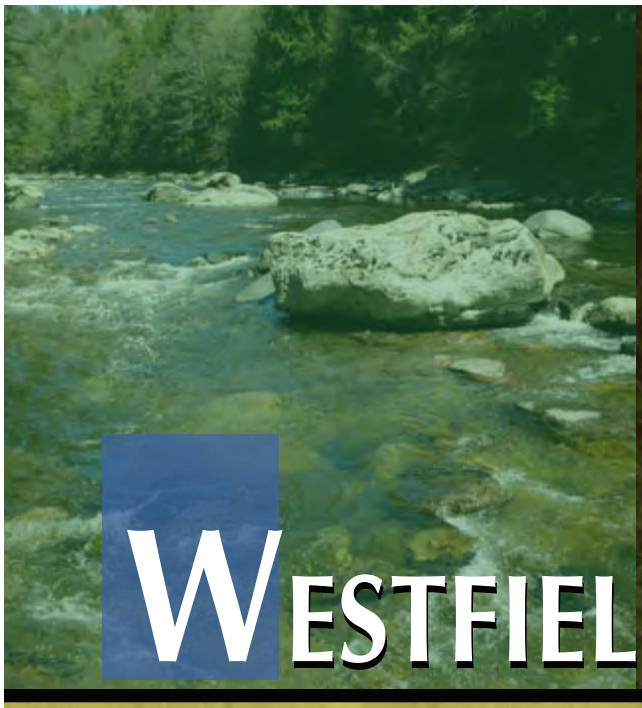


WESTFIELD RIVER

FIVE YEAR WATERSHED ACTION PLAN

Prepared by the Pioneer Valley Planning Commission
This project was funded by the Executive Office of Environmental Affairs.

June 2006

Executive Summary

Created by watershed partners, the Westfield River Watershed Action Plan outlines issues and priority actions over the next five years, charting a course of action for state agencies, watershed communities and other decision makers within or related to the Westfield River watershed. This plan provides a detailed assessment of the current condition of the watershed based on an extensive literature review, and outlines a program for watershed protection and restoration that will guide state funding priorities in the Westfield basin.

The Westfield River Watershed Action Plan examines the issues and priorities of the watershed from within the context of five subwatersheds: Eastern Main Stem, Western Main Stem, West Branch, Middle Branch and East Branch. For each subwatershed, the condition of the watershed is discussed within the context of five categories:

- Water Quantity and Stream Flow
- Water Quality
- Habitat and Fish Passage
- Land Use, Open Space and Growth
- Recreation

Following a subwatershed planning approach, a summary of assessment findings is presented for each of the five subject categories followed by a list of the most relevant objectives and priority actions. Six priority projects have also been identified with one-page scopes of work for implementation over the next five years.

Water Quantity and Stream Flow Assessment Findings:

Little is known about water quantity and stream flows throughout the watershed. There area number of FERC licensed hydroelectric plants on the Western Main Stem, used by industrial operations still located on the river. Low flows have been observed downstream of the Cobble Mountain Reservoir Dam on the Little River and no flow release requirements for this dam. The West Branch, East Branch and lower Middle Branch, below the Littleville Reservoir Dam, have been classified as Medium Stressed Basins due to periodic low flows. More data is needed to better understand flow regimes in each of these locations. The first of two dam removal projects in the watershed have also been completed on the West Branch. The Silk Mill Dam on Yokum Brook was removed in February 2003 and plans to breach Ballou Dam, also on the West Branch are currently underway.

A major water withdrawal has been proposed for the Eastern Main Stem known as the Russell Biomass Power Plant in Russell. This project has undergone an Expanded Environmental Notification Form and is ordered to perform a Draft and Final Environmental Impact Report under the Massachusetts Environmental Policy Act (MEPA). This project will need to undergo extensive analysis before any MEPA permitting will occur.

Water Quantity and Stream Flow Objectives:

- Implement measures to ensure stream continuity and adequate stream flows and flow regimes.
- Conduct public education, outreach and planning about restoration and protection of surface and groundwater resources.
- Implement cross-municipal land use controls and regulatory improvements for groundwater and surface water resource protection.

Water Quality Assessment Findings

The lower watershed is the most urbanized and the portion of the watershed where impervious surfaces are having an impact on water quality. Six watershed communities (Agawam, Holyoke, Southampton, Southwick, Westfield and West Springfield) and two State agencies (Massachusetts Highway Department and the Massachusetts Turnpike Authority) are regulated under the National Pollutant Discharge Elimination System (NPDES) Phase II Stormwater program. The communities are actively engaged in the Phase II program, drafting and adopting stormwater control bylaws and performing public education and outreach. MHD and MTA are still seeking compliance with the program.

Five ponds and lakes are considered impaired by invasive exotic aquatic weeds, known as a Category 4c Water on the *Massachusetts Year 2006 Integrated List of Waters* and ten ponds, lakes, streams, and river segments are listed as waters requiring a Total Maximum Daily Load (TMDL) analysis, known as Category 5 Waters. Streambank erosion and illegal dumping are prevalent in isolated locations along the main stem and some tributaries. Road salt contamination has been documented in private wells within the Zone II the Barnes Aquifer, a rapidly developing section of the lower watershed in the City of Westfield and Town of Southampton.

Water Quality Objectives:

- Identify sources of nonpoint source pollution to surface and groundwater resources.
- Implement cross-municipal land use controls and regulatory improvements for groundwater and surface water resource protection.
- Implement structural best management practices to control point and nonpoint sources of pollution.
- Identify important stream corridors, headwaters and adjacent wetlands in need of protection (West, Middle and East Branches).

Habitat and Fish Passage Assessment Findings

Roughly 78 miles in ten towns of the Westfield River and its three branches have been designated as a National Wild and Scenic River. The Natural Heritage and Endangered Species Program has identified 56 percent of the Westfield River watershed as either Biocore Habitat or Supporting Landscape Habitat. Biocore Habitat is the most viable habitat for rare species and natural communities in Massachusetts. Supporting Natural Landscape Habitat is the buffer area that connects Biocore Habitat, and identifies large, naturally vegetated blocks that are relatively free from the impacts of roads and other development.

Upstream and downstream fish passage is available at the DSI facility on the Eastern Main Stem for anadromous and resident fish and eel. The other three major dams on the lower main stem have systems for downstream fish passage. Massachusetts Department of Fish and Game regularly stocks Atlantic salmon fry and trout in the watershed.

Habitat and Fish Passage Objectives

- Support the restoration of migratory and resident fish populations to the Connecticut and Westfield Rivers.
- Collaborate with government agencies, watershed organizations, land trusts, municipalities and private citizens to ensure protection of remarkable river and stream corridors in perpetuity (West, Middle and East Branches).

Land Use, Open Space and Growth Assessment Findings

The watershed is home to nearly 100,000 people with land use characterized by 7 percent agricultural, 12 percent developed and 82 percent undeveloped with roughly 27 percent of all land permanently protected as open space. The watershed is divided into distinctly rural and urban communities. The upper reaches of the watershed are primarily rural communities distinguished by unfragmented forests and scattered with agricultural, seasonal, and home-based businesses. The communities of Westfield, Agawam, West Springfield, and Holyoke in the lower (southeastern) basin are urbanized with the greatest job opportunities. The rural and suburban communities surrounding the region's job center are experiencing the most significant growth. Population growth in the top seven fastest growing watershed communities from 1990 to 2004 ranged from just under 40 percent in Middlefield to 20 percent in Becket.

Land Use, Open Space and Growth Objectives

- Promote land conservation as a tool for protecting natural resources
- Promote the use of Chapter 61 A and Agricultural Preservation Restirction (APR) programs among landowners and municipalities
- Support locally based agriculture
- Maintain updated open space and recreation plans (OSRPs)
- Adopt growth management bylaws that will protect natural resources and open space and minimize the impacts of new housing, transportation and economic development

- Promote economic development respectful of the environment and historic resources
- Promote urban beautification

Recreation Assessment Findings

The river and other lakes and ponds in the watershed are widely used for fishing, swimming, kayaking and canoeing. Sections of the West, Middle and East Branches are noted in the Appalachian Mountain Club's River guide for Massachusetts Connecticut and Rhode Island. The East Branch provides on of the longest whitewater runs in Massachusetts. The winter pool release at the Knightville Dam triggers the annual Westfield River Whitewater Canoe Races, the longest continuing running race in the country, now in its 53rd year.

The Appalachian Trail crosses October Mountain State Forest in Becket. The West Branch also contains 10 beautiful stone arch railroad bridges known as the Keystone Arches. Listed in the National Register of Historic Places, the arches are a popular trail destination point. The watershed contains many other opportunities for hiking, bicycling and camping.

Recreation Objectives

- Increase policing and maintenance at existing access points along river.
- Increase the number of established public access points along the river.
- Utilize river access points for public outreach about watershed issues and on-going projects.
- Control unauthorized motorized recreational vehicle use in the watershed and provide opportunities for this type of recreation in appropriate places.

Structure of the Watershed Plan

The Westfield River Five-Year Watershed Action Plan was developed following the approach and format provided in the Executive Office of Environmental Affairs' (EOEA) *Five-Year Watershed Action Plan Guidance* document. Consistent with the EOEA framework, input was sought from a project Steering Committee consisting of representatives from local, regional and state agencies, non-profit organizations and municipalities as well as public comment. Committee members included representation from the following watershed stakeholders, a complete list of Steering Committee members is included in the Appendices:

13 of the 28 watershed communities
The Nature Conservancy – Westfield River Highlands Program
Westfield River Wild and Scenic Advisory Committee
Westfield River Watershed Association
Massachusetts Department of Agricultural Resources
Massachusetts Department of Conservation and Recreation
Massachusetts Department of Environmental Protection
Massachusetts Riverways Program
Executive Office of Environmental Affairs
University of Massachusetts
Pioneer Valley Planning Commission
ESS Group Inc.

For planning purposes, the Westfield basin has been divided into five subwatersheds: Eastern Main Stem, Western Main Stem, West Branch, Middle Branch, and East Branch. The condition of the watershed is discussed within the context of the following five categories: Water Quantity and Stream Flow; Water Quality; Habitat and Fish Passage; Land Use, Open Space and Growth; and, Recreation. The plan opens with a watershed wide summary of some of the significant watershed assets. The second half of the plan focuses on each of the five subwatersheds. For each subwatershed there is a brief summary of the Assessment Findings which highlight key issues. Following the Assessment findings are the Priority Objectives and Priority Actions identified through the literature review and public comment that address the identified key issues.

The third section of the plan identifies a clear vision for the watershed and the goals and objectives for the next five years. The goals and objectives were extracted from an extensive literature review of existing state, federal, local and non-profit watershed –based plans including the 2003 Westfield River Open Space and Recreation Plan (PVPC), MA

Watershed Initiative Work Plans, DEP's Nonpoint Source Action Strategy for the Westfield Basin, and local Open Space and Recreation Plans. The WAP goals and objectives were advertised for public comment and refinement during three public forums held in April of 2006.

The last section of the plan includes one-page scopes of work for the six priority projects identified in this planning process for funding and implementation over the next five years. The work plans for these projects were developed with input from the Steering Committee and also made available for public comment.

Public Participation Process

Participation in the project Steering Committee was solicited via letters mailed to the chief elected officials in each of the 28 watershed communities. PVPC sent the first letter in late December 2005, followed by a subsequent letter from EOEA in January 2006. The Westfield River Watershed Association and PVPC made follow-up phone calls to each of the communities in late January 2006. The PVPC and WRWA issued two press releases announcing the project and seeking participation in the Steering Committee. The press releases were published in the Hampshire Gazette, the Union News, the Berkshire Eagle, and the Country Journal in January and February of 2006.

The Steering Committee met three times from January through April to compile a literature review list, review the draft goals and objectives, and develop the scopes of work for the six priority projects. The draft Watershed Action Plan was presented at three public forums in April, 2006: the Westfield River Symposium, an evening at the Worthington Historical Society, and an evening at the Agawam Public Library. The draft Plan was also available for review on PVPC's website.

Watershed Overview

The Westfield River watershed forms a general "L" shape, approximately 48 miles long and 20 miles wide, extending from the Berkshire Mountains in the west to the Connecticut River in the east. The river drops 2,000 feet in elevation before entering the Connecticut River. The watershed is bounded on the north by the Deerfield River Basin, on the east by the Connecticut River Basin, and on the west and south by the Housatonic and Farmington River Basins. Thin soils in the hills combined with steep gradients produce extreme and rapid differences in the rate of flow, occasional flooding, and at times low water conditions. The annual spring run-off usually provides excellent whitewater canoeing and months of plentiful trout fishing.

The Westfield River corridor encompasses many valuable features and resources, including:

- The first designated National Wild and Scenic River in Massachusetts in the Westfield River;
- The longest uncontrolled river in the state (West Branch of the Westfield River);
- Massachusetts' only regenerating Atlantic salmon habitat;
- An active corps of volunteer and professional planners, government officials, environmentalists, developers, advocates, builders and citizens;
- Outstanding biodiversity;
- Extraordinary scenic and historic resources, such as Jacob's Ladder Trail, Keystone Arch Bridges, Glendale Falls and Chesterfield Gorge;
- Excellent water quality, one of Massachusetts' best coldwater fisheries, and one of the finest whitewater boating areas in the northeastern United States on the Westfield River;
- Many traditional New England villages with beautiful historic buildings and town centers; and,
- A population density of less than half a person per acre—the second lowest density of all Massachusetts watersheds.

Water Quantity and Stream Flow

According to the Massachusetts Department of Environmental Protection (DEP), there are 82 lakes, ponds and impoundments in the Westfield River basin, 48 of which are greater than 10 acres. Aside from recreation and wildlife habitat, the waters within the Westfield basin are used for industrial processing, waste assimilation, hydroelectric power, water storage, and drinking water supplies. In all, nearly 6,000 acres of open water exist in the watershed.

Thirteen communities in the watershed are served, in part, by municipal water systems. The 10 remaining municipalities do not have public water systems and are served only by private groundwater wells. The watershed contains five major water supply reservoirs and

one regional aquifer, the Barnes Aquifer. Borden Brook and Cobble Mountain Reservoir, located in Granville, Blandford, and Russell, are both part of the second largest water supply storage system in the state, serving more than 250,000 people in the Hampshire and Hampden counties. The Springfield water system diverts an annual average of 37 million gallons a day out of the Westfield basin for use by the municipalities of Springfield, East Longmeadow, Longmeadow, Ludlow, and Agawam. Cobble Mountain Reservoir in Blandford, Russell, and Granville is the largest lake in the basin occupying approximately 1,135 acres, and the second largest water body in the state after the Quabbin Reservoir.

Granville Reservoir supplies water to approximately 20,000 Westfield residents. McLean Reservoir, which is located at the basin's eastern periphery in Holyoke, is used as an emergency back-up water supply for the City of Holyoke. Located south of McLean Reservoir, Bear Hole Reservoir supplies approximately 21 percent of the City of West Springfield's potable water.

The southern portion of the Barnes Aquifer is located in the Westfield basin in the cities of Holyoke and Westfield. The Barnes Aquifer supplies over five million gallons of water a day to over 60,000 people in four cities and towns and, in recent years, has been under great pressure from commercial and residential development.

More data is needed about water quantity and stream flow throughout the watershed. The Water Resources Commission has classified the West and East Branches as well as most of the Middle Branch as medium stressed basins due to low flows and aberrant flow regimes. EOEA is currently funding a project called Water Budgets that will evaluate the effects of water withdrawals and wastewater discharges on stream flow. Results from this project are not expected until 2007.

In 1993, 43 miles of the Westfield River's East, Middle and West Branches in the towns of Becket, Chester, Chesterfield, Cummington, Middlefield, and Worthington were designated as the first National Wild and Scenic River in Massachusetts. This designation was sought in order to protect the free-flowing and outstanding scenic qualities of the Westfield River. In 2001, an additional 35 miles were added to the designation in the towns of Huntington, Savoy, Washington, and Windsor.

The River Continuity Project, developed in partnership between UMASS-Amherst, MA Department of Fish and Game and The Nature Conservancy, has been mapping and analyzing stream crossings, developing a digital database for inventory and evaluation, and prioritizing barriers to fish passage and stream flow for removal. Results from this project have been used in the development of Priority Project #4. A full project report is due to be completed in June 2006.

Water Quality

Over 73,000 acres of the Westfield River watershed have been designated as outstanding resource waters as identified by the Massachusetts Surface Water Quality Standards of 1995 (314 CMR 4.00). According to the regulation, these waters "constitute an outstanding resource as determined by their outstanding socioeconomic, recreational, ecological and/or

aesthetic values." The regulation also states that the quality of these waters shall be "protected and maintained."

There are 11 federally-permitted NPDES wastewater discharges to the Westfield River or its tributaries, but only one upstream of Huntington. Wastewater effluent from municipal treatment plants in the towns of Westfield, Huntington, and Russell is discharged into the Westfield River. Water quality is discussed in detail by subwatershed in later sections of this plan.

Habitat and Fish Passage

The Westfield River basin contains approximately 51,240 acres of BioMap core habitat and 146,000 acres of supporting natural landscape. According to DFG's Natural Heritage and Endangered Species Program, 15 percent of the total land area in the Westfield River watershed is core habitat and 44 percent is supporting natural landscape. While the Westfield River basin only accounts for 4.8 percent of the Commonwealth's total land area, it contains 15 percent of its BioMap supporting natural landscape.

The Nature Conservancy (TNC), an international non-profit conservation group, has identified the Westfield River basin as an ecoregional priority area. Within the Lower New England/Northern Piedmont ecoregion—an area that stretches from Maryland to Maine and comprises parts of 12 states, TNC identified several large forest blocks ("matrix forests") on the Berkshire plateau as being among the highest priorities for conservation. These blocks represent the highest quality and least fragmented areas of their kind in the Northeast, and thereby represent biodiversity of global significance.

The Westfield River Watershed area is unique for its integration of intact forest, aquatic systems, and embedded wetlands. The forests provide a link between the forests of northern New England with those of southern New England and the mid-Atlantic states to the south. They provide opportunities for movement of wide-ranging species across the landscape as well as high quality breeding habitat for interior nesting neotropical migrant birds. Just over 79 percent of the Westfield watershed is forested, and 70 percent of this forest lacks formal protection according to TNC.

In 2002, the major aquatic systems of this area, including the mainstem of the Westfield and its three main tributaries, were identified as ecoregional priorities by TNC. The upper reaches of the watershed offer exceptional habitat for coldwater fish and juvenile Atlantic salmon; the lower mainstem provides high quality spawning habitat for three species of migratory fish (American shad, blueback herring, and sea lamprey).

TNC describes matrix forests as large forested areas that, if allowed to regain their natural condition, will maintain ecological processes and provide habitat necessary to support many natural communities and species populations. The watershed encompasses patch target habitats for protectection including acidic peatlands and a pitch pine-scrub oak ridgetop community. Thirty nine state-listed rare species, two federally-listed species, and thirteen TNC ecoregional target species have been recorded in the area. The Westfield is a recovered and recovering landscape – one that was completely cleared in the early 1800's –

and it offers one of the last opportunities for large-scale forest and aquatic system conservation in southern New England.

Invasive species are non-native plants that have great potential for rapid colonization. These plants significantly impact the biodiversity of aquatic and upland habitats in our watershed by shading out native plants, offering very little value to wildlife, and degrade water quality. Controlling invasive plants is often very difficult and early detection is vital. Complete eradication of a species can take years and may never be achieved. A list of the most common invasive species is provided in Table 1.

Table 1 Common Invasive Species in the Westfield Basin

European Water Chestnut *Trapa natans*	Common Reed *Phragmites australis*
Purple Loosestrife *Lythrum salicaria*	Eurasian Milfoil *Myriophyllum spicatum*
Variable Milfoil *Myriophyllum heterophyllum*	Multiflora Rose *Rosa multiflora, thunbergii*
Fanwort *Cabomba caroliniana*	Honeysuckle *Lonicera japonica, thunbergii*
Oriental Bittersweet *Solanum dulcamara*	Autumn Olive *Elaeagnus umbellata*
Norway Maple *Acer platanoides*	Japaneese Knotweed *Polygonum cuspidatum*
Barberry *Berberis vulgaris, thunbergii*	Glossy Buckthorn *Rhamnes frangula*
Burning Bush *Euonymous alatus*	

There are 89 species of vascular plants found in the Westfield watershed that are endangered, threatened, or of special concern according to the Massachusetts Hatural Heritage and Endangered Species Program (NHESP)(2003). This represents more than 20 percent of the state's total of 448 rare species, a considerable proportion of the state's rare biodiversity. Protecting such a wide diversity of rare species will involve protecting an equal diversity of their habitats, everywhere from vernal pools and riverine corridors to ridgetops and diverse deciduous forests.

The East, Middle, and West branches of the Westfield River support naturally reproducing or wild populations of brown and brook trout (*Salmo trutta* and *Salvelinus fontindis*), according to DFG. DFG classifies such naturally reproducing trout populations as a "critical resource" due to their rarity in Massachusetts. Trout require exceptionally clear, cold waters in which to reproduce. Development can play a crucial role in degrading the pristine water quality to support these species of fish.

The Westfield River is an important component in federal and state efforts to restore Atlantic salmon and other anadromous species to Massachusetts. As part of this restoration program, members of the U.S. Department of Fish and Wildlife and the Massachusetts DFG have been working together to improve anadromous fish populations and fish passage along all reaches of the Westfield River. This project has involved extensive research, stocking, and monitoring programs, and has been relatively successful due to intensified efforts in the past decade. According to recent research, the adult salmon range on the

Westfield River extends into the towns of Cummington and Windsor on the East Branch and up through Becket on the West Branch.

There are approximately 16,622 acres of wetlands in the Westfield River watershed, nearly five percent of the total area. Identified wetland habitats in the basin occur primarily along streams and rivers as well as in lands adjacent to major ponds. Much of the wetland areas in town have not yet been identified by MassGIS or USGS maps and have yet to be identified in the field by wetland scientists and included in a statewide inventory data layer.

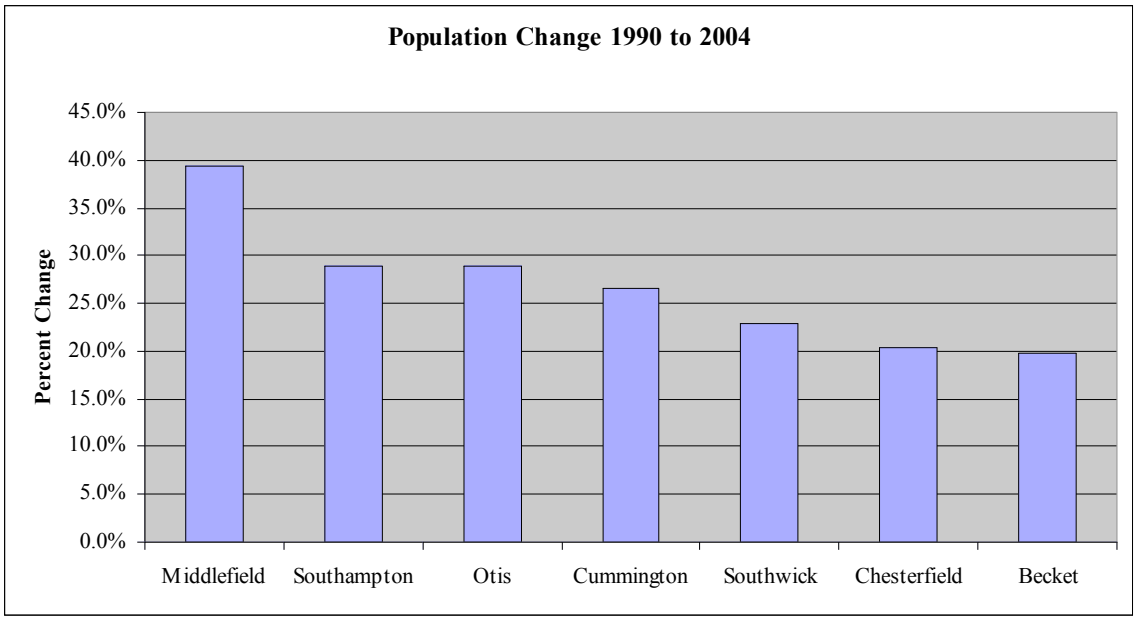
According to NHESP, 52 vernal pools within the Westfield basin have been certified in seven communities. The Massachusetts aerial photo survey of potential vernal pools has been produced by the NHESP to help locate likely vernal pools; 748 potential vernal pools have been identified throughout the basin using this survey.

Land Use, Open Space and Growth

The Westfield River basin is home to nearly 100,000 residents with a population density of 193 persons per square mile. The cities of Westfield, West Springfield, Agawam, and Holyoke account for the majority of the watershed's population. The 18 rural hilltowns account for 82 percent of watershed area but only 18 percent of the population. Clearly the demographic characteristics of the hilltowns are significantly different from those of Holyoke, Agawam, West Springfield, Southwick, and Westfield. Differences include educational attainment, ethnic background, and average weekly wage.

The Westfield River watershed is divided into distinctly rural and urban communities. The upper reaches of the watershed are primarily rural communities distinguished by unfragmented forests and scattered with agricultural, seasonal, and home-based businesses. The communities of Westfield, Agawam, West Springfield, and Holyoke in the lower (southeastern) basin are urbanized with the greatest job opportunities as demonstrated in Table 4. The rural and suburban communities surrounding the region's job center are experiencing the most significant growth as depicted in Table 2. Population growth in the top seven fastest growing watershed communities from 1990 to 2004 ranged from just under 40 percent in Middlefield to 20 percent in Becket.

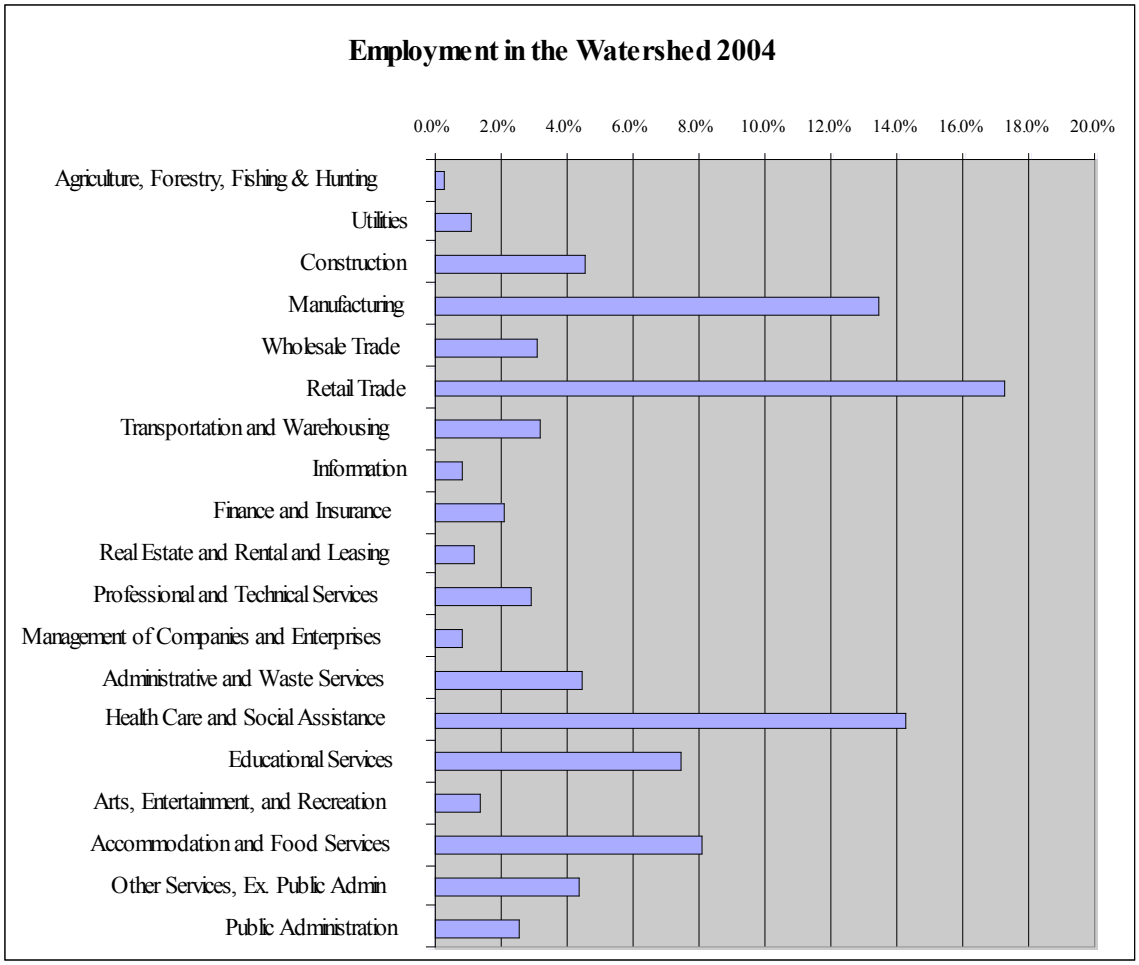
Table 2 Watershed Communities with Greatest Population Change 1990 to 2004



Source: U.S. Census Bureau

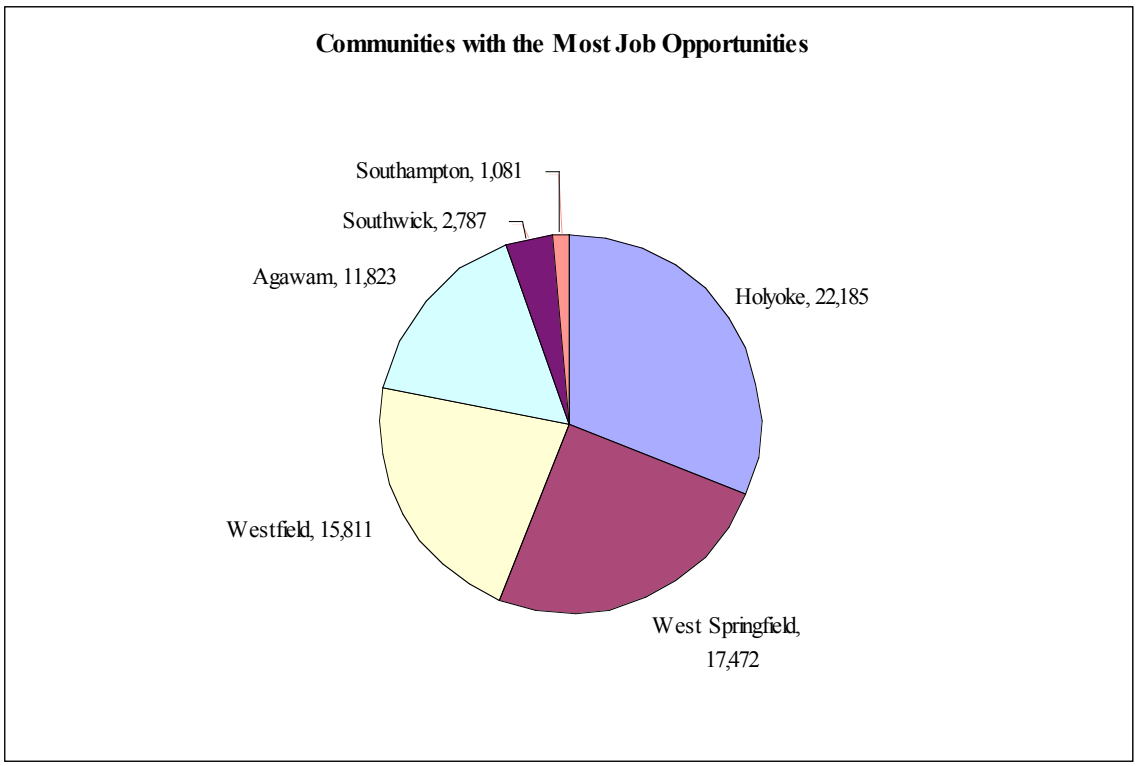
Total residential uses in the basin account for nearly 24,000 acres; roughly 7 percent of the basin's land use. Industrial and commercial land uses in the watershed account for only .8 percent of the total land use and occupy 2,525 acres. Over the past thirty years, urban sprawl has become the dominant force affecting land use change in the Pioneer Valley and in the Westfield watershed. From 1971 to 1999, the communities of Westfield and Agawam have experienced the greatest loss of cropland in the entire Pioneer Valley losing nearly 2,400 acres. In that same time period, the communities with the greatest increase in commercial development included: Holyoke, Westfield, West Springfield, and Agawam (PVPC). Urban sprawl problems are the worst in suburban communities and the region's smaller cities.

Table 3 Employment in Watershed 2004



Source: Massachusetts Department of Workforce Development

Table 4 Watershed Communities with the Most Job Opportunities



The lack of funding for open space protection is a major issue throughout the watershed. As noted above, only 30 percent of the watershed's forestlands have some form of permanent protection. The Community Preservation Act (CPA) is a funding mechanism that is extremely underutilized throughout the watershed with only four communities having passed the CPA at any funding level.

Table 5 CPA in Watershed Communities

Community	Surcharge	Exemptions	Vote Date
Agawam	1%	Low Income	11/6/2001
Southampton	3%	First $100,000	5/7/2001
Southwick	3%	Low Income, First $100,000	11/5/2002
Westfield	1%	First $100,000	11/5/2002

Source: EOEA, 2006

Recreation

The Westfield River's scenery is "exemplary in the region," according to the National Park Service's National Wild and Scenic eligibility study for the river (1992). The 1981 Massachusetts Landscape Inventory found many of the river's scenic features to be "distinctive," a term reserved for only 4 percent of the state's landscapes at that time.

The river's scenic characteristics include deep valleys, gorges, outstanding vistas of valleys, mountains and hills, rock outcrops and formations, and diverse vegetation types.

Probably the most regionally significant scenic resources are located in the upper, more rural part of the watershed. Several outstanding geologic and scenic features of national or regional significance occur along the East, West, or Middle branches of the Westfield River: Chesterfield Gorge, Glendale Falls, Windsor Jambs, West Worthington Falls, Tekoa and Shatterack mountains, and East Branch "Pork Barrel" Wilderness.

Education and Outreach

Education and outreach is occurring throughout the watershed on a range of topics from estate planning for conservation to stormdrain stenciling projects with local Boy Scouts. As there are many issues of concern within the watershed, so to are there many opportunities for public education and involvement. Education and outreach needs will be discussed in more depth within the subwatershed sections of this report, integrated in to the category that it is most relevant to, if at all. The most pressing outreach needs include nonpoint source control in the lower watershed, agricultural BMPs, support and adoption of the Community Preservation Act in the upper watershed, support and adoption of growth managment tools to control sprawl and protect regional character, and forest stewardship planning for private landowners.

Eastern Main Stem Subwatershed

Agawam, Holyoke, Montgomery, Russell, Southampton, Southwick, Westfield, West Springfield

The Eastern Main Stem Subwatershed includes all or portions of eight communities (Agawam, Holyoke, Montgomery, Russell, Southampton, Southwick, Westfield and West Springfield) encompassing roughly 75 square miles. Stream flow in this subwatershed is regulated by four major dams on the main stem and water quality impaired by urban nonpoint source runoff and treated discharge from wastewater treatment facilities. Nestled within the most urban part of the watershed, the lower main stem remains an important source of recreation, priority and supporting habitat, and a place of beauty.

DSI Fish Ladder @ A&D Hydro Inc. in West Springfield
Source: USFWS

Table 6 Waters of the Eastern Main Stem Subwatershed

River Segment	Named Rivers, Streams and Brooks	Named Lakes, Ponds and Impoundments	Classification
MA 32-05	Westfield River Bearden Brook Bradley Brook Freeland Brook Stage Brook		Class B, Warm Water Fishery*
MA 32-06	Westfield River – main stem		Class B,
MA 32-07	Westfield River – main stem		Class B Warm
MA 32-09	Powder Mill Brook Arm Brook	Frog Hole	Class B*
MA 32-24	Pond Brook Bush Brook	Chapin Pond Buck Pond (MA32012) Horse Pond (MA32043) Pequot Pond (MA32055)	Class B*
MA 32-25	Great Brook Johnson Brook	Congamond Lakes: North Pond (MA32022) Middle Pond (MA32021) South Pond (MA32023)	Class B*
MA 32-27	Miller Brook		Class B
MA 32-28	White Brook		Class B
MA 32-29	Paucatuck Brook	Bearhole Reservoir McLean Reservoir (MA32050) Ashley Pond Reservoir (MA32002) Ashley Cutoff (MA32001) North Railroad Pond (MA32053) Clear Pond (MA32077) Connor Reservoir (MA32024) Wright Pond (MA32078)	Class B

Source: DEP, 2005

* MDFW proposed segment be listed as Cold Water Fishery in next revision of SWQS

Water Quantity and Stream Flow

Assessment Findings:

Alterations in stream flow, caused by upstream impoundments, to the segment of the Westfield River from the Route 20 Bridge in Westfield to the confluence with the Connecticut River caused DEP to identify the Aquatic Life Use assessment in this lower stretch of the river with an Alert Status (DEP 2005).

Just before passing the village of Cresent Mills, the river is dammed at the Littleville Power Company's Crescent Mill Dam, where the Cresenct Hydroelectric Project is operated (also known as the Texon Project, FERC Exempt license number 2986). The dam forms a small, three-acre impoundment. The turbine to the Littleville Power Company's Crescent Mill Dam hydroelectric project discharges back to the Westfield River at the base of the dam so there is no bypassed reach of the river. A downstream fish passage flow is released through a sluiceway between April and July each year and a trashrack overlays with one inch of clear space are installed during this period to provide additional protection to out-migrating anadromous fish (DEP 2005).

Further downstream in the Town of Russell, the river is impounded by the Indian River Power Supply LLC hydroelectric project, formerly owned by Westfield River Paper Company Dam. The hydroelectric powerhouse at this dam is currently inactive. An exemption from FERC licensing and revisions to the application have recently been filed by the owners to bring the facility back into operation. The downstream fish passage system is a free-surfaced open flow channel flow structure with no flow control gate. Habitat evaluation and permanent minimum flow requirements will be set by FERC and the resource agencies after the hydro plant returns to service.

Woronoco Hydro LLC owns and operates the FERC licensed Woronoco Hydroelectric Project. Based on the conditions of the FERC license, the project operates in a run-of-river mode and minimizes fluctuations in the impoundment surface water elevation by maintaining a discharge from the project so that, at any point in time, flows measured independently downstream from the project tailrace approximate the sum of inflows to the project impoundment (DEP 2005). The downstream fish passage system is a free-surfaced open channel flow structure with no flow control gate. Below the confluence of the three bypass channels, flows drop over 14.6 feet of very steep ledge that form a natural block to upstream migrant fish. An eel passage facility is planned for this location (DEP 2005).

A&D Hydro, Inc. (formerly DSI Inc.) is licensed to operate the West Springfield FERC licensed project and dams known locally as the West Springfield Dam and the Mitteneague Dam, spanning the river between West Springfield and Agawam. Minimum flow violations were noted at this site in 2001 (DEP 2005).

Table 7 Hydropower Facilities – Eastern Main Stem Subwatershed

Facility	Location	License	Receiving Water Body
FERC Licensed Hydroelectric Plants			
Woronocco Hydroelectric Project – Woronoco Hydro LLC	Russell	FERC 2631	Westfield River MA32-05
West Springfield Hydroelectric Plant – A&D Hydro	West Springfield	FERC 2608	Westfield River MA32-07
FERC Exempt Licensed Hydroelectric Plant			
Crescent Hydroelectric Project (Texon) - Littleville Power Company Inc.	Westfield	FERC Exempt 2986	Westfield River MA32-05
Westfield River Paper Company – Indian River Power Supply LLC	Westfield		Westfield River MA32-05

Source: DEP 2005

Little is known about the effects of water withdrawal and discharge on stream flow in the lower watershed. As mentioned above, EOEA is currently funding a project called Water Budgets to examine this. The study is expected to be completed in 2007. Table 8 provides basic information about Water Management Act withdrawals for this subwatershed.

A major water withdrawal has been proposed for the Eastern Main Stem of the Westfield River on Station Road in Russell known as the Russell Biomass Power Plant. Based on information provided in the Massachusetts Environmental Policy (MEPA) Expanded Notification From (EOEA #13635), the project proposes the development of a 50 megawatt (MW) biomass wood fuel power plant on the abandoned, former site of the Westfield River Paper Company. The subject 70 acre parcel, currently owned by Westfield Paper Lands, LLC, is proposed to be subdivided with an 18-acre parcel earmarked for use by Russell Biomass LLC for siting the biomass power plant and associated appurtenances. In order to connect with the existing 115 kV electrical grid, approximately 5.2 miles of transmission line will need to be constructed within an existing transmission line easement.

Significant site preparation work has already been completed as part of a previously permitted gravel operation. Therefore, approximately 18 acres of cleared ground is presently available for the sitting of the proposed power plant and related facilities. The site has an existing intake structure for the withdrawal of an average 662,000 and maximum 885,000 gallons of water per day to be used for cooling operations. In addition, the site is a discharge point for an average 101,000 average gallons per day of return water that is collected from the cooling tower.

The large withdrawal of water from the Westfield River for the Russell Biomass Plant and the discharge of water warmer than ambient stream temperatures could have significant and

adverse impacts on water quality, thermal regime and hydrology. As stated in the ENF Certificate issued October 31, 2005, EOEA is requiring a Draft and Final Environmental Impact Report be performed for this project. The proponent is required to undertake significant analysis and quantification of the effects of the proposed withdrawal and discharge on the Westfield River as part of the DEIR.

Table 8 WMA Registrations and Permits – Eastern Main Stem Subwatershed

Facility	WMA Registration Number	WMA Permit Number	Source (G=ground S= surface)	Authorized Withdrawal (MGD)
DSI-West Springfield	10432502	N/A	Surface	0.11
Holyoke Waterworks	10413701	N/A	Ground	1.01
John S. Lane & Son, Inc.	N/A	9P210432901	Westfield River –S	0.65
Texon USA	N/A	9P210425603	Westfield River –S	0.72
Russell Water Department	N/A	9P210425602	Ground	0.29
Southwick Water Department	10427905	9P10427901	Ground	0.72
Southworth Company	10432501	N/A	Surface	0.15
West Springfield Water Department	10432901	N/A	Ground	6.71
Westfield Water Department	10432901	N/A	Surface and ground	6.11

Source: DEP 2005

Water Quantity and Stream Flow Objectives:

- Implement measures to ensure stream continuity and adequate stream flows and flow regimes (Objective 1-5)
- Conduct public education, outreach and planning about restoration and protection of surface and groundwater resources (Objective 1-2)
- Implement cross-municipal land use controls and regulatory improvements for groundwater and surface water resource protection (Objective 1-3)

Water Quantity and Stream Flow Priority Actions:

- Study the importance of the Southampton aquifer recharge area to the long-term capacity of the Barnes Aquifer (See Priority Project #6)
- Quantify the effects of buildout within the Barnes Aquifer Zone II recharge area to determine capacity of the aquifer to support growth (See Priority Project #6)
- Evaluate flow data for the Woronocco Hydroelectric Project (FERC Project 2631) to ensure that run-of-river conditions, minimum flow releases and impoundment fluctuation conditions of the license are being met.
- Sign all drinking water supply watersheds and Zone IIs.
- Adopt private well regulations that are consistent with municipal water conservation standards.
- Evaluate outlet control practices at Bearhole Reservoir.

Water Quality

Assessment Findings:

Downstream from the Cresent Mill Dam, the river receives process wastewater and noncontact cooling water from the Texon USA facility and Jen-Coat Inc. The river receives the discharge of treated effluent from the Huntington POTW, Russell WWTP, the Westfield WWTP. Jen-Coat, Inc and the City of Westfield are permitted to discharge stormwater to the Westfield River.

Water quality determinations for the Eastern Main Stem were largely deduced by the biological fish and benthic macroinvertebrate compositions. DEP listed this subwatershed as Support for Aquatic Life except for the lower 1.0 mile of the main stem, most likely due to municipal point source discharges, and the lower 3.4 miles of Powder Mill Brook which are listed as Impaired. Both impaired reaches were dominated by pollution tolerant species, reduced overall fish abundance, and habitat quality degradation.

Bank erosion and illegal dumping has been noted in places along the Main Stem and Powdermill Brook. Bank erosion is potentially a natural event in the history of a river. Nearly every stream and river is undergoing change. Sometimes these changes are natural or imperceptible. Other times, and more often, streams and rivers are adjusting to channel, flood plain, or watershed changes imposed in years past by human activity. Understanding the natural tendencies of a stream, its current condition, and what changes may be anticipated in the future is invaluable to making sound protection, management, and restoration decisions. Before streambank restoration is undertaken, a comprehensive geomorphic assessment should be performed. The River Management Program of Vermont's Department of Environmental Conservation advocates this type of approach and provides the technical assistance to conduct geomorphic assessments of streams and their watersheds in Vermont.

The NPDES Phase II regulated communities of Agawam, Westfield, West Springfield, Southwick, Holyoke and Southapton are engaged in public education and outreach programs about stormwater management and nonpoint source pollution. The Massachusetts Highway Department (MHD) and the Massachusetts Turnpike Authority (MTA) are also

municipal separate stormsewer systems (MS4s) regulated under Phase II. The Notice of Intent (NOI) from both entities have yet to be approved by EPA and the two agencies have not yet identified their receiving waters. Stormwater from the Massachusetts Turnpike (I91) and other state roads most certainly drain to the Westfield River and its tributaries. It is important that both of these agencies thoroughly identify their receiving waters and implement adequate water quality protection measures.

Tables 10 and 11 include the five water bodies that are listed as Category 5 Waters and three water bodies listed as Category 4c Waters in the *2006 Massachusetts Integrated List of Waters* (DEP, April 2006). Category 4c Waters are waters with an impairment not caused by a pollutant (i.e. exotic species). Category 5 Waters are waters requiring a Total Maximum Daily Load (TMDL) study. A TMDL or Total Maximum Daily Load is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards, and an allocation of that amount to the pollutant's sources. Sources of sedimentation, turbidity and suspended solids along the lower main stem and in the Category 5 Waters of North Railroad Pond and Powdermill Brook need to be identified and BMPs implemented once this is done.

There are several road and bridge improvement projects that are scheduled in the Pioneer Valley Transportation Improvement Program (TIP) for Fiscal Years 2006-2010 that provide the opportunity for stormwater treatment system upgrades or installations. The Pioneer Valley TIP is a five year schedule of projects identified by year and location complete with funding source and cost. The TIP is developed annually and is available for amendment and adjustment at any time. All TIP projects are consistent with the Regional Transportation Plan for the Pioneer Valley Region.

The largest TIP project in the Westfield watershed is the Great River Bridge construction project in Westfield, estimated to cost $50 million. This project involves the construction a new bridge over the main stem of the Westfield River in downtown Westfield. Other TIP projects planned for the Eastern Main Stem Subwatershed include resurfacing Routes 10/202 in Southwick ($1.8 million), design and construction of Route 20 access road in Westfield ($2.5 million), Main Street and Park Square highway improvements in Westfield ($6.3 million) and, construction of the Columbia Greenways Rail Trail and River Walk in Westfield ($3.2 million).

Road salt contamination has also been found in private wells along Routes 10 and 202 in Westfield and Southampton in a two year study being conducted by Smith College and the Barnes Aquifer Protection Advisory Committee (BAPAC). This area is also within the Zone II of the Barnes Aquifer.

Table 9 NPDES Permitted Discharges

Facility	Location	Permit #	Receiving Water Body
Municipal Wastewater Treatment Plants and Sanitary Wastewater Discharges			
Westfield WPCP	Westfield	MA0101800	Westfield River MA32-05
Huntington WWTP	Huntington	MA0101265	Westfield River MA32-05
Russell Village WWTF	Russell	MA0100960	Westfield River MA32-05
Woronoco Village WWTP	Russell	MA0103233	Westfield River MA32-05
Industrial Waterwater Treatment Plants and Non-Process Discharges			
Texon USA	Russell	MA0005282	Westfield River MA32-05
Former Standard Uniform	Agawam	MA0037036	Westfield River MA32-05
NPDES General Permits			
Jen-Coat Inc.	Westfield	MAG250856	Westfield River MA32-05
Fibermark Inc. DSI	West Springfield	MAG250966	
Renaissance Manor	Westfield	Permit pending	Westfield River MA32-06
NPDES Phase II Stormwater General Permit			
MS4	Agawam	MAR041001	Westfield River MA32-05
MS4	Holyoke	MAR041011	None in watershed
MS4	Southampton	MAR041021	Pequot Pond
MS4	Southwick	MAR041022	Congamond Lakes Great Brook
MS4	Westfield	MAR041236	Westfield River MA32-05 Buck Pond Chapin Pond Arm Brook
MS4	West Springfield	MAR041024	Westfield River MA32-05 Paucatuck Brook

Source: MA DEP, WQAR, April 2005; MassGIS; DEP Stormwater Phase II

Table 10 Massachusetts Category 4c Waters, Impairment not caused by a pollutant

Name	Location	Cause of Impairment
Buck Pond (MA32012)	Westfield	Exotic Species
Congamond Lakes South Pond (MA32023)	Southwick	Exotic Species
Horse Pond (MA32043)	Southwick	Exotic Species

Source: DEP, *2006 Integrated List of Impaired Waters*, April 2006

Table 11 Massachusetts Category 5 Waters, waters requiring a TMDL

Name	Location	Cause of Impairment
North Railroad Pond (MA32053)	Holyoke	Noxious Aquatic Plants Turbidity
Pequot Pond (MA32055)	Westfield / Southampton	Nutrients Organic Enrichment/Low DO Exotic Species
Powdermill Brook (MA32-09)	Montgomery/Westfield	Siltation Suspended Solids Turbidity
Congamond Lakes North Pond (MA32022)	Southwick	Organic enrichment / low DO / exotic species
Congamond Lakes Middle Pond (MA32021)	Southwick	Organic enrichment / low DO / exotic species

Source: DEP, *2006 Integrated List of Impaired Waters*, April 2006

Water Quality Objectives:

- Identify sources of nonpoint source pollution to surface and groundwater resources (Objective 1-1)
- Implement cross-municipal land use controls and regulatory improvements for groundwater and surface water resource protection (Objective 1-3)
- Implement structural best management practices to control point and nonpoint sources of pollution (Objective 1-4)

Water Quality Priority Actions:

- Develop a DEP / EPA approved Quality Assurance Project Plan (QAPP) for design of a water quality sampling program throughout the watershed (See Priority Project #2 for more details)
- Perform water quality monitoring at hot spots and to assess streambank stability and potential restoration sites along all river segments - Powdermill Brook (See Priority Project #2 for more details)
- Conduct bacteria monitoring to better assess the status of Primary and Secondary Contact Recreational Uses and identify sources – Great Brook, Pond Brook (See Priority Project #2 for more details)
- Review NPDES Phase II Stormwater Plans, extent of compliance, and the effectiveness at minimizing impacts of stormwater runoff from their facilities in Westfield, Agawam, West Springfield, Southampton, Holyoke, and Southwick (See Priority Project #3)
- Implement pre- and post-construction regulatory bylaws for the treatment and management of stormwater consistent with NPDES Phase II requirements (See Priority Project #3)
- Stabilize eroded river banks and restore habitat with native species – Main Stem Westfield River, Powdermill Brook
- Perform public education and outreach on illegal dumping particularly along Powdermill Brook.

- Support BAPAC and Smith College in their investigation of road salt contamination within the Barnes Aquifer Zone II.
- Support the expansion of sewer to the Congamond Lakes area.
- Implement stormwater treatment BMPs on North and South Pond of the Congamond Lakes.

Habitat and Fish Passage

Assessment Findings:

The Eastern Main Stem subwatershed is regularly stocked with trout by MDFW. Upstream and downstream fish passage at the A&D Hydro, Inc. facility on the Westfield River in Agawam and West Springfield is through a denali type ladder designed for anadromous and resident fish including Atlantic salmon, blueback herring and American shad. Eel passage at the fishway was also installed in 2002 and rebuilt in 2005 by USGS.

The fish community present in the upper reaches of this subwatershed, as sampled by MDFW in 2001, are indicative of good habitat and water quality conditions as well as stable flow regimes. The Rapid Bioassessment Protocol III (RBP III) analysis of the benthic macroinvertebrate community collected downstream from the discontinued Strathmore Paper Company discharge in Russell and the Westfield WWTP in Westfield indicated slightly impacted conditions compared to a reference station on the Westfield River at Route 112 in Huntington, further upstream (DEP 2005). However, this was a dramatic improvement in conditions from the 1996 survey when the Strathmore Paper Company still maintained two discharges.

Overall, DEP listed this subwatershed as Support for Aquatic Life except for the lower 1.0 mile of the main stem, most likely due to municipal point source discharges, and the lower 3.4 miles of Powder Mill Brook which are listed as Impaired. Both impaired reaches were dominated by pollution tolerant species, reduced overall fish abundance, and habitat quality degradation. The Aquatic Life Use is assessed with an Alert Status for Pond Brook in Westfield due to the presence of pollution tolerant fish species sampled by DEP in 2001.

As discussed above under Water Quantity and Stream Flows, the Russell Biomass Power Plant is proposed for location on Station Road in Russell on the Eastern Main Stem of the Westfield River. Based on information provided in the Massachusetts Environmental Policy (MEPA) Expanded Notification Form Certificate (EOEA #13635) dated October 31, 2005, the project has the potential to adversely affect the habitat of Creeper Mussel (*Strophitus undulates*), a freshwater mussel that is a Species of Special Concern. Comments from the Natural Heritage and Endangered Species Program (NHESP) prompted a requirement in the DEIR that the proponent should map the habitat of the Creeper downstream of the intake and discharge point, and perform an analysis of the potential impacts of water withdrawal and discharges on the Creeper and its habitat. In addition, other protected rare and endangered species occur within the proposed transmission line corridor in the vicinity of Mt. Tekoa. In order for the project not to result in a “take”, the proponent must discuss minimization and mitigation of rare species impacts associated with the transmission line.

Table 12 Sampled Fish Populations – Eastern Main Stem

Common Name	Scientific Name
American eel	*Anguilla rostrata*
Atlantic Salmon	*Salmo salar*
Black crappie	*Pomoxis nigromaculatus*
Blacknosed dace	*Ryinichthys atratulus*
Bluegill	*Lepomis macrochirus*
Brook Trout	*Salvelinus fontinalis*
Brown trout	*Salmo trutta*
Creek chubsucker	*Semotilus atromaculatus*
Common shiner	*Notropis cornutus*
Fall fish	*Semotilus corporalis*
Longnosed dace	*Rhinicthys cataractae*
Pumpkinseed	*Lepomis gibbosus*
Red breast sunfish	*Lepomis auritus*
Rock bass	*Ambloplites rupestris*
Sea lamprey	*Petromyzon marinus*
Smallmouth bass	*Micropterus dolomieu*
Tessellated darter	*Etheostoma olmstedi*
White Sucker	*Catostomus commersoni*

Source: MA DEP 2005

Despite its largely urban nature, almost 30 percent of the subwatershed is identified by NHESP as either Biocore or Supporting Landscape habitat as quantified in Table 13 .

Table 13 Natural Lands – Eastern Main Stem

Habitat Type*	Acres	Square Miles	Percent of Subwatershed
TNC Core Habitat	0	0	0
NHESP Priority Habitat	8,439	13	17.3%
NHESP Biocore	5,993	9	12%
NHESP Supporting Landscape	8,017	13	17.3%

* There is overlap between TNC Core Habitat, NHESP Priority Habitat and NHESP Biocore. NHESP Biocore and Supporting Landscape are the only mutually exclusive habitat categories.

Habitat and Fish Passage Objectives and Priority Actions:

Objectives:

- Support the restoration of migratory and resident fish populations to the Connecticut and Westfield Rivers (Objective 1-6)

Priority Actions:

- Develop fish passage alternatives at identified dams and culverts blocking migration pathways (see Priority Project #4)
- Continue to conduct biological monitoring (habitat, benthic and fish populations) to evaluate the status of the Aquatic Life Use.
- Perform an upstream/downstream benthic macroinvertebrate community study to document improvements associated with upgrades to the Westfield WWTP.
- Perform long-term monitoring of fish populations to investigate possible long-term effects of salmon stocking on reproducing wild trout populations.
- Conduct fish population sampling to determine effectiveness of fish passage facilities at FERC licensed and exempt projects.
- Increase public awareness about fish restoration programs and promote volunteer efforts to restore migratory and local fish populations.

Land Use, Open Space and Growth

Assessment Findings:

Despite its mostly urban nature, 58 percent of the Eastern Main Stem subwatershed remains undeveloped. From 1971 to 1999, the communities of Westfield and Agawam experienced the greatest loss of cropland in all of Hampshire and Hampden counties losing nearly 2,400 acres to development. In that same time period, the communities with the greatest increase in commercial development included Holyoke, Westfield, West Springfield and Agawam; and the communities succumbing to the greatest amount of sprawl were Westfield, Southwick and Agawam. In comparison to the significant rate of development, protected open space is only 6,249 acres or 13 percent of this subwatershed.

Table 14 Land Use in Eastern Main Stem Subwatershed

Land Use	Acres	Square Miles	Percent of Subwatershed
Agriculture	5,448	8.5	11.4%
Developed	14,600	22.8	30.6%
Undeveloped	27,730	43.3	58%
TOTAL	47,779	74.6	

Source: MassGIS, 1999

Land Use, Open Space and Growth Objectives:

- Promote land conservation as a tool for protecting natural resources (Objective 3-2)
- Promote the use of Chapter 61 A and Agricultural Preservation Restriction (APR) programs among landowners and municipalities (Objective 4-1)
- Support locally based agriculture (Objective 4-3)
- Maintain updated Open Space and Recreation Plans (OSRPs) (Objective 5-3)
- Adopt growth management bylaws that will protect natural resources and open space and minimize the impacts of new housing, transportation and economic development (Objective 6-1)
- Promote economic development respectful of the environment and historic resources (Objective 6-2)
- Promote urban beautification (Objective 6-3)

Land Use, Open Space and Growth Priority Actions:

- Provide funding for and public awareness of Agricultural Preservation Restrictions (APR) and Conservation Restrictions (CR) as a means to permanently protect open space.
- Identify lands eligible for MGL Chapter 61 Programs (Ch. 61 for forestlands, Ch. 61A for agricultural lands and Ch. 61B for recreation lands).
- Inventory existing Chapter lands and set priorities for conservation.
- Develop funding mechanisms so that towns can take advantage of their right of first refusal when a property withdraws from a Chapter 61 program.
- Advocate for state income tax deductions for land gifts and bargain sales of land for conservation.
- Support organizations that promote land conservation and the agricultural infrastructure and economy (Berkshire Grown, CISA, NOFA, etc.).
- Establish farmer's markets and/or farm stands throughout the region.
- Adopt growth management bylaws such as: scenic upland zoning, back lot with open space zoning, shared driveways, erosion and sediment controls, natural resource protection overlay districts, flexible development, transfer of development rights, hazardous material by-law, right-to-farm bylaw, Low Impact Development bylaw.
- Adopt Community Preservation Act (CPA) in all watershed towns and cities – Holyoke, Montgomery, Russell, West Springfield.
- Launch urban forestry programs by taking advantage of funding from the Department of Conservation and Recreation.
- Promote the use of Forest Stewardship Program as an incentive for conservation of forestlands on private land.
- Encourage NRCS to complete and release digital mapping of prime farmland and productive soils.

Recreation

Assessment Findings:

The lower main stem of the river is mostly meandering flatwater used for fishing, canoeing and kayaking, and swimming. Members of the kayak community are interested in implementing a feasibility study for developing a "Whitewater Park" on the rock out cropping immediately upstream of the Great River Bridge in Westfield. The Appalachian Mountain Club's (AMC) River Guide (2000) describes these three river wide ledges as "excellent for surfing". Other popular canoe and kayak access points along the main stem are below the DSI/A &D Hydro Inc. dam in West Springfield and at Pynchon Point in Agawam, the confluence with the Connecticut River. Formalized trail systems for hiking exist in this part of the watershed in Stanley Park in Westfield, Robinson State Forest in Agawam and Mitteneague Park in West Springfield. The Westfield River Bikeway is a roughly one mile long paved trail along the Westfield River in downtown Westfield.

DEP was not able to assess Primary and Secondary Contact Recreational Uses for most of this subwatershed due to the lack of recent bacteria data available. Primary and Secondary Contact Recreational Use on the lower main stem is assessed with an Alert Status due to some elevated bacteria counts collected in 1999 (DEP 2005).

Great Brook in Southwick and Westfield is assessed as support for Primary and Secondary Contact Recreational Use with an Alert Status due to two high bacteria counts sampled in 1999 (DEP 2005). In Powdermill Brook, the Primary and Secondary Contact Recreational Use was assessed by DEP as support for the upper 6.1 mile reach with an Alert Status due to anthropogenic debris (trash along the banks) and, Impaired for Primary and Secondary Contact along the lower 3.4 mile reach due to instream turbidity, severe sedimentation, and nuisance growth of algae and aquatic macrophytes. Primary and Secondary Recreational Contact for Pond Brook in Westfield is assessed by DEP with an Alert Status due to some high fecal coliform counts collected by ESS in 2000 (DEP 2005).

Recreation Objectives:

- Increase policing and maintenance at existing access points along river (Objective 5-2)
- Increase the number of established public access points along the river (Objective 5-1)
- Utilize river access points for public outreach about watershed issues and on-going projects (Objective 5-4)
- Control unauthorized motorized recreational vehicle use in the watershed and provide opportunities for this type of recreation in appropriate places (Objective 5-5)

Recreation Priority Actions:

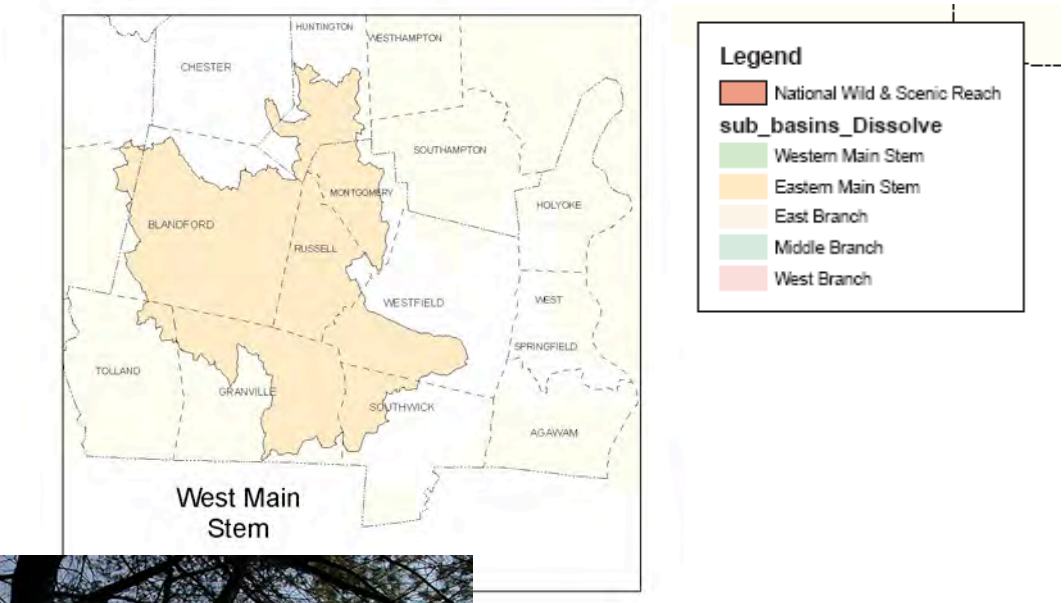
- Work with watershed communities to identify appropriate locations for motorized recreational vehicle use and perform outreach to inform users about these areas.
- Work with DFG to implement ticketing and vehicle confiscation operation for trespassing.

- Construct kiosks at major river access points for use as public outreach vehicles.
- Work with local communities and watershed stakeholders to implement maintenance programs such as regular trash pickup at river launch areas.
- Work with DFG to implement more regular patrols of at river access points.
- Gain trail access through acquisition or easements to streams and ponds.

Western Main Stem

Blandford, Granville, Huntington, Montgomery, Russell, Otis, Southwick, Tolland, and Westfield

The Western Main Stem subwatershed includes all or portions of nine communities (Blandford, Chester, Granville, Huntington, Montgomery, Russell, Otis, Southwick, and Westfield) encompassing almost 128 square miles. Draining to the upper main stem of the Westfield River, this subwatershed is more rural including the drainage areas for four municipal surface water supplies.



Granville Reservoir and Dam
Source: Anne Capra. PVPC

Table 15 Waters of the Western Main Stem Subwatershed

River Segments	Named Rivers, Streams and Brooks	Named Lakes, Ponds and Impoundments
MA 32-08	Little River Jack's Brook	Crane Pond Sacket Reservoir
MA 32-21	Bradley Brook Black Brook Stage Brook	Black Brook Reservoir
MA 32-22	Potash Brook	Dunlap Pond Russell Pond (MA32061)
MA 32-23	Moose Meadow Brook	Montgomery/Tekoa/Westfield Reservoir (MA32074)
MA 32-30	Roaring Brook Crow Brook	
MA 32-33	Bedlam Brook Tiffany Brook	
MA 32-34	Dickinson Brook	Cooley Lake (MA32026)
MA 32-35 (formerly 32-26)	Little River Peebles Brook Pond Brook	Cobble Mountain Reservoir (MA32018) Borden Brook Reservoir (MA32011) Blair Pond (MA32009)
MA 32-36 (formerly 32-26)	Little River Munn Brook Cooks Brook	Granville Reservoir (MA32038)

Water Quantity and Flow

Assessment Findings:

There is one FERC non-jurisdictional hydropower project, Cobble Mountain Station, on the Little River owned by the Springfield Water and Sewer Commission in Granville downstream from Cobble Mountain Reservoir. The facility, owned by Northeast Generation Services Company - a subsidiary of Northeast Utilities System, maintains three water wheel generators with a total rating of 30.6 megawatts. The station's purpose is to generate electricity to move water to the West Parish Water Treatment Plant. There are currently no flow release requirements at the Cobble Mountain Dam to the Little River. Low flows have been observed downstream of the dam and the no flow release requirements caused DEP to assign an Alert Status to the Aquatic Life Use for the 2.2 miles of Little River downstream of Cobble Mountain dam.

Little is known about the effects of water withdrawal and discharge on stream flow in the lower watershed. As mentioned above, EOEA is currently funding a project called Water Budgets to examine this. The study is expected to be completed in 2007. Table 16 provides basic information about Water Management Act withdrawals for this subwatershed.

Table 16 WMA Registrations and Permits - Western Main Stem Subwatershed

Facility	WMA Registration Number	WMA Permit Number	Source (G=ground S= surface)	Authorized Withdrawal (MGD)
Old Farm Golf Club, LLC	N/A	9P10427902	Surface and Ground	0.15
Russell Water Department	12560000	9P210425602	Surface and Ground	0.29
Springfield Water and Sewer Commission	10428101	N/A	Surface	37.2
Westfield Water Department	10432901	N/A	Surface and Ground	6.11

Source: DEP 2005; PVPC Water Budgets Project, 2006

Water Quantity and Stream Flow Objectives:

- Implement measures to ensure stream continuity and adequate stream flows and flow regimes (Objective 1-5)
- Conduct public education, outreach and planning about restoration and protection of surface and groundwater resources (Objective 1-2)
- Implement cross-municipal land use controls and regulatory improvements for groundwater and surface water resource protection (Objective 1-3)

Water Quantity and Stream Flow Priority Actions:

- Evaluate streamflow conditions in Little River and Cook Brook
- Sign all drinking water supply watersheds and Zone IIs.
- Adopt private well regulations that are consistent with municipal water conservation standards.

Water Quality

Assessment Findings:

The presence of three intolerant fish species (Atlantic Salmon, brook trout and brown trout) surveyed by DEP 1997 and 2001 is indicative of excellent water quality and habitat in the subwatershed above Cobble Mountain Reservoir. MDFW has recommended that all but one tributary to this subwatershed (lower Little River) be listed as Cold Water Fisheries in the next revision of the SWQS.

The NPDES Phase II regulated communities of Westfield and Southwick are engaged in public education and outreach programs about stormwater management and nonpoint source pollution. There is a need for outreach to farmers along Moose Meadow Brook about agricultural BMPs to control bacteria, nutrient and sediment loading to this brook.

The Massachusetts Highway Department (MHD) and the Massachusetts Turnpike Authority (MTA) are also municipal separate stormsewer systems (MS4s) regulated under

Phase II. The Notice of Intent (NOI) from both entities have yet to be approved by EPA and the two agencies have not yet identified their receiving waters. Stormwater from the Massachusetts Turnpike (I91) and other state roads most certainly drain to the Westfield River and its tributaries. It is important that both of these agencies thoroughly identify their receiving waters and implement adequate water quality protection measures.

There are two road improvement projects that are scheduled in the Pioneer Valley Transportation Improvement Program (TIP) for Fiscal Years 2006-2010 that provide the opportunity for stormwater treatment system upgrades or installations. The Pioneer Valley TIP is a five year schedule of projects identified by year and location complete with funding source and cost. The TIP is developed annually and is available for amendment and adjustment at any time. All TIP projects are consistent with the Regional Transportation Plan for the Pioneer Valley Region. These projects include Route 187 (Little River Road) reconstruction in Southwick ($8 million) and Route 20 resurfacing in Huntington and Chester ($3.5 million). Reconstruction of Congamond Road (Route168) in Southwick is currently at 25 percent design and seeking inclusion in the TIP when design reaches 100 percent.

Blair Pond in Blandford, a Category 4c Waters in DEP's *2006 Integrated List of Impaired Waters*, is impaired by invasive exotic species. Category 4c Waters are waters with an impairment not caused by a pollutant.

Table 17 River Segments and Classification – Western Main Stem

River Segments	Location	Classification
MA 32-08	Horton's Bridge, Westfield, to confluence with the Westfield River, Westfield	Class B, Warm Water Fishery
MA 32-21	Confluence of Black and Stage Brooks, Russell, to the confluence with the Westfield River	Class B*
MA 32-22	Outlet of Dunlap Pond in Blandford to confluence with Westfield River at the village of Woronoco, Russell.	Class B*
MA 32-23	Westland west of Buggy Mountain, Montgomery, to confluence with Westfield River.	Class B*
MA 32-30	North of Horse Hill in Huntington State Forest, Huntington to confluence with Westfield River, Mongomery	Class B*
MA 32-33	North of Blandford Road, to confluence with Peebles Brook, Blandford.	Class A*
MA 32-34	Confluence of Trumble and Seymour Brook, to confluence	Class B*

	with Munn Brook, Granville	
MA 32-35	Outlet of Cobble Mountain Reservoir dam, northwest of Gorge Road, Russell (formerly part of segment MA32-26)	Class B* / **
MA 32-36	Dam northwest of Gorge Road, Russell, to Horton's Bridge, Westfield (formerly part of segment MA32-26)	Class B Warm Water Fishery*

Source: DEP 2005

* MDFW has proposed that these segments be listed as Cold Water Fisheries in the next revision of the SWQS.

**MA DEP's Division of Water Supply has recommended that the Little River and its tributaries from the source at the outlet of Cobble Mountain Reservoir Dam in Russell, to a dam northwest of Gorge Road, Russell, be reclassified from Class B to Class A public water supply waterbody in the next revision of the SWQS.

Table 18 NPDES Permitted Discharges

Facility	Location	Permit #	Receiving Water Body
NPDES General Permits			
West Parish Filters WTP (Springfield)	Westfield	MAG640023	Cooks Brook MA32-36
Westfield WTP	Southwick	MAG640001	Jack's Brook MA32-08
Industrial Water Treatment Plants and Non-Process Discharges			
Northeast Utilities	Westfield	MA0035556	Little River MA32-36
NPDES Phase II Stormwater General Permit			
Columbia Manufacturing Company	Westfield	MAR05C251	Little River
MS4	Southwick	MAR041022	Little River
MS4	Westfield	MAR041236	Westfield River MA32-08 Crane Pond Little River Munn's Brook Cook Brook

Source: DEP, WQAR, April 2005; MassGIS; DEP Stormwater Phase II

Table 19 Listed Impaired Waters

Name (Segment)	Location	Category	Cause of Impairment
Blair Pond (MA32009)	Blandford	4c	Exotic Species
Moose Meadow Brook (MA32-23)	Montgomery / Westfield	5	Pathogens Turbidity
Little River (MA32-08)	Westfield	5	Pathogens
Little River (MA32-36)	Russell / Westfield	5	Siltation

Source: DEP, *2006 Integrated List of Impaired Waters*, April 2006

Water Quality Objectives:

- Identify sources of nonpoint source pollution to surface and groundwater resources (Objective 1-1)
- Implement cross-municipal land use controls and regulatory improvements for groundwater and surface water resource protection (Objective 1-3)
- Implement structural best management practices to control point and nonpoint sources of pollution (Objective 1-4)

Water Quality Priority Actions:

- Develop a DEP / EPA approved Quality Assurance Project Plan (QAPP) for design of a water quality sampling program on all river segments.
- Perform water quality monitoring at hot spots and to assess streambank stability and potential restoration sites along all river segments – Moose Meadow Brook, Little River, Cooks Brook
- Conduct bacteria monitoring to better assess the status of Primary and Secondary Contact Recreational Uses and identify sources – Moose Meadow Brook
- Review NPDES Phase II Stormwater Plans, extent of compliance, and the effectiveness at minimizing impacts of stormwater runoff from their facilities in Westfield and Southwick
- Stabilize eroded river banks and restore habitat with native species – Main Stem Westfield River
- Adopt and implement pre- and post-construction regulatory bylaws for the treatment and management of stormwater consistent with NPDES Phase II requirements – Westfield and Southwick
- Perform outreach to farmers along Moose Meadow Brook about agricultural BMPs to control bacteria, nutrient and sediment loading to this brook.

Habitat and Fish Passage

Assessment Findings:

MDFW regularly stocks salmon fry in parts of this subwatershed. The presence of intolerant species (Atlantic salmon, brook trout and brown trout) is indicative of excellent water and habitat quality in the upper subwatershed. The benthic macroinvertebrate survey performed by DEP in 2001 downstream of Cobble Mountain Reservoir outlet indicated slightly impacted conditions compared to the upstream location at Route 112 in Huntington. The Aquatic Life Use assessed by DEP is assigned an Alert Status due to the observation of low flows downstream of the dam and the no flow release requirements for the 2.2 miles of Little River downstream of the Cobble Mountain Dam.

In Moose Meadow Brook, slightly low DO and elevated nutrients as well as the presence of agricultural activities (grazing allowed in the riparian zone) result in the Aquatic Life Use assessed by DEP being identified with an Alert Status for the lower 1.3-mile reach of the brook (DEP 2005).

The 2.2 mile reach of the Little River downstream of its confluence with Cook Brook is assessed as impaired for the Aquatic Life Use by DEP for habitat quality degradation resulting from instream deposition. The lower reach of the Little River from Horton's

Bridge in Westfield to the confluence with the Westfield River is assessed as support for Aquatic Life Use by DEP due to the diverse assemblage of stream fishes, however, the samples were dominated by species tolerant to both enrichment and habitat degradation.

A portion of the Westfield River in Huntington from roughly the town line with Montgomery in the south to the intersection with Route 66 in the north is part of the National Wild and Scenic River designation.

Table 20 Sampled Fish Populations

Common Name	Scientific Name
American eel	*Anguilla rostrata*
Atlantic Salmon	*Salmo salar*
Blacknosed dace	*Ryinichthys atratulus*
Brook Trout	*Salvelinus fontinalis*
Brown trout	*Salmo trutta*
Common shiner	*Notropis cornutus*
Creek chubsucker	*Semotilus atromaculatus*
Fall fish	*Semotilus corporalis*
Golden Shiner	*Notemigonus crysoleucas*
Longnosed dace	*Rhinicthys cataractae*
Pumpkinseed	*Lepomis gibbosus*
Slimy sculpin	*Cottus cognatus*
Tessellated darter	*Etheostoma olmstedi*
White Sucker	*Catostomus commersoni*
Yellow perch	*Perca flavescens*

Source: DEP 2005

NHESP has identified almost 63 percent of this subwatershed as Biocore or Supporting Landscape habitat, with only 33 percent of the subwatershed protected open space.

Table 21 Natural Lands - Western Main Stem Subwatershed

Habitat Type	Acres	Square Miles	Percent of Subwatershed
TNC Core Habitat	7,500	12	9.4%
NHESP Priority Habitat	2,951	5	3.9%
NHESP Biocore	13,963	22	17.2%
NHESP Supporting Landscape	36,928	58	45.7%

* There is overlap between TNC Core Habitat, NHESP Priority Habitat and NHESP Biocore. NHESP Biocore and Supporting Landscape are the only mututally exclusive habitat categories.

Habitat and Fish Passage Objectives:

- Support the restoration of migratory and resident fish populations to the Connecticut and Westfield Rivers (Objective 1-6)
- Collaborate with government agencies, watershed organizations, land trusts, municipalities and private citizens to ensure protection of remarkable river and stream corridors in perpetuity (Objective 2-2)

Habitat and Fish Passage Priority Actions:

- Develop fish passage alternatives at identified dams and culverts blocking migration pathways (See Priority Project #4 for more details)
- Continue to conduct biological monitoring (habitat, benthic and fish populations) to evaluate the status of the Aquatic Life Use – Moose Meadow Brook, Little River, Cooks Brook
- Perform long-term monitoring of fish populations to investigate possible long-term effects of salmon stocking on reproducing wild trout populations.
- Conduct fish population sampling to determine effectiveness of downstream fish passage at Cobble Mountain Dam
- Increase public awareness about fish restoration programs and promote volunteer efforts to restore migratory and local fish populations.

Land Use, Open Space and Growth

Assessment Findings:

The Western Main Stem subwatershed is significantly more rural than its Eastern Main Stem counterpart with just over 87 percent of the subwatershed undeveloped. From 1971 to 1999, Westfield experienced the greatest loss of cropland in all of Hampshire and Hampden counties losing nearly 1,193 acres to development. In that same time period, Westfield was one of four communities experiencing the greatest increase in commercial development; and the communities succumbing to the greatest amount of sprawl were Westfield, Southwick and Agawam. In comparison to the significant rate of development, protected open space is only 6,249 acres or 13 percent of this subwatershed. Although a portion of this subwatershed transects the two more developed communities if Westfield and Southwick, the majority of the Western Main Stem subwatershed is rural with just over 87 percent undeveloped; roughly 34 percent as protected open space.

The Town of Blandford is a rural hilltown with 44 percent of land permanently protected from development. Because of its fairly remote location, Blandford has been able to maintain a quiet, rural character, however the Blandford Board of Selectmen are interested in developing an exit off the Mass Turnpike in Blandford to support planned industrial and commercial development on land proposed for re-zoning adjacent to the Turnpike. Since the late 1970's the population has seen only a slight increase from 1,038 persons in 1980 to 1,214 persons in 2000. The rapidly growing suburban sprawl from the east and south seems to stop at Granville's border. While Granville grew by only 8.4 percent over the last decade, similar hilltowns such as Tolland and Otis grew by more than 30 percent. Population projections for Granville over the next thirty years are for a 3.1 percent

increase; Tolland, a 15 percent increase; while Blandford and Montgomery may actually experience an overall decrease in population (Huntington OSRP, 2004).

The Town of Russell is located along Route 20, also known as the Jacob's Ladder Scenic Byway, a popular tourism route connecting the Pioneer Valley to many attractions in Berkshire County. Russell has lost 30 percent of its open space from 1971 to 1999, and has had a 60 percent increase in ½ acre residential development over the same time period. Huntington, located due west of Russell along Route 20, has the largest population of the southern hilltowns and has the largest commercial town center.

Table 22 Land Use in Western Main Stem Subwatershed

Land Use	Acres	Square Miles	Percent of Subwatershed
Agriculture	4,036	6.3	4.9%
Developed	6,504	10.2	8%
Undeveloped	71,063	111.0	87.1%
TOTAL	81,603	127.5	

Source: MassGIS, 1999

Land Use, Open Space and Growth Objectives:

- Promote land conservation as a tool for protecting natural resources (Objective 3-2)
- Promote the use of Chapter 61 A and Agricultural Preservation Restriction (APR) programs among landowners and municipalities (Objective 4-1)
- Support locally based agriculture (Objective 4-3)
- Maintain updated Open Space and Recreation Plans (OSRPs) (Objective 5-3)
- Adopt growth management bylaws that will protect natural resources and open space and minimize the impacts of new housing, transportation and economic development Objective 6-1)
- Promote economic development respectful of the environment and historic resources (Objective 6-2)
- Promote urban beautification (Objective 6-3)

Priority Actions:

- Provide funding for and public awareness of Agricultural Preservation Restrictions (APR) and Conservation Restrictions (CR) as a means to permanently protect open space.
- Identify lands eligible for MGL Chapter 61 Program (Ch. 61 for forestlands, Ch. 61A for agricultural lands and Ch. 61B for recreation lands).
- Inventory existing Chapter 61 lands and set priorities for conservation.
- Develop funding mechanisms so that towns can take advantage of their right of first refusal when a property withdraws from a Chapter 61 program.
- Advocate for state income tax deductions for land gifts and bargain sales of land for conservation
- Support organizations that promote land conservation and the agricultural infrastructure and economy (Berkshire Grown, CISA, NOFA, etc.)

- Establish farmer's markets and/or farm stands throughout the region
- Adopt growth management bylaws such as: scenic upland zoning, back lot with open space zoning, shared driveways, erosion and sediment controls, natural resource protection overlay districts, flexible development, transfer of development rights, hazardous material by-law, right-to-farm bylaw, Low Impact Development bylaw
- Adopt Community Preservation Act (CPA) in all watershed towns and cities
- Launch urban forestry programs by taking advantage of funding from the Department of Conservation and Recreation.
- Promote the use of Forest Stewardship Program as an incentive for conservation of forestlands in private land.
- Encourage NRCS to complete and release digital mapping of prime farmland and productive soils.

Recreation

Assessment Findings:

DEP was not able to assess the Primary and Secondary Contact Recreational Uses in most of this subwatershed due to too limited recent bacteria data available (DEP 2005). The lower 1.3-mile reach of Moose Meadow Brook is assessed as impaired for Primary and Secondary Recreational Uses because of elevated fecal coliform bacteria counts and turbidity. The source of impairment is agricultural activities associated with grazing in the riparian zone.

The lower segment of the Little River (MA32-08) from Horton's Bridge in Westfield to the confluence with the Westfield River is assessed as impaired by DEP for Primary Contact Recreational Use due to elevated levels of fecal coliform counts collected in 1996, 1999 and 2001. Secondary Recreational Use is assessed as support in this segment (ESS, 2000; DEP, 2005). As mentioned above, there are currently no flow release requirements at the Cobble Mountain Dam to the Little River. Members of the canoe and kayak community, also known as paddlers, are interested in negotiating scheduled releases from the Cobble Mountain Dam to the Little River with the Springfield Water and Sewer Commission and Northeast Utilities for recreational whitewater paddling.

Tekoa and Shatterack Mountains are two peaks on the Russell/Montgomery town line along the main stem of the Westfield River which offer scenic views, hiking opportunities, unique natural features, and historical significance. The area is a privately owned, unprotected upon space. Appalachian Mountain Club's Noble View in Russell includes 360 acres of land with trails and campsites including primitive accommodations for larger group events.

Recreation Objectives:

- Increase policing and maintenance at existing access points along river (Objective 5-2)
- Utilize river access points for public outreach about watershed issues and on-going projects (Objective 5-4)
- Control unauthorized motorized recreational vehicle use in the watershed and provide opportunities for this type of recreation in appropriate places (Objective 5-5)

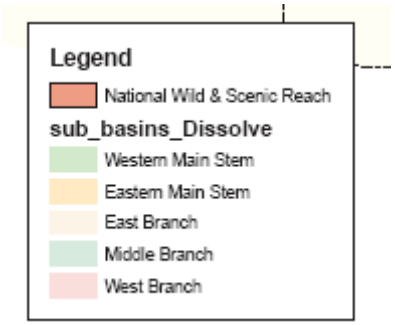
Recreation Priority Actions:

- Work with watershed communities to identify appropriate locations for motorized recreational vehicle use and perform outreach to inform users about these areas.
- Work with DFG to implement ticketing and vehicle confiscation operation for trespassing – Granville Reservoir, Cobble Mountain Reservoir, Borden Brook Reservoir
- Construct kiosks at major river access points for use as public outreach vehicles.
- Work with local communities and watershed stakeholders to implement maintenance programs such as regular trash pickup at river launch areas.
- Work with DFG to implement more regular patrols of at river access points.
- Gain trail access through acquisition or easements to streams and ponds.

West Branch

Becket, Blandford, Chester, Huntington, Middlefield, Peru, and Washington

The West Branch subwatershed covers seven communities (Becket, Blandford, Chester, Huntington, Middlefield, Peru and Washington) and encompasses almost 96 square miles.



Keystone Arch Bridge and West Branch
Source: Christopher Curtis, PVPC

Table 23 West Branch Subwatershed Waters

River Segments	Named Rivers, Streams and Brooks	Named Lakes, Ponds and Impoundments
MA 32-01	West Branch Roaring Brook Goldmine Brook Otis Wait Brook Factory Brook Coles Brook	
MA 32-17	Depot Brook	
MA 32-18	Shaker Mill Brook	
MA 32-19	Yokum Brook	Buckley-Dunton Lake (MA32013) Rudd Pond (MA32060) Yokum Pond (MA32079)
MA 32-20	Walker Brook Cushman Brook	Center Pond (MA32015) Robin Hood Lake (MA32057)
MA 32-31	Sanderson Brook Griffin Brook	

Water Quantity and Flow

Assessment Findings:

The Water Resources Commission has classified the West Branch subwatershed as a medium stressed basin. More information is needed about the effects of periodic low flows in this subwatershed. EOEA is currently funding a project called Water Budgets that will examine the effects of water withdrawals and wastewater discharges on stream flow. Results from this project are not expected until 2007.

Through a project sponsored by the MA DFG, Riverways – River Restore Program, the Silk Mill Dam on Yokum Brook was removed in February 2003. The River Restore program is also working on a project to breach Ballou Dam also on Yokum Brook.

Table 24 WMA Registrations and Permits- West Branch Subwatershed

Facility	WMA Registration Number	WMA Permit Number	Source (G=ground S= surface)	Authorized Withdrawal (MGD)
Huntington Water Department	10414301	N/A	Surface and Ground	0.12

Source: DEP 2005

Water Quantity and Stream Flow Objectives:

- Implement measures to ensure stream continuity and adequate stream flows and flow regimes (Objective 1-5)
- Conduct public education, outreach and planning about restoration and protection of surface and groundwater resources (Objective 1-2)
- Implement cross-municipal land use controls and regulatory improvements for groundwater and surface water resource protection (Objective 1-3)

Water Quantity and Stream Flow Priority Actions:

- Evaluate streamflow conditions to monitor "medium stress" condition – West Branch
- Adopt private well regulations that are consistent with municipal water conservation standards.

Water Quality

Assessment Findings:

DFG has recommended classifying this entire subwatershed as a Cold Water Fishery in the next revision of the SWQS. There is one NPDES permitted discharge facility at the Austin Brook Slow Sand Filtration Plant in Chester. Water quality standards are consistently met in Walker Brook downstream of the permitted discharge.

The Massachusetts Highway Department (MHD) and the Massachusetts Turnpike Authority (MTA) are also municipal separate stormsewer systems (MS4s) regulated under Phase II. The Notice of Intent (NOI) from both entities have yet to be approved by EPA and the two agencies have not yet identified their receiving waters. Stormwater from the Massachusetts Turnpike (I91) and other state roads most certainly drain to the West Branch of the Westfield River and its tributaries. It is important that both of these agencies thoroughly identify their receiving waters and implement adequate water quality protection measures.

There are several road improvement projects that are scheduled in the Pioneer Valley Transportation Improvement Program (TIP) for Fiscal Years 2006-2010 that provide the opportunity for stormwater treatment system upgrades or installations. The Pioneer Valley TIP is a five year schedule of projects identified by year and location complete with funding source and cost. The TIP is developed annually and is available for amendment and adjustment at any time. All TIP projects are consistent with the Regional Transportation Plan for the Pioneer Valley Region. These projects include Route 20 resurfacing in Huntington and Chester ($3.5 million) and Kinne Brook Road bridge replacement in Chester ($3.6 million). The TIP for Berkshire County includes the following projects: Lower Valley Bridge reconstruction on Depot Brook in Washington ($600,000), upgrade Route 8 bridge load capacity in Becket ($500,000)reconstruction of Bonny Rigg Hill Road in Becket ($2.8 million) and, reconstruction of Washington Mountain Road in Becket and Washington ($2.7 million).

Center Pond in Becket is the only Category 4c Waters (DEP, 2006) in this subwatershed. Center Pond is listed for invasive exotic species. The Becket Conservation Commission is actively involved in an aquatic weed management program for this 114-acre pond.

Table 25 West Branch River Segments and Classification

River Segments	Location	Classification
MA 32-01	Confluence of Depot Brook and Yokum Brook in Becket to confluence with Westfield River, Huntington	Class B, Cold Water Fishery
MA 32-17	Washington (north of Beach Road) to confluence with Yokum Brook in Becket.	Class B*
MA 32-18	October Mountain State Forest in Washington to confluence with Depot Brook in Becket.	Class B*
MA 32-19	Outlet of Buckley-Dunton Lake (east of Walling Mountain) in Becket, to confluence with Depot Brook Becket.	Class B*
MA 32-20	Headwaters, at outlet of Center Pond (north of YMCA Road) in Becket to confluence of the West Branch Westfield River, Chester.	Class B*
MA 32-31	North of Chester Road in the Chester/Blandford State Forest, Blandford, to confluence with West Branch Westfield River, Chester.	Class B*

Source: MA DEP 2005
*MDFW recommends listing segment as a Cold Water fishery in next revision of the SWQS.

Table 26 NPDES Permitted Discharges – West Branch Subwatershed

Facility	Town / City	Permit #	Receiving Water Body
NPDES General Permits			
Austin Brook Reservoir Slow Sand Water Filtration Plant	Chester	MAG640035	Walker Brook MA32-20

Source: DEP, 2005; MassGIS; DEP Stormwater Phase II

Water Quality Objectives:

- Identify sources of nonpoint source pollution to surface and groundwater resources (Objective 1-1)
- Implement cross-municipal land use controls and regulatory improvements for groundwater and surface water resource protection (Objective 1-3)

- Implement structural best management practices to control point and nonpoint sources of pollution (Objective 1-4)
- Identify important stream corridors, headwaters, and adjacent wetlands in need of protection (Objective 2-1)
- Collaborate with government agencies, watershed organizations, land trusts, municipalities and private citizens to ensure protection of remarkable river and stream corridors in perpetuity (Objective 2-2)

Water Quality Priority Actions:

- Develop a DEP / EPA approved Quality Assurance Project Plan (QAPP) for design of a water quality sampling program on all river segments.
- Perform water quality monitoring at hot spots and assess streambank stability and potential restoration sites - Yokum Brook downstream of Ballou Dam near Becket Elementary School
- Conduct bacteria monitoring to better assess the status of Primary and Secondary Contact Recreational Uses and identify sources – Shaker Mill Brook, Depot Brook, West Branch, Yokum Brook, Walker Brook, and Sanderson Brook
- Stabilize eroded river banks and restore habitat with native species
- Implement pre- and post-construction regulatory bylaws for the treatment and management of stormwater - Becket, Blandford, Chester, Middlefield, Washington
- Implement a Water Supply Protection District to regulate land use activities on privately owned land with in the Huntington municipal well's Zone II – Chester
- Update, or implement, local river protection bylaw to effectively protect the wild and scenic characteristics of the Westfield River by controlling development that would be inconsistent with the scenic qualities of the river – Becket, Huntington, Chester, Middlefield, Washington

Habitat and Fish Passage

Assessment Findings:

MDFW regularly stocks salmon fry throughout this subwatershed and trout in certain areas. The presence of multiple age classes of three salmonids and four intolerant species along with fluvial dependent/specialist species is indicative of excellent water quality and habitat conditions as well as stable flow regimes on the upper watershed (DEP 2005). The benthic macroinvertebrate community survey by DEP in the most upstream location of Yokum Brook was extremely diverse and considered to represent the best attainable conditions in the watershed (DEP 2005). Aquatic Life Use along the main stem of the West Branch is identified with an Alert Status by DEP due to the absence of trout in this segment and the low abundance of intolerant fishes other than stocked salmon.

The Taconic Chapter of Trout Unlimited is leading an effort to provide ongoing community stewardship of the Atlantic Salmon Egg Rearing Program in the Becket-Washington Elementary School with support from the Massachusetts Outdoor Classroom and an EPA Environmental Education Grant.

Table 27 Sampled Fish Populations- West Branch Subwatershed

Common Name	Scientific Name
Atlantic Salmon	*Salmo salar*
Blacknosed dace	*Ryinichthys atratulus*
Brook Trout	*Salvelinus fontinalis*
Brown trout	*Salmo trutta*
Common shiner	*Notropis cornutus*
Creek chubsucker	*Semotilus atromaculatus*
Longnosed dace	*Rhinicthys cataractae*
Slimy sculpin	*Cottus cognatus*
White Sucker	*Catostomus commersoni*
Yellow perch	*Perca flavescens*

Source: MA DEP 2005

NHESP has identified almost 65 percent of this subwatershed as Biocore or Supporting Landscape habitat.

Table 28 Natural Lands – West Branch Subwatershed

Habitat Type	Acres	Square Miles	Percent of Subwatershed
TNC Core Habitat	15,552	24	25%
NHESP Priority Habitat	1,895	3	3.1%
NHESP Biocore	4,904	8	8.3%
NHESP Supporting Landscape	34,836	54	56.3%

Habitat and Fish Passage Objectives:

- Support the restoration of migratory and resident fish populations to the Connecticut and Westfield Rivers (Objective 1-6)
- Collaborate with government agencies, watershed organizations, land trusts, municipalities and private citizens to ensure protection of remarkable river and stream corridors in perpetuity (Objective 2-2)

Habitat and Fish Passage Priority Actions:

- Develop fish passage alternatives at identified dams and culverts blocking migration pathways – Johnson Hill Road and Otis Wait Brook, Chester
- Continue to conduct biological monitoring (habitat, benthic and fish populations) to evaluate the status of the Aquatic Life Use – West Branch
- Perform long-term monitoring of fish populations to investigate possible long-term effects of salmon stocking on reproducing wild trout populations – West Branch
- Increase public awareness about fish restoration programs and promote volunteer efforts to restore migratory and local fish populations.

Land Use, Open Space and Growth

Assessment Findings:

Although almost 65 percent of this subwatershed is identified as important habitat, only 26 percent (or 15,674 acres) is protected open space.

As a primarily residential community of just under 2000 people, Becket does not act as a destination point for neighboring communities. The year-round population in Becket is forecasted to grow between 25 and 50 percent over the next twenty years. Although historical land settlement patterns were clustered into three distinct villages, today subdivisions have been planned throughout town regardless of landform limitations such as slopes and wetlands. The ability to build on these divided lots has been hampered by the ability to meet requirements for wells and soil percolation rates for septic systems. It is estimated that there are over 30 subdivisions in Becket, none of which are completely built out, and some which will never be unless requirements for on-site septic systems are changed.

Although Middlefield does not have proximity to any major highway or developed tourist or recreational attraction, Middlefield had the greatest population growth for a watershed community between 1990 and 2004, growing almost 40 percent. Of Middlefield's 15,400 acres, nearly 67 percent is under some form of permanent or temporary protection from development; just over 5,100 acres are owned by the state and just under 4,900 acres are in one of the Chapter 61 Programs (Middlefield OSRP, 2003).

Table 29 Land Use in West Branch Subwatershed

Land Use	Acres	Square Miles	Percent of Subwatershed
Agriculture	1,399	2.2	2.3%
Developed	3,331	5.2	5.4%
Undeveloped	56,429	88.2	92.3%
TOTAL	61,158	95.6	

Source: MassGIS, 1999

Land Use, Open Space and Growth Objectives:

- Promote land conservation as a tool for protecting natural resources (Objective 3-2)
- Promote the use of Chapter 61 A and Agricultural Preservation Restirction (APR) programs among landowners and municipalities (Objective 4-1)
- Support locally based agriculture (Objective 4-3)
- Maintain updated Open Space and Recreation Plans (OSRPs) (Objective 5-3)
- Adopt growth management bylaws that will protect natural resources and open space and minimize the impacts of new housing, transportation and economic development (Objective 6-1)
- Promote economic development respectful of the environment and historic resources (Objective 6-2)

Land Use, Open Space and Growth Priority Actions:

- Provide funding for and public awareness of Agricultural Preservation Restrictions (APR) and Conservation Restrictions (CR) as a means to permanently protect open space.
- Adopt Community Preservation Act (CPA) in Becket, Chester, Middlefield, Washington.
- Develop funding mechanisms so that towns can take advantage of their right of first refusal when a property withdraws from a Chapter 61 program.
- Identify lands eligible for MGL Chapter 61 Program (Ch. 61 for forestlands, Ch. 61A for agricultural lands and Ch. 61B for recreation lands).
- Inventory existing Chapter 61 lands and set priorities for conservation.
- Advocate for state income tax deductions for land gifts and bargain sales of land for conservation.
- Promote the use of Forest Stewardship Program as an incentive for conservation of forestlands on private land.
- Support organizations that promote land conservation and the agricultural infrastructure and economy (Berkshire Grown, CISA, NOFA, etc.).
- Establish farmer's markets and/or farm stands throughout the region
- Adopt growth management bylaws such as: scenic upland zoning, back lot with open space zoning, shared driveways, erosion and sediment controls, natural resource protection overlay districts, flexible development, transfer of development rights, hazardous material by-law, right-to-farm bylaw, Low Impact Development bylaw.
- Encourage NRCS to complete and release digital mapping of prime farmland and productive soils.
- Identify unprotected headwater parcels and prioritize for conservation – Becket, Washington

Recreation

Assessment Findings:

DEP was not able to assess the Primary and Secondary Contact Recreational Use due to too little bacteria data available for this subwatershed.

The West Branch of the Westfield River valley contains 10 beautiful stone arch railroad bridges, known locally as the Keystone Arches, listed as a historic district on the National Register of Historic Places. The bridges were built in 1841 to carry the Boston and Albany railroad over the deep gorge of the West Branch, connecting Middlefield and Becket or Middlefield and Chester. The supervisor of the stone bridges construction was George Washington Whistler, father of artist James Whistler. One bridge, a double-arched granite structure, is in active service today as part of the Conrail-CSX Railroad. The railroad was relocated in 1912 with new poured concrete bridges and changes to some of the earlier stone structures.

Beckets mountainous terrain includes a portion of October Mountain State Forest, the largest contiguous state forest in Massachusetts, through which a portion of the Appalachian Trail runs.

Recreation Objectives:

- Increase policing and maintenance at existing access points along river (Objective 5-2)
- Utilize river access points for public outreach about watershed issues and on-going projects (Objective 5-4)
- Control unauthorized motorized recreational vehicle use in the watershed and provide opportunities for this type of recreation in appropriate places (Objective 5-5)

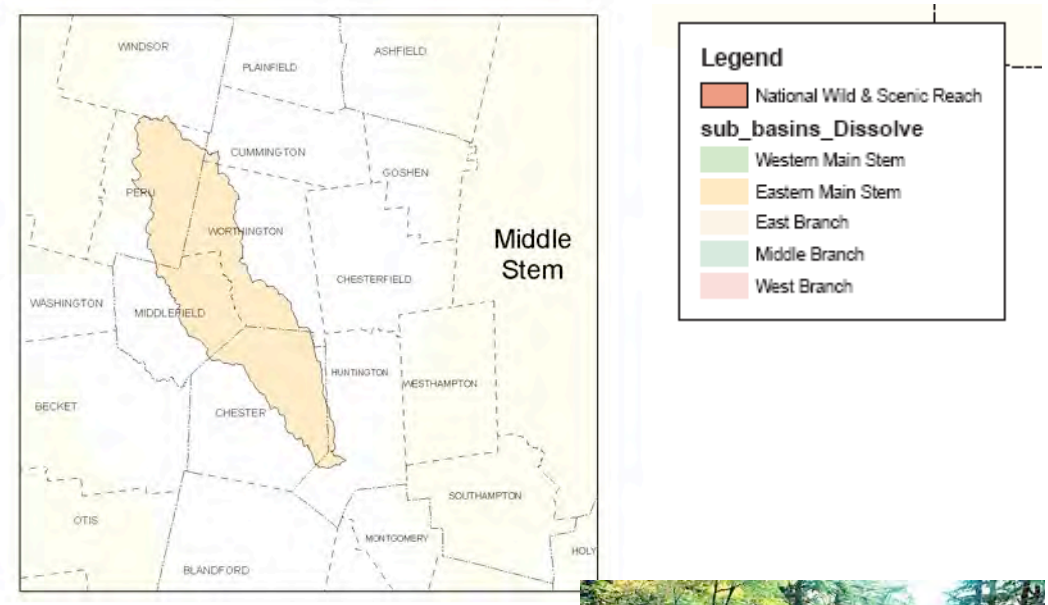
Recreation Priority Actions:

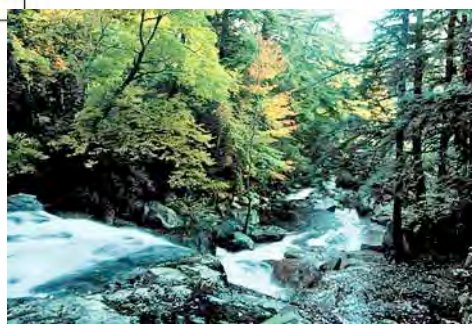
- Work with watershed communities to identify appropriate locations for motorized recreational vehicle use and perform outreach to inform users about these areas.
- Work with DFG to implement ticketing and vehicle confiscation operation for trespassing – Horn Pond Reservoir, Austin Brook Watershed
- Construct kiosks at major river access points for use as public outreach vehicles, particularly in Nationally designated Wild and Scenic segment- Becket, Middlefield, Chester, Huntington
- Work with local communities and watershed stakeholders to implement maintenance programs such as regular trash pickup at river launch areas.
- Work with DFG to implement more regular patrols at river access points, particularly at Keystone Arches where vandalism has been a problem.
- Gain trail access through acquisition or easements to streams and ponds
- Post “Low Clearance” warning for paddlers at new hazard created by replacement of Bancroft Bridge.

Middle Branch

Chester, Middlefield, Peru and Worthington

The Middle Branch subwatershed primarily covers four communities (Chester, Middlefield, Peru and Worthington) and encompasses almost 53 square miles.





Glendale Falls
Source: The Trustees of Reservations

Table 30 Waters of the Middle Branch

River Segments	Named Rivers, Streams and Brooks	Named Lakes, Ponds and Impoundments
MA 32-02	Middle Branch Day Brook Tuttle Brook Fuller Brook Trout Brook	Littleville Reservoir (MA32046) Garnet Lake (MA32037)
MA 32-03	Middle Branch	
MA 32-10	Glendale Brook	
MA 32-32	Kinne Brook	

Water Quantity and Stream Flow

Assessment Findings:

The Littleville Reservoir Dam is 1,360' long and 160' high above streambed, consisting of compacted earth fill with an impervious core and is protected by rock slopes on both sides (DEP 2005). Peak storage is 10.6 billion gallons when filled to spillway crest. The Class I project was built in 1940 and is authorized for water supply storage for the Springfield Water and Sewer Commission. The hydropower project at the ACOE flood control dam at Littleville Reservoir is not permitted to generate electricity.

The MA Water Resources Commission has classified the lower Middle Branch, below the Littleville Reservoir Dam, as a medium stressed basin due to aberrant low flows. More information is needed about stream flow above and below the dam. Littleville Reservoir is operated by the Springfield Water and Sewer Commission and is used as an emergency back up supply for Cobble Mountain Reservoir during periods of drought.

Water Quantity and Stream Flow Objectives:

- Implement measures to ensure stream continuity and adequate stream flows and flow regimes (Objective 1-5)
- Conduct public education, outreach and planning about restoration and protection of surface and groundwater resources (Objective 1-2)

Water Quantity and Stream Flow Priority Actions:

- Evaluate streamflow conditions downstream of the Littleville Dam.
- Adopt private well regulations that are consistent with municipal water conservation standards.

Water Quality

Assessment Findings:

The presence of three intolerant fish species (Atlantic Salmon, slimy sculpin, and brook trout) surveyed by DEP in 1997 indicate excellent water quality (DEP 2005).

There is one road improvement project scheduled in the Berkshire Transportation Improvement Program (TIP) for Fiscal Years 2006-2010 that provide the opportunity for stormwater treatment system upgrades or installations. Similar to the Pioneer Valley TIP, the Berkshire TIP is a five year schedule of projects identified by year and location complete with funding source and cost. The TIP is developed annually and is available for amendment and adjustment at any time. All TIP projects are consistent with the Regional Transportation Plan. This project involves reconstruction of Skyline Trail in Hinsdale and Peru ($6 million).

The Massachusetts Highway Department (MHD) is also municipal separate stormsewer system (MS4) regulated under Phase II. The Notice of Intent (NOI) from MHD has not yet been approved by EPA and the agency has not identified their receiving waters. Stormwater from State roads most certainly drain to the Middle Branch of the Westfield River and its tributaries. It is important that MHD thoroughly identify their receiving waters and implement adequate water quality protection measures.

Table 31 River Segments and Surface Water Quality Classifications

River Segments	Location	Classification
MA 32-02	Peru State Wildlife Management Area, Peru, to inlet of Littleville Lake upstream from boat ramp (south of Kinne Brook Road)	Class A*
MA 32-03	Littleville Dam to Confluence with Westfield River, Huntington	Class B, Warm Water Fishery*
MA 32-10	Headwaters in a wetland in Peru State Forest, Peru, to confluence with Middle Branch Westfield River, Middlefield	Class A*
MA 32-32	West of West Street, Worthington, to confluence with Middle Branch Westfield River	Class A*

Source: MA DEP, 2005

*MDFW propose segment and tributaries be listed as Cold Water Fishery in next revision of SWQS

Water Quality Objectives:

- Identify sources of nonpoint source pollution to surface and groundwater resources (Objective 1-1)
- Implement cross-municipal land use controls and regulatory improvements for groundwater and surface water resource protection (Objective 1-3)
- Implement structural best management practices to control point and nonpoint sources of pollution (Objective 1-4)

Water Quality Priority Actions:

- Develop a DEP / EPA approved Quality Assurance Project Plan (QAPP) for design of a water quality sampling program on all river segments.
- Conduct bacteria monitoring to better assess the status of Primary and Secondary Contact Recreational Uses and identify sources – Middle Branch, Glendale Brook, Kinne Brook
- Implement "Pooper Scooper" bylaws and outreach program for excessive amounts of dog feces near Kinne Brook bridge heading towards Dayville.
- Implement pre- and post-construction regulatory bylaws for the treatment and management of stormwater - Middlefield, Peru, Worthington
- Identify unprotected headwater parcels and prioritize for conservation – Middlefield, Peru, Worthington
- Update, or implement, local river protection bylaw to effectively protect the wild and scenic characteristics of the Westfield River by controlling development that would be inconsistent with the scenic qualities of the river- Chester, Middlefield, Worthington, Peru

Habitat and Fish Passage

Assessment Findings:

MDFW regularly stocks salmon in some segments of this subwatershed. Upstream fish passage to this segment of the Middle Branch of the Westfield River is blocked by the Littleville Reservoir Dam. In 2002, ACOE installed three feet of aluminum stoplogs in the overflow channel to create a plunge pool for smolts going over the dam. MDFW regularly stocks salmon fry and trout upstream from the Littleville Dam. The presence of three intolerant species (Atlantic salmon, brook trout and slimy sculpin) is indicative of excellent water and habitat quality. On Kinne Brook, the Aquatic Life Use is identified with an Alert Status by DEP because of the inconsistencies in fish population data between 1997 and 2001. NHESP has identified just over 77 percent of this subwatershed as Biocore or Supporting Landscape habitat.

Table 32 Sampled Fish Populations – Middle Branch Subwatershed

Common Name	Scientific Name
Blacknosed dace	*Ryinichthys atratulus*
Slimy sculpin	*Cottus cognatus*
Atlantic Salmon	*Salmo salar*
Creek chubsucker	*Semotilus atromaculatus*
Common shiner	*Notropis cornutus*
Golden Shiner	*Notemigonus crysoleucas*
White Sucker	*Catostomus commersoni*
Longnosed dace	*Rhinicthys cataractae*
Smallmouth bass	*Micropterus dolomieu*
Brown trout	*Salmo trutta*
Brook Trout	*Salvelinus fontinalis*
American eel	*Anguilla rostrata*

Pumpkinseed	*Lepomis gibbosus*
Yellow perch	*Perca flavescens*
Fall fish	*Semotilus corporalis*

Source: DEP, 2005

Table 33 Natural Lands – Middle Branch Subwatershed

Habitat Type	Acres	Square Miles	Percent of Subwatershed
TNC Core Habitat	11,394	18	34%
NHESP Priority Habitat	4,039	6	11.3%
NHESP Biocore	6,584	10	18.9%
NHESP Supporting Landscape	19,866	31	58.5%

Habitat and Fish Passage Objectives:

- Support the restoration of migratory and resident fish populations to the Connecticut and Westfield Rivers (Objective 1-6)
- Collaborate with government agencies, watershed organizations, land trusts, municipalities and private citizens to ensure protection of remarkable river and stream corridors in perpetuity (Objective 2-2)

Habitat and Fish Passage Priority Actions:

- Develop fish passage alternatives at identified dams and culverts blocking migration pathways.
- Perform long-term monitoring of fish populations to investigate possible long-term effects of salmon stocking on reproducing wild trout populations – Middle Branch
- Increase public awareness about fish restoration programs and promote volunteer efforts to restore migratory and local fish populations.

Land Use, Open Space and Growth

Assessment Findings:

Roughly 93 percent of this subwatershed is undeveloped with 13,194 acres or 38% of the total land area as protected open space. More than one-half of the Town of Peru is woodland and much of it is owned by the State. In Worthington, slow but steady residential development has been consuming open space with a 65 percent increase in residential lots from 1990-2000 (Worthington CD Plan, 2004). The town has also seen a roughly 15 percent decrease in working agricultural lands between 1971 and 1999.

Table 34 Land Use in Middle Branch Subwatershed

Land Use	Acres	Square Miles	Percent of Subwatershed
Agriculture	1,335	2.1	4%
Developed	1,001	1.6	3%

Undeveloped	31,492	49.2	93%
TOTAL	33,829	52.9	

Source: MassGIS, 1999

Land Use, Open Space and Growth Objectives:

- Promote land conservation as a tool for protecting natural resources (Objective 3-2)
- Promote the use of Chapter 61 A and Agricultural Preservation Restriction (APR) programs among landowners and municipalities (Objective 4-1)
- Support locally based agriculture (Objective 4-3)
- Maintain updated Open Space and Recreation Plans (OSRPs) (Objective 5-3)
- Adopt growth management bylaws that will protect natural resources and open space and minimize the impacts of new housing, transportation and economic development (Objective 6-1)
- Promote economic development respectful of the environment and historic resources (Objective 6-2)

Land Use, Open Space and Growth Priority Actions:

- Provide funding for and public awareness of Agricultural Preservation Restrictions (APR) and Conservation Restrictions (CR) as a means to permanently protect open space.
- Identify lands eligible for MGL Chapter 61 Program (Ch. 61 for forestlands, Ch. 61A for agricultural lands and Ch. 61B for recreation).
- Inventory existing Chapter 61 lands and set priorities for conservation.
- Develop funding mechanisms so that towns can take advantage of their right of first refusal when a property withdraws from a Chapter 61 program.
- Promote the use of Forest Stewardship program as an incentive for conservation of forestlands on private land.
- Advocate for state income tax deductions for land gifts and bargain sales of land for conservation
- Support organizations that promote land conservation and the agricultural infrastructure and economy (Berkshire Grown, CISA, NOFA, etc.)
- Establish farmer's markets and/or farm stands throughout the region
- Adopt growth management bylaws such as: scenic upland zoning, back lot with open space zoning, shared driveways, erosion and sediment controls, natural resource protection overlay districts, flexible development, transfer of development rights, hazardous material by-law, right-to-farm bylaw, Low Impact Development bylaw
- Adopt Community Preservation Act (CPA) in Worthington, Peru
- Encourage NRCS to complete and release digital mapping of prime farmland and productive soils.

Recreation

Assessment Findings:

Too limited recent water quality data was available for this subwatershed to be assessed by DEP for Primary and Secondary Contact Recreational Uses.

The 510-acre Littleville Reservoir plus the 1,567-acre ACOE property at Littleville Dam, and abutting private land easements on another 10-acres, offer recreational opportunities including picnicing, boating, fishing and hiking. The lake has an intensive on-going trout-stocking program making fishing the primary sport. Members of the paddling community are interested in negotiating scheduled water releases with the ACOE and the Springfield Water and Sewer Commission at the Littleville Dam for whitewater paddling.

Fed by more than five square miles of watershed, Glendale Falls in Middlefield is one of the longest and most powerful waterfall runs in Massachusetts. In spring, the waters of Glendale Brook roar over steep rock ledges more than 150 feet high before joining the Middle Branch of the Westfield River. Owned by The Trustees of Reservations, the property is open to hiking and seasonal hunting.

West Worthington Falls, sometimes called Thayer Falls, is a series of attractive cascades that fall approximately 50 feet into a rocky gorge on the Middle Branch. The area is privately owned and posted against trespassing. It is certified forestry land, protected under the Massachusetts General Laws Chapter 61, the Forestry Tax Assessment Act.

Recreation Objectives:

- Increase policing and maintenance at existing access points along river (Objective 5-2)
- Utilize river access points for public outreach about watershed issues and on-going projects (Objective 5-4)
- Control unauthorized motorized recreational vehicle use in the watershed and provide opportunities for this type of recreation in appropriate places (Objective 5-5)

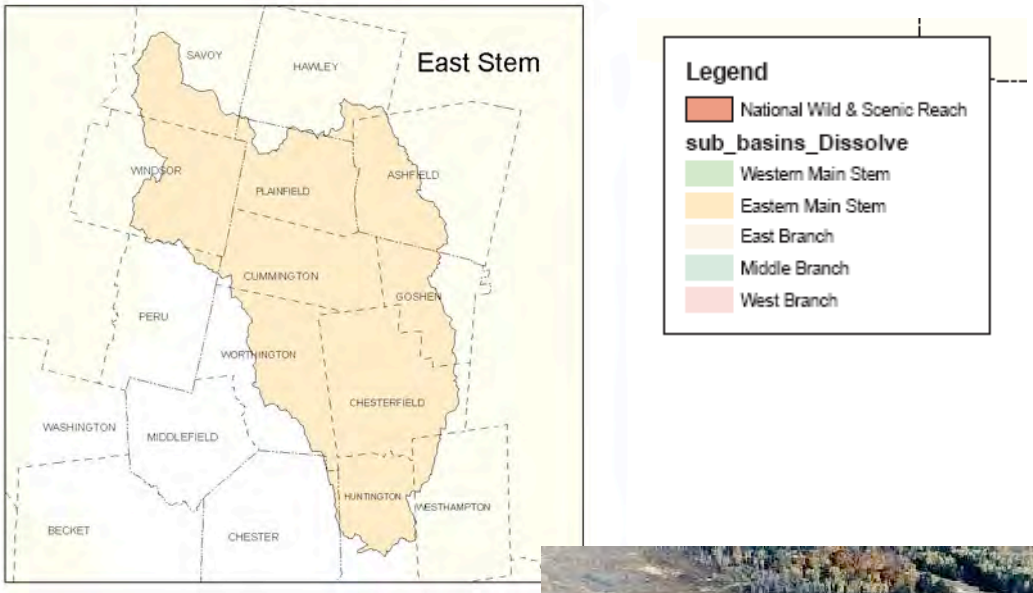
Recreation Priority Actions:

- Work with watershed communities to identify appropriate locations for motorized recreational vehicle use and perform outreach to inform users about these areas.
- Construct kiosks at major river access points for use as public outreach vehicles.
- Work with local communities and watershed stakeholders to implement maintenance programs such as regular trash pickup at river launch areas.
- Work with DFG to implement more regular patrols of at river access points.
- Gain trail access through acquisition or easements to streams and ponds.

East Branch

Ashfield, Chesterfield, Cummington, Goshen, Hawley, Huntington, Plainfield, Savoy, Worthington, and Windsor

The East Branch subwatershed covers ten communities (Ashfield, Chesterfield, Cummington, Goshen, Hawley, Huntington, Plainfield, Savoy, Worthington, and Windsor) and encompasses almost 96 square miles.



Knightville Dam
Source: PackYourGear.com

Table 35 East Branch Subwatershed Waters

River Segments	Named Rivers, Streams and Brooks	Named Lakes, Ponds and Impoundments
MA 32-04	East Branch – main segment Drowned Land Brook Center Brook Pond Brook Dead Branch Tower Brook Mill Brook Bartlett Brook Westfield Brook Windsor Jambs Brook	Windsor Pond (MA32076) Knightville Dam Reservoir Crooked Pond (MA32028) Damon Pond (MA32029) Hammond Pond (MA32040) Norwich Pond (MA32054) Scout Pond (MA32063)
MA 32-11	Meadow Brook	
MA 32-12	Swift River North Branch Swift River Stones Brook	
MA 32-13	West Falls Branch Bronson Brook Stevens Brook Childs Brook Kearney Brook	
MA 32-14	Watts Stream	
MA 32-15	Wards Brook	
MA 32-16	Little River	

Water Quantity and Stream Flow

Assessment Findings:

The MA Water Resources Commission has classified the East Branch as a medium stressed basin. EOEA is currently funding a project called Water Budgets that will evaluate the effects of water withdrawal and discharge on stream flow. There is one NPDES permitted discharge and no WMA withdrawals in this subwatershed. It is unclear whether or not this subwatershed will be included in the study.

The ACOE New England District maintains a flood control project, Knightville Reservoir Dam in Huntington. Knightville Dam is a Class I project that is part of a system of 14 ACOE flood control dams in the Connecticut River watershed. The Knightville Dam is 1,200'long and 150' high (above streambed), consisting of compacted earth with an impervious core and protected with rock slopes on both sides. Peak storage capacity is 16 billion gallons when filled to spillway crest, extending roughly six miles with a surface area of 960 acres. The hydropower project at the ACOE flood control Knightville Dam is not permitted to generate electricity (DEP 2005).

No permanent storage pool is maintained except in the winter to prevent the flood gates from freezing. Historically the winter pool is held until the last week of April when it is

released for the Westfield River White Water Canoe Races. There is no evidence of aberrant streamflow fluctuations at the downstream gage (USGS gage 01179500) (DEP 2005).

Water Quantity and Stream Flow Objectives:

- Implement measures to ensure stream continuity and adequate stream flows and flow regimes (Objective 1-5)
- Conduct public education, outreach and planning about restoration and protection of surface and groundwater resources (Objective 1-2)
- Implement cross-municipal land use controls and regulatory improvements for groundwater and surface water resource protection (Objective 1-3)

Water Quantity and Stream Flow Priority Actions:

- Monitor streamflow conditions downstream of Knightville Dam.
- Adopt private well regulations that are consistent with municipal water conservation standards.

Water Quality

Assessment Findings:

A priority pollutant scan of sediments at Knightville Dam performed by ACOE in 2000 found EPA priority pollutants in the sediments to be low and indicative of background conditions (DEP 2005). Beach closures at both MA DCR Westfield River beaches at Windsor State Forest and Gardner State Park for bacteria and fecal coliform caused DEP to list this segment of the river as impaired for Primary Contact Recreation Use, however it is not assessed for Secondary Contact due to lack of recent fecal coliform bacteria data. The East Branch of the Westfield River (segment MA32-04) is listed as a Category 5 Waters on DEP's *2006 Integrated List of Impaired Waters* for pathogens. Category 5 Waters are waters requiring a Total Maximum Daily Load (TMDL) analysis. A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards, and an allocation of that amount to the pollutant's sources.

MDFW has proposed that several tributaries to this segment of the Westfield River be listed in the next revision of the Surface Water Quality Standards as cold water fisheries including: Pond Brook, Dead Branch, Tower Brook, Mill Brook, Bartlett Brook, Westfield Brook, Windsor Jambs Brook, Swift River, North Branch Swift River, Stones Brook West Falls Branch, Bronson Brook, Stevens Brook, Childs Brook, Kearney Brook Little River and Meadow Brook.

The Massachusetts Highway Department (MHD) is also municipal separate stormsewer system (MS4) regulated under Phase II. The Notice of Intent (NOI) from MHD has not yet been approved by EPA and the agency has not identified their receiving waters. Stormwater from State roads most certainly drain to the East Branch of the Westfield River and its tributaries. It is important that MHD thoroughly identify their receiving waters and implement adequate water quality protection measures.

Table 36 River Segments and Surface Water Quality Classifications

River Segments	Location	Classification
MA 32-04	Confluence of Drowned Land Brook and Center Brook, Savoy to confluence with Middle Branch Westfield River, Huntington	Class B, Cold Water Fishery
MA 32-11	Outlet of unamed pond in Plainfield, south of Route 116, to confluence with Westfield River, Cummington	Class B*
MA 32-12	Southwest of Hawley center to confluence with Westfield River at the village of Swift River, Cummington	Class B*
MA 32-13	Headwaters at confluence of Bronson Brook and an unnamed tributary near intersection of Dingle Road and Route 143, Worthington to confluence with Westfield River near the village of West Chesterfield, Chesterfield	Class B*
MA 32-14	Near West Hill, Worthington to confluence with Wards Stream at Ringville, Worthington	Class B
MA 32-15	Southeast of Knowles Hill, Worthington to confluence with Watts Stream at Ringville, Worthington	Class B
MA 32-16	Confluence of Watts and Wards Streams at Ringville, Worthington to confluence with Westfield River, Huntington	Class B*

Source: MA DEP 2005
*MDFW proposing segments be listed as Cold Water Fisheries in next revision of Surface Water Quality Standards

The Maples, formerly called the Worthington Senior housing Inc., is authorized to discharge up to 0.0023 MGD of treated sanitary wastewater to Wards Stream (permit issued September 1999) (DEP 2005). The wastewater is treated through subsurface sand filters and on occasion the wasterwater reaches a chlorine tank after sand filtration and is discharged to Wards Stream. The facility has been in compliance with its NPDES permit and whole effluent toxicity testing is not required.

Table 37 NPDES Permitted Discharges

Facility	Town / City	Permit #	Receiving Water Body
Municipal Wastewater Treatment Plants and Sanitary Wastewater Discharges			
The Maples	Worthington	MA0027871	Wards Brook MA32-15

Source: DEP, WQAR, April 2005

Table 38 Massachusetts Category 5 Waters, waters requiring a TMDL

Name	Location	Cause of Impairment
Westfield River (MA32-04)	Savoy to Huntington	Pathogens

Source: DEP, *2006 Integrated List of Impaired Waters*, April 2006

Water Quality Objectives:

- Identify sources of nonpoint source pollution to surface and groundwater resources (Objective 1-1)
- Implement cross-municipal land use controls and regulatory improvements for groundwater and surface water resource protection (Objective 1-3)
- Implement structural best management practices to control point and nonpoint sources of pollution (Objective 1-4)
- Collaborate with government agencies, watershed organizations, land trusts, municipalities and private citizens to ensure protection of remarkable river and stream corridors in perpetuity (Objective 2-2)
- Identify important stream corridors, headwaters, and adjacent wetlands in need of protection (Objective 2-1)

Water Quality Priority Actions:

- Develop a DEP / EPA approved Quality Assurance Project Plan (QAPP) for design of a water quality sampling program on all river segments.
- Conduct bacteria monitoring to better assess the status of Primary and Secondary Contact Recreational Uses and identify sources – Windsor State Forest, East Branch, Meadow Brook, Swift River, West Falls Branch, Watts Stream, Little River, DCR State beaches (Gardner State Park, Huntington)
- Implement pre- and post-construction regulatory bylaws for the treatment and management of stormwater – Hawley, Huntington, Chesterfield, Goshen, Cummington, Plainfield, Windsor, Savoy and Ashfield

Habitat and Fish Passage

Assessment Findings:

The MDFW regularly stocks salmon fry and trout in this segment of the Westfield River. Stocked Atlantic Salmon smolts are able to move downstream through the Knightville Dam via the late April release of the winter pool, however, migrating adults are unable to move upstream past the Dam at this time (DEP 2005). A modified Rapid Bioassessment Protocol III benthic macroinvertebrate survey performed by DEP in 2001 downstream of the Knightville Dam and upstream of the confluence with the Middle Branch indicated

excellent habitat conditions. The benthic community at this survey station was considered diverse and to represent "least impacted" conditions in the watershed and was used as a reference station. There are no fish consumption advisories for this segment of the river.

Comparative fish population data from surveys performed in the late 1970's found game fish, primarily trout to comprise 27% of the biomass. Trout populations counted in samples from 2001 by DEP found significantly reduced populations. It is unclear whether salmon stocking is having an effect of trout population sin this segment of the Westfield River.

Table 39 Sampled Fish Populations – East Branch Subwatershed

Common Name	Scientific Name
Blacknosed dace	*Ryinichthys atratulus*
Slimy sculpin	*Cottus cognatus*
Atlantic Salmon	*Salmo salar*
Creek chubsucker	*Semotilus atromaculatus*
Common shiner	*Notropis cornutus*
White Sucker	*Catostomus commersoni*
Longnosed dace	*Rhinicthys cataractae*
Lake chub*	*Couesius plumbeus*
Rainbow trout	*Oncorhynchus mykiss*
Smallmouth bass	*Micropterus dolomieu*
Brown trout	*Salmo trutta*
Bullhead trout	*Ameiurus nebulosus*
American eel	*Anguilla rostrata*
Pumpkinseed	*Lepomis gibbosus*
Tessellated darter	*Etheostoma olmstedi*

Source: MDFW 2001 in DEP 2005
*MA Endangered Species

Just over 52 percent of the subwatershed is identified as Biocore or Supporting Landscape habitat by NHESP.

Table 40 East Branch Subwatershed Natural Lands

Habitat Type	Acres	Square Miles	Percent of Subwatershed
TNC Core Habitat	11,352	18	11%
NHESP Priority Habitat	9,996	16	9.6%
NHESP Biocore	19,668	31	18.7%
NHESP Supporting Landscape	36,014	56	33.7%

Habitat and Fish Passage Objectives:

- Support the restoration of migratory and resident fish populations to the Connecticut and Westfield Rivers (Objective 1-6)

- Collaborate with government agencies, watershed organizations, land trusts, municipalities and private citizens to ensure protection of remarkable river and stream corridors in perpetuity (Objective 2-2)

Habitat and Fish Passage Priority Actions:

- Develop fish passage alternatives at identified dams and culverts blocking migration pathways:
    - Curtis Road and Page Brook, Chesterfield
    - East Street and Baker Road, Chesterfield
    - South Road and Dead Branch, Chesterfield
    - Route 9 and Shaw Brook, Windsor
    - High Street Hill and Alder Meadow Brook, Windsor
    - Pierce Road and Mongue Meadow Brook, Windsor
- Continue to conduct biological monitoring (habitat, benthic and fish populations) to evaluate the status of the Aquatic Life Use
- Perform long-term monitoring of fish populations to investigate possible long-term effects of salmon stocking on reproducing wild trout populations – Swift River, Little River
- Increase public awareness about fish restoration programs and promote volunteer efforts to restore migratory and local fish populations.

Land Use, Open Space and Growth

Assessment Findings:

Roughly 88 percent of this subwatershed is undeveloped with 26,294 acres or 25% of the total land area as protected open space.

Like many of the surrounding communities, Goshen is primarily considered a bedroom community since most residents travel outside the town boundaries for work. However, as housing pressures intensify in the Pioneer Valley, the location of Goshen, Cummington and Plainfield along Route 9 make the likelihood for new home development greater in these communities. Goshen's population increased 11 percent from 1990 to 2000 and is expected to increase over 37 percent by 2010.

Most development in Cummington consists of single-family homes, with development clustered into three villages. Development outside these villages has increased significantly in the last few years and town continues to issue an increasing number of building permits each year. Althought he town's population increased 20 percent from 1990 to 2000; a 3.6 percent decrease in population is anticipated between 2000 and 2010.

Residential growth in Chesterfield is increasing outside of the village center, into forests and agricultural land. With 37 percent of Chesterfield under some form of protection (Town owned, Chapter 61, and APR) there are still about 12,000 acres of land immediately susceptible to development.

Plainfield , Ashfield, Windsor, and Savoy are similarly rural hilltown communities facing growing populations and increasing residential development pressures. Remaining

agricultural activities continue to dwindle as farming as a way of life becomes more and more an occupation of the past.

Table 41 Land Use in East Branch Subwatershed

Land Use	Acres	Square Miles	Percent of Subwatershed
Agriculture	7,921	12.4	7.5%
Developed	4,837	7.6	4.5%
Undeveloped	93,507	146.1	88%
TOTAL	106,265	166	

Source: MassGIS, 1999

Land Use, Open Space and Growth Objectives:

- Promote land conservation as a tool for protecting natural resources (Objective 3-2)
- Promote the use of Chapter 61 A and Agricultural Preservation Restirction (APR) programs among landowners and municipalities (Objective 4-1)
- Support locally based agriculture (Objective 4-3)
- Maintain updated Open Space and Recreation Plans (OSRPs) (Objective 5-3)
- Adopt growth management bylaws that will protect natural resources and open space and minimize the impacts of new housing, transportation and economic development (Objective 6-1)
- Promote economic development respectful of the environment and historic resources (Objective 6-2)

Land Use, Open Space and Growth Priority Actions:

- Provide funding for and public awareness of Agricultural Preservation Restrictions (APR) and Conservation Restrictions (CR) as a means to permanently protect open space.
- Identify lands eligible for MGL Chapter 61 Program (Ch. 61 for forestlands, Ch. 61A for agricultural lands and Ch. 61B for recreation lands).
- Inventory existing Chapter 61 lands and set priorities for conservation.
- Advocate for state income tax deductions for land gifts and bargain sales of land for conservation.
- Support organizations that promote land conservation and the agricultural infrastructure and economy (Berkshire Grown, CISA, NOFA, etc.)
- Establish farmer's markets and/or farm stands throughout the region
- Adopt growth management bylaws such as: scenic upland zoning, back lot with open space zoning, shared driveways, erosion and sediment controls, natural resource protection overlay districts, flexible development, transfer of development rights, hazardous material by-law, right-to-farm bylaw, Low Impact Development bylaw.
- Develop funding mechanisms so that towns can take advantage of their right of first refusal when a property withdraws from a Chapter 61 program.
- Adopt Community Preservation Act (CPA) – Huntington, Chesterfield, Goshen, Ashfield, Worthington, Cummington, Plainfield, Windsor and Savoy.

- Launch urban forestry programs by taking advantage of funding from the Department of Conservation and Recreation.
- Promote the use of Forest Stewardship Program as an incentive for conservation of forestlands on private land.
- Support The Nature Conservancy's program to protect so-called Forest Matrix Blocks

Recreation

Assessment Findings:

The East Branch of the Westfield River provides one of the longest whitewater runs in Massachusetts, particularly in the spring with scheduled releases at Knightville Dam, but also all season long if not in a drought year with Class I to III rapids. The Knightville Reservoir's 2,430-acre ACOE property in Huntington, in addition to another 248 acres of abutting private land easements, offer recreational opportunities including camping, fishing, hiking and cross-country skiing. The release of the winter pool in the last week of April triggers the Westfield River White Water Canoe Races. This 8-mile race draws hundreds of canoeists to the Westfield River. The Annual Westfield River Whitewater Race is in its 53rd year. Members of the paddling community are interested in negotiating other scheduled dam releases for recreational whitewater paddling.

Chesterfield Gorge is a superb natural river gorge on the East Branch in West Chesterfield. The gorge is surrounded by sheer granite cliffs and topped with a hemlock and beech forest. It is owned by the Trustees of Reservations, and provides opportunities for picnics, hiking, and exploration of the remains of the High Bridge, part of the Boston to Albany post road. The gorge is runnable by expert paddlers under certain water levels, according to AMC's River Guide (2000).

The East Branch "Pork Barrel" wilderness is one of the most wild and scenic portions of the entire river with large, deep pools running over rocks into a four-mile long gorge. This land is located in Chesterfield and much is currently owned by MA Department of Conservation and Recreation.

Windsor Jambs in Windsor State Forest is a cascading waterfall that plunges through a 25-foot wide gorge, with 80-foot-high granite walls rising on either side. The Jambs are located in a thick spruce forest highlighted with rolling hills and mountain streams. D.A.R. State Forest in Goshen offers trails, swimming, picnicking and camping.

Recreation Objectives:

- Increase policing and maintenance at existing access points along river (Objective 5-2)
- Utilize river access points for public outreach about watershed issues and on-going projects (Objective 5-4)
- Control unauthorized motorized recreational vehicle use in the watershed and provide opportunities for this type of recreation in appropriate places (Objective 5-5)

Recreation Priority Actions:

- Work with watershed communities to identify appropriate locations for motorized recreational vehicle use and perform outreach to inform users about these areas.
- Work with DFG to implement ticketing and vehicle confiscation operation for trespassing – Granville Reservoir, Cobble Mountain Reservoir, Borden Brook Reservoir
- Construct kiosks at major river access points for use as public outreach vehicles.
- Work with local communities and watershed stakeholders to implement maintenance programs such as regular trash pickup at river launch areas.
- Work with DFG to implement more regular patrols of at river access points.
- Gain trail access through acquisition or easements to streams and ponds

Five-Year Watershed Action Plan Priority Projects

Six priority projects have been identified for implementation in the Westfield Basin. These projects have been referenced throughout the plan under appropriate subwatershed categories. The following section provides summary descriptions of these projects with cost estimates for their implementation. The implementation of each of the priority projects is meant to coincide with existing and other on-going projects and work plans of various watershed stakeholder organizations. Thus, depending upon the time of implementation, the scopes for each of these projects may change relative to the work of other organizations. Likewise, funding for these other coincidental projects can be considered matching funds and potentially a source of on-going funding for program continuation where applicable and needed.

Project #1 Implement Growth Management Strategies

Project #2 Water Quality Monitoring Program

Project #3 Implement a Stormwater Pollution Reduction Program

Project #4 Fish Restoration and Migration Barrier Removal

Project #5 Public Education and Outreach – Sense of Place Campaign

Project #6 Analysis of Buildout on Water Resources of the Barnes Aquifer

PROJECT #1 Implement Growth Management Strategies

GOAL: Sustain regional character

OBJECTIVE: Adopt growth management bylaws that will protect natural resources and open space and minimize the impacts of new housing, transportation and economic development.

LOCATION: Westfield River Watershed

DESCRIPTION: Work with watershed communities to adopt Smart Growth strategies that revitalize downtowns and encourage clustered development and increased housing density in previously developed areas or on non-priority resource area lands.

Strategy #1 Encourage Traditional Neighborhood Developments (TNDs)
Create incentives in zoning and subdivision regulations to promote pedestrian friendly TNDs. TNDs have grid-like street patterns with sidewalks and street trees, medium to high-density housing, and nearby public open space are within walking distance to shops and services.

Strategy #2 Promote Compact, Mixed Use Village Centers
Provide incentives for urban infill, clustered residential and mixed use villages within or immediately surrounding town centers or designated community growth centers in order to increase pedestrian/bicycle access, jobs and affordable housing. Tools include mixed use commercial zoning and density-based zoning incentives.

Strategy #3 Revitalize Urban Core Areas and Downtowns
Streamline or update antiquated zoning regulations to promote mixed use and infill development in downtown areas. Allow a greater density downtown than in surrounding areas. Prescribe a balanced mix of commercial, residential, cultural, and entertainment uses. Allow mixed uses in formally single use buildings.

Strategy #4 Develop Incentives for Cluster Housing
Open space communities replicate the traditional New England village land use pattern by clustering single family homes on smaller lots surrounded by protected open space. Open space communities promote efficiency of land use, lower costs of development, roads and infrastructure, lower municipal costs, and protect natural features. Tools include by-right cluster zoning bylaws and Open Space Residential Zoning bylaws.

Strategy #5 Improve Housing Opportunities and Neighborhood Quality
Provide a variety of housing choices in existing residential neighborhoods and create more livable, pedestrian-friendly neighborhood environments. Tools include Accessory Apartment Bylaws and Inclusionary Zoning Bylaws.

Strategy #6 Encourage Adoption of the Community Preservation Act(CPA)
The CPA enables communities to derive revenue from a surcharge of up to 3% on local property tax. Funds are to be spent on open space, historic preservation, and low and moderate income housing. The State provides matching funds to communities and increases the dollars that can be spent on community preservation.

PROJECT COSTS: $80,000

PROJECT #2 Westfield River Basin, Water Quality Monitoring Program

GOAL: Maintain the integrity of aquatic ecosystems and protect the quality and quantity of surface and groundwater drinking supplies.

OBJECTIVE: Identify sources of nonpoint source pollution to surface and groundwater resources.

LOCATION: Select stream/river segments within the Westfield River Basin

DESCRIPTION: Project will focus on the development and implementation of water quality monitoring program within the Westfield River watershed to address water quality conditions, specifically bacteria contamination and cold water fisheries designated uses. Study design for this project will be coordinated with state and federal agencies and municipal boards tasked with water quality monitoring to design an approach that will provide useful data and generate awareness of water quality problems to better identify sources.

Based on a 2001 DEP Water Quality Report, several sections of the Westfield River and a number of its tributaries are impaired due to bacteria contamination from stormwater runoff. Bacteria contamination has led these stretches of river to fail to meet designated uses such as primary and secondary contact recreation. In order to address this failure, bacteria sampling at targeted locations can be implemented to identify the sources of contamination. Several areas should be the prime focus of bacteria monitoring based on water quality data collected during prior studies and proximity of the bacteria contamination to public swimming areas. These areas include the following river sections:

1. Mainstem of the Westfield River (MA32-04) in the vicinity of the two DCR state beaches. Entereococcus is the prime contaminant in this area. Targeted sampling can be used to track source upstream.
2. The Little River (MA32-08) in the City of Westfield. This section is impaired for primary recreational contact because of bacteria contamination. Two tributaries of the Little River, Ashley Brook and Jack's Brook, should be targeted as possible bacteria sources based on past water quality data. In addition, data can also be used to assess the effectiveness of Westfield's Phase II Stormwater management plan.
3. Pond Brook (MA32-24) in the City of Westfield based on past water quality data which indicated elevated levels of fecal coliform contamination.

Bacteria monitoring can provide the necessary data to determine contamination sources and effective solutions. Volunteer Stream Teams can be organized to implement a monitoring program. With valid water quality data collected for several sampling events, funding to implement solutions becomes more readily available.

Based on the 2001 DEP Report, it is also evident that a large number of streams within the Westfield River Basin have the potential to be designated as coldwater fisheries by the Massachusetts Division of Fish and Wildlife. These streams are characterized by clear,

cold, water whose quality is suitable for supporting more sensitive species such as brook trout. In order to demonstrate water quality conditions satisfy the cold water fisheries classifications, water quality monitoring will include collecting data on dissolved oxygen and temperature as required.

The following streams are potential coldwater fisheries and were recommended for further investigation based on the 2001 DEP report:

- West Falls Branch (MA32-13)
- Glendale Brook (MA32-10)
- Kinne Brook (MA32-32)
- Middle Branch of the Westfield River (MA32-03)
- Depot Brook (MA32-17)
- Shaker Mill Brook (MA32-18)
- Walker Brook (MA32-20)
- Sanderson Brook (MA32-31)
- Roaring Brook (MA32-30)
- Potash Brook (MA32-22)
- Moose Meadow Brook (MA32-23)
- Bedlam Brook (MA32-33)
- Dickinson Brook (MA32-34)
- Little River (MA32-35 & 36)
- Powdermill Brook (MA32-09)
- Pond Brook (MA32-24)
- Great Brook (MA32-25)
- Miller Brook (MA32-27)
- White Brook (MA32-28)

Once documentation is collected, streams could be listed as coldwater fisheries in the next revisions of the Massachusetts Surface Water Quality Standards.

Project tasks include:

1. Convene a Study Design Steering Committee consisting of state, federal and local agencies tasked with water quality monitoring to identify sampling goals and objectives and identify sampling locations.
2. Develop a Quality Assurance Project Plan (QAPP) for water quality monitoring and data collection.
3. Organize and train a volunteer Stream Team to collect water quality data. *(Note: Stream Teams are being formed in the watershed in the Summer '06 to perform visual assessments of select river segments. This project is being coordinated by the Westfield River Wild and Scenic Advisory Committee.)*
4. Collect bacteria data at the three selected sites during two sampling events.
5. Collect dissolved oxygen and temperature data at 19 selected sites during two sampling events.

PROJECT COST: approximately $32,500

- $10,000 to develop QAPP for monitoring program
- $1,500 for 1 day volunteer training program
- $5,000 to implement/coordinate monitoring program
- $10,000 laboratory analysis (bacteria and nutrients)
- $6,000 data analysis and development of monitoring report

PROJECT #3: Implement a Stormwater Pollution Reduction Program

GOAL: Maintain the integrity of the aquatic ecosystems and protect the quality and quantity of surface and groundwater drinking supplies.

OBJECTIVE: Implement cross-municipal land use controls and regulatory improvements for groundwater and surface water resource protection.

LOCATION: Westfield River Watershed

DESCRIPTION: Work with watershed communities to implement environmental performance standards for the management of stormwater in local bylaws. Develop community tools needed to effectively implement new stormwater bylaws such as: permit checklists for both applicants and town boards, site inspection checklists for designated enforcement officer, strategies for improved communication between town boards such as pre-permit/development review by all town boards, and new bylaw training for all town boards. This project would seek cross-municipal regulatory consistency in those communities with shared water resources.

Strategy #1 Low Impact Development (LID) Bylaws
LID is the combination of environmentally sensitive site planning for the protection of important resource areas and the use of innovative structural best management practices with performance standards for effective treatment and recharge of stormwater.

Strategy #2 Strengthen Wild and Scenic Riverfront Protection Bylaws

- Increase the width of district's required buffer strip to reflect MA River Protection Act requirements;
- Provide for better bylaw enforcement, including non-criminal disposition provisions;
- Restrict parking or storage of vehicles or construction materials within the buffer area; and,
- Add environmental performance standards for uses by Special Permit including single-family homes.

Strategy #3 Improve Aquifer and Surface Water Supply Protection Bylaws
Updates to water supply protection bylaws could include: compliance with current DEP regulations, environmental performance standards, expansion of allowable best management practices, requirements for operation and maintenance, and requirements for hazardous material spill prevention planning.

Strategy #4 Implement Upland Zoning Bylaws
This type of bylaw seeks to define the amount of upland, or non-regulated resource area, that must be available for a lot to be buildable.

Strategy #5 Implement Erosion and Sediment Control Bylaws
This can be done as a stand alone stormwater bylaw or through LID.

PROJECT COSTS: $75,000

PROJECT #4: Fish Restoration and Migration Barrier Removal

GOAL: Maintain the integrity of the aquatic ecosystems and protect the quality and quantity of surface and groundwater drinking supplies.

OBJECTIVE: Support the restoration of migratory fish and resident fish populations to the Connecticut and Westfield Rivers.

LOCATION: West Branch and East Branch Subwatersheds

DESCRIPTION: The network of roads and transportation infrastructure within the Westfield River Basin has led to fragmentation of aquatic ecosystems. River and stream continuity is disrupted in many areas from road crossings which were originally designed with little, if any consideration for maintaining aquatic ecosystem functions. The lack of continuity created by road crossings is an obstacle to restoring native migratory fish species within the basin.

The Massachusetts Riverways River Continuity Project is a collaborative effort of the Riverways Program, the University of Massachusetts Extension Program, the Nature Conservancy (TNC) and other nonprofit and agency partners which have been working to address concerns of the impact of road-stream crossings on the movement of aquatic species. Through the project, a database with information on the status of existing crossings has been compiled. The database has been used to prioritize problem crossings for possible retrofit/replacement projects. The following five road crossing sites have been given highest priority for restoration:

- Town of Chester – Johnson Hill Road and Otis Wait Brook
- Town of Chesterfield – Curtis Road and Page Brook
- Town of Chesterfield – East Street and Baker Brook
- Town of Chesterfield – South Road and Dead Branch
- Town of Windsor – Route 9 and Shaw Brook

These crossings ranked as "Tier 1" subwatersheds according to TNC's watershed prioritization, "highest" priority based on the UMASS stream prioritization and also scored as severe barriers to river continuity. These crossings will be reviewed for feasibility of conducting retrofit/replacement projects based on site conditions. Improvements to these crossings can aid in the restoration of migratory fish species and improve habitat connectivity for other aquatic life. Project tasks include:

1. Conduct field investigations at each of the five high priority sites for the possibility of a restoration project.
2. Collect existing survey, engineering and biological data to support feasibility assessment.
3. Prepare feasibility assessment, evaluate alternatives at each crossing and identify permitting requirements.
4. Develop conceptual design plans for each crossing.

PROJECT COST: approximately $75,000

PROJECT #5: Public Education and Outreach – Sense of Place Campaign

GOAL: Recognize, maintain and protect remarkable river and stream corridors.

OBJECTIVE: Collaborate with government agencies, watershed organizations, land trusts, municipalities and private citizens to ensure protection of remarkable river and stream corridors.

LOCATION: Westfield River Watershed

DESCRIPTION: This project will complement on-going watershed-based projects by providing design and print of outreach materials for distribution a public offices, stores, libraries, and publicly-owned kiosks at river access points. Material will seek to promote awareness of the National Wild and Scenic designation and promote strategies and best management practices for the protection of the watershed.

Additionally, this project will engage local schools in river education and outreach through the development of a River Festival for school-aged children and their families. The River Festival will be based on the Water Festival model established and published by The Groundwater Foundation, a national groundwater advocacy organization founded in 1985. This one-day event will provide an opportunity for students, their families and teachers from across the region to come together with natural resource experts to learn about surface and groundwater resources from within a watershed-based framework through innovative hands-on activities. The festival is designed to be fun and memorable for students as well as informative for adults making everyday decisions about water management issues.

River Festival activities and events could include:

- Children create their own "Aquifer-In-A-Jar" by layering materials and then "polluting" it with food coloring to see how contaminants move through subsurface environments.
- Students examine and learn about aquatic insects through microscopes connected to television monitors.
- Teams prepare and compete in "Puddle Pictures" (based on Pictionary) and "Dripial Pursuit" (based on Trivial Pursuit) tournaments with other schools.
- High school drama students perform skits and involve children with audience participation; Interpretive dance sessions for the movement of raindrops, the river, etc.
- Students write their own public service announcements or commercials to be performed for a video camera.

PROJECT COSTS:

$15,000 Outreach materials in support of on-going projects

$35,000 River Festival

PROJECT #6: Analysis of Buildout on Water Resources with the Barnes Aquifer

GOAL: Maintain the integrity of aquatic ecosystems and protect the quality and quantity of surface and groundwater supplies

OBJECTIVE: Identify sources of nonpoint source pollution to surface and groundwater resources.

LOCATION: Barnes Aquifer Zone II

DESCRIPTION: The Barnes Aquifer is a regionally important aquifer serving the communities of Westfield, Southampton, Easthampton and Holyoke. Residential, commercial and industrial development is occurring within the Zone II at an increasing rate. Although each of these communities has aquifer protection bylaws that prohibit highly threatening uses and encourage clean recharge of stormwater, increasing areas of impervious surfaces may contribute to reduced aquifer quantity. Less water would impact communities' ability to grow. Given the current water shortages facing Massachusetts communities, it is important to understand the limitations of our water resources so that we may plan accordingly for future growth.

To plan for future growth within the Towns that withdraw water from the Barnes Aquifer, the capacity of municipal wells within the Aquifer needs to be determined based on projected buildout. Using the approach developed by the Executive Office of Environmental Affairs's (EOEA) Buildout Analysis, predicted populations for the four communities that withdraw water from municipal wells within the Barnes Aquifer will be calculated to quantify future water demand. The basis for this assessment will be readily available information (EO418 Buildout Analysis, Water Management Act permit limits, well pumping capacities ect…).

The predicted water demand under buildout conditions will be used as a conservative measure to assess potential impacts of the future water withdrawal on natural streamflow (recharge). The water budget analysis will take into account the current and potential water supply capacity as well as the current and potential water demands of communities within the Aquifer. The water budget approach is a relatively simple accounting of water inputs (wastewater discharges) and outputs (water supply withdrawals, inflow and infiltration, irrigation and recharge loss of impervious areas) in the study area, and uses streamflow as a general measure of hydrologic impact. The principal inputs and outputs of water within the sub-basins in the Aquifer will be quantified and a relative net human impact will be determined. The net human impact will then compared to the estimated natural streamflow for each sub-basin in the study area to determine the human impact relative to natural streamflow (net gain or loss).. With the water budget in hand, communities can better understand and minimize the adverse effects of their water supply withdrawals and impervious area coverages to the Aquifer.

The long-term viability of the Barnes Aquifer is also compromised by contamination from TCE and road salt within portions of the Zone II. To identify the affect of this contamination the aquifer classification system of the Massachusetts Contingency Plan (MCP) will be used. The MCP classifications will assist in characterizing the affect this

contamination may have on the potential drinking water source areas and future water supply capacity areas within the Aquifer.

Project tasks include:

1. Use buildout model to calculate future populations within Westfield, Southampton, Easthampton and Holyoke.
2. Determine future water demand under buildout conditions within the Barnes Aquifer.
3. Determine whether existing municipal wells within the Barnes Aquifer will have the capacity to meet the expected increase in demand (projected buildout demand vs. WMA permitted withdrawal capacity).
4. Assess impacts of future water withdrawal on water budget.
5. Account for the contamination within the Barnes Aquifer in calculating future water demand.

PROJECT COST: $40,000

Westfield River Watershed Goals and Objectives

This section provides a combined summary of the goals and objectives identified for the Westfield River watershed from the following sources:

- Westfield River Watershed Open Space and Recreation Plan (PVPC, 2003);
- Massachusetts Watershed Initiative -Westfield River Watershed Team Work Plans 1999-2004;
- Local Open Space and Recreation Plans
- Feedback from the Westfield River Watershed Action Plan Steering Committee; and,
- Public comment.

For each objective, potential partners and funding sources have also been identified. In previous sections of this plan, each objective referenced a specific objective # that corresponds to the objectives in this table. Thus, the partners and funding noted for that objective are likely to be involved with the specific actions recommended under each objective throughout this plan.

Goals and Objectives	Potential Partners	Potential Funding Sources
Goal #1: Maintain the integrity of aquatic ecosystems and protect the quality and quantity of surface and groundwater drinking supplies		
Objective 1-1: Identify sources of nonpoint source pollution to surface and groundwater resources	○ Westfield River Watershed Association ○ DEP ○ Regional Planning Agencies (PVPC, FRCOG, BRPC) ○ Westfield River Wild and Scenic Committee ○ Municipalities	○ DEP Section 604b Grant ○ Section 104(b)(3) Wetlands and Water Quality Grant Program ○ USGS Water Resources Research Act Grant
Objective 1-2: Conduct public education, outreach and planning about restoration and protection of surface and groundwater resources .	○ Regional Planning Agencies (PVPC, FRCOG, BRPC) ○ WRWSAC ○ WRWA ○ TNC ○ TTOR ○ Municipalities	○ EOEA ○ DEP Section 319 ○ DCR Rivers and Harbors Grant Program ○ US Fish and Wildlife Service Challenge Cost Share Grant ○ Riverways Urban Rivers Small Grants ○ Mass. Environmental Trust

Objective 1-3: Implement cross-municipal land use controls and regulatory improvements for groundwater and surface water resource protection	○ Regional Planning Agencies (PVPC, FRCOG, BRPC) ○ DEP ○ Municipalities	○ Smart Growth Technical Assistance
Objective 1-4: Implement structural best management practices to control point and nonpoint sources of pollution	○ Regional Planning Agencies (PVPC, FRCOG, BRPC) ○ DEP ○ Westfield Watershed Association ○ Municipalities ○ MassHighway ○ Mass Turnpike Authority	○ Riverways Urban Rivers Small Grants ○ Section 319, Federal Clean Water Act ○ Self-Help Program ○ Mass. Environmental Trust
Objective 1-5: Implement measures to ensure stream continuity and adequate stream flow .	○ Regional Planning Agencies (PVPC, FRCOG, BRPC) ○ U.S. Fish and Wildlife Service ○ Westfield River Wild and Scenic Committee ○ Westfield River Watershed Association ○ Army Corp of Engineers ○ Riverways, Mass. Dept. of Fisheries	○ Riverways Urban Rivers Small Grants ○ Section 319, Federal Clean Water Act ○ Self-Help Program ○ Mass. Environmental Trust
Objective 1-6: Support the restoration of migratory and resident fish populations to the Connecticut and Westfield Rivers .	○ Regional Planning Agencies (PVPC, FRCOG, BRPC) ○ Municipalities ○ U.S. Fish and Wildlife Service ○ Westfield River Wild and Scenic Committee ○ Westfield River Watershed Association ○ Riverways, Mass. Dept. of Fisheries ○ NOAA ○ USGS ○ American Rivers ○ Trout Unlimited ○ The Nature Conservancy ○ Fish America ○ Massachusetss Corporate Wetlands Restoration Partnership ○ Connecticut River Watershed Council (CRWC)	○ Riverways Urban Rivers Small Grants ○ Section 319, Federal Clean Water Act ○ Self-Help Program ○ Mass. Environmental Trust
Objective 1-7: Encourage municipal ownership and protection of important recharge areas and watersheds to surface and groundwater drinking sources	○ EOEA ○ Westfield River Watershed Association ○ Springfield Water and Sewer Commission ○ Westfield River Wild and Scenic Committee ○ Municipalities ○ Land Trusts	○ DEP Source Water Protection Grants ○ Community Preservation Act

Goal #2: Recognize, maintain and protect remarkable river and stream corridors		
Objective 2-1: Identify important stream corridors, headwaters, and adjacent wetlands in need of protection	○ TNC ○ EOEA ○ Westfield River Watershed Association ○ Westfield River Wild and Scenic Committee ○ Municipalities ○ Land Trusts	○ EOEA ○ Riverways Urban Rivers Small Grants ○ Section 319, Federal Clean Water Act ○ Self-Help Program ○ Mass. Environmental Trust
Objective 2-2: Collaborate with government agencies, watershed organizations, land trusts, municipalities and private citizens to ensure protection of remarkable river and stream corridors in perpetuity	○ EOEA ○ Westfield River Watershed Association ○ Westfield River Wild and Scenic Committee ○ Pioneer Valley Planning Commission ○ TNC ○ TTOR ○ Municipalities	○ EOEA ○ Riverways Urban Rivers Small Grants ○ Section 319, Federal Clean Water Act ○ Self-Help Program ○ Mass. Environmental Trust
Objective 2-3: Recognize remarkable and important river and stream corridors	○ Westfield River Watershed Association ○ Westfield River Wild and Scenic Committee ○ Mass. Heritage ○ Dept. of Fisheries, Wildlife, & law enforcement ○ Municipalities ○ Local Colleges and Universities ○ Local Garden clubs or Volunteer Groups	○ EOEA ○ Riverways Urban Rivers Small Grants ○ Section 319, Federal Clean Water Act ○ Self-Help Program ○ Mass. Environmental Trust
Goal #3: Protect natural resources, unfragmented forest blocks and significant habitats		
Objective 3-1: Encourage communities and conservation groups to develop natural resource inventories and plans	○ Municipalities ○ Westfield River Watershed Association ○ Land Trust ○ Westfield River Wild and Scenic Committee ○ Regional Planning Agencies (PVPC, FRCOG, BRPC) ○ TTOR ○ Local Schools	○ Riverways Urban Rivers Small Grants ○ Section 604b, Federal Clean Water Act ○ Mass. Environmental Trust ○ EOEA for cost share on Stewardship Plans ○ Forest Land Enhancement Program (FLEP)
Objective 3-2: Promote land conservation as a tool for protecting natural resources	○ Municipalities ○ Westfield River Watershed Association ○ Land Trust ○ Westfield River Wild and Scenic Committee ○ Regional Planning Agencies (PVPC, FRCOG, BRPC) ○ DCR Service Forestry Program	○ National Parks Service ○ TNC

Objective 3-3: Promote local education programs that encourage a high standard of land management on private property within the watershed	○ EOEA ○ Massachusetts Department of Environmental Protections ○ Regional Planning Agencies (PVPC, FRCOG, BRPC) ○ DCR Service Forestry Program ○ Local Schools ○ Municipalities	○ DEP Aquifer Land Protection Program ○ SWAP Grants for prioritizing land protection in drinking water supply areas ○ Municipalities Land Acquisition funds (CPA)
Objective 3-4: Identify populations of invasive exotic plants and work to control them throughout the Connecticut and Westfield watersheds	○ USFW Silvio O. Conte National Wildlife Refuge ○ New England Wildflwoer Society ○ University of Connecticut ○ Westfield River Watershed Association ○ Westfield River Wild and Scenic Committee ○ Mass. Heritage ○ Dept. Fish and Game ○ Local Colleges and Universities ○ Local Garden clubs or Volunteer Groups	○ EOEA Restoration Program; Mass. Forest stewardship program; Non-game Tax Fund; Land and Water Conservation Fund ○ Fields and Pond Foundation ○ National Fish and Wildlife Foundation ○ TNC ○ Mass Audubon Society ○ TTOR
Goal #4: Conserve agricultural lands and encourage environmentally sound agricultural practices		
Objective 4-1: Promote the use of Chapter 61 A and Agricultural Preservation Restirction (APR) programs among landowners and municipalities Actions:	○ Westfield River Watershed Association ○ Municipalities ○ Conservation groups ○ Colleges and universities ○ Riveryways, Mass. Dept. of Fisheries ○ Mass Department of Food & Agriculture ○ USDA ○ Municipalities	○ USDA ○ Agriculture Business Training Program ○ Agricultural Environmental Enhancement Program ○ Agricultural Preservation Restriction Program ○ Agro-Environmental Technology Grant Program ○ Farmland Stewardship Program ○ Farmland Viability Enhancement Program
Objective 4-2: Provide educational programs to farmers regarding best management practices that allow for successful, productive farms as well as healthy water resources and encourage implementation of appropriate BMPs	○ Westfield River Watershed Association ○ Regional Planning Agencies (PVPC, FRCOG, BRPC) ○ Mass Department of Food & Agriculture ○ USDA ○ Communities Involved in Supporting Agriculture ○ American Farmland Trust ○ Northeast Organic Farming Association ○ The Small Farm Institute ○ Municipalities	○ USDA ○ Agriculture Business Training Program ○ Agricultural Environmental Enhancement Program ○ Agricultural Preservation Restriction Program ○ Agro-Environmental Technology Grant Program ○ Farmland Stewardship Program ○ Farmland Viability Enhancement Program
Objective 4-3: Support locally based agriculture	○ EOEA ○ Regional Planning Agencies (PVPC, FRCOG, BRPC) ○ Mass Department of Food & Agriculture	○ USDA ○ Agriculture Business Training Program ○ Agricultural Environmental Enhancement Program

	○ USDA ○ Communities Involved in Supporting Agriculture ○ American Farmland Trust ○ Northeast Organic Farming Association ○ The Small Farm Institute ○ Municipalities	○ Agricultural Preservation Restriction Program ○ Agro-Environmental Technology Grant Program ○ Farmland Stewardship Program ○ Farmland Viability Enhancement Program
Goal #5: Enhance recreational opportunities for people of all ages		
Objective 5-1: Increase the number of established public access points along the river	○ Riverways ○ DCR ○ Wild and Scenic Committee ○ Westfield River Watershed Association ○ Municipalities ○ Regional Planning Agencies (PVPC, FRCOG, BRPC)	○ Self-Help Grants ○ National Parks Services ○ MA Environmental Trust ○ Riverways Urban Rivers
Objective 5-2: Increase policing and maintenance at existing access points along river	○ Wild and Scenic Committee ○ Westfield River Watershed Association ○ DCR ○ Regional Planning Agencies (PVPC, FRCOG, BRPC) ○ Local Colleges ○ Municipalities	○ MA Environmental Trust ○ Riverways Urban Rivers
Objective 5-3: Maintain updated open space and recreation plans (OSRPs)	○ Municipalities	○ EOEA Smart Growth Technical Assistance
Objective 5-4: Utilize river access points for public outreach about watershed issues and on-going projects	○ Municipalities ○ DCR ○ EOEA - Division of Conservation Services	○ Self Help, Division of Conservation Services
Objective 5-5: Control unauthorized motorized recreational vehicle use in the watershed and provide opportunities for this type of recreation in appropriate places	○ Municipalities ○ Department of Conservation and Recreation ○ EOEA ○ Local Law enforcement ○ Mass Environmental Police	○ Self Help, Division of Conservation Services ○ CDBG ○ Massachusetts Office of Disability ○ Massachusetts Office for the Blind ○ Various Civic or religious organizations (Shriners, American Legions) ○ Massachusetts Rehabilitation Commission
Goal #6: Sustain regional character		
Objective 6-1:Adopt growth management bylaws that will protect natural resources and open space and minimize the impacts of new housing,	○ Westfield River Watershed Association ○ Regional Planning Agencies (PVPC, FRCOG, BRPC) ○ EOEA - ○ Municipalities	○ Smart Growth Technical Assistance ○ CDBG ○ DHCD

transportation and economic development	○ DHCD	
Objective 6-2: Promote economic development respectful of the environment and historic resources	○ Regional Planning Agencies (PVPC, FRCOG, BRPC) ○ Municipalities ○ DCR ○ EOEA ○ Land Trusts ○ Local Historical Commissions	○ EOEA ○ Mass Historical Commission ○ CDBG
Objective 6-3: Promote urban beautification	○ Municipalities ○ Division of Conservation Services ○ Regional Planning Agencies (PVPC, FRCOG, BRPC) ○ Land Trust ○ TNC ○ USDA ○ EOEA ○ Appalachian Mountain Club	

Insert Westfield River Basin Map

Insert Water Resources Map

Insert Development Suitability Map

Insert Natural Landscape Map

Insert Land Use Map

Appendix A Westfield River Watershed Action Plan Steering Committee

Christine Duerring	MA Department of Environmental Protection
John Clarkeson	Executive Office of Environmental Affairs
Vandana Rao	Executive Office of Environmental Affairs
Carl Nielsen	ESS Group Inc.
Dan Herzlinger	ESS Group Inc.
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Julie Mueller	Town of Blandford
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Bob Thompson	Town of Chester
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Appendix C Goals, Objectives and Actions Summary

Goal #1: Maintain the integrity of aquatic ecosystems and protect the quality and quantity of surface and groundwater drinking supplies.
Objective 1-1: Identify sources of nonpoint source pollution to surface and groundwater resources
Actions:
Develop a DEP / EPA approved Quality Assurance Project Plan (QAPP) for design of a water quality sampling program on all river segments
Develop Stream Teams
Perform water quality monitoring at hot spots and to assess streambank stability and potential restoration sites along all river segments.
Investigate sources of sediment loading to Yokum Brook, Bradley Brook, Little River, and Powdermill Brook
Conduct bacteria monitoring to better assess the status of Primary and Secondary Contact Recreational Uses and identify sources
Monitor bacteria levels at all swimming areas in watershed including two MA DCR state beaches in Huntington and Windsor
Monitor possible sources of nonpoint source pollution from septic systems
Identify drinking water sources that are threatened by road salt contamination
Identify priority resource areas that are threatened by road salt contamination
Identify abandoned test wells and implement program for capping and decommissioning wells
Support the ongoing TCE contmaination of the Barnes Aquifer investigation led by DEP
Quantify the effects of buildout within the Barnes Aquifer Zone II recharge area to determine capacity of the aquifer to support growth.
Support the Acid Rain Monitoring Project
Objective 1-2: Conduct public education, outreach and planning about restoration and protection of surface and groundwater resources
Actions:
Identify Zone II recharge areas for all groundwater supplies

Sign all drinking water supply watersheds and recharge areas
Educate local officials about water quality and quantity best management practices (BMP's)
Support the Westfield River Watershed Association, Westfield River Wild and Scenic Advisory Committee, Jacobs Ladder Trail Business Association, Pioneer Valley Planning Commission, Berkshire Regional Planning Commission, The Trustees of Reservations Highlands Communities Initiative and other watershed advocate organizations
Support the Westfield River Symposium hosted by the Westfield River Watershed Association
Establish a River Awareness Week, regular lectures, river cleanups and other outreach forums to increase awareness of the river and educate the public about issues critical to river protection.
Develop municipal Spill Response Plans and require such plans for new or redevelopment projects within the watershed that treat, store or generate hazardous materials.
Study importance of Southampton aquifer recharge area in Westfield
Support the expansion of sewer to the Pequot Pond area of Southampton
Identify and certify vernal pools
Identify important headwater areas for protection
Objective 1-3: Implement cross-municipal land use controls and regulatory improvements for groundwater and surface water resource protection
Actions:
Implement a Water Supply Protection District to regulate land use activities on privately owned land with in the watershed and recharge areas of public water supplies
Adopt private well regulations that are consistent with municipal water conservation standards
Enforce the Wetland Protection Act as amended by the Rivers Protection Act
Update, or implement, local river protection bylaw to effectively protect the wild and scenic characteristics of the Westfield River by controlling development that would be inconsistent with the scenic qualities of the river
Create blueways along rivers, lakes, and streams by adopting river protection overlay zones, to supplement provisions in the MA River Protection Act.
Implement pre- and post-construction regulatory bylaws for the treatment and management of stormwater consistent with NPDES Phase II requirements.
Adopt Upland Zoning Bylaws the exclude resource areas from buildable lot dimensions, i.e. bylaw defines uplands as land not regulated under the MA Wetlands Protection Act or local wetland bylaws
Ensure all new building permits issued meet the new BOH groundwater regulation, BOH floor drain regulation and state plumbing code
Objective 1-4: Implement structural best management practices to control point

and nonpoint sources of pollution
Actions:
Review NPDES Phase II Stormwater Plans, extent of compliance, and the effectiveness at minimizing impacts of stormwater runoff from their facilities in the Westfield River and tributaries for: Westfield, Agawam, West Springfield, Southampton, Holyoke, and Southwick
Support the expansion of sewer to the Congamond Lakes area; identify locations of future wastewater treatment plants to accommodate growth and replace failing septic systems
Clean up potential groundwater pollution sources such as the uncapped landfill, farms and residential dumping areas
Stabilize eroded river banks and restore habitat with native species
Implement stormwater treatment BMPs on North and South Pond of the Congamond Lakes
Encourage Vegetative buffers strips (greenways) between development and wetland/river areas.
Upgrade septic system at Knightsville Road gravel operation
Seek low interest loans for septic repair/ replacement; Pursue alternative septic system technologies
Upgrade Green Bridge culvert
Seek redirection of Route 20 storm drain conveyances and outfalls outside of the Zone II in the town center and Strathmore Park.
Assess feasibility, through research and experimentation, of reducing salt content in sand/salt mixes for winter road treatments
Minimize sediment pollution caused by road building and construction near intermittent and perennial streams
Implement programs compliant with NPDES Phase II requirements for illicit discharge detection and elimination, good housekeeping, and pre-and post-construction stormwater controls
Review town maintenance of dirt roads and encourage reduced sediment runoff
Work with Mass Highway to check catch basins and mitigate silitation at Pond Brook and alert with run-off issues
Implement “Pooper Scooper” bylaws and outreach program for excessive amounts of dog feces near Kinne Brook bridge heading towards Dayville
Objective 1-5: Implement measures to ensure stream continuity and adequate stream flows and flow regimes.
Actions:
Evaluate flow data for FERC Project 2631to ensure that run-of-river conditions, minimum flow releases and impoundment fluctuation conditions of the license are being met (Segment 32-5)

Investigate source(s) of aberrant streamflow fluctuations observed using on-line real-time data for USGS gage 01183500
To ensure run-of-river operations all dam operators should install, calibrate, and maintain a continuous streamflow monitoring gage or determine some other method to ensure compliance with run-of-river operations
Evaluate outlet control practices at Bearhole Reservoir
Evaluate streamflow conditions and water quality and effectiveness of the current NPDES permit limits in Little River and Cook Brook
Require appropriate limits and monitoring on the Renaissance Manor NPDES permit (Segment 32-06)
Work with US Army Corps of Engineers on dam release issues and flooding problems at Rocky Brook Drive
Objective 1-6: Support the restoration of migratory and resident fish populations to the Connecticut and Westfield Rivers
Actions:
Develop fish passage alternatives at identified dams and culverts blocking migration pathways
Continue to conduct biological monitoring (habitat, benthic and fish populations) to evaluate the status of the Aquatic Life Use
Perform an upstream/downstream benthic macroinvertebrate community study to document improvements associataed with upgrades to the Westfield WWTP, Yokum Brook dam removal, and flow alterations on the Little River
Perform long-term monitoring of fish populations to investigate possible long-term effects of salmon stocking on reproducing wild trout populations
Conduct fish population sampling to determine effectiveness of fish passage facilities at FERC licensed and exempt projects
MDFW should designate river segments identified by DEP as cold water fisheries in the next revision of the Surface Water Quality Standards
Increase public awareness about fish restoration programs and promote volunteer efforts to restore migratory and local fish populations
Objective 1-7: Encourage municipal ownership and protection of important recharge areas and watersheds to surface and groundwater drinking sources.
Actions:
Develop land acquisition programs for watersheds, recharge areas and headwaters of drinking water sources (donation/purchase)
Begin conversions and negations with landowners abutting Horn Pond about fee-simple purchase of land or purchase of development rights through a conservation restriction (deed restriction). Options include purchase of entire properties or the 100-200-foot buffer of land surrounding the pond.
Goal #2: Recognize, maintain and protect remarkable river and stream corridors

Objective 2-1: Identify important stream corridors, headwaters, and adjacent wetlands in need of protection.
Actions:
Identify unprotected parcels of watershed property and prioritize for acquisition
Identify critical sections of wetland resources along the Westfield River corridor
Objective 2-2: Collaborate with government agencies, watershed organizations, land trusts, municipalities and private citizens to ensure protection of remarkable river and stream corridors in perpetuity
Actions:
Adopt headwaters overlay zoning
Seek long term protection of wetlands, headwaters, and buffer zones throughout watershed through acquisition, deed restriction, or donation
Acquire funding to create a blueway network
Work with private landowners through conservation restrictions or land acquisition by a land trust to protect the Drowned Lands
Consider a Community Preservation Act or a fund to purchase land.
Continue to use the Community Preservation Act
Objective 2-3: Recognize remarkable and important river and stream corridors
Actions:
Reclassify the Little River and its tributaries from the source at the outlet of Cobble Mountain Reservoir Dam in Russell to the dam northwest of Gorge Road, Russell from Class B to Class A Public Water Supply in the next revision of the Surface Water Quality Standards.
Remove the CSO designation on the lower Westfield River (Segments 32-06, 32-07, 32-08)
Goal #3: Protect natural resources, unfragmented forest blocks and significant habitats.
Objective 3-1: Encourage communities and conservation groups to develop natural resource inventories and plans
Actions:
Encourage ecological inventories and the study of forest blocks by landowners, conservation organizations, and public agencies

Establish dialogue with MA Fish and Game Dept., PVPC, and Umass Extension to explore wildlife habitat improvement
Link existing protected lands together into protected corridors.
Create an animal and plant habitat inventory
Objective 3-2: Promote land conservation as a tool for protecting natural resources
Actions:
Provide funding for and public awareness of Agricultural Preservation Restrictions (APR) and Conservation Restrictions (CR) as a means to permanently protect open space.
Encourage land exchange of tax-title land with abutting owners to establish connected town owned parcels, tax deductions for owners donating small undevelopable parcels to the town for conservation, or private land trusts
Advocate for state income tax deductions for land gifts and bargain sales of land for conservation
Identify lands eligible for MGL Chapter 61 Programs (Ch. 61 for forestland, Ch. 61A for agriculture, Ch. 61B for recreation)
Inventory existing Chapter 61 lands and set priorities for conservation
Support The Nature Conservancy's program to protect so-called Forest Matrix Blocks
Objective 3-3: Promote local education programs that encourage a high standard of land management on private property within the watershed
Actions:
Pursue public outreach to land owners on planning and management of mining operations, including restoration of gravel pits and other sites after extractions of material is completed. Prepare a town wide inventory of sand a gravel pits and store quarries. Explore conservation of important gravel and sand resources.
Promote the use of the Forest Stewardship Program as an incentive for conservation of forestlands on private land.
Establish fire ponds.
Involve Massachusetts Forestry associations, DCR Service Forestry Program and Forest Stewardship Program.

Objective 3-4: Identify populations of invasive exotic plants and work to control them throughout the Connecticut and Westfield watersheds
Actions:
Work with DCR and other agencies to inventory potential invasive plant species in town.
Develop plans to address removal and control of invasive plants

Remove plants along the Jacobs Ladder Trail Corridor that are diseased, damaged, visually obstructive or invasive exotics
Goal #4: Conserve agricultural lands and encourage environmentally sound agricultural practices
Objective 4-1: Promote the use of Chapter 61 A and Agricultural Preservation Restirction (APR) programs among landowners and municipalities
Actions:
Promote conservation restrictions that allow for continued agricultural and forest management in order to maintain farms and productive forests. Inventory prime farmland and productive soils.
Inventory and assess agricultural lands appropriate for protection
Objective 4-2: Provide educational programs to farmers regarding best management practices that allow for successful, productive farms as well as healthy water resources and encourage implementation of appropriate BMPs
Actions:
Provide outreach to farmers about nutrient, pesticide and herbicide management as well as vegetative buffers for water resource protection
Implement agricultrual BMPs on Powdermill Brook in the vicinity of the Russellville Road crossing and in the Moose Meadow Brook subwatershed
Objective 4-3: Support locally based agriculture
Actions:
Support Organizations that promote land conservation and the agricultural infrastructure and economy (Berkshire Grown, CISA, NOFA, etc.)
Establish farmer's markets and/or farm stands throughout the region
Goal #5: Enhance recreational opportunities for people of all ages
Objective 5-1: Increase the number of established public access points along the river
Actions:
Maintain and increase maintenance at river access points
Assess yokum Brook for safe and accessible swimming areas

Gain trail access through acquisition or easements to streams and ponds
Objective 5-2: Increase policing and maintenance at existing access points along river
Actions:
Work with local communities and watershed stakeholders to implement maintenance programs such as regular trash pickup at river launch areas
Work with DFG to implement more regular patrols of at river access points
Objective 5-3: Maintain updated open space and recreation plans (OSRPs)
Action:
Assist municiplaities in updating their OSRPs every five years
Objective 5-4: Utilize river access points for public outreach about watershed issues and on-going projects
Action:
Construct kiosks at major river access points for use as public outreach vehicles
Objective 5-5: Control unauthorized motorized recreational vehicle use in the watershed and provide opportunities for this type of recreation in appropriate places
Action:
Work with watershed communities to identify appropriate locations for motorized recreational vehicle use and perform outreach to inform users about these areas
Work with DFG to implement ticketing and vehicle confiscation operation for trespassing
Goal #6: Sustain regional character
Objective 6-1:Adopt growth management bylaws that will protect natural resources and open space and minimize the impacts of new housing, transportation and economic development
Actions:
Adopt Site Plan Approval Zoning Bylaw

Adopt environmental performance standards for commercial, industrial, and residential development to ensure treatment and recharge of stormwater, nonpoint pollution control, air quality, and erosion and sediment control
Adopt growth management bylaws such as: scenic upland zoning, back lot with open space zoning, shared driveways, erosion and sediment controls, natural resource protection overlay districts, flexible development, transfer of development rights, hazardous material by-law, right-to-farm bylaw, Low Impact Development bylaw
Objective 6-2: Promote economic development respectful of the environment and historic resources
Actions:
Ensure that local and regional transportation plans and projects meet the needs of all watershed towns (e.g. road salt, erosion, town character)—work to implement Mass Highway's "Fix it First" initiative.
Provide tax incentives for part-time agricultural and forestry operations
Adopt Community Preservation Act (CPA) in all watershed towns and cities
Pursue Scenic Byway Designation on appropriate roads
Objective 6-3: Promote urban beautification
Action:
Launch urban forestry programs by taking advantage of funding from the Department of Conservation and Recreation

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