



ENVIRONMENT

THE BOSTON REGION MPO'S VISION FOR THE ENVIRONMENT

Transportation-planning activities and projects will strive to reduce air quality degradation and other environmental degradations caused by transportation. Vehicle emissions (carbon monoxide [CO], nitrogen oxides [NO_x], volatile organic compounds [VOCs], particulates, and carbon dioxide [CO₂]) will be reduced by modernizing transit, truck, and automobile fleets and through increasing transit mode share.

Transportation projects will consider the management and minimization of soil and water contamination, such as highway and rail right-of-way runoff, and wetland impacts. Construction of transportation facilities will avoid or minimize negative impacts to natural resources. Transportation planning will also promote project design that preserves cultural resources such as community character and cohesiveness, quality of life, and historic and scenic resources; protects greenfields, open space, wildlife, and ecosystems; and advances sustainability and health-promoting transportation options. Transportation agencies will work with environmental and cultural resource agencies to achieve these ends.

To implement this vision, the MPO has developed a set of policy statements to guide its decision-making:

- Give priority to projects that maintain and improve public transportation facilities and services, so as to increase public transportation mode share and reduce reliance on automobiles.
- Give priority to projects that reduce congestion or manage transportation demand to improve air quality.



- Support, through planning and programming, projects that make transportation in the region more sustainable.
- Promote the use of low-polluting or alternative fuels, efficient engine technology, and other new, viable technologies that protect our resources.
- Consider environmental issues during project selection; in particular, air quality and the reduction of pollutants (CO, NO_x, VOCs, particulates, and CO₂), the protection of water resources (soil and water contamination, stormwater management, and wetlands impacts), greenfields and open space, and wildlife and ecosystem preservation; and value those projects that reduce negative impacts.
- Recognize value in transportation projects that preserve natural and cultural resources, including visual, historic, aesthetic, noise, community cohesiveness, and local quality of life values.
- Recognize, in evaluations, projects that respect community character in their purpose and design.

- Consult with environmental and cultural resource agencies and entities on environmental effects, particularly through the existing National Environmental Policy Act/Massachusetts Environmental Policy Act (NEPA/MEPA) processes.
- Encourage, through planning and programming, transportation choices that promote a healthy lifestyle, such as walking and bicycling.

INTRODUCTION

The policies above are those that are pertinent to this chapter. The issues of land use and economic development, which are closely connected to the environment, are discussed in Chapter 11. Air quality conformity issues are discussed separately in Chapter 15. Some categories of policies do not address environmental issues directly and yet have significant influence upon the environment. For example, the MPO's policy on system preservation can have a positive effect by discouraging the implementation of projects that might impinge on environmentally sensitive or simply undeveloped areas. Policies and actions supporting bicycle, pedestrian, intelligent transportation systems (ITS), and public transportation also favor the protection of the environment.

This chapter describes the environmental process involved in project selection and development. This process strives to protect and enhance the natural and manmade resources of our region: water supply and quality, wetlands and open-space land, floodplain, fish and wildlife, endangered species, historical and archaeological sites, and air quality. This chapter responds to a federal directive in SAFETEA-LU to describe the process by which concern for the environment is reflected in transportation planning in the MPO region.¹

The next section of this chapter presents a visual overview of the Boston Region MPO area in

¹ *Interim Guidance for Implementing Key SAFETEA-LU Provisions on Planning, Environment, and Air Quality for Joint FHWA/FTA Authorities*, "Planning Provisions," September 2, 2005, modified March 20, 2006. Metropolitan and statewide plans—environmental mitigation: "Metropolitan and statewide transportation plans must include a discussion of types of potential environmental mitigation activities, to be developed in consultation with federal, state and tribal wildlife, land management, and regulatory agencies." Note: there are no tribal entities in the Boston Region MPO area.

Metropolitan and statewide plans—new consultations: "MPOs and states must consult, as appropriate, with state and local agencies responsible for land use management, natural resources, environmental protection, conservation, and historic preservation in developing long-range transportation plans."

terms of environmental parameters. The subsequent (and final) section describes the collaborative relationship between transportation and environmental agencies during project development. This chapter was prepared in consultation with MassHighway, the MBTA, and the MEPA Unit of the Executive Office of Environmental Affairs.

ENVIRONMENTAL OVERVIEW OF THE REGION

Figures 10-1 through 10-8, provided at the end of this chapter, present the following overviews of the Boston Region MPO area: Areas of Critical Environmental Concern (acec), special flood hazard areas [FEMA Q3 flood plain], wetlands, water supply and well head protection areas, protected open space, Natural Heritage and Endangered Species Program Priority Habitats, historic places on the State Registry, and air quality. The projects that have been recommended in the Plan are included on each of these figures. They are listed in Table 10-1, which immediately precedes the figures.

Areas of Critical Environmental Concern

The 28 Areas of Critical Environmental Concern (ACECs) in Massachusetts are recognized for their unique, significant natural and cultural resources. Individual communities nominate candidates for ACEC designation, and the Secretary of Environmental Affairs determines whether to designate the area as an ACEC. The ACEC designation helps to ensure that any activities undertaken in or near the ACEC have minimal negative impacts.²

Statewide, the 28 ACECs, located in 73 towns, cover almost a quarter million acres. Figure 10-1 indicates the 12 that are located at least partially in the Boston Region MPO area:³

- *Canoe River Aquifer*, 17,200 acres, designated in 1991; Easton, Foxborough, Mansfield, Norton, Sharon, and Taunton
- *Central Nashua River Valley*, 12,900 acres, designated in 1996; Bolton, Harvard, Lancaster, and Leominster
- *Cranberry Brook Watershed*, 1,050 acres, designated in 1983; Braintree and Holbrook
- *Fowl Meadow and Ponkapoag Bog*, 8,350 acres, designated in 1992; Boston, Canton, Dedham, Milton, Norwood, Randolph, Sharon, and Westwood
- *Golden Hills*, 500 acres, designated in 1987; Melrose, Saugus, and Wakefield
- *Miscoe-Warren-Whitehall Watersheds*, 8,700 acres, designated in 2000; Grafton, Hopkinton, and Upton
- *Neponset River Estuary*, 1,300 acres, designated in 1995; Boston, Milton, and Quincy



² The Executive Office of Environmental Affairs has defined the following specific impact areas: (1) marine and aquatic productivity, (2) surface-water and groundwater quality, (3) habitat values, (4) storm damage prevention or flood control, (5) historic and archeological resources, (6) scenic and recreational resources, and (7) other natural resource values of the area.

³ Source: www.mass.gov/dcr/stewardship/acec/listACEC.pdf.

- *Parker River/Essex Bay*, 25,500 acres, designated in 1979; Essex, Gloucester, Ipswich, Newbury, and Rowley
- *Rumney Marshes*, 2,800 acres, designated in 1988; Boston, Lynn, Revere, Saugus, and Winthrop
- *Weir River*, 950 acres, designated in 1986; Cohasset, Hingham, and Hull
- *Westborough Cedar Swamp*, 1,650 acres, designated in 1975; Hopkinton and Westborough
- *Weymouth/Hingham Back River*, 950 acres, designated in 1982; Hingham and Weymouth



Flood Hazard

Figure 10-2 indicates Federal Emergency Management Agency (FEMA) Q3 Special Flood Hazard Areas. A simplified definition of these areas is that they are within 100-year floodplains.

There are 20 FEMA classifications, 13 of which are included in the Special Flood Hazard category.

An example of a classification is Base Flood Elevation Determinations (BFEDs). BFEDs are the computed elevations to which floodwater is anticipated to rise during the base flood. Federal, state, and local policies direct proponents of most transportation projects to minimize construction and implement mitigation measures in areas categorized as within a 100-year floodplain.⁴

As can be seen in Figure 10-2, FEMA Q3 Special Flood Hazard Areas are located throughout the region. Large concentrations occur in some locations, especially along the coast in Marshfield, Scituate, Cohasset, Hull, Revere, Lynn, Nahant, Essex, and Ipswich.

Wetlands

Figure 10-3 shows designated wetlands in the region. It indicates the following categories: marsh/bog, wooded marsh, cranberry bog, salt marsh, open water, reservoir (with Public Water System Identification), tidal flats, and beach/dune. As can be seen in the figure, designated wetlands are spread throughout the region. They can be seen, however, in greater density outside of Route 128 than inside.

Water Supply and Wellhead Protection Areas

Figure 10-4 shows areas related to water used for human consumption. There are surface water protection areas as well as those associated with wells. The three categories for surface water protection refer to proximity to water: zone A is closest, zone B is farther, and zone C is farther still but somewhere within the watershed. The wellhead protection areas include the recharge areas for wells. Also depicted on the map are locations of wells, existing and proposed.⁵

Figure 10-4 shows that, while water supply sources are found throughout the region, there are fewer sources inside of Route 128.

⁴ Source: www.mass.gov/mgis/q3.htm.

⁵ Source: www.mass.gov/mgis/pws.htm.

Protected Open Space

Figure 10-5 shows land that is protected open space. There are four levels of protection: perpetuity, limited, term limited, and none. The first category, perpetuity, means that the parcel can never be developed. No protection means that the land is available for development. The middle two categories are not as clearly defined. In general, limited protection implies that there are extra impediments to development. The level and type of extra protection varies. Term limited protection means the land is protected now, but not necessarily in the future. This includes term conservation restrictions and term deed restrictions.

As may be seen in Figure 10-5, protected open space is found throughout the region, much of it protected in perpetuity. There are small parcels as well as many large protected areas.

Natural Heritage and Endangered Species Program Priority Habitats

Figure 10-6 presents information on habitats as provided by the National Heritage and Endangered Species Program (NHESP). Three categories are presented: NHESP Certified Vernal Pools, NHESP Estimated Habitats of Rare Wildlife, and NHESP Priority Habitats of Rare Species. Priority Habitats of Rare Species are the habitats of state-listed rare species, both plants and animals. Estimated Habitats of Rare Wildlife is a subset of Priority Habitats that shows habitats for state-listed rare wildlife, but not those for plants.⁶

Vernal pools, also defined by NHESP, are not permanent bodies of water. Because they are devoid of fish, they provide safe breeding grounds for many amphibians and invertebrates. A vernal pool typically fills in the autumn and is completely dry by mid- or late summer. Some may dry not every year but often enough to prevent fish habitats from developing.⁷



As may be seen in Figure 10-6, there are many large areas described as Priority or Estimated Habitats. Again, these areas are primarily outside of Route 128. There are particularly large concentrations on the South Shore. Vernal pools are found throughout the region.

Historic Places

Published annually by the Massachusetts Historical Commission, the State Register of Historic Places is a compilation of historic places based on local, state, or national designations of significance.⁸ Since 1982, the Commission has developed a list of more than 60,000 properties in the commonwealth. Figure 10-7 indicates all of the listings that are available in digital-map form (the listings through 1997). Newly designated properties are published annually and updated regularly. The Commission also maintains information on archeological sites. That information is not part of the public record.

As may be seen in Figure 10-7, there are many sites scattered throughout the MPO region, particularly inside of Route 128. Some are specific sites and others are historic districts.

⁶ Information obtained from National Heritage and Endangered Species Program website: www.mass.gov/dfwele/dfw/nhesp/nhenv_priohab.htm.

⁷ Information obtained from National Heritage and Endangered Species Program website: www.mass.gov/dfwele/dfw/nhesp/nhvenal.htm

⁸ Information from website of Mass. Secretary of State: www.sec.state.ma.us/mhc/mhcidx.htm.

Air Quality

Reducing air pollutants is a goal for the MPO in its selection of transportation projects and programs. It is specifically required through the federal Clean Air Act, which requires all MPOs in areas that are not meeting air quality standards to ensure that they are not increasing emissions of specific pollutants. The pollutants that the Boston Region MPO is required to address in this Plan are volatile organic compounds, nitrogen oxides, and carbon monoxide. These three pollutants and the actions required by the MPO are described in more detail in Chapter 15, Air Quality Conformity Determination. Two additional pollutants, particulate matter and carbon dioxide, are of concern to the MPO although it is not required through federal regulations to address them. The MPO has begun to focus on ways it can help in reducing these two pollutants and will continue to do so throughout the timeframe of this Plan.

Particulate matter is a mixture of microscopic solids and liquid droplets suspended in air. Fine particulates can be emitted directly or formed in the atmosphere from mobile-source emissions. These particles can get deep in the lungs, and some may even get into the bloodstream. Recent research suggests that individuals—particularly the elderly, children, or those with diabetes or preexisting cardiac or pulmonary disease—living in close proximity to major roads face a significantly higher risk of cardiopulmonary problems than those with less exposure to vehicle emissions.

In particular, emissions of particulate matter from motor vehicles are receiving increased attention as a potential public health risk. One initiative underway in Massachusetts is the school bus retrofit project sponsored by the state Department of Environmental Protection and being undertaken and funded as a Congestion Mitigation Air Quality program. This project will retrofit the state's school bus fleet, significantly reducing particulates, hydrocarbons, and carbon monoxide. In addition, if more of the freight currently moved by truck could be carried by freight rail in the region,

the resulting reductions in both congestion and truck emissions could have a positive air quality impact. Although vehicles and fuels are getting cleaner, people are driving more, which is counteracting some of the progress towards clean air that could be achieved through technology. Figure 10-8 indicates areas within the MPO with significant motor-vehicle traffic volumes. Policy and planning steps are necessary to address the threat to public health, since technology alone cannot resolve this issue.

Carbon dioxide (CO₂) is present in the earth's atmosphere at low concentrations and acts as a greenhouse gas. Greenhouse gases help to warm the earth's atmosphere and are so called because they simulate the effect of a greenhouse, trapping heat within the atmosphere and contributing to an increase in the earth's temperature. The burning of fossil fuels from mobile sources causes an increase in CO₂ emissions and contributes to atmospheric warming and global climate change. In January 2007, Governor Deval Patrick signed the Regional Greenhouse Gas Initiative, committing Massachusetts to a multi-state effort to reduce emissions of CO₂ and address global climate change. In April of the same year, the Supreme Court ruled that the Environmental Protection Agency has the authority to regulate heat-trapping gases in automobile emissions. This decision may have important implications for how CO₂ is regulated across the region's transportation system. The MPO will continue to support projects and programs that reduce emissions of CO₂ in the region.

ENVIRONMENTAL INPUT DURING PROJECT DEVELOPMENT

The MPO's policies determine which projects of regional significance are programmed in the Regional Transportation Plan. Guided by the nine policies stated at the beginning of this chapter, the MPO considers environmental effects as it assigns ratings to potential projects, with the goal of favoring projects that either maintain or improve the status quo. The regionally significant

projects that best support all the policies of the MPO are selected for the Plan.

A project's environmental effects are assessed at the macro level for the Plan. The detailed study and review of a project's specific effects on the environment occurs during design and prior to the project's being programmed in the Transportation Improvement Program. Environmental oversight occurs at the federal, state, and local levels. The National Environmental Policy Act (NEPA) guides federal oversight.⁹ Conservation commissions provide local guidance.

The primary mechanism for state environmental review is the MEPA process. The level of analysis required for a given project is determined by a series of triggers. If a project meets certain criteria, for example, an environmental impact report (EIR) is required. Some of these triggers are directly related to transportation.¹⁰ A transportation project, however, may trigger MEPA review in other ways, related to wetland impacts, for example. Findings may result in the need for mitigation of environmental impacts. Examples of mitigation measures to minimize impacts on adjacent areas are narrowing of a roadway or increase of slope. A trail might be built on a boardwalk to minimize impacts on wetlands or wildlife. Or additional land might be set aside to replace an impacted floodplain.

The MPO signatory operating agencies, MassHighway, the MBTA, Massport, and MassPike, have procedures for environmental reviews. MassHighway's Design Guide contains

a very detailed description of the MEPA process.¹¹ While this description applies specifically to MassHighway projects, it gives an excellent overview of the procedures and requirements involved in the environmental review process for all projects in Massachusetts.



CHAPTER 10 FIGURES

The following pages present the eight figures that were referred to in the discussions in this chapter. The table below provides a key to the projects shown in the figures.

⁹ The National Environmental Policy Act of 1969, as amended (Pub. L. 91-190, 42 U.S.C. 4321-4347, January 1, 1970, as amended by Pub. L. 94-52, July 3, 1975, Pub. L. 94-83, August 9, 1975, and Pub. L. 97-258, § 4(b), Sept. 13, 1982).

¹⁰ Major transportation projects such as new interchanges, new rapid transit lines, new airports, or new runways trigger an Environmental Notification Form (ENF) and a mandatory Environmental Impact Review (EIR). Other triggers in this category include the generation of 3,000 or more new Average Daily Traffic volumes or construction of 1,000 or more parking spaces (both the latter at a single location), etc.

An ENF would at least be required for a new airport taxiway, new roadways at least one-quarter mile long, widening of a roadway by four feet or more for one-half mile or more, cutting of five or more public shade trees of 14 or more inches in diameter at breast height, eliminating 300 or more feet of stone wall, etc.

¹¹ Massachusetts Highway Department Project Development and Design Guide, 2006. See especially chapter 2, "Project Development."

TABLE 10-1
LIST OF RECOMMENDED PROJECTS

KEY NUMBER ON FIGURES	HIGHWAY PROJECTS	COST
1	BEDFORD, BILLERICA & BURLINGTON: MIDDLESEX TURNPIKE IMPROVEMENTS PHASE 3	\$19,200,000
2	BELLINGHAM: PULASKI BOULEVARD	\$13,006,510
3	BELMONT: TRAPELO ROAD	\$13,000,000
4	BOSTON: EAST BOSTON HAUL ROAD/CHELSEA TRUCK ROUTE **	\$18,000,000
5	BOSTON: SULLIVAN SQUARE **	\$40,000,000
6	BOSTON: RUTHERFORD AVENUE	\$45,507,000
7	BOSTON: RESURFACING AT VARIOUS LOCATIONS	\$21,500,000
8	BOSTON LOGAN AIRPORT: CONSOLIDATED RENTAL CAR FACILITY *	\$337,000,000
9	BRAINTREE: BRAINTREE SPLIT	\$36,017,000
10	CANTON: I-95/I-93 INTERCHANGE	\$216,000,000
11	CANTON: I-95 NORTHBOUND/DEDHAM STREET RAMP *	\$9,000,000
12	CONCORD & LINCOLN: ROUTE 2/CROSBY'S CORNER GRADE SEPARATION	\$72,000,000
13	DANVERS: ROUTE 128/ROUTE 35 AND ROUTE 62	\$25,982,000
14	FRAMINGHAM: ROUTE 126/135 GRADE SEPARATION	\$54,080,000
15	FRAMINGHAM AND NATICK: RESURFACING AND RELATED WORK ON ROUTE 9	\$12,500,000
16	CONCORD TO WESTFORD: BRUCE FREEMAN RAIL TRAIL	\$17,250,000
17	HANOVER: ROUTE 53 FINAL PHASE	\$1,000,000
18	HUDSON TO ACTON: ASSABET RIVER RAIL TRAIL	\$16,725,000
19	HUDSON: ROUTE 85 IMPROVEMENTS	\$8,400,000
20	MALDEN, REVERE, & SAUGUS: ROUTE 1 IMPROVEMENTS	\$70,304,000
21	MARSHFIELD: ROUTE 139 WIDENING	\$7,150,200
22	NEEDHAM & NEWTON: NEEDHAM STREET/HIGHLAND AVENUE	\$17,000,000
23	QUINCY: QUINCY CENTER CONCOURSE, PHASE 2	\$8,100,000
24	READING & WOBURN: I-93/I-95 INTERCHANGE	\$194,792,000
25	SALEM: BRIDGE STREET	\$10,000,000
26	SOMERVILLE: ASSEMBLY SQUARE ROADWAYS *	\$28,000,000
27	WEYMOUTH, ABINGTON, HINGHAM, & ROCKLAND: SOUTH WEYMOUTH NAVAL AIR STATION ACCESS IMPROVEMENTS *	\$90,014,750
28	WEYMOUTH: ROUTE 18 CAPACITY IMPROVEMENTS PROJECT **	\$26,100,000
29	WOBURN: MONTVALE AVENUE	\$3,400,000
30	WOBURN: NEW BOSTON STREET BRIDGE	\$4,500,000
	TRANSIT PROJECTS	
31	FAIRMOUNT LINE IMPROVEMENTS	\$114,000,000
32	RED LINE-BLUE LINE CONNECTOR (DESIGN ONLY)	\$29,000,000
33	BOSTON: FERRY EXPANSION: RUSSIA WHARF/SOUTH STATION	\$2,200,000
34	1000 ADDITIONAL PARK AND RIDE SPACES	\$69,100,000
35	REVERE: WONDERLAND PARKING GARAGE *	\$52,000,000
36	SOMERVILLE: GREEN LINE LECHMERE TO COLLEGE AVENUE	\$934,000,000
37	SOMERVILLE: GREEN LINE COLLEGE AVENUE TO MYSTIC VALLEY PARKWAY (ROUTE 16)	\$130,000,000
38	SOMERVILLE: CONSTRUCT ORANGE LINE STATION AT ASSEMBLY SQUARE	\$50,000,000

* Non-MPO Funding is used to fund the following projects:

- Consolidated Rental Car Facility will be paid for by the Massachusetts Port Authority from General Airport Revenue Bonds, taxable revenue bonds supported by revenue from the daily Customer Facility Charge and rent from car companies, and the Transportation Infrastructure and Innovation Act (TIFIA) funds.
- I-95 NB/Dedham Street Ramp will be paid for by the developer.
- South Weymouth Naval Air Station Access Improvements (includes East-West Parkway) will use state, local, and private resources.
- Somerville Assembly Square Roadway project will use American Recovery and Reinvestment Act (ARRA) funding, state, local, and private resources.
- Wonderland South Parking Garage will use ARRA, federal, and state resources.

** A portion of these projects are funded with earmarks.

FIGURE 10-1
AREAS OF CRITICAL ENVIRONMENTAL CONCERN

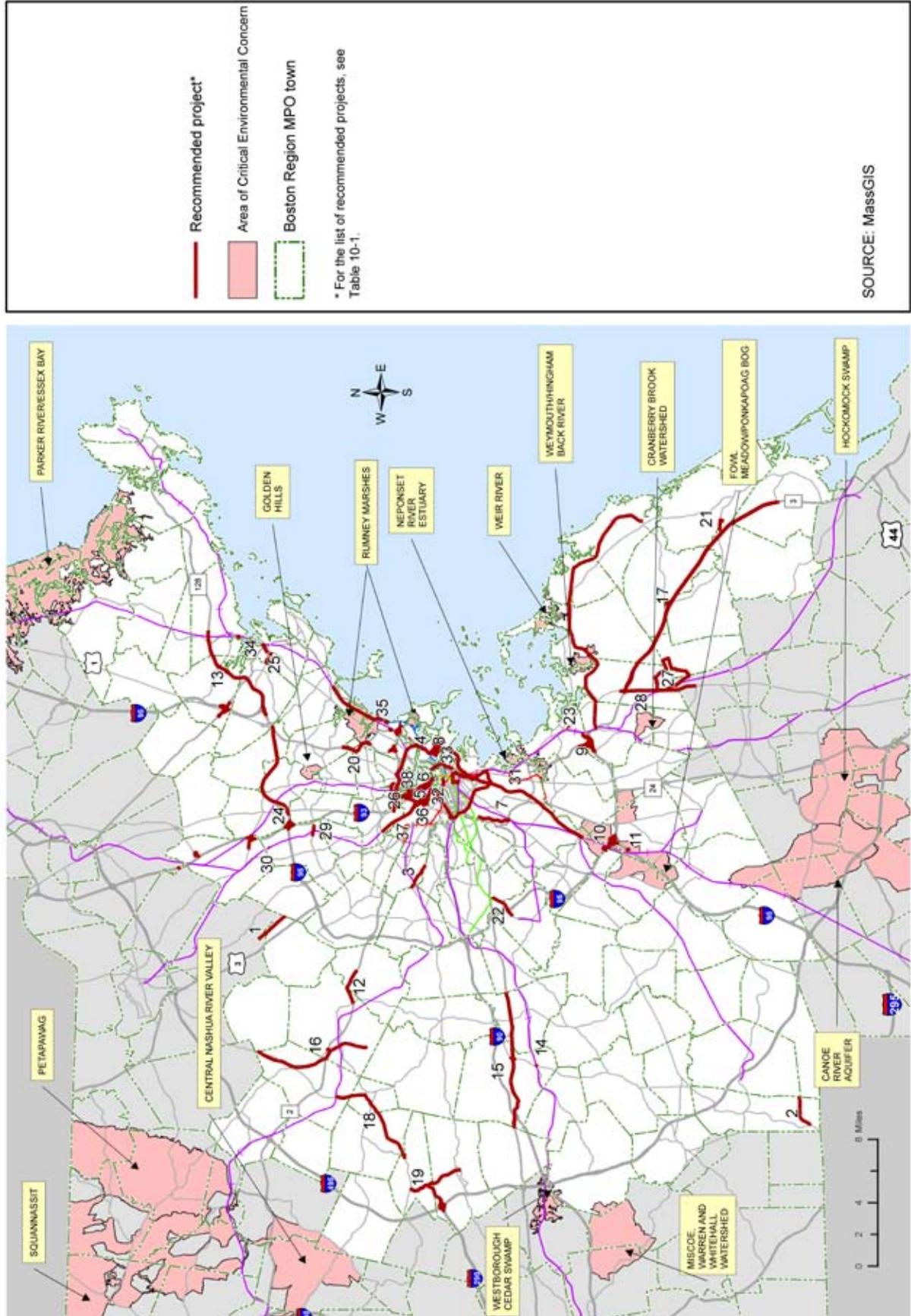


FIGURE 10-2
 FEMA Q3 SPECIAL FLOOD HAZARD AREAS

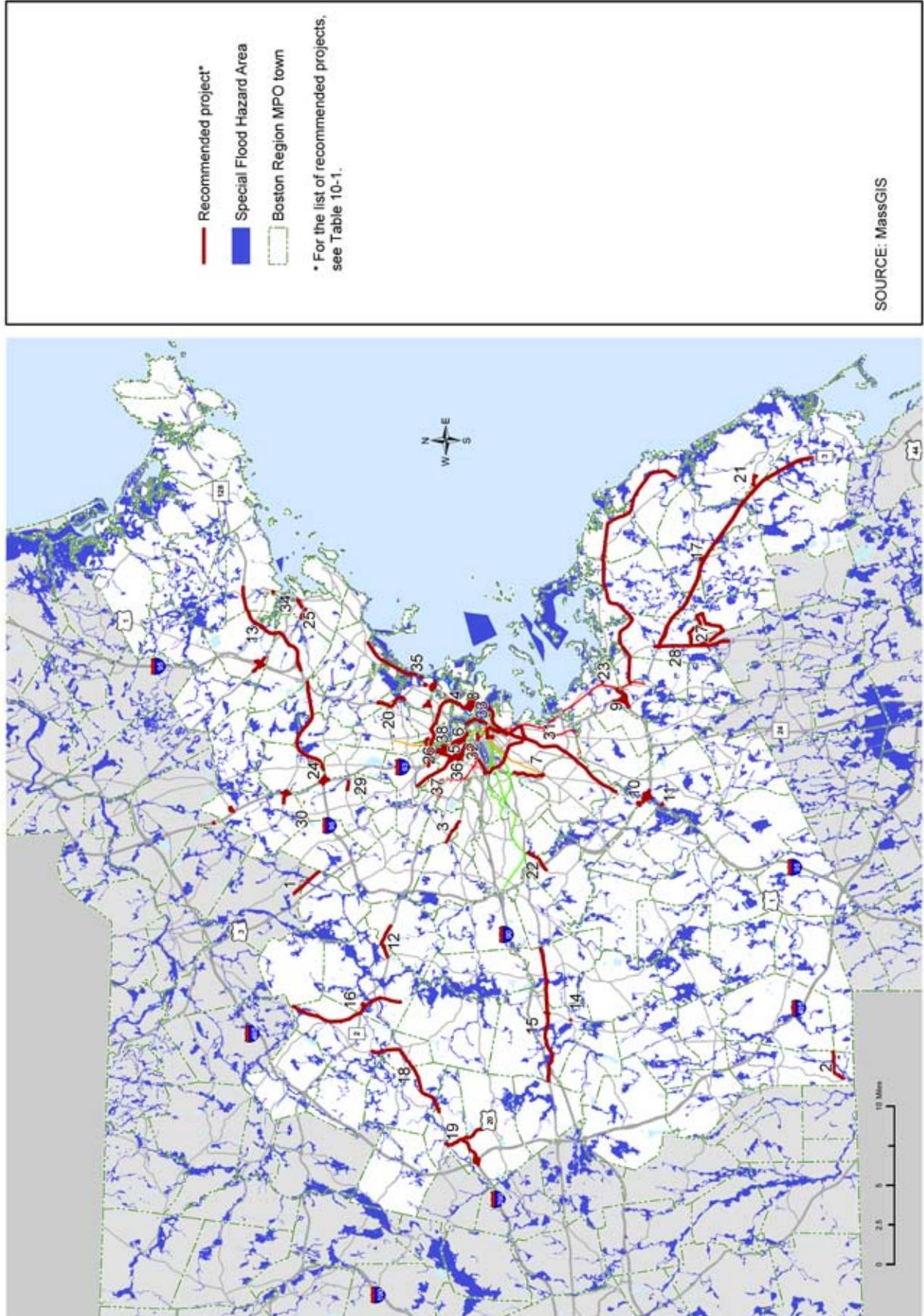


FIGURE 10-4
WATER SUPPLY AND WELLHEAD PROTECTION AREAS

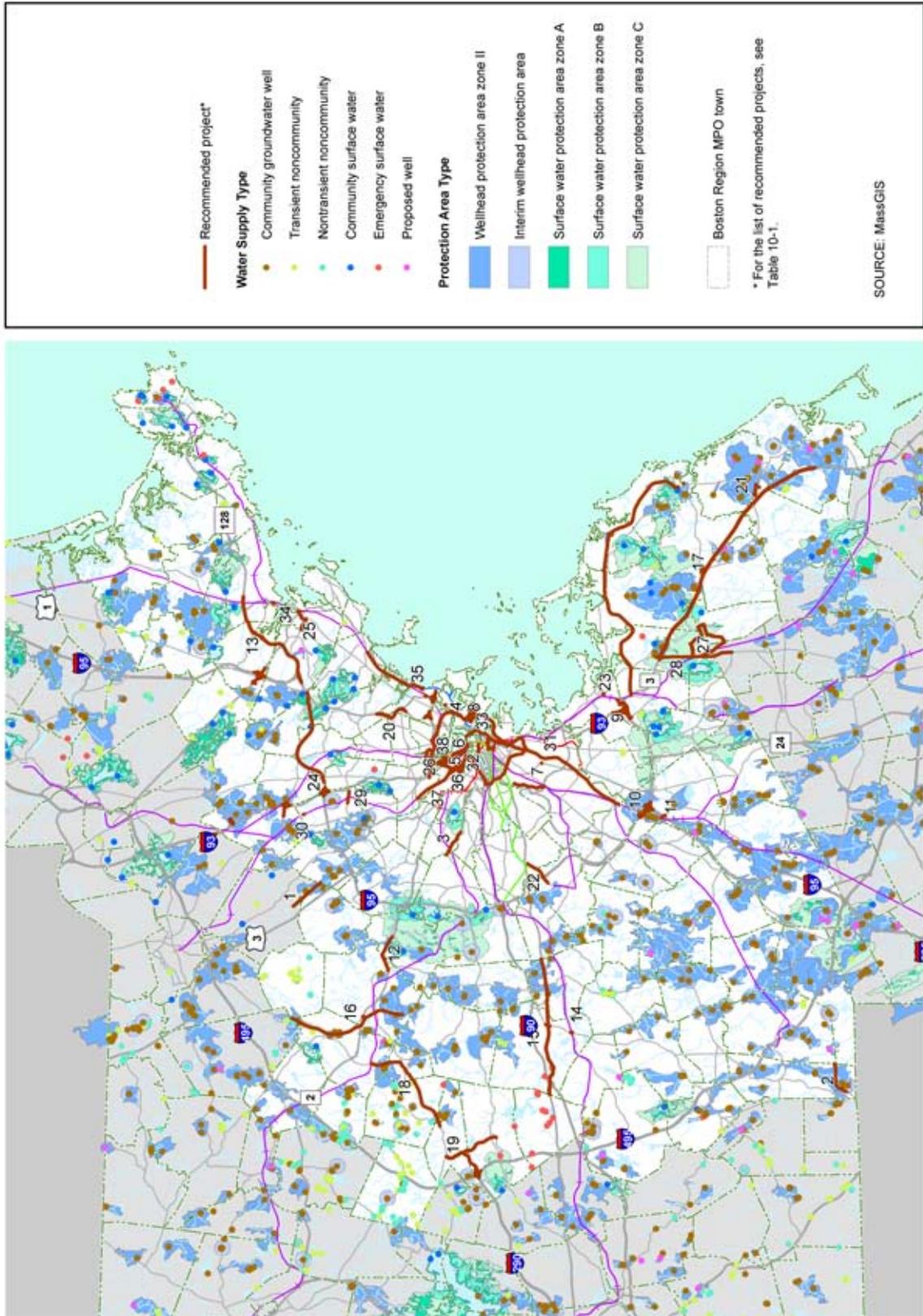


FIGURE 10-6
NATIONAL HERITAGE AND ENDANGERED SPECIES PROGRAM PRIORITY HABITATS

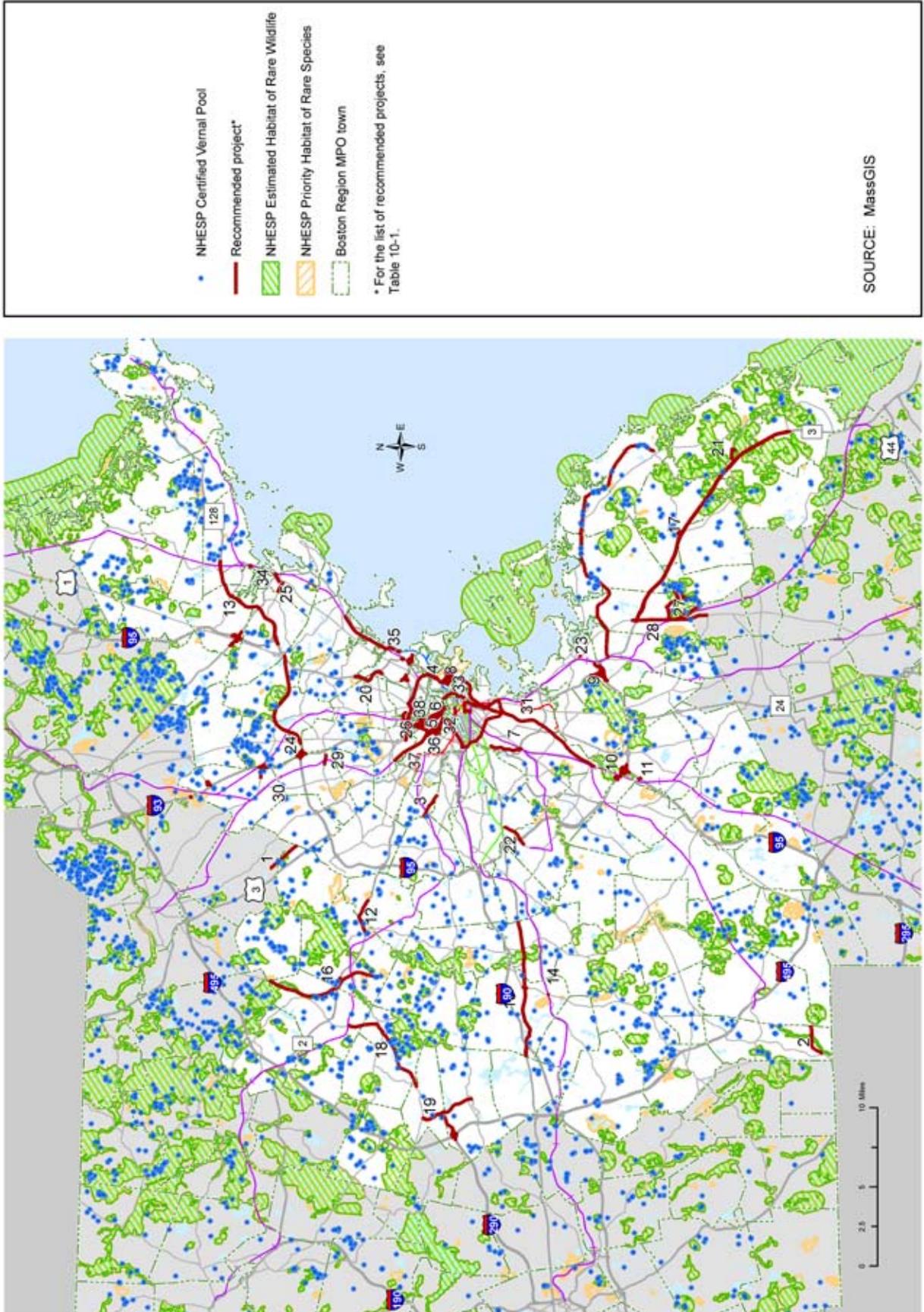


FIGURE 10-7
HISTORIC PLACES ON THE STATE REGISTER

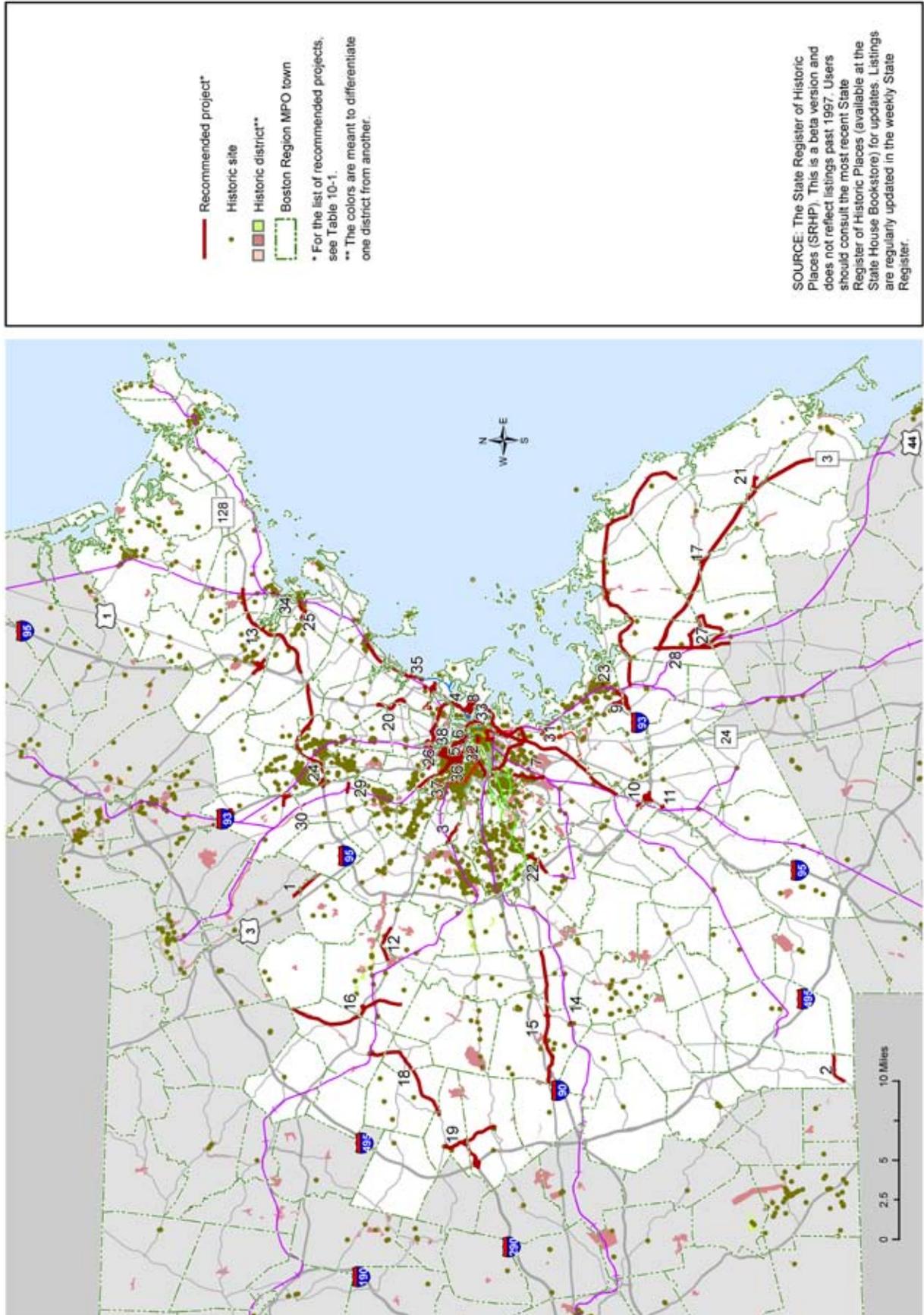


FIGURE 10-8

SIGNIFICANT MOTOR-VEHICLE TRAFFIC VOLUME LOCATIONS

