypagytis unipunctata	One-spotted variant		Friends of Oxbow 2000
**Idia diminuendis*	Orange spotted idia		Friends of Oxbow 2000
**Halysidota tessellaris*	Pale tussock		Friends of Oxbow 2000
Eudryas unio	Pearly wood nymph		Friends of Oxbow 2000
**Lithacodia carneola*	Pink barred lithacodia		Friends of Oxbow 2000
Callopistria mollissima	Pink shaded fern moth		Friends of Oxbow 2000
Antheraea polyphemus	Polyphemus moth		Friends of Oxbow 2000
Protoboarmia porcelaria	Porcelain gray		Friends of Oxbow 2000
Panopoda rufimargo	Red-lined panopoda		Friends of Oxbow 2000
**Dryocampa rubicunda*	Rosy maple moth		Friends of Oxbow 2000
**Phragmatabia fuliginosa*	Ruby tiger		Friends of Oxbow 2000
**Ectropis crepuscularia*	Saddleback looper		Friends of Oxbow 2000
**Euchaena serrata*	Sawwing		Friends of Oxbow 2000
**Hypoprepia fucosa*	Scarlet winged lilchen moth		Friends of Oxbow 2000
Eueretagrotis sigmoides	Sigmoid dart		Friends of Oxbow 2000
**Callopistria cordata*	Silver spotted fern moth		Friends of Oxbow 2000
Paonias astylus	Small eyed spinx		Friends of Oxbow 2000
Eugonobapta nivosaria	Snowy geometer		Friends of Oxbow 2000
Catocala sordida	Sordid underwing		Friends of Oxbow 2000
Euclea delphinii	Spiny oak slug		Friends of Oxbow 2000

Scientific Name	Common Name	Status	References
Dasychira obligata	Streaked tussock		Friends of Oxbow 2000
**Cyclophora pendulinaraia*	Sweetfern geometer		Friends of Oxbow 2000
**Panthea pallescens*	Tufted white pine caterpllar		Friends of Oxbow 2000
	Tussock moth		Friends of Oxbow 2000
Ctenucha virginica	Virginia ctenuchid		Friends of Oxbow 2000
Laothoe juglandis	White sphinx		Friends of Oxbow 2000
	Woodland moth		Friends of Oxbow 2000
Pyrrharctia isabella	Woolybear (Isabella tiger moth)		Friends of Oxbow 2000
**Spilosoma viginica*	Yellow bear tiger		Friends of Oxbow 2000
**Colobochyla interpuncta*	Yellow lined owlet		Friends of Oxbow 2000
Agrotis ipsilon	Ypsilon dart (cutworm)		Friends of Oxbow 2000

Scientific Name	Status	References
**Abagrotis alternata*		Friends of Oxbow 2000
Acrobasis stigmella		Friends of Oxbow 2000
Amolita roseola		Friends of Oxbow 2000
Anaplectoides prasina		Friends of Oxbow 2000
Anomogyna praevia		Friends of Oxbow 2000
Callima argenticinctella		Friends of Oxbow 2000
Choristoneura pinus		Friends of Oxbow 2000
Chrystoteucha topiaria		Friends of Oxbow 2000
Dasychira cinnamomea		Friends of Oxbow 2000
Efermaladia giradellus		Friends of Oxbow 2000
Euchlaena muzaria		Friends of Oxbow 2000
Eufernalda agitatellus		Friends of Oxbow 2000
Eulithis explanata		Friends of Oxbow 2000
**Euliths diversilineata*		Friends of Oxbow 2000
**Gabara subnivosella*		Friends of Oxbow 2000
Heptagrotis phyllophora		Friends of Oxbow 2000
Herculia binodularis		Friends of Oxbow 2000
Herpetogramma aegealis		Friends of Oxbow 2000
Herpetogramma pertextalis		Friends of Oxbow 2000
Holomelina opella		Friends of Oxbow 2000
**Idia rotundalis*		Friends of Oxbow 2000
Leucania insueta		Friends of Oxbow 2000
Lithacodes fascola		Friends of Oxbow 2000
Macrochilo litophora		Friends of Oxbow 2000
**Nemorim bistriaria*		Friends of Oxbow 2000
**Noctura pronuba*		Friends of Oxbow 2000
Olethreutes lacunara		Friends of Oxbow 2000
**Orgyia leucostigma*		Friends of Oxbow 2000
**Paonias myops*		Friends of Oxbow 2000
Peoria approximella		Friends of Oxbow 2000
Redectis vitrea		Friends of Oxbow 2000
Renia salusalis		Friends of Oxbow 2000
**Scopula cacuminaria*		Friends of Oxbow 2000
**Semiothisa granitata*		Friends of Oxbow 2000
Semiothisa pinistrobata		Friends of Oxbow 2000
**Semiothisda bisgnata*		Friends of Oxbow 2000
**Semiothsa minorata*		Friends of Oxbow 2000
Tetralopha asperatella		Friends of Oxbow 2000
Zanclognatha laevigata		Friends of Oxbow 2000
**Zanclognatha protumnusalis*		Friends of Oxbow 2000

Table F-24. Butterflies at Oxbow NWR

Scientific Name	Common Name	Status	References
Celestrina ladon	Spring azure		Friends of Oxbow 2000
Nymphalis antiopa	Mourning cloak		Friends of Oxbow 2000
Nymphalis antiopa	Mourning cloak		Friends of Oxbow 2000
Megisto cymela	Little wood satyr		Friends of Oxbow 2000
Vanessa virginiensis	American lady		Friends of Oxbow 2000
Celastrina ladon neglecta	Summer azure		Friends of Oxbow 2000
Phyciodes tharos	Pearl crescent		Friends of Oxbow 2000
Speyeria cybele	Great spangles fritterlary		Friends of Oxbow 2000
Vanessa atalanta	Red admiral		Friends of Oxbow 2000
Ebidua anthedon	Northern Pearly eye		Friends of Oxbow 2000
Danaus plexippus	Monarch		Friends of Oxbow 2000
Papilio polyxenes	Black swallowtail		Friends of Oxbow 2000
Pieris rapae	Cabbage white		Friends of Oxbow 2000
Colias philodice	Clouded sulphur		Friends of Oxbow 2000
Colias philodice	Clouded sulphur (white)		Friends of Oxbow 2000
Coenonnypha tullia	Common ringlet		Friends of Oxbow 2000
Colias philodice	Common sulphur (albino)		Friends of Oxbow 2000
Euphyes vestris	Dun skipper		Friends of Oxbow 2000
Polygonia comma	Eastern comma		Friends of Oxbow 2000
Papilio glaucus	Eastern tiger swallowtail		Friends of Oxbow 2000
Sattrides eurydice	Eyed brown satyr		Friends of Oxbow 2000
Strymon melinus	Gray hairstreak		Friends of Oxbow 2000
Feniseca tarquinius	Harvester		Friends of Oxbow 2000
Poanes hobomok	Hobomok skipper		Friends of Oxbow 2000
Ancyloxpha numitor	Least skipper		Friends of Oxbow 2000
Thorybes pylades	Northern cloudywing		Friends of Oxbow 2000
Colias eurytheme	Orange sulphur		Friends of Oxbow 2000
Polygoina interrogationis	Question mark		Friends of Oxbow 2000
Limenitis arthemis astyanax	Red-spotted purple		Friends of Oxbow 2000
Epargyreus clarus	Silver-spotted skipper		Friends of Oxbow 2000
Satyrium liparops	Striped hairstreak		Friends of Oxbow 2000
Limenitis archippus	Viceroy		Friends of Oxbow 2000

Table F-25. Dragonflies and Damselflies at Oxbow NWR

Scientific Name	Common Name	Status	References
Lestes rectangularis	Spreadwing		Friends of Oxbow 2000
Pachydiplax longipennis	Blue Dasher		Friends of Oxbow 2000
Sympetrum spp.	Meadow Hawk		Friends of Oxbow 2000
Everes comyntas	Eastern tailed blue		Friends of Oxbow 2000
Stylunus spiniceps	Arrow clubtail		Friends of Oxbow 2000
Gomphus spp.	Clubtail		Friends of Oxbow 2000
Hagenius brevistylus	Common dragon hunter		Friends of Oxbow 2000
Libellula luctosa	Common ringlet		Friends of Oxbow 2000
Ischnura verticalis	Eastern forktail		Friends of Oxbow 2000
Erythemis simplicicollis	Eastern pondhawk (green jacket)		Friends of Oxbow 2000
Calopenyx maculata	Ebony jewelwing		Friends of Oxbow 2000
Ischnura posita	Fragile foxtail		Friends of Oxbow 2000
Leucorrhinia frigida	Frosted whiteface		Friends of Oxbow 2000
Porocordulia libera	Racket tailed emerald		Friends of Oxbow 2000
Sympetrum ribiculdulum	Ruby meadowhawk		Friends of Oxbow 2000

Scientific Name	Common Name	Status	References
Libellula incesta	Slaty skimmer		Friends of Oxbow 2000
Lestes rectangularis	Slender spreadwing		Friends of Oxbow 2000
Nehalennia gracilis	Sphagnum sprite		Friends of Oxbow 2000
Argia fumiphennis	Violet dancer		Friends of Oxbow 2000
Libellula lustucosa	Widow skimmer dragonfly		Friends of Oxbow 2000
Sympetrum vicinum	Yellow legged meadownhawk		Friends of Oxbow 2000
Stylunus scudderi	Zebra clubtail		Friends of Oxbow 2000

Table F-26. Insects at Oxbow NWR

Scientific Name	Common Name	Status	References
Carabidae sp.	Ground Beetle		Friends of Oxbow 2000
Chrysomealinae sp.	Flower Beetle (red spotted)		Friends of Oxbow 2000
Chrysomealinae sp.	Flower Beetle (yellow striped)		Friends of Oxbow 2000
Lycosidae sp.	Running Wolf Spider		Friends of Oxbow 2000
Salticidae sp.	Jumping Spider		Friends of Oxbow 2000
Dytiscus harrisi	Predacious Diving Beetle		Friends of Oxbow 2000
Acilius sp.	Water Tigers		Friends of Oxbow 2000
Tropisternus sp.	Water Scavenger Beetle		Friends of Oxbow 2000
Eubranchipus vernalis	Fairy Shrimp		Friends of Oxbow 2000
Limnephilidae sp.	Caddis Fly		Friends of Oxbow 2000
Stratiomyidae sp.	Soldier Fly		Friends of Oxbow 2000
Haliplidae sp.	Crawling Water Beetle		Friends of Oxbow 2000
Malacosoma disstria	Tent Caterpillers		Friends of Oxbow 2000
Ixodes scapularis	Deer Ticks		Friends of Oxbow 2000
Simuliidae spp.	Black flies		Friends of Oxbow 2000
Bombus spp.	Bumble bee		Friends of Oxbow 2000
Halictidae family	Burrowing bees		Friends of Oxbow 2000
Chironomidae family	Midges		Friends of Oxbow 2000
Locusta spp.	Locust		Friends of Oxbow 2000
Magicicada spp.	Cicada		Friends of Oxbow 2000
(?)	Metwing Beetle		Friends of Oxbow 2000
Alaus oculatus	Eastern click beetle		Friends of Oxbow 2000
Myrmeleon spp.	Ant Lions		Friends of Oxbow 2000
	Birch leaf minor		Friends of Oxbow 2000
Leioburnun spp.	Daddy long-legs Spider		Friends of Oxbow 2000
	Potato Leaf Hopper		Friends of Oxbow 2000
Calopteron recticulatum	Banded Netwing Beetle		Friends of Oxbow 2000
Chrysops spp.	Deer fly		Friends of Oxbow 2000
Camponotus pennsylvanicus	Carpenter ant		Friends of Oxbow 2000
	Hover fly		Friends of Oxbow 2000
	Scorpion fly		Friends of Oxbow 2000
Populla japonica	Japanese beetle		Friends of Oxbow 2000
Cicindela punctulata	Tiger beetle		Friends of Oxbow 2000
Photuris pennsylvanicus	Firefly		Friends of Oxbow 2000
	Rose leaf hopper		Friends of Oxbow 2000
	Snout beetle		Friends of Oxbow 2000
Placoadella sp.	Turtle Leech		Friends of Oxbow 2000
Placoadella sp.	Turtle Leech		Friends of Oxbow 2000
Macrobdella decora	American Mediainal Leech		Friends of Oxbow 2000
Pyrrharetia isabella	Wooly bear (Isabella tiger moth catapiller)		Friends of Oxbow 2000
Psylla alni	American alder pysllid		Friends of Oxbow 2000
Eliss pennanut (calithemeis elisa)	Calico pennant		Friends of Oxbow 2000
Dernacebtor spp	Eastern wood tick		Friends of Oxbow 2000
Culex pipineas	House mosquito		Friends of Oxbow 2000

Table F-27. Freshwater Mollusks at Oxbow NWR

Scientific Name	Common Name	Status	References
Physella heterostroyha	Freshwater Snails		Friends of Oxbow 2000
Planorbidae gyrauls	Coiled Snail		Friends of Oxbow 2000
Elliptio complanate	Eastern elliptio		Friends of Oxbow 2000
Lampsilis radiata	Eastern lampmussel		Friends of Oxbow 2000
Alasmidonta undulata	Triangle floater	SC	Friends of Oxbow 2000
Andononta implicata	Alewife floater		Friends of Oxbow 2000
Margaritifera margaritifera	Eastern pearlshell		Friends of Oxbow 2000
Amnicola limnosa	Little pond snail		Friends of Oxbow 2000
Sphaerium occidentalle	Fingernail clam		Friends of Oxbow 2000
Orconectes rusticas	Crayfish		Friends of Oxbow 2000

Table F-28. Vascular Plants at Oxbow NWR

Scientific Name	Common Name	Status	References
Athyrium filix-feminia	Northern Lady fern		Friends of Oxbow 2000
Botrychium dissectum obliquum	Dissected fern		Sorrie, 1987
Cystopteris tenuis	Fragile fern		Friends of Oxbow 2000
Cystopteris tenuis	Brittle Fern		Friends of Oxbow 2000
Dennstaedtia punctilobula	Hay-scented fern		Friends of Oxbow 2000
Deparia acrostichoides	Silvery spleenwort		Sorrie, 1987
Diphasiastrum digitatum	Southern ground-cedar		Friends of Oxbow 2000
Diphasiastrum habereri	Hybrid clubmoss		Friends of Oxbow 2000
Diphasiastrum tristachyum	Slender ground-cedar		Friends of Oxbow 2000
Dryopteris carthusiana	Spinulose woodfern		Friends of Oxbow 2000
Dryopteris cristata	Crested woodfern		Friends of Oxbow 2000
Dryopteris intermedia	Grandular woodfern (intermediate)		Friends of Oxbow 2000
Dryopteris marginalis	Marginal woodfern		Friends of Oxbow 2000
Lygodium palmatum	Climbing Fern	SC	Sorrie, 1987
Drypolteris spinulosa	Wood fern		Friends of Oxbow 2000
Equisetaceae fluviatile	River horsetail		Friends of Oxbow 2000
Equisetaceae hyemale	Scouring horsetail		Friends of Oxbow 2000
Equisetum arvense	Common horsetail		Friends of Oxbow 2000
Equisetum fluviatile	Swamp horsetail		Friends of Oxbow 2000
Equisetum hyemale	Rough horsetail		Friends of Oxbow 2000
Equisteum sp.	Horsetail		Friends of Oxbow 2000
Huperzia lucidula	Shining clubmoss		Friends of Oxbow 2000
Lycopodium clavatum	Common clubmoss		Friends of Oxbow 2000
Lycopodium complanatum	Running pine		Friends of Oxbow 2000
Lycopodium hickeyi	Hickey's princess pine		Friends of Oxbow 2000
Lycopodium obscurum	Princess pine		Friends of Oxbow 2000
Lycopodium spp	Club moss		Friends of Oxbow 2000
Matteuccia struthiopteris	Ostrich fern		Friends of Oxbow 2000
Oncoclea sensibilis	Sensitive fern		Friends of Oxbow 2000
Osmunda cinnamomea	Cinnamon fern		Friends of Oxbow 2000
Osmunda claytoniana	Interrupted fern		Friends of Oxbow 2000
Osmunda regalis	Royal fern		Friends of Oxbow 2000
Platyneuron	Ebony spleenwort		Friends of Oxbow 2000
Polystichum acrostichoides	Christmas fern		Friends of Oxbow 2000
Pteridium aquilinum	Bracken fern		Friends of Oxbow 2000
Thelypteris noveboracensis	New York fern		Friends of Oxbow 2000
Thelypteris pdustris	Marsh fern		Friends of Oxbow 2000
Thelypteris simulata	Massachusetts fern		Friends of Oxbow 2000
Eleocharis ovata	Ovate Spike Sedge	SE	Hunt 1991

Scientific Name	Common Name	Status	References
Abies balsamea	Balsam fir		Friends of Oxbow 2000
Juniperus spp.	Juniper		Friends of Oxbow 2000
Pinus rigida	Pitch pine		Sorrie, 1987
Pinus strobus	White pine		Friends of Oxbow 2000
Aralia nudicaulis	Wild sasparilla		Friends of Oxbow 2000
Arisaema atrorubens	Jack-in-the-pulpit		Friends of Oxbow 2000
Calamagrostis coarctata	Bluejoint Reed		Friends of Oxbow 2000
Carex crinita	Fringed sedge		Friends of Oxbow 2000
Carex stricita	Tussock sedge		Friends of Oxbow 2000
Cypripedium acaule	Pink Lady's slipper		Friends of Oxbow 2000
Dulichium arundianaceum	Three-way sedge		Friends of Oxbow 2000
Epipactis helleborine	Helleborine		Friends of Oxbow 2000
Eriocaylon septangulare	Pipe Wort		Friends of Oxbow 2000
Erythronium americanum	Trout Lily (Yellow alder's tongue)		Friends of Oxbow 2000
Goodyera pubescens	Downy rattlesnake plantain		Friends of Oxbow 2000
Iris versicolor	Blue flag iris		Friends of Oxbow 2000
Juncus effusus	Soft rush		Friends of Oxbow 2000
Leersia oryzoides	Rice cut-grass		Friends of Oxbow 2000
Lemna minor	Lesser Duckweed		Friends of Oxbow 2000
Lilium philadelphicum	Wood lily		Friends of Oxbow 2000
Nughar variegatum	Yellow cow lily		Friends of Oxbow 2000
Phalaris arundinacea	Reed canary grass		Friends of Oxbow 2000
Plantago spp.	Water Plantain		Friends of Oxbow 2000
Saggitaria latifolia	Arrowhead		Friends of Oxbow 2000
Schizachyrium scoparium	Little bluestem		Friends of Oxbow 2000
Scirpus atrovirens	Black Bulrush		Friends of Oxbow 2000
Scirpus cyperinus	Bulrush		Friends of Oxbow 2000
Sparganiaceae spp.	Bur-reed spp.		Friends of Oxbow 2000
Spirodela polyrrhiza	Greater Duckweed		Friends of Oxbow 2000
Symplocarpus foetidus	Skunk Cabbage		Friends of Oxbow 2000
Sparganium minimum	Small Bur-Reed	SE	Searcy 1994
Typha latifolia	Cat-tails		Friends of Oxbow 2000
Veratrum viride	False Hellebore		Friends of Oxbow 2000
Acer rubrum	Red maple		Friends of Oxbow 2000
Acer saccharinum	Silver maple		Friends of Oxbow 2000
Aesculus hippocastanum	Horse chestnut		Friends of Oxbow 2000
Alnus rugosa	Speckled alder		Friends of Oxbow 2000
Betula papyrifera	Paper birch		Friends of Oxbow 2000
Betula papyrifera	White birch		Friends of Oxbow 2000
Betula populifloria	Grey birch		Friends of Oxbow 2000
Carpinus carolinana	Ironwood (Blue Beech)		Friends of Oxbow 2000
Castanea dentata	American chestnut		Sorrie, 1987
Carya ovata	Shagbark hickory		Friends of Oxbow 2000
Comandra umbellata	Bastard-toadflax		Sorrie, 1987
Comptonia peregrina	Sweet fern		Friends of Oxbow 2000
Corylus americana	American hazelnut		Friends of Oxbow 2000
Crataegus spp	Hawthorne		Friends of Oxbow 2000
Fraxinus americana	White ash		Friends of Oxbow 2000
Hamamelis virginiana	Witch hazel		Friends of Oxbow 2000
Malus prunifolia	Plum-leaf apple		Friends of Oxbow 2000
Malus pumila	Apple		Friends of Oxbow 2000
Myrica gale	Sweet gale		Sorrie, 1987
Ostrva virginiaia	Hop-hornbeam (Ironwood)		Friends of Oxbow 2000
Overcus bicolor	Swamp white oak		Friends of Oxbow 2000

Scientific Name	Common Name	Status	References
Pinus rigida	Pitch pine		Friends of Oxbow 2000
Platanus occidentalis	American sycamore		Friends of Oxbow 2000
Populus deltoides	Cottonwood		Friends of Oxbow 2000
Populus grandidentata	Big-toothed aspen		Friends of Oxbow 2000
Populus tremuloides	Quaking aspen		Friends of Oxbow 2000
Populus balsamifera	Balsam Poplar	WL	Hunt 1991
Prunus serotina	Black Cherry		Friends of Oxbow 2000
Quercus alba	White oak		Friends of Oxbow 2000
Quercus palustris	Pin Oak		Friends of Oxbow 2000
Quercus coccinea	Scarlet oak		Friends of Oxbow 2000
Quercus prinus	Chestnut oak		Friends of Oxbow 2000
Quercus rubra	Red oak		Friends of Oxbow 2000
Quercus velutina	Black oak		Friends of Oxbow 2000
Salix discolor	Willow		Friends of Oxbow 2000
Salix nigra	Black willow		Friends of Oxbow 2000
Sorbus americana	Mountain-ash		Friends of Oxbow 2000
Tilia americana	Basswood		Friends of Oxbow 2000
Ulmus americana	American elm		Friends of Oxbow 2000
Viburnum dentatum	Arrowood viburnum		Friends of Oxbow 2000
Elaeagnus angustifolia	Autumn olive		Friends of Oxbow 2000
Berberis vulgaris	European barberry		Friends of Oxbow 2000
Myrica pensylvanica	Bayberry		Friends of Oxbow 2000
Verbena hastata	Blue vervain		Friends of Oxbow 2000
Rubus spp	Bramble		Friends of Oxbow 2000
Arctium minus	Burdock		Friends of Oxbow 2000
Cephalanthus occidentalis	Buttonbush		Friends of Oxbow 2000
Rhamnus cathartica	Common buckthorn		Friends of Oxbow 2000
Sambucus canadensis	Common elderberry		Friends of Oxbow 2000
Rubus flagellaris	Dewberry		Friends of Oxbow 2000
Elaeagnus sp	Eleganus		Friends of Oxbow 2000
Vitis labrusca	Fox-grape		Friends of Oxbow 2000
Rhamnus frangula	Glossy buckthorn		Friends of Oxbow 2000
Crataegus sp	Hawthorne shrub		Friends of Oxbow 2000
Vaccinium corymbosum	Highbush blueberry		Friends of Oxbow 2000
Lonicera spp	Honeysuckle		Friends of Oxbow 2000
Berberis thunbergii	Japanese barberry		Friends of Oxbow 2000
Lonicera japonica	Japanese honeysuckle		Friends of Oxbow 2000
Vaccinium vacillans	Lowbush blueberry		Friends of Oxbow 2000
Lyonia ligustrina	Maleberry		Friends of Oxbow 2000
Spiraea latifolia	Meadowsweet		Friends of Oxbow 2000
Kalmia latifolia	Mountain laurel		Friends of Oxbow 2000
Rose multiflora	Multiflora rose		Friends of Oxbow 2000
Viburnum lentago	Nannyberry		Friends of Oxbow 2000
Celastrus orbiculatus	Oriental bittersweet		Friends of Oxbow 2000
Cornus racemosa	Panicked dogwood		Friends of Oxbow 2000
Juniperus communis	Pasture juniper		Friends of Oxbow 2000
Toxicodendron radicani	Poison ivy		Friends of Oxbow 2000
Salix discolor	Pussy Willow		Friends of Oxbow 2000
Actaea rubra	Red Baneberry		Friends of Oxbow 2000
Uitis riparia	Riverbank grape		Friends of Oxbow 2000
Amelanchier canadensis	Shad		Friends of Oxbow 2000
Amelanchier laevis	Shadbush		Friends of Oxbow 2000
Cornus sp.	Shrubby dogwood		Friends of Oxbow 2000
Cornus amomum	Silky dogwood		Friends of Oxbow 2000
Rhus glabra	Smooth sumac		Friends of Oxbow 2000
Rhus typhia	Staghorn sumac		Friends of Oxbow 2000

Scientific Name	Common Name	Status	References
Spiraea tomentosa	Steeplebush		Friends of Oxbow 2000
Chimaphila maculata	Striped wintergreen		Friends of Oxbow 2000
Rosa palustris	Swamp rose		Friends of Oxbow 2000
Parthenocissus quinquefolia	Virginia creeper		Friends of Oxbow 2000
Clematis virginiana	Virgins bower		Friends of Oxbow 2000
Verbena urticifolia	White verbain		Friends of Oxbow 2000
Cornus racemosa	White Dogwood		Friends of Oxbow 2000
Ribes americanum	Wild currant		Friends of Oxbow 2000
Viburnum rudum var. cassinoidos	Wild raisin		Friends of Oxbow 2000
Rosa sp.	Wild rose		Friends of Oxbow 2000
Rhus copallinum	Winged Sumac		Friends of Oxbow 2000
Ilex vertecillata	Winterberry		Friends of Oxbow 2000
Acelepias syricaca	Milkweed		Friends of Oxbow 2000
Achillea millefolium	Yarrow		Friends of Oxbow 2000
Actaea pachypoda	White baneberry (Doll's eyes)		Friends of Oxbow 2000
Ambrosia artemisiifolia	Common Ragweed		Friends of Oxbow 2000
Anemone quinquefolia	Wood anemone		Friends of Oxbow 2000
Apios americana	Groundnut		Friends of Oxbow 2000
Arctium minus	Burdock (common)		Friends of Oxbow 2000
Aster cordifolius	Heart leaved aster		Friends of Oxbow 2000
Aster divaricatus	White wood aster		Friends of Oxbow 2000
Aster ericoides	Many flowered aster		Friends of Oxbow 2000
Aster linariifolius	Stiff aster		Friends of Oxbow 2000
Aster novae-angliae	New England aster		Friends of Oxbow 2000
Liatris borealis	New England Blazing Star	SC	Hunt 1991
Aster novi-belgii	New York aster		Friends of Oxbow 2000
Aster pilosus	Heath aster		Friends of Oxbow 2000
Aster umbellatus	Flat top white aster		Friends of Oxbow 2000
Baptisia tinctoria	Wild indigo		Friends of Oxbow 2000
Barbarea spp.	Winter cress		Friends of Oxbow 2000
Bidens coronata	Tickseed sunflower		Friends of Oxbow 2000
Bidens frondosa	Beggar ticks		Friends of Oxbow 2000
Geranium bicknellii var. *bicknelli*	Bicknell's Cranesbill	WL	Hunt 1991
Boehmeria cylindrica	Bog-hemp (fasle nettle)		Friends of Oxbow 2000
Centaurea jacea	Brown knapweed		Friends of Oxbow 2000
Centaurea maculosa	Spotted knapweed		Friends of Oxbow 2000
Chelone glabra	White turtlehead		Friends of Oxbow 2000
Chimiaphila maculata	Variegated pipsissewa		Friends of Oxbow 2000
Chimiaphila umbellata	Pipsissewa		Friends of Oxbow 2000
Chrysanthemum leucanthemum	Oxye daisy		Friends of Oxbow 2000
Cichorium intybus	Chicory		Friends of Oxbow 2000
Cicuta maculata	Water hemlock		Friends of Oxbow 2000
Circaea lutetiana	Enchanter's Nightshade		Friends of Oxbow 2000
Cirsium arvense	Canadian thistle		Friends of Oxbow 2000
Cirsium vulgare	Common Thistle		Friends of Oxbow 2000
Clematis virginiana	Clematis		Friends of Oxbow 2000
Cuscuta gronovii	Common Dodder		Friends of Oxbow 2000
Cusuta gronovii	Dodder		Friends of Oxbow 2000
Daucus carota	Queen Annes lace		Friends of Oxbow 2000
Desmodium canadense	Showy tick trefoil		Friends of Oxbow 2000
Dianthus armeria	Deptford pink		Friends of Oxbow 2000
Erigeron annuus	Daisy fleabane		Friends of Oxbow 2000
Erigeron sp.	Fleabane		Friends of Oxbow 2000
Eupatorium dubium	Eastern Joe-Pye weed		Friends of Oxbow 2000
Eupatorium maculatum	Joe-pye weed		Friends of Oxbow 2000
Eupatorium perfoliatum	Boneset		Friends of Oxbow 2000

Scientific Name	Common Name	Status	References
Euthamia graminifolia	Grass leaved (lace-leaved) goldenrod		Friends of Oxbow 2000
Fragaria virginiana	Wild Strawberry		Friends of Oxbow 2000
Galium mollugo	Bedstraw - wild madder		Friends of Oxbow 2000
Galium spp trifidum	Tree lobed bedstraw (small)		Friends of Oxbow 2000
Galium tinctorium	Stiff Marsh-bedstraw		Friends of Oxbow 2000
Galium tomctproi	Clayton's bedstraw		Friends of Oxbow 2000
Gentiana clausa	Bottle gentian		Friends of Oxbow 2000
Glechoma hederacea	Ground ivy		Friends of Oxbow 2000
Helianthus tuberosus	Jerusalem artichoke		Friends of Oxbow 2000
Hepatica nobilis var. obtusa	Hepitica round leafed		Friends of Oxbow 2000
Hesperis matronalis	Dame's Rocket		Friends of Oxbow 2000
Houstonia caerulea	Bluets (quaker lady)		Friends of Oxbow 2000
Hypericum perforatum	St. Johnswort		Friends of Oxbow 2000
Hypericum punctatum	St. Johnswort, spotted		Friends of Oxbow 2000
Hypericum virginiacum	Marsh St. Johns wort		Friends of Oxbow 2000
Impatiens capensis	Jewelweed (touch-me-not)		Friends of Oxbow 2000
Lactuca biennis	Tall blue lettuce		Friends of Oxbow 2000
Lactuca canadensis	Wild lettuce		Friends of Oxbow 2000
Linaria canadensis	Blue toadflax		Friends of Oxbow 2000
Lycopus spp.	Water Horehound		Friends of Oxbow 2000
Lysimachia ciliata	Fringed loosestrife		Friends of Oxbow 2000
Lysimachia quadrifolia	Whorled loosestrife		Friends of Oxbow 2000
Asarum canadense	Wild ginger	WL	Friends of Oxbow 2000
Lysimachia terrestris	Swamp Candle		Friends of Oxbow 2000
Lythrum salicaria	Purple loosestrife		Friends of Oxbow 2000
Maianthemum candaense	Canada mayflower		Friends of Oxbow 2000
Matricaria discoidea	Pineapple-weed		Friends of Oxbow 2000
Melilotus alba	White sweet clover		Friends of Oxbow 2000
Mentha arvensis	Wild mint		Friends of Oxbow 2000
Mimulus ringens	Blue Monkey Flower		Friends of Oxbow 2000
Monotropa uniflora	Indian Pipe		Friends of Oxbow 2000
Nuphar variegata	Yellow water-lily		Friends of Oxbow 2000
Oenothera perennis	Small Sundrops		Friends of Oxbow 2000
Bidens discoidea	Small Beggar-Ticks	WL	Hunt 1991
Oenothera sp.	Evening primrose		Friends of Oxbow 2000
Phytolacca americana	Pokeweed		Friends of Oxbow 2000
Pilea pomila	Clearweed		Friends of Oxbow 2000
Plantago major	Plantain		Friends of Oxbow 2000
Plantago major var. major	Common Plantain		Friends of Oxbow 2000
Polygonum punctatum	Smartweed		Friends of Oxbow 2000
Potentilla norvegica	Rough Cinquefoil		Friends of Oxbow 2000
Potentilla simplex	Old field cinquefoil		Friends of Oxbow 2000
Prunella vulgaris	Self heal		Friends of Oxbow 2000
Pyrola elliptica	Elliptic Shinleaf		Friends of Oxbow 2000
Ranunculus abortivus	Small flowered buttercup (crowsfoot)		Friends of Oxbow 2000
Rubus idaeus	Black raspberry		Friends of Oxbow 2000
Rubus idaeus	Red raspberry		Friends of Oxbow 2000
Rudbeckia serotina	Black eyed susan		Friends of Oxbow 2000
Rumex acetosella	Sheep sorrel		Friends of Oxbow 2000
Rumex crispus	Curled dock		Friends of Oxbow 2000
Sanguinaria canadensis	Bloodroot		Friends of Oxbow 2000
Saponaria officinalis	Bouncing bet		Friends of Oxbow 2000
Solanum dulcamara	Bittersweet Nightshade		Friends of Oxbow 2000
Solidago caesia	Blue stemmed goldenrod		Friends of Oxbow 2000
Solidago canadensis	Canada goldenrod		Friends of Oxbow 2000
Solidago juncea	Early goldenrod		Friends of Oxbow 2000

Scientific Name	Common Name	Status	References
Solidago patula	Rough-leaved goldenrod		Friends of Oxbow 2000
Solidago puberula	Downy goldenrod		Friends of Oxbow 2000
Solidago rugosa	Rough-stemmed goldenrod		Friends of Oxbow 2000
Solidago spp.	Field goldenrod		Friends of Oxbow 2000
Tanacetum vulgare	Tansy		Friends of Oxbow 2000
Taraxacum officinale	Dandelion		Friends of Oxbow 2000
Thalictrum polygamum	Tall meadow rue		Friends of Oxbow 2000
Tragopogon porrifolius	Goat's Beard (Oysterplant)		Friends of Oxbow 2000
Trientalis borealis	Starflower		Friends of Oxbow 2000
Trifolium arvense	Rabbitfoot clover		Friends of Oxbow 2000
Trifolium pratense	Red clover		Friends of Oxbow 2000
Trifolium procumbens	Hop clover		Friends of Oxbow 2000
Trifolium repens	White clover		Friends of Oxbow 2000
Trifolium spp.	Clover		Friends of Oxbow 2000
Urtica dioica	Stinging nettle		Friends of Oxbow 2000
Urtica procera	Tall nettle		Friends of Oxbow 2000
Urtica sp.	Nettle		Friends of Oxbow 2000
Verbascum thapsus	Common mullen		Friends of Oxbow 2000
Verbena urticifolia	White vervain		Friends of Oxbow 2000
Veronica officinalis	Common speedwell		Friends of Oxbow 2000
Vicia craecca	American vetch		Friends of Oxbow 2000
Vicia spp.	Vetch		Friends of Oxbow 2000
Viola septentrionalis	Violet, northern blue		Friends of Oxbow 2000
Viola spp	Violet (long leaved)		Friends of Oxbow 2000
Viola spp.	Blue violet		Friends of Oxbow 2000
Virginia otenucha	Native loosestrife		Friends of Oxbow 2000
Vitis spp.	Wild Grape		Friends of Oxbow 2000
Ganoderma applanatum	Artists conch		Friends of Oxbow 2000
Poloyporus betulinus	Birch polypore		Friends of Oxbow 2000
not found	Black knot of cherry		Friends of Oxbow 2000
Cantharellus cinnabarinus	Cinnabar-red		Friends of Oxbow 2000
Laccaria laccata	Common lacara		Friends of Oxbow 2000
Galerina autumnalis	Deadly galerina		Friends of Oxbow 2000
Geastrum spp	Earth star		Friends of Oxbow 2000
Russula emetica	Emetic russula		Friends of Oxbow 2000
Scutellinia scutellata	Eyelash cup		Friends of Oxbow 2000
Monotropa uniflora	Indian pipes		Friends of Oxbow 2000
Ganoderma lucidum	Ling chih		Friends of Oxbow 2000
Pleurotus ostreatus	Oyster		Friends of Oxbow 2000
Lycoperdon umbrium	Pear shaped		Friends of Oxbow 2000
Scleroderma citrinum	Pigskin poison puffballs		Friends of Oxbow 2000
Mirasmius sp	Pinwheel		Friends of Oxbow 2000
not found	Scaly pugskin puffball		Friends of Oxbow 2000
Nymphodies	Spagnum moss		Friends of Oxbow 2000
Collybia maculata	Spotted collybia		Friends of Oxbow 2000
Tricentalis borealis	Starflower		Friends of Oxbow 2000
Daedalea conjiagosa	Thin mazae flat poloypore		Friends of Oxbow 2000
Thametes versicolor	Turkey tail		Friends of Oxbow 2000
not found	Vescolor polypores		Friends of Oxbow 2000
Poloyoporus albellus	White chese polypore		Friends of Oxbow 2000
Tremella mesenterica	Witches butter		Friends of Oxbow 2000
Betulinus	not found		
Collybia sp	not found		
Cortinarius sp	not found		
Russaula sp	not found		
Stereum sp	not found		

Scientific Name	Common Name	Status	References
Cladonia cristatella	British soldiers		Friends of Oxbow 2000
Candelariella sp	Egg yoke lichen		Friends of Oxbow 2000
Evernia mesomorpha	Flabby antler lichen		Friends of Oxbow 2000
Trapeliopsis granulosa	Gray earth lichen		Friends of Oxbow 2000
Amandinea punctata	Gret stupple lichen		Friends of Oxbow 2000
not found	Haircap moss		Friends of Oxbow 2000
Cladonia cervicornis	Lichen (Cladonia cervicornis)		Friends of Oxbow 2000
Cladonia grayi	Lichen (Cladonia grayi)		Friends of Oxbow 2000
Cladonia rei	Lichen (Cladonia rei)		Friends of Oxbow 2000
Lecanora dispersa	Lichen (Lecanora dispersa)		Friends of Oxbow 2000
Micaria sp.	Lichen (Micaria sp).		Friends of Oxbow 2000
Peltigra didactyla	Lichen (Peltigra didactyla)		Friends of Oxbow 2000
Placynthiella icmalea	Lichen (Placynthiella icmalea)		Friends of Oxbow 2000
Placynthiella oligotropha	Lichen (Placynthiella oligotropha)		Friends of Oxbow 2000
Trapelia involuta	Lichen (Trapelia involuta)		Friends of Oxbow 2000
Verrucaria sp	Lichen (Verrucaria)		Friends of Oxbow 2000
Caloplaca sp.	Orange lichen (fire dots)		Friends of Oxbow 2000
Dibaeis baeomhyces	Pink earth lichen		Friends of Oxbow 2000
Cladonia conicoraea	Power horn lichen		Friends of Oxbow 2000
Hypogymnia physodes	Puffed shield lichen		Friends of Oxbow 2000
Cladina rangiferina	Reindeer lichen		Friends of Oxbow 2000
Cladina subtenuis	Reindeer lichen		Friends of Oxbow 2000
Micarea erratica	Rock tar lichen		Friends of Oxbow 2000
Physcia stellaris	Rosette lichen		Friends of Oxbow 2000
Placynthiella uliginosa	Tar lichen		Friends of Oxbow 2000
Cladonia macilenta	White pine lichen		Friends of Oxbow 2000
Flavoparmelia caperata	Wrinkled shield lichen		Friends of Oxbow 2000
Anthoceros laevis	not found		Friends of Oxbow 2000
Ptilidium pulcherrimum	not found		Friends of Oxbow 2000
Bazzania trilobata	not found		Friends of Oxbow 2000
Norwellia curvifolia	not found		Friends of Oxbow 2000

References Used for the Oxbow NWR Species List

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Thomas 1992 Thomas, Howard H. , PhD. *Small Mammal Surveys of the Sudbury Training Annex, Sudbury, Middlesex County, Massachusetts and Fort Devens Military Reservation, Lancaster, Worcester County, and Shirley, Middlesex County, Massachusetts*. Fitchburg State College. April - December 1992.

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Brewer 2000 Correspondance from Melissa Brewer dated January 11, 2000 (An update to the fish species list in the Nashua River)

Hunt 1991 David M. Hunt. *Floristic Survey with Emphasis on Rare Species of Fort Devens, Massachusetts*. December 1991

Searcy 1994 Karen Searcy, Matthew Hickler and Bruce Lindwell. *Progress Report: Critical Habitata and Floristics Survey of Fort Devens, Massachusetts, 1994 continuation.* Biology Department, University of Massachusetts. October 15, 1994

Lockwood 2000 Observations by Ron Lockwood while birding on refuge land during field season.

Lockwood - BBS 2000 Year 2000 survey results from breeding bird survey by Ron Lockwood & Lisa Plagge

Friends of Oxbow 2000 Observations by the Friends of Oxbow NWR during Biodiversity Days 2000 Programs (John McCarter 3/19; Bryan Windmiller 4/15; Wayne Peterson 4/29; Elizabeth Bagdonas 4/29; Roy Christoph 5/12, Peter Alden 5/13, Russ Cohen 6/17, Kathy Leahy 7/19, Joe Choinere 7/29, Kate O'Brien 7/29, Richard Hartley 8/12, John McCarter 8/13, Ray Abair & Dan Lubin 8/13, Paul Wanta 8/13

Plagge 2000 Observations by Lisa Plagge, Biological Technician at Great Meadows NWR while completing wildlife field surveys

McCarter 2000 Mammals documented at Oxbow NWR, Summer 1998 - Winter 2000 by Jon McCarter

KEY TO "STATUS" COLUMN NOTATIONS

FE	Federally Endangered
FT	Federally Threatened
SE	State (MA) Endangered
ST	State (MA) Threatened
SC	State (MA) Special Concern
WL	State (MA) Watch List Species

NAWCA North American Waterfowl Management Plan Priority Species
NGSMC US Fish & Wildlife Service Region 5 Nongame Species of Managemtent Concern
SRC US Fish & Wildlife Service Region 5 Species of Regional Concern

Friends of the Oxbow National Wildlife Refuge
Biodiversity 2000

Naturalist Leaders Resumes

Ray Abair - Ferns and Mosses
Ray Abair began studying plants in 1989 and has since taken many courses at the New England Wildflower Society and The Arnold Arboretum. He received Certificates in Native Plant Studies, Field Botany and Floristic Survey Techniques from the New England Wildflower Society where he also conducts field trips and teaches ferns and mosses. He studied mosses at the Farlow Herbarium. Memberships include the Arnold Arboretum, Friends of the Farlow, New England Wildflower Society and the New England Botany Club.

Peter Alden - Invasive Plants, Birds, General Ecology
Peter Alden was the sparkplug for the July 1998 Biodiversity Day in Concord and Lincoln, Massachusetts. He is working with the Secretary of Environmental Affairs to implement a state-wide program. Peter is nationally recognized naturalist and has written several field guides for the National Audubon Society such as the *Field Guide to African Wildlife*. Closer to home, he the recently wrote the National Audubon Society *Field Guide to New England*.

Elizabeth Bagdonas - Emergent Spring Plants
Elizabeth Bagdonas is a wetlands biologist and Conservation Administrator for the Town of Bedford, Massachusetts. She has taught botany at the Worcester Horticultural Society Tower Hill facility and led workshops on vernal pools and wetlands for the Massachusetts Association of Conservation Commissions.

Rona Balco - Vernal Pools and Wildflowers
Rona Balco has a long history of teaching the natural world to children. She has led a project resulting in the restoration of a dam and associated freshwater marsh on local conservation land and conducted plant and animal inventories. Rona is a guide teacher for the Massachusetts Audubon Society Wachusett Meadows Wildlife Sanctuary. She has a Certificate in Native Plant Studies from the New England Wildflower Society and is a graduate of the University of Massachusetts Coverts Program. She has also served as a Director of the Bolton Land Trust and been an Associate Member of the Bolton Conservation Commission.

Joe Choiniere - Nesting Birds and General Ecology
Joe Choinere is Director of the Massachusetts Audubon Society Wachusett Meadow Wildlife Sanctuary. In addition to managing all aspects of Sanctuary operations, he develops and teaches natural history programs on New England plants

and animals. At Wachusett he has led programs focused on bringing school age children to the Sanctuary to provide on-the-ground natural history experiences. Joe trains and supervises undergraduate college interns in field biology. He has been guest lecturer on old growth forests and wildlife management at colleges and universities throughout the region and has a degree in Natural History from the University of Massachusetts.

Gene Christoph - Mushrooms
Gene Christoph is a retired science teacher. He has been active in community affairs, serving on the Lancaster Planning Board and is a member of the Lancaster Land Trust.

Roy Christorph - Birds
Inspired by a teacher when he was 8 years old, Roy Christorph has been a bird lover specializing in warblers. He has a BS degree in biology from Atlantic Union College.

Russ Cohen - Edible Plants
Russ has been a wild foods enthusiast since his high school years. He leads dozens of wild foods teaching programs yearly. He holds a Bachelors Degree in land use planning from Vasser College and a law degree from Ohio State University. Russ works in the Riverways Program of the Massachusetts Department of Fisheries, Wildlife and Law Enforcement. Among his awards are: the Environmental Achievement Award from Save the Bay, Environmental Service Award from the Massachusetts Association of Conservation Commissions and the Public Servant of the Year Award from the Environmental League of Massachusetts.

Al Ferry - Mushrooms
Al Ferry is a member of the North American Mycology Association, has co-chaired the North East Mushroom Foray for more 15 years and has been on the Identification Committee of the Boston Mycological Club, the oldest such organization in North America.

Richard Hartley - Fishes
Mr. Hartley has been the Massachusetts State Warm and Coldwater Project Leader for 9 years. He is a 1990 graduate from the University of Maine with a Masters Degree in Zoology, with a concentration in fisheries.

Pat Huckery - Mollusks
Ms. Huckery has worked as Conservation Biologist for the Massachusetts Natural Heritage and Endangered Species Program for 10 years where she conducts surveys for state-protected rare vertebrates and invertebrates and oversees vernal pool certification and education. She is a leader in freshwater mussel conservation and coordinated the publication of the first Massachusetts Freshwater Mussel Atlas. Ms. Huckery has a Bachelors Degree from Florida Southern College and a Masters Degree in Environmental Science from the University of Massachusetts. She is a Professional Wetlands Scientist and is member of the National Biological Society

Elizabeth Kneiper - Lichens
Ms. Kneiper has a Masters in Biology degree,with specialty in lichenology. She is a teacher at the New England Wildflower Society Garden in the Woods focusing on lichens and their habitat, is a volunteer at the Harvard University Herbarium and is a member of the New England Lichen Network. Ms. Kneiper conducts lichen inventories as a consultant and participated in the 1998 pilot "Biodiversity" program in Concord and Lincoln, Massachusetts.

Kathleen Leahy- Day Insects
Kathleen Leahy is an orchard ecosystem consultant who works with over twenty growers in central New England, including, the Bolton/Harvard area. She is a specialist in Integrated Pest Management, a technique for managing pests in ways that are least disruptive to the ecosystem. Most of her clients refer to her as "the lady bug."

Bob Leverett - Trees and Shrubs
An expert on New England's old growth forests, Bob Leverett has led educational programs for the Massachusetts Audubon Society, Appalachian Mountain Club and other conservation organizations. Co-founder of the Eastern Native Tree Society, he has written extensively about ancient forests in the northeast. His works include co-authoring *Eastern Old Growth Forests - Prospects for Rediscovery and Recovery*, *Stalking the Forest Monarch - A Guide to Measuring Champion Trees* and *Re-Wilding the Northeast - A New Wilderness Paradigm*. The Massachusetts Natural Heritage Program recognizes Bob as the discoverer of most of the 40 odd known old growth stands in Massachusetts.

Don Lubin - Ferns and Mosses
Don Lubin has a BA degree in physics from Brandeis University with long experience identifying and cataloging fems. He has found uncommon hybrid wood fems and collected specimens for the New England Botanical Club collection at the Asa Gray Herbarium. Don leads classes and field trips for the New England Wildflower Society and is conducting a census of ferns and fern allies the Wachusett Mountain Reservation. He has conducted surveys for the Massachusetts Natural Heritage Program, Metropolitan District Commission, Sudbury Valley Trustees, Nature Conservancy and Trustees of Reservations.

Mark Mello - Night Insects
Mark Mello is a Director of the Lloyd Center for Environmental Studies in South Dartmouth, Massachusetts.

John McCarter - Mammals
Animal tracker John McCarter is a staff instructor for Paul Rezendes Photography and Nature programs. He has taught for Outdoor Recreation Services in Carlisle and has led outings for the Friends of the Oxbow National Wildlife Refuge.

Kate O'Brien - Emergent Wetlands Plants
Kate O'Brien received her Masters in Wildlife Ecology from the Yale School of Forestry and Environmental Studies. Her projects have included studies of the Hawaiian monk seal, moose and deer in the boreal forests of Saskatchewan and songbird research in South Carolina. She specializes in quantifying wildlife habitat by surveying vegetation. Kate works for the U.S. Fish and Wildlife Service at the Rachel Carson Wildlife Sanctuary in Maine.

Jessie Panek - Wildflowers
Jessie Panek leads tours at the Garden in the Woods, the display garden of the New England Wildflower Society. She has taken numerous courses there, and designed their exhibit for the New England Flower Show in 1997. She has studied at Radcliffe's Landscape Design Program, and works as a landscape designer. Her interest in wildflowers grew out of a love of gardening and birdwatching.

Wayne Peterson - Birds
Wayne Peterson is Field Ornithologist with the Massachusetts Audubon Society. Throughout his career, he has led trips and tours, lectured and conducted birding workshops throughout North America. His tour leading experience has taken him from arctic Canada to South America, Antarctica, Iceland, Africa and Madagascar. Wayne is Vice President of the American Birding Association, past Chairman of the Massachusetts Avian Report Committee, and is a New Encland Regional Editor for North American Birds. His writing projects have included co-authoring Birds of Massachusetts (with Richard Veit), contributor to the Audubon Society Master Guide to Birding, and writing the National Audubon Society's Pocket Guide to Songbirds and Familiar Backyard Birds (East).

Scott Reyonlds - Bats
D. Scott Reynolds is a populations biologist and holds a PhD in biology. He manages his own consulting company, New England Ecological Sciences.

David Small - Birds, Butterflies and Dragonflies
David Small is Supervisor of Watershed Maintenance at the Quabbin Reservoir for the Metropolitan District Commission. He is a lifelong naturalist and President of the Athol Bird and Nature Club.

Jeremiah R. Trimble - Dragonflies and Damselflies
Jeremiah Trimble is symbolic of our hope for the future. A recent Connecticut College graduate majoring in zoology, he has established himself as a leading New England dragonfly expert. He served on the Zoology Advisory Board of the Connecticut College Zoology Department. Project work included profiling species of endangered dragonflies and damselflies for the Massachusetts Endangered Species Program and collecting data and conducting impact studies on odondates as part of the environmental impact statements at the former Otis Air Force Base. As a research assistant, he conducted studies on feeding habits of dragonflies, surveyed moth and butterflies at the Massachusetts

Audubon Society Wellfleet Bay Wildlife Sanctuary, researched the abundance and diversity of breeding birds on St. John in the U.S. Virgin Islands and developed dragonfly conservation plans. He is also a field trip leader for the Massachusetts Audubon Society.

Paul Wanta - Mammals

Paul Wanta teaches wilderness skills at the Tracking Project in Albuquerque, New Mexico, and for Paul Renzendes of Royalston, Massachusetts. He has fourteen years tracking experience and study. During his biodiversity program young people and their parents discovered tracks and other indications of animals who live on the refuge. Participating trackers move quietly, camouflaging themselves in the terrain, and elevate their perceptions to detect animal signs. With Paul's help young trackers gain an important element of outdoor literacy --- the abillty to read the clues left behind by our animal neighbors.

Jack Whelan - Vernal Pools

Jack Whelan is a member of the Harvard Conservation Commission and has taught vernal pool certication programs. He is a graduate of the University of Massachusetts Coverts program. As a trail guide in the Town of Harvard, he works with elementary school children in introducing them to the joys of understanding the natural world.

Bryan Windmiller - Salamanders, Turtles, Snakes

Bryan Wildmiller is the principal herpetologist of Hyla Associates, an environmental consulting firm that he founded. The company serves local conservation commission and state and federal environmental agencies in matters pertaining to the conservation and protection of amphibians, reptiles and vernal pools. Mr. Windmiller is an expert in the 1998 Concord/Lincoln Biodiversity Day and served on the Concord Natural Resource Commission.