Appendix A

Nashua River Watershed Tributary Basin Major Water Resource Issues, Recreation And Priority Habitat Areas, And Resource Protection Goals And Recommended Actions.

(Note: The Metropolitan District Commission (MDC) is now the Massachusetts Department of Conservation and Recreation (DCR))

The Quinapoxet River Sub-Basin

Land Area:	57 sq miles or 35,463 acres
Primary Municipalities:	Holden, Princeton, Rutland
Permanently Protected Land Area:	11,396 acres or 48%
River length:	10.6 miles
% Imperviousness:	8.2 %
# of NPDES* discharge permits:	3 minor
Limited Protection Land Area (Chap. 61, etc.):	6,219 acres
Dams: 1;	DCR in West Boylston

Geographic Overview and Ecosystem Characteristics: Most of this sub-basin lies in the Massachusetts communities of Holden, Princeton and Rutland with parts extending into Paxton and West Boylston. Located in the "fuzzy" zone encompassing parts of both the Upper Worcester Plateau and the Southern New England Coastal Plains and Hills ecoregions of central Massachusetts, this area drains into the Wachusett Reservoir: the largest body of open water in the greater Nashua River watershed.

Topography is generally hilly, encompassing numerous flatter wetlands, broad valleys, and floodplains. A low percentage (8.2%) of total impervious surfaces — namely, paved areas such as streets, driveways, and parking lots — for this whole sub-basin indicates that concerns of compromised stormwater and other non-point sources of contaminants (for example: pesticides, fertilizers, oils, asphalt, pet wastes, salt, sediment, litter and other debris) is not a pressing concern. As detailed below in the "water resources" section, there is a large amount of permanently protected undeveloped open space in this sub-basin.

Land Ownership and Land Use Patterns: The land-use pattern is predominantly forest (hardwood mixed with softwood) or wetland plus low-density residential settlement as well as concentrated settlements and strip development located near town centers and along major roads. Agriculture (notably "hobby farms" and backyard horse paddocks), gravel extraction, commercial operations, industry and other developed land uses are less significant.

Major Water Resource Issues: Most of the already heavily developed areas in the sub-basin are served by public water systems. The majority of Rutland and Holden town residents have on-site septic systems but both town centers are sewered. All the sewered flow is carried outside of the Nashua River watershed to the Upper Blackstone Water Pollution Abatement District facility. There are no wastewater treatment plants in this sub-basin. The one National Pollution Discharge Elimination System (NPDES) permit is for Holden Trap Rock Company on Austin Brook. Streamflow, as in most of New England, has significant seasonal changes.

Based on recent findings in a Hydrologic Analysis (inflow/outflow) by Camp, Dresser, Mckee, under contract with Executive Office of Energy and Environmental Affairs (EOEEA) for the Massachusetts Watershed Initiative Nashua Team, the upper reaches of the Quinapoxet sub-basin are currently under a medium level of stress. With continued withdrawals over the next 20 years, the entire Quinapoxet sub-basin will be experiencing flow stress. The upper reaches, from the Quinapoxet Reservoir up, will remain under "medium stress". The lower reaches (remaining portion discharging directly to Wachusett reservoir) will also be under medium stress.

Medium stress means that the net 7Q10 outflow from the sub-basin equals or exceeds the estimated natural 7Q10. 7Q10 is the lowest consecutive 7 day streamflow that is likely to occur in a ten year period in

a particular river segment. High stress means that the net average August outflow from the sub-basin equals or exceeds the estimated natural August average flow.

The areas around Muschopauge Pond--which supplies water to the Towns of Rutland and Holden — and Asnebumskit Pond--which supplies water to the Town of Paxton — are locally zoned for watershed protection. There are two major surface water supply systems for the City of Worcester (which include the Quinapoxet Reservoir, Pine Hill Reservoir, and Kendall Reservoirs 1 and 2). Indeed, 36% of the Quinapoxet sub-basin's water is diverted into the City of Worcester's reservoirs and from there to Blackstone River basin.

A total of 35% of this sub-basin is protected open space (Worcester reservoirs' surface water included). The City of Worcester owns the land that immediately surrounds each of its reservoirs and approximately 25% of its entire water supply watershed: it is a highly-protected forest with no public access. Furthermore, the Department of Conservation and Recreation (DCR) is a large land owner, the Town of Holden owns over 600 acres as the Trout Brook Conservation Area, and Massachusetts Audubon Society owns several hundred acres in the Wachusett Meadow Wildlife Sanctuary in addition to other properties in the sub-basin.

This sub-basin features an extensive network of streams and rivers feeding the Wachusett reservoir including: Asnebumskit, Ball, Bumbo, Cobb, Governor, Muschopauge, Trout, and the Quinapoxet. According to the 1998 Nashua River Watershed Report Card, the upper 4.5 miles of the Quinapoxet River is rated as non-supportive of biology and hydrology. The DCR believes that low flow is the cause of impaired habitat. The low flow is related to limited discharge from Worcester's Quinapoxet Reservoir. Given the Quinapoxet is a noted trout stream, there is a concern for the trout fishery that hydromodification and water withdrawals lead to reduced streamflows; thus, less habitat and often lower quality habitat, since less flow is available to dilute pollutants and stream temperatures are likely to be higher.

The lower Quinapoxet is rated as on alert for biology, chemistry and hydrology. Chaffin's Brook is considered a "moderately septic polluted stream" and its lower reach has noxious aquatic plants in an impoundment. Trout Brook in Holden is considered to be high quality habitat and have limited disturbance. There are a number of medium yield aquifers surrounding Holden center and to protect this resource the town has passed an aquifer protection bylaw.

As for the water quality of the sub-basins' lakes and ponds: Streeter Pond in Paxton, and Eagle Lake and Dawson, Stump and Unionville Ponds in Holden are all considered to be eutrophic as well as to have noxious and non-native plants. Maple Spring Pond in Holden is considered to be eutrophic, and Chaffin Pond in Holden is considered to be hypereutrophic. There are no 303d-listed impaired water bodies in this sub-basin.

Recreation and Priority Habitat Areas: Wachusett Mountain, Quinapoxet Reservoir, and Pine Hill Reservoir areas have been identified as important core habitat areas. Muschopauge Brook, especially at Holbrook Swamp is a protection priority, as are the extensive wetlands with adjacent uplands south of Davis Hill. This focus area is a connector between the expansive open space of Mt. Wachusett to the north, the Pine Hill Reservoir focus area to the south, and the Poutwater Pond focus area to the east.

The Pine Hill Reservoir focus area forms the southern extent of a string of open areas stretching north. It is exceptional for the extent of undeveloped hillside directly adjacent to large bodies of water. The area around the reservoirs is known to provide excellent snake habitat. Protection priorities include Bond Hill and the wetland to the west and unprotected interior parcels such as the area around Worcester Brook north of Pine Hill Reservoir, and Streeter Pond to the south.

The Poutwater Pond focus area is an important corridor between the Savage Hill and Wekepeke Brook focus areas and is the nearest large area of limited development to the west of Wachusett Reservoir. Poutwater Pond and the adjacent, large spruce-tamarack bog wetland/ upland combination are likely important reptile and amphibian breeding habitat. Priorities are Flagg and Hog Hills.

Resource Protection Goals and Recommended Actions

GOAL: Protect wildlife habitat and migration corridors in the sub-basin.

- Assist DCR, MassWildlife, other state agencies, municipalities, and local land trusts in consensual transactions to acquire additional open space in priority areas.
- Sponsor local events to raise public understanding about native wildlife and the impacts of development patterns on ecosystem and habitat integrity.
- Work with local conservation commissions to gain their backing for natural resource and habitat inventories.
- Continue DCR-Division of Watershed Management's Private Land Forestry program which encourages private forest landowners to adopt forestry practices — namely, forest management planning required by the Chapter 61 program — that protect water quality.
- Encourage citizen certification of vernal pools.

GOAL: Protect high-priority open space, vistas, and community character in the sub-basin.

- Encourage the use of MA Executive Order 418 funding for "Open Space and Resource Protection Plans" for each Massachusetts community in the Quinapoxet River sub-basin.
- Conduct public education sessions to promote local passage of Community Preservation Act.
- Work toward ideal of at least 25-50% protected open space in each municipality.
- Work with municipal officials to develop subdivision standards that require proponents to devote at least 50% of land (not including already undevelopable wet or steep land) for open space conservation and encourage mixed-use development and cluster zoning by-right bylaws.

GOAL: Increase recreational opportunities throughout the sub-basin.

- Support the Wachusett Greenways group in its volunteer efforts to link communities via open spaces and multi-use inter-municipal trails and, in particular, the Mass Central Rail Trail.
- Improve recreational opportunities by removing weeds from water bodies.
- Educate the public and municipal departments (especially Public Works Depts.) on efforts relating to invasive species identification and removal.

GOAL: Improve water quality in the basin.

- Assist Holden, Paxton and West Boylston with its EPA's Clean Water Act-mandated MS-4 Phase II stormwater requirements. These municipalities will be required to obtain permits to reduce impacts to the receiving streams through the development of Best Management Practices (BMPs), elimination of cross-connections and significant public education. CSO controls and the development of a long-range control plan will be required.
- Conduct more detailed inflow/outflow studies given stressed status of some waterways.
- Determine status of Holden Trap Rock Stormwater Prevention Plan.
- Monitor for waste solvent (vinyl chloride) and high metals leaching from Holden landfill into groundwater.
- Identify the major sources of fecal coliform and nitrate-nitrogen inputs to the river and work with communities to address the problem.
- Identify the degree of threat from potential faulty/ illicitly discharging septic systems, which may result in bacterial and nutrient contamination of nearby streams and groundwater.
- Identify underground storage tanks and work with communities to have them removed.
- Monitor effects of increasing urbanization to prevent diminished groundwater recharge and to declining stream flow as well as stream channel widening and downcutting.
- Help develop and disseminate Best Management Practices for small-scale agricultural operations.

GOAL: Reduce negative effects of development in this sub-basin.

- Monitor uncontrolled runoff from construction sites to prevent sedimentation of streams.
- Track increased imperviousness and both direct and indirect riparian zone alterations that may increase stream temperature and cause sedimentation.
- Help local volunteer board members responsible for development and land-use rulemaking and enforcement get technical assistance and information regarding fundamental and innovative
- Increase or establish staff hours of municipal conservation agents to more effectively monitor runoff from construction sites and assist with the preparation of relevant bylaws.
- Write and implement stormwater, erosion and sedimentation bylaws/controls.

The Stillwater River Sub-Basin

Land Area:	39.3 square miles or 23,401 acres
Permanently Protected Land Area:	8,778 acres (13.6 sq miles) or 47%
Limited Protection Land Area (Chap. 61, etc.):	3126 acres (4.8 sq miles) River length: 9.9 miles
Dams:	none
% Imperviousness:	~ 8%
# of MA NHESP* Priority Habitat Sites:	1
# of NPDES* discharge permits:	none
Most threatened waterbodies:	Bartlett, Quag and Stuart Ponds. East Wachusett and Waushacum Brooks

Geographic Overview and Ecosystem Characteristics: Most of this sub-basin lies primarily in the communities of Sterling, Princeton and West Boylston with parts extending into Holden, Leominster, and Westminster. Located in the "fuzzy" zone encompassing parts of both the Upper Worcester Plateau and the Southern New England Coastal Plains and Hills ecoregions of central Massachusetts, this area drains into the Wachusett Reservoir: the largest body of open water in the greater Nashua River watershed.

Topography is generally hilly, encompassing numerous flatter wetlands, broad valleys, and floodplains. This sub-basin has a large amount (49%) of permanently protected undeveloped open space owned by Department of Conservation and Recreation (DCR), the municipalities, and others: particularly along the lower Stillwater. Another significant portion of private lands are classified as Chapter 61, 61A or 61B.

A low percentage (less than 8%) of total impervious surfaces -- namely, paved areas such as streets, driveways, and parking lots-- for this whole sub-basin indicates that concerns of compromised stormwater and other non-point sources of contaminants (for example: pesticides, fertilizers, oils, asphalt, pet wastes, salt, sediment, human litter and other debris) is not a pressing concern. As the Stillwater watershed becomes increasingly developed, there will be more threat of water quality deterioration from risks associated with urbanization, including thermal pollution, over-fertilization of lawns, improper handling of hazardous wastes, septic system leachate, street runoff, and the like.

Land Ownership and Land Use Patterns: The land-use pattern is predominantly undeveloped forest (hardwood mixed with softwood) or wetland plus low-density residential settlement in the hilly upland areas. Concentrated settlements and strip developments are located near town centers and along major roads. Heavily traveled Interstate 190 runs through this sub-basin. The highway which connects Worcester and Leominster has led to and will continue to lead to increased development pressures, primarily of single-family residences. Agriculture (notably "hobby farms" and backyard horse paddocks), commercial operations, industry and other developed land uses are less significant. However, sand and gravel extraction operations are contributing to sedimentation and land use change.

Major Water Resource Issues: Streamflow, as in most of New England, has significant seasonal changes. Existing flows for the Stillwater River are considered to be under "medium stress". The Stillwater River system is an important water supply (that is, overlying a major aquifer). The River - and the very extensive wetland system bordering it-- feeds the Wachusett Reservoir (12% of the reservoir's total) and is in turn fed by numerous streams including: Ball, Babcock, Bailey, Connelley, East Wachusett, Houghton, Keyes, Rocky, Scanlon, Washacum and Wilder. There are no wastewater treatment plants nor NPDES permitees in this sub-basin. The majority of residents have on-site septic systems although a number of homes will be serviced by the new Holden-West Boylston Sewer Project.

As for specific areas of concern, there is streambank erosion along Crowley Road in Sterling which can lead to siltation/sediment deposition, higher instream temperatures, and threatened habitat. Further, Bartlett Pond in Leominster, and the Quag and Stuart Pond in Sterling are eutrophic and are heavily vegetated with noxious* plants. East Wachusett Brook in Princeton-Sterling is considered to only partially support recreation due to high bacteria (fecal coliforms) during both wet and dry conditions; otherwise, it has high quality habitat and limited disturbance. Waushacum Brook, however, is considered a "moderately septic polluted stream".

On a positive note, Justice Brook in Sterling is very clean and has particularly low bacteria levels. The River and several of its tributaries are stocked with trout and self-reproducing populations of native brook trout are found throughout the sub-basin. According to the 1998 Nashua River Watershed Report Card, the Stillwater is rated as on alert for aquatic habitat. Beavers, on the other hand, have capitalized on the present environmental conditions and proliferated to the point of being considered a "nuisance" species. The most serious damage beavers are causing in this sub-basin, in addition to increased localized flooding behind their dams, is from bacterial contamination of wellwater. There is no 303(d)-listed impaired water body in this sub-basin.

Recreation and Priority Habitat Areas: Keyes Brook, a tributary to the Stillwater running northwest from West Sterling, is part of the MA Natural Heritage and Endangered Species Program Priority Habitat area that connects down the Stillwater all the way to Wachusett Reservoir and is habitat for numerous listed turtle species. The area is not without some development, yet it is an important connector between the extensive habitat of focus areas to the northwest (Bartlett Swamp, Wachusett Mt. State Reservation, and Leominster State Forest) and southwest (Poutwater Wildlife Management Area in the Quinapoxet sub-basin). Protection priorities should focus on Hy-Crest Pond area and south of Justice Hill Road.

Resource Protection Goals and Recommended Actions

GOAL: Protect wildlife habitat and migration corridors in the sub-basin.

- Assist DCR, MassWildlife, other state agencies, municipalities, and local land trusts in consensual transactions to acquire additional open space in priority areas especially in Hy-crest Pond to south of Justice Hill Road area.
- Sponsor local events to raise public understanding about native wildlife and the impacts of development patterns on ecosystem and habitat integrity.
- Work with local conservation commissions to gain their backing for natural resource/ habitat inventories.
- Continue DCR — Division of Watershed Management's Private Land Forestry program which encourages private forest landowners to adopt forestry practices — namely, forest management planning required by the Chapter 61 program — that protect water quality.
- Encourage citizen certification of vernal pools.

GOAL: Protect high-priority open space, vistas, and community character in the sub-basin.

- Assure continued commitment from DCR to using Stillwater Farm as an educational resource for watershed protection as well as a eco-tourist destination.
- Encourage the use of MA Executive Order 418* funding for "Open Space and Resource Protection Plans" for each Massachusetts community in the Stillwater River sub-basin.
- Conduct public education sessions to promote local passage of Community Preservation Act.
- Work toward ideal of at least 25-50% protected open space in each municipality.
- Work with municipal officials to develop subdivision standards that require proponents to devote at least 50% of land (not including already undevelopable wet or steep land) for open space conservation and encourage mixed-use development and cluster zoning by-right bylaws.

GOAL: Increase recreational opportunities throughout the sub-basin.

- Support the Wachusett Greenways group in its volunteer efforts to link communities via multi-use intermunicipal trails and open spaces, and in particular the Mass Central Rail Trail.
- Improve canoeing, fishing, and swimming opportunities by removing weeds from water bodies and educating the public about the spread of invasive plants.
- Educate municipal departments (especially Public Works Depts.) on efforts relating to invasive species identification and removal.

GOAL: Improve water quality in the basin.

- Conduct more detailed inflow/outflow studies given stressed status of some waterways.
- Encourage Town of Sterling to apply for state Aquifer Land Acquisition funds to acquire land adjacent to town wellfield (if appropriate to town).
- Identify the major sources of fecal coliform and nitrate-nitrogen inputs to the river and work with communities to address the problem.
- Assist the municipalities of Holden, Leominster and West Boylston in implementing EPA's Phase II stormwater requirements. These municipalities will be required to obtain permits to reduce impacts to the receiving streams through the development of Best Management Practices (BMPs), elimination of cross-connections and significant public education. CSO controls and the development of a long-range control plan will be required.
- Identify the degree of threat from potential faulty/ illicitly discharging septic systems, which may result in bacterial and nitrate contamination of nearby streams and groundwater.
- Identify underground storage tanks (USTs) and work with communities to have them removed.
- Monitor effects of increasing urbanization to prevent diminished groundwater recharge and to declining stream flow as well as stream channel widening and down cutting.
- Help develop and disseminate) Best Management Practices for small-scale, hobby type agricultural operations.

GOAL: Reduce negative effects of development in this sub-basin.

- Monitor uncontrolled runoff from construction sites to prevent sedimentation of streams.
- Track increased imperviousness and both direct and indirect riparian zone alterations that may increase stream temperature and cause sedimentation.
- Help local volunteer board members responsible for development and land-use rulemaking and enforcement get technical assistance and information regarding fundamental and innovative techniques to control and guide land use and development balanced with adequate resource protection (e.g., Citizens Planner Training Collaborative workshop offerings).
- Increase or establish staff hours of municipal conservation agents to more effectively monitor runoff from construction sites and assist with the preparation of relevant bylaws.
- Write and implement stormwater, erosion, and sedimentation bylaws/controls.

Wachusett Reservoir Sub-Basin

Land Area:	21.7 square miles or 16,024 acres
Permanently Protected Land Area:	4,680 acres (7.3 sq miles) or 38%
Limited Protection Land Area (Chap. 61, etc.):	655 acres
Dams:	1 in Clinton
% Imperviousness:	approximately 10.6%
# of MA NHESP* Priority Habitat Sites:	1
# of discharge permits:	none
Most threatened water bodies:	Gates and West Boylston Brooks

Geographic Overview and Ecosystem Characteristics: Most of this 16,024 acre (surface water not included) sub-basin lies in the Massachusetts communities of Boylston and West Boylston with parts extending into Sterling and Holden. Located in the Southern New England Coastal Plains and Hills ecoregion of central Massachusetts, this area drains into the Wachusett Reservoir: the largest body of open water in the greater Nashua River watershed. The Southern New England Coastal Plains and Hills ecoregion is an area with generally similar soils, vegetation, shape of the land, and especially, moderate climate and bedrock geology (glacial tills and outwash deposits). Topography is generally hilly, encompassing numerous flatter wetlands, broad valleys, and floodplains.

Land Ownership and Land Use Patterns: The land-use pattern is nearly 75% forest (hardwood mixed with softwood) or wetland plus low-density residential settlement as well as concentrated settlements and strip development located near town centers and along major roads. Agriculture (notably "hobby farms" and backyard horse paddocks), gravel extraction, commercial operations, industry and other developed land uses are less significant.

Major Water Resource Issues: Streamflow, as in most of New England, has significant seasonal changes. Based on recent findings in a Hydrologic Analysis (inflow/outflow) by Camp, Dresser, Mckee, under contract with EOEA for the Massachusetts Watershed Initiative Nashua Team, the Wachusett sub-basin is currently under a medium level of stress. With continued development and withdrawal pressures, the sub-basin will continue as "medium stress" by the year 2020. It should be noted that while there is a minimum flow requirement for discharge over the Wachusett Dam, local and regional water suppliers need to recognize the importance of continuing demand for supply on the reservoir.

This means that the net 7Q10 outflow from the sub-basin equals or exceeds the estimated natural 7Q10. 7Q10 is the lowest consecutive 7 day streamflow that is likely to occur in a ten year period in a particular river segment.

Because the Wachusett watershed is highly managed for the Worcester and MWRA withdrawals, these withdrawals were not considered in the evaluation of stress in the Wachusett Watershed-a much more detailed analysis would be required to evaluate their uses. Instead, the calculations were based on other uses of water in the watershed, particularly withdrawals by Holden, Rutland, Princeton, Sterling, and West Boylston. Based on these withdrawals, three of the four subareas in the Wachusett Watershed were calculated to have medium-stress in the future.

This sub-basin features an extensive network of streams and rivers feeding the reservoir including: Boylston, Chaffin's (Unionville outlet), Gates, Malagasco, Malden, Scarlett and Waushacum Brooks; though, all together these brooks make up a comparatively minor percentage of the total inflow to the reservoir.

Though Wachusett Reservoir is principally fed by the Stillwater and Quinapoxet Rivers-together both account for about 30% of annual inflow -- these two are considered separate sub-basins and are dealt with separately in this Plan. The Wachusett Reservoir provides very high-quality drinking water to a large portion of the Commonwealth's population via the Massachusetts Water Resources Authority (MWRA) and Department of Conservation and Recreation (DCR) Division of Watershed Management (DWM). More than 90% of the water leaving the Reservoir is withdrawn by the MWRA and only a small amount is released downstream to the South Nashua River.

The amount of permanently protected (owned by DCR and others) undeveloped open space, 28.4% (surface water not included), in the sub-basin has meant that the water quality in the reservoir remains excellent, indeed, to such an extent that filtration treatment has to date been considered unnecessary. There are no wastewater treatment plants or industrial discharges in this sub-basin.

10.6% of total impervious surfaces --namely, paved areas such as streets, driveways, and parking lots — for this whole sub-basin indicates that concerns of compromised stormwater and other non-point sources of contaminants (for example: pesticides, fertilizers, oils, asphalt, pet wastes, salt, sediment, human litter and other debris) is an increasingly pressing concern. The majority of residents have on-site septic systems although a number of homes will be serviced by the new Holden-West Boylston Sewer Project.

As for specific areas of concern, Wachusettt Reservoir itself has non-native plants and mercury contamination (as found in fish tissue samples); thus, according to the 1998 Nashua River Watershed Report Card, the Wachusett Reservoir is rated as partially-supportive for biology and non-supportive of fish tissue. However, its waters are crystalline with low turbidity, bacterial counts, algal densities, and nutrients. On the other hand, Gates Brook is considered to be the "most contaminated tributary" in this sub-basin with high nitrates and severe impairment for aquatic life. West Boylston Brook is similarly impaired and has the highest nitrate level. Both Gates and West Boylston Brooks are classified by the DCR as "severely septic polluted", having the highest fecal coliform loadings in this watershed, while Boylston and Malden Brooks are considered "moderately septic polluted streams".

Scarlett Brook is considered to be severely impaired for conductivity and fecal coliform which — as with the above mentioned streams — is expected to rise due to high numbers of improperly functioning septic systems and the area's increasing density of development. Beaman Pond, Boylston, Chaffin's (Unionville outlet), Malagasco, and Waushacum Brooks are other tributaries in this sub-basin which are severely impaired for conductivity or fecal coliform. Gates and Malagasco Brook, in particular, exhibit significant impacts potentially caused by contamination (as yet to be identified). Not withstanding these limitations, most of the small waterways in this sub-basin are healthy functioning ecosystems exceeding Class A standards in many regards with low levels of phosphorus and other "non-point" pollutants. Also, each of the above mentioned tributaries to the Reservoir have low flows and, thus, contribute only a minor load of "impaired" waters. There are no 303(d)-listed* impaired water bodies in this sub-basin.

Recreation and Priority Habitat Areas: The Reservoir itself is important habitat for lake-nesting and lake-feeding birds. The entire water surface with adjacent upland connects with the Stillwater River as one large state-designated Natural Heritage and Endangered Species Program Priority Habitat area. The BioMap Core Habitat area in this sub-basin corresponds directly with the NHESP Priority Habitat area, while BioMap Supporting Habitat areas lie along the eastern edge of this sub-basin.

Resource Protection Goals and Recommended Actions

GOAL: Protect wildlife habitat and migration corridors in the sub-basin.

- Assist DCR, MassWildlife, other state agencies, municipalities, and local land trusts in consensual transactions to acquire additional open space in priority areas.
- Sponsor local events to raise public understanding about native wildlife and the impacts of development patterns on ecosystem and habitat integrity.
- Work with local conservation commissions to gain their backing of natural resource/ habitat inventories.
- Continue DCR-DWM's Private Land Forestry program which encourages private forest landowners to adopt forestry practices - namely, forest management planning required by the Chapter 61 program — that protect water quality

GOAL: Protect high-priority open space, vistas, and community character in the sub-basin.

- Encourage the use of MA Executive Order 418 funding for "Open Space and Resource Protection Plans" for each Massachusetts community in the Stillwater River sub-basin.
- Conduct public education sessions to promote local passage of Community Preservation Act.
- Work toward ideal of at least 25-50% protected open space in each municipality.
- Work with municipal officials to develop subdivision standards that require proponents to devote at least 50% of land (not including already undevelopable wet or steep land) for open space conservation and encourage mixed-use development and cluster zoning by-right bylaws.

GOAL: Increase recreational opportunities throughout the sub-basin.

- Support the Wachusett Greenways group in its volunteer efforts to link communities via multi-use intermunicipal trails and open spaces, and in particular the Mass Central Rail Trail.
- Improve canoeing, fishing, and swimming opportunities by removing weeds from water bodies.
- Educate the public and municipal departments (especially Public Works Depts.) on efforts relating to invasive species identification and removal.

GOAL: Improve water quality in the basin.

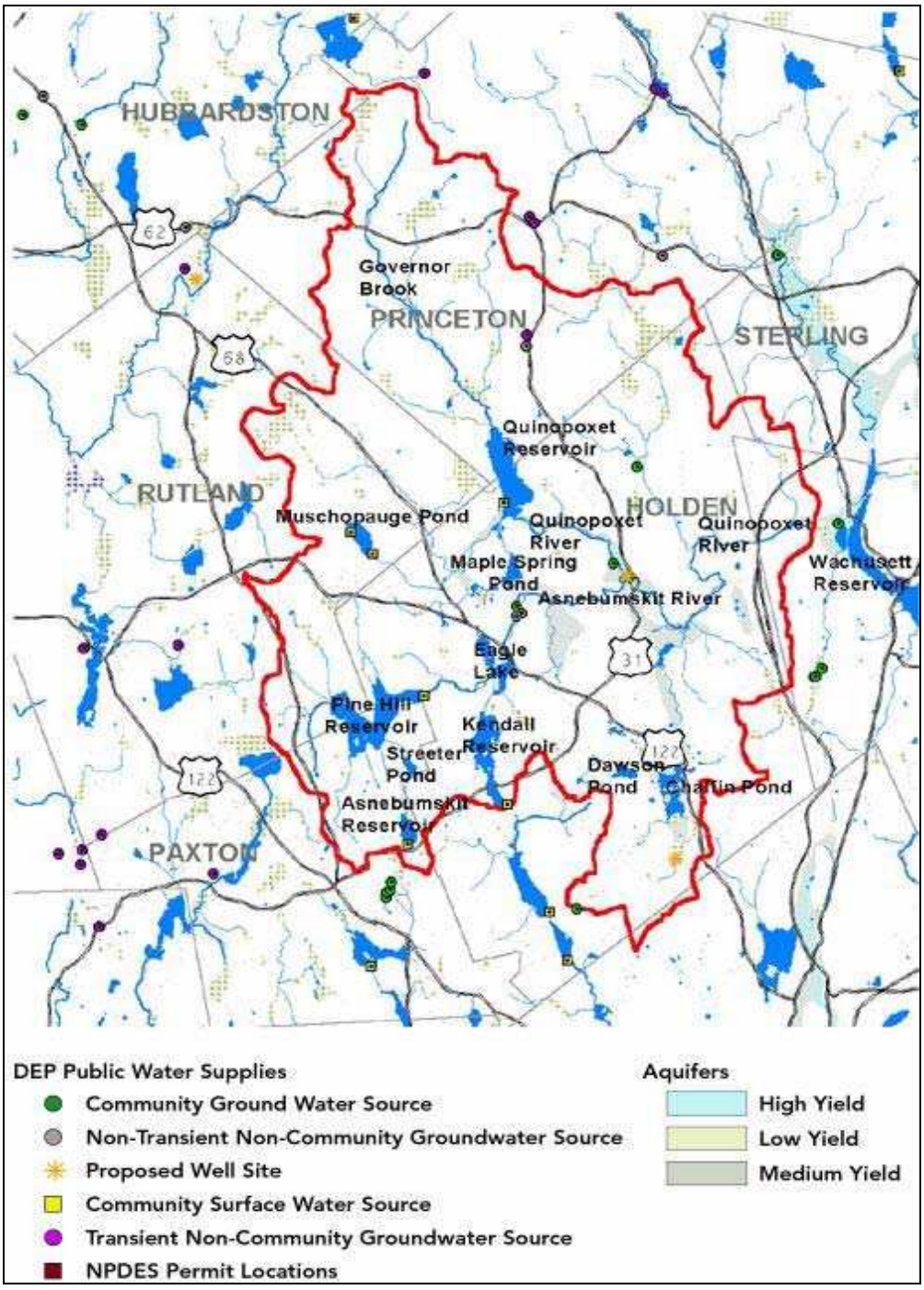
- Conduct more detailed inflow/outflow studies given stressed status of some waterways.
- Evaluate West Boylston and Holden's sewer project for impact on surface water quality.
- Assist Boylston and West Boylston with its EPA's Clean Water Act-mandated MS-4 Phase II stormwater requirements. These municipalities will be required to obtain permits to reduce impacts to the receiving streams through the development of Best Management Practices (BMPs), elimination of

- cross-connections and significant public education. CSO controls and the development of a long-range control plan will be required.
- Identify the major sources of fecal coliform and nitrate-nitrogen inputs to the river and work with communities to address the problem.
- Identify the degree of threat from potential faulty/ illicitly discharging septic systems, which may result in bacterial and nutrient contamination of nearby streams and groundwater.
- Identify underground storage tanks (USTs) and work with communities to have them removed.
- Monitor effects of increasing urbanization to prevent diminished groundwater recharge and to declining stream flow as well as stream channel widening and down cutting.
- Help develop and disseminate Best Management Practices for small-scale, hobby type agricultural operations.

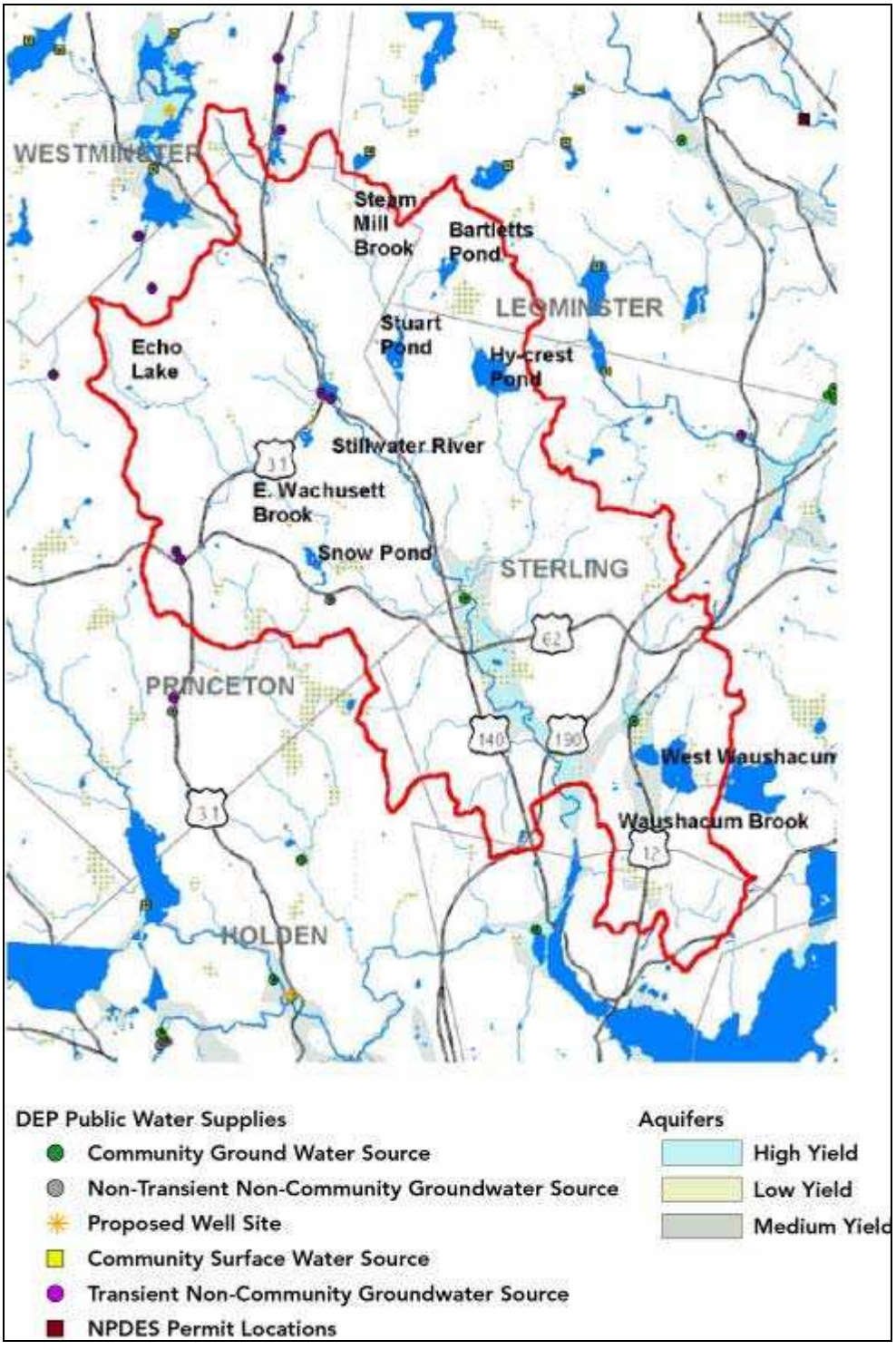
GOAL: Reduce negative effects of development in this sub-basin.

- Monitor uncontrolled runoff from construction sites to prevent sedimentation of streams.
- Track increased imperviousness and both direct and indirect riparian zone alterations that may increase stream temperature and cause sedimentation.
- Help local volunteer board members responsible for development and land-use rulemaking and enforcement get technical assistance and information regarding fundamental and innovative techniques to control and guide land use and development balanced with adequate resource protection (e.g., Citizens Planner Training Collaborative workshop offerings).
- Increase or establish staff hours of municipal conservation agents to more effectively monitor runoff from construction sites and assist with the preparation of relevant bylaws.
- Write and implement stormwater, erosion and sedimentation bylaws/controls.

Quinapoxet River Sub-Basin



Stillwater River Watershed Sub-basin



Wachusett Reservoir Sub-basin