IV. Environmental Inventory and Analysis

A. Geology, Soils and Topography

Bridgewater is in the northwestern portion of the Old Colony Planning Council Region and in the Greater Brockton sub-region consisting of Abington, Avon, Brockton, Bridgewater, East Bridgewater, Easton, Stoughton, West Bridgewater, and Whitman.

The terrain has limited relief ranging from 10 feet above mean sea level (MSL) along the southern end of Taunton River to 175 feet MSL at Sprague's Hill and 157 feet MSL at Great Hill on the Bridgewater State College Campus. Much of the land is low-lying with poor drainage and scattered wetlands, especially in the southern and western parts of the town.

Overall, this relatively developed town has many streams, scattered ponds (often man-made impoundments). These are its most prominent geologic features it also has commonly tight glacial soils limiting on-site disposal opportunities and groundwater yields. While the region's extensive drainage system has many streams, none except the Matfield River, the Town River and the Taunton River itself are very large because the communities are close to the headwaters of the several basins.

Similarly, the town has very few major streams beyond the South Brook because most streams run for a short distance to the Town and Taunton Rivers, as discussed under Water Resources.

The climate is temperate, lacking the extremes found in the south, the far north or the interior of the country, and without the range of precipitation of the northwest or desert regions. Yet there is enough of a range of temperature and weather to give us serious winter storms, rare but dramatic hurricanes, and occasionally dangerous heat waves. One fairly constant factor is the annual 40-plus inches of rain needing to be accommodated by the streams and wetlands, or stored for use.

Soils

The various soils' suitability for septic systems can help to prioritize open space acquisitions if two similar sites have very different potential for development. Similarly, in cases where maintaining the amount and quality of ground water recharge is a concern a site's recharge value may be an important consideration. However acquisition should not be crucial in outlying areas if adequate protective regulations are in place - as they are in Bridgewater.

Glacial till is found in drumlins - oval hills formed by the moving glacier. These are shaped like half a football sliced the long way, and are commonly oriented north-south like that on Forest Street just east of South Street. They usually contain layers or lenses of clay along with gravel and other materials and can be very tight, as noted above. They absorb septic system effluent slowly and shed water rapidly sometimes compounding local drainage issues, but they also offer good building sites in popular scenic hillside locations. Thus any un-built upon drumlins would deserve a strong consideration for at least partial protection.

Fluvial (outwash) soils are deposited by glacial melt-water streams and typically contain much sand and gravel. There are found throughout Bridgewater. Such soils offer good (or sometimes excessively rapid) septic effluent absorption and can hold much groundwater.

Lacustrine (lake bottom) soils are fine-textured silt and clay deposited by flowing glacial melt-water beyond the point where heavier sand and gravel settle. The large glacial Lake Taunton covered much of the Bridgewater area leaving thick silt and clay deposits, particularly in the southern and eastern sections of the town. These areas are quite difficult to serve with septic systems and lead to extensive areas with septic limitations. Such soils are can also be found along streams as with the clay pits at the former and present Stiles and Hart Brick Works on the Town and Taunton Rivers respectively.

Organic soils reflect incompletely-decayed plant material and are found in the northeastern corner of the town in the Hockomock Swamp. They can hold large amounts of water, slowly releasing it to streams and even more slowly releasing it to the underlying aquifers. They are poorly suited for septic systems or groundwater recharge and make poor building sites particularly when composed of easily compressed peat.

The patterns of soils with severe limitation for septic systems and those with great potential for ground water recharge indicated in the 1969 Plymouth County Soils Survey by the former Soil Conservation Service, noted in Chapter III, are very complex, as are those from the current Plymouth County Soils Survey by the Natural Resources Conservation Service (NRCS). However, mapped data from the first survey is not available digitally and it is not available yet in for the Bridgewater area from the second. The following map (Figure IV-1) from the NRCS shows the more generalized patterns of Soil Map Units, i.e., groups of soils commonly found together. While the individual soils will vary in some traits, they are described as parts of such units in the following April, 2000 listing of General Soil Map Units found in Bridgewater.

1. Birchwood-Poquonock-Matapoisett
   Very deep, nearly level to moderately steep, well-drained to poorly-drained soils formed in sandy mantled (sic) underlain by loamy firm to friable glacial till in areas of ground moraines and uplands.

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2. Freetown-Swansea-Scarboro
   Very deep, nearly level, very-poorly drained soils formed in very-deep to shallow freshwater organic deposit, underlain by glacial fluvial deposits in swamps and depressions. Such soils would be severely limited for septic systems or groundwater recharge.

3. Hinckley-Windsor-Deerfield
   Very deep, nearly level to steep, excessively to moderately well-drained soils formed in glacial fluvial deposits on outwash plains, deltas, kames, and ice contact deposits. These could be too well drained for effective treatment by septic systems, but would be good for ground water recharge.

4. Scituate-Montauk-Norwell
   Very deep, gently sloping to steep, well-drained to poorly-drained soils formed in loamy glacial till overlying dense glacial till; on upland oval hills (drumlins) and ground

moraines. These are apt to be poor for septic system and for ground water recharge due to the underlying dense material obstructing downward movement.

9. Raynham-Scio-Birdsal

Very deep, nearly level to gently sloping, moderately well-drained to poorly-drained soils formed in silty lacustrine deposits. These too, are apt to be poor for septic system and for groundwater recharge due to the underlying dense material obstructing downward movement.

10. Woodgbridge-Paxton-Ridgebury

Very deep, gently sloping to steep, well-drained to poorly-drained soils formed in loamy glacial till overlying dense glacial till; on upland oval hills (Drumlins) and on ground moraines. Again these are apt to be poor for septic systems and groundwater recharge despite well-draind surface soils.

The soils best suited for septic systems are those that are well-drained, but not excessively well-drained on level or gently sloping land with no shallow underlying layers of dense silt or till. They can benefit from being over well-sorted glacial fluvial soils unless coarse underlying soils offer inadequate treatment as the water percolates toward ground water.

As noted above, well-drained soils over firm or dense glacial tills will be less suitable for septic systems or ground water recharge because the percolating water will be excessively slowed by the firm layer, often called fragipan.

Moderately or poorly-drained soils over freshwater organic deposits (commonly called peat) or over silty lacustrine (lake) deposits are the least suitable for septic systems or recharge. Thus unit #1, Birchwood-Poquonock-Mattapoisett, is found over much of Bridgewater's undevelopable Hoclomock swamp lands, and #9, Raynham-Scio-Birdsal, is over much of the tight clay soils along the Town and Taunton Rivers (leading to the creation of the Stiles and Hart brick works.)

In all, the map of soil units gives limited guidance to developability since most units contain a range of drainage characteristics and varied underlying soils. Even maps organized by limitations for septic systems can give only rough guidance to developability since many large lots will contain some soil which will percolate quickly enough for a system to be approved. In any case the finer-grain information in the published 1969 Plymouth County Soil Survey and from the even more detailed current survey (when available) are better guides to developability and to groundwater recharge potential than the map of units. Thus the Open Space Committee should refer to this more detailed data if it seeks to prioritize similar acquisition candidates according to their possibilities of the being developed or their recharge potential.

B. Landscape Character

Bridgewater's landscape combines woodlands, wetlands, remaining farm fields including those around the Correctional Complex, views of two major ponds/lakes and occasional glimpses of the Taunton River. It also has, a strong town center, increasing amounts of commercial strip development, outlying low-density neighborhoods, and the major institutional presence of the Bridgewater State College including the iconic Boyden Hall.

Farmlands and meadows bordering major roads are often more appreciated than other less-visible lands because of the views they provide. Most notable are the remaining farms along Plymouth Street and fields rolling down to the River from Plymouth Street at Wyman Meadow, and at the end of Auburn Street at the Lehtola Farm. Other significant expanses are the former State Farm along Summer Street at the BCC, and pastures along South street north of Winter Street (the land discussed under BSOD under Zoning in Chapter I). The approximately 200-acre Cumberland Farms land along the Taunton River is quite extensive with about 4,800 feet of river frontage but is likely to be the least suited to septic systems or recharge. The landscape view from the road is limited to a short section of Curve Street but the land has a major impact on the landscape viewed from the River. It is also across from significant state riverside holdings in Middleborough.

Much of the town's landscape is fading or under threat. In recent years residential and institutional growth have claimed the Imhoff farm, much of the Homenook farm, portions of the Perkins land, the McIntyre farm, the Pole Farm, the Pawlowski Farm, much of the Wyman Farm, woodlands on Pine and Conant Streets, and other former agricultural and forest holdings. In response to these losses and in appreciation of what is left of the town's natural beauty, there have been local efforts to enhance a variety of public land and to preserve farmlands and other open areas. Thus the town purchased the Hogg Farm in 2000 for municipal and recreational use and bought the Wyman Meadow for a well site and conservation use.

With such multi-purpose purchases as with the Wyman Meadow land, it is important to divide the land into the intended municipal and conservation pieces and then to put the conservation land into protected ownership. That way the municipal land remains available for the intended municipal purposes without the legislative acts needed to change the use of "parkland" under the State Constitution's Article 97; and the conservation land is clearly protected - as it would not be as general municipal land.

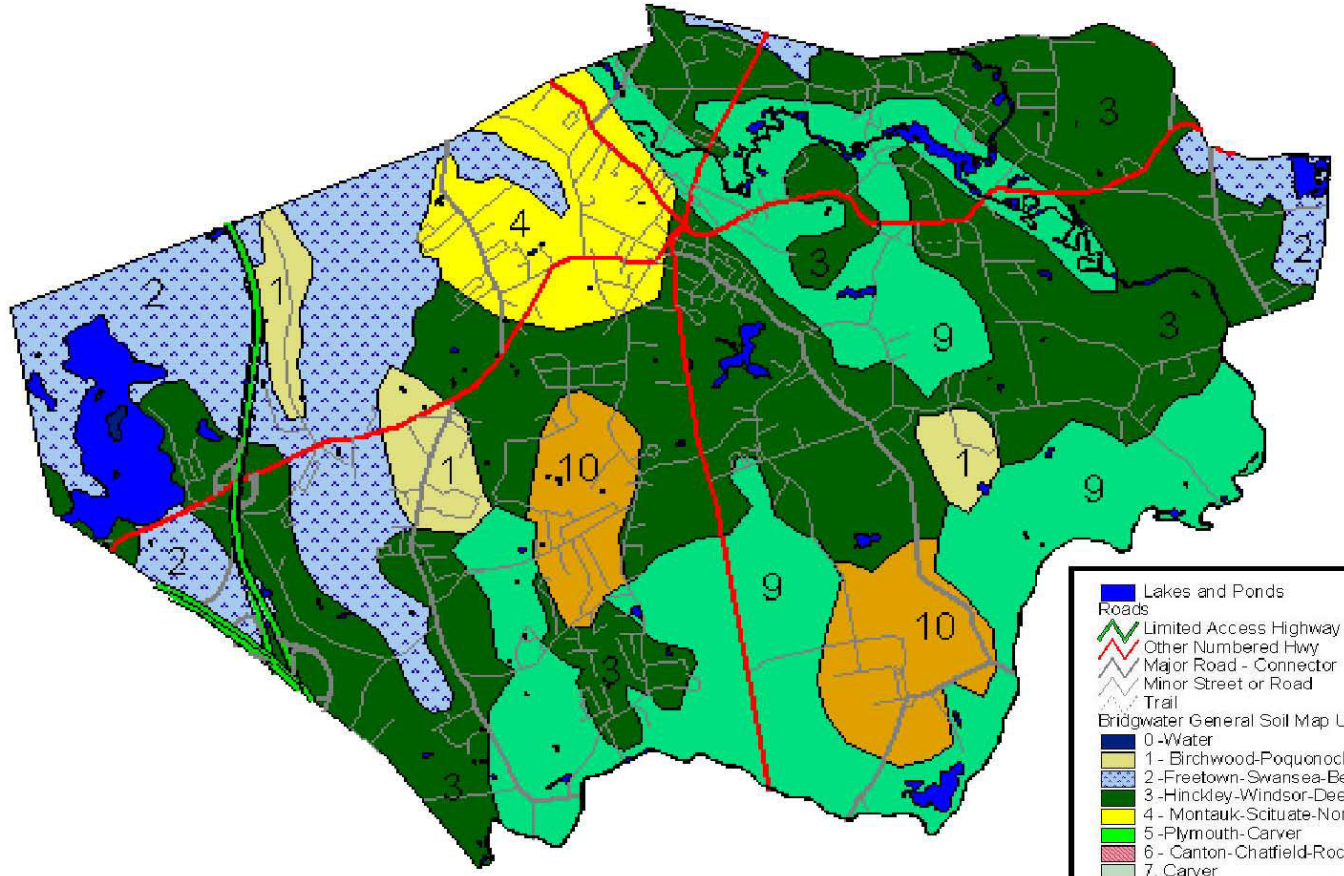
The town has successfully used State Self Help funds to buy the Tuckerwood woodlands in 1998 and the historic Stiles and Hart brick-making site (the former Plymouth County Agricultural Society Fairgrounds) in 1999, along with the Wyman Meadow and the first Self Help project, the Titicut Conservation Parkland. These are all along the Town and Taunton Rivers adding many acres and miles to Bridgewater's proposed protected river greenway. This is a major component of the Conservation Parklands System. See the map of Land of Conservation and Recreation interest in Ch. V.

Earlier in the late 1970s Bridgewater acquired the extensive Chaffee Farm as general open space and then later created the Olde Scotland Links town-owned golf course. The adjacent unused Chaffee Farm land east of the Golf Course is the previously proposed Vernon Street/Chaffee Park intended for further varied recreation use, as discussed in Chapter V.

BRIDGEWATER OPEN SPACE PLAN

GENERAL SOIL MAP UNITS

FIGURE IV-1



GIS DATA SOURCES:
NESOILS, PLYMOUTH COUNTY SOIL SURVEY

OLD COLONY PLANNING COUNCIL 70 SCHOOL STREET BROCKTON, MA 02301 SEPTEMBER, 2008

FIGURE IV-1

BCC and Old State Farm fields between Titcut Street and Summer St.

The character of the streets bordering these scenic areas can enhance the public appreciation of them by having modest widths and curvilinear configurations, following the topography, and guiding the eye to the view where it is safe to look. At the same time, the overall street hierarchy has to meet traffic demands so a design is needed which accommodates inevitable traffic while maintaining flexibility, e.g. one with narrow, curved streets but few cul de sacs and good connectivity to adjacent streets and through routes.

Most early development followed the high ground with roads built along ridges and land sloping away on both sides and most recent development (except for the sewered area around the center) has focused on uplands that are suitable for septic systems. Therefore, as the 2005 draft plan put it, "The greatest concentrations of pristine lands, some private and some public are now found further from public view along major rivers and water bodies." Expansive wetlands and forests of red maples and similar vegetation predominate in such remote areas. These resources are most appreciated by sportsmen and others engaged in such "passive" [quotes ours] or "natural" recreational activities as canoeing and hiking.

Much of the coveted land along the rivers is still unbuilt. The combination of farming in the adjacent rich floodplain soils and the protection offered by the Massachusetts River Protection Act and the Wetlands Protection Act has kept significant portions of the riparian corridors free of development, though some has recently been removed from Ch. 61A lands proposed for subdivision.

Still, all but the wettest, most unbuildable farm land in Bridgewater is vulnerable to change by residential, commercial, or industrial development given the adaptability of innovative and alterative sewage disposal systems. It is also affected by development pressures along Route 24. Only the lands in protective ownership, under conservation restrictions, with the most severe septic limitations, or within the 100-foot to 200-foot streamside fringes protected by the Wetlands and River Protection Acts are beyond risk. (And some land between the 100-foot and 200-foot strip is not always fully protected.)


Foreshortened view of the above fields showing old train station structure and hay bales in distance.

Recent open space plans in Bridgewater and West Bridgewater have proposed a greenbelt along the Town River to protect open space and water resources there, and, in the words of the 2005 Plan submission, to "enhance the effectiveness of open space by concentrating it along a significant feature - the whole Town River Greenway in both communities." This effort, part of the adopted Conservation Parks System program, should build on recent acquisitions along the Town River. It requires a close look at chances for streamside access or potential acquisitions on intervening properties, particularly at the Waterford Village Ch. 40R project noted above.

In contrast to these natural areas is the human-altered landscape. One end of this is the pattern of fields which remain unforested due to farming, haying or related management. At the other end is conscious smaller-scale planting and landscaping of public and private spaces such as parts of downtown Bridgewater. As the January 4, 2005 draft plan submission notes: "Tree-lined streets and plantings at major intersections greet travelers as they enter Central Square. Once there, the efforts of the Bridgewater Improvement Association and other civic organizations draw the visitor's focus to the meticulously maintained Central Common, which boasts sitting areas and memorials." See the map of Scenic Resources and Unique Environments, Figure IV-7.

The 2005 submission goes on to note that "This feeling of connected parks is carried through along Summer and School Streets, incorporating other peaceful and scenic resting places with the beautiful landscaped campus of Bridgewater State College. It is a short walk from here to the Carver's Pond Park. It is part of the town's vision to link pathways to the Stiles and Hart

Conservation Area, thereby pulling this passive resource site into the downtown community landscape and further connecting this portion of the park system to the river greenway."

The town has many scenic ways (not designated Scenic Roads) including those listed below under Scenic Resources.

C. Water Resources

The Stream System

The town is in the approximately 562-square mile Taunton Basin, the second largest in Massachusetts. vIt contains the beginning of the Taunton River where the 14-mile long Town River, originating at Lake Nippenicket and draining much of West Bridgewater, meets the Matfield River. vThe Matfield River draws on the Salisbury Brook and Beaver Brook. These meet in East Bridgewater, to form the Matfield River which then picks up the Satucket River in the Joppa section of East Bridgewater just north of the Bridgewater town line. The Matfield River then flows south to meet the Town River in Bridgewater and to form the Taunton River. See the Water Resources Map.

The basin is unusually flat with only a 20-foot drop over its 40-mile main stem.
This may partly explain the lack of mill dams noted below. The basin is characterized by low permeability glacial till soils and less frequent very coarse sand and gravel outwash soils; by shallow depths to groundwater; and by many wetlands. These features significantly constrain conventional on-site wastewater disposal and may exacerbate storm water runoff issues, but they provide unique habits for aquatic and upland wild life.

Developed land basin-wide has gone from 56,800 acres in 1971, at the time of the second MacConnell Mass Map Down survey, to 92,340 acres in 1999, a 62% increase. With this growth, including much in Bridgewater, has come increased concerns with water quality, water supply, and management of stormwater and waste water. These concerns have led to the ongoing Taunton River Watershed Plan study being coordinated by Bridgewater State College, and to the more waste-water focused Upper Taunton Basin Wastewater Evaluation project. This section draws heavily on the first project's Phase I report.

The Taunton River Basin has 108 sub-watersheds or sub-basins of which six are wholly or partially within Bridgewater. These are typically the areas upstream of the confluence of two second order streams and range from 5 to 10 square miles. The south-central portions of Bridgewater are drained by Sawmill Book and its tributaries running through extensive areas of flood plain and wetlands south of Flagg Street and east of the Bridgewater Correctional Complex and entering the Taunton River just west of Route 18. It is also drained by Snow's Brook and its tributaries flowing through Sturtevant Pond and entering the Taunton River just above the Sturtevant Bridge on South Street. Sturtevant's Pond is an example of the many lesser streams dammed and small ponds enlarged by impoundment in order to power local industries. These have left well-established mill ponds.

The southeastern corner is drained by Beaver Brook and Spring Brook, flowing through an extensive area of 100-year flood plain and entering the Taunton River just west of Auburn Street.

The northwestern corner of the town is drained by the Hockomock River running from West Bridgewater through the Hockomock Swamp to the Town River just upstream of Route 24.

The north-central part of the town is drained north to the Town River by the substantial South Brook which runs through Carver's Pond and Skeeter Mill Pond east of Water Street and through extensive areas of wetlands and 100-year flood plain en route to the river.

The northeastern corner of the town is drained to the Taunton River by Blood Pond Brook flowing through wetlands and Blood Pond to the rRiver.

In all, eight mapped sub-basins (smaller brooks, streams and wetlands draining into the Town, Matfield and Taunton Rivers) drain the town to the Taunton River and ultimately to Mount Hope Bay and Narragansett Bay. Due to the short distance to the Rivers none of these streams is very long or has large flows.

The last dam on the Bridgewater end of the Town River is at the former Stanley Iron Works on High Street just upstream of the beginning of the Taunton River. It produces the long, 450-acre Town River Pond extending well into West Bridgewater.

It is notable that there are no dams on the Taunton River itself except for the very low, deteriorated one at Paper Mill Village just below confluence of the Matfield and Town Rivers. As a result the Taunton is often referred to as the longest free-flowing stream in the state. (Even the mighty Connecticut River is dammed for power and recreation at Turner's Falls.)

Flood Hazard Issues

The following map shows areas in the 100-year and 500-year flood hazard zones. These are largely portions of the Hockomock Swamp in the northwestern corner of the town, and along river-side swamp and farmland. These are mapped in the eastern-most corner of the town just past East Street; from Auburn Street to and along Spring Brook; from Summer Street to Sawmill Brook and adjacent wetlands; on to lowland by Sturtevant's Bridge; south under Forest Street and then though Sturtevant's Pond, and up Snow's Brook to Pleasant Street.

So far, risks and losses due to flood hazards have been slight due to the terrain affected, and to effective regulation. This is discussed further under Environmental Problems below.

Sedimentation

Sedimentation from construction or agricultural runoff can cloud water or cover bottom features fish need for procreation and generally lower water quality, as well as clog drains and increase maintenance. However, Highway Superintendent Bagas reports that stream or pond sedimentation is not a significant problem in Bridgewater due to proper protective practices and natural features. See Section G, Environmental Problems below.

Aquifer recharge

Aquifer recharge is important to maintain to groundwater table which the town relies upon for water supplies. It is also important to maintain water as a general resource, particularly in areas where it is reflected in pond levels.

Recharge is greatest over coarse soils, like sand and gravel, or where it is augmented by use of devices such as the rain gardens or underground recharge galleries used for stormwater management. It is limited over surfaces with a high rate of runoff such as sloping lawns, tight clay-like soils, or ledge, and none occurs over paved surfaces. In such cases water runs more rapidly to storm drains and the stream system, leading to flashy streams and increased downstream flooding.

Recharge is most immediately important where it directly supplies aquifers drawn on for water supplies. Thus it would be important to maintain or increase recharge over the Matfield River and Carver's Pond Zone II areas over which the Aquifer Protection Zoning District is mapped. However, it is also important to maintain recharge in outlying Zone III areas from which groundwater eventually flows to the Zones II (the areas from which water is drawn by a well over a 6-month drought.)

The areas with the greatest recharge potential can be identified on a soil map and they are suggested by the areas with fewest limitations for septic systems, since those limitations frequently reflect tight soils as well as high water tables. (However some lands with highly porous soils have septic limitations due steep slopes.)

In general, the areas with a high recharge potential are quite scattered and often close to soils with severe septic limitations. The areas with a high recharge potential are those with coarse sandy soils with high porosity which allow rapid movement of water down through soil layers to the aquifer. These patterns can be derived from the maps and descriptions in the U.S. Soil Conservation Service's 1969 Plymouth County Soil Survey.

In addition to maintaining the quantity of recharge, it is important to protect its quality. Therefore storm water management systems using leaching catch basins, underground recharge galleries, or detention ponds are often preceded by water quality devices which remove oil or grease along with sediments, particularly those carrying nutrients or contaminants.

For these reason too, areas of high porosity located close to or over Zone II areas should get a higher priority for protection. However the areas with high recharge potential are so frequent and so scattered that would not be practical or necessary to try to protect them all through ownership. Thus Bridgewater should not rely upon landownership and land protection alone to maintain recharge and water quality. Instead it is important that it has to the effective protective regulations discussed earlier combined with subdivision regulations and water management policies minimizing runoff and enhancing recharge in outlying areas, regardless of ownership.

Water Quality

As provided by the Clean Water Act, states may categorize water bodies according to how the meet the standards for their designated uses. The uses include aquatic life support, fish and shellfish consumption, drinking water supply, and primary (e.g., swimming) and secondary (e.g., boating) contact recreation. The results are published with other data in the Integrated List of Waters, and the following draws on the 2006 edition.

The categories are:

1. Unimpaired and not threatened for all designated uses.

2. Unimpaired for some uses and not assessed for others.

3. Insufficient information to make assessments for any uses

4. Impaired or threatened for one or more uses, but not requiring calculation of Total Maximum Daily Load (TMDL), or

4c. Impairment not caused by pollution

5 Impaired or threatened for one or more uses and requiring a TMDL because they are not likely to meet surface water quality standards even "after the implementation of technology-based controls." These are prioritized and scheduled for development of TMDLs for various pollutants and uses.

The rankings therefore reflect the expected uses and may not be directly comparable, but the available information helps to understand the potentials of Bridgewater's water bodies.

As noted in the Old Colony Planning Council's 1974 "Bridgewater Land Use and Natural Features Study", "While Bridgewater marks the beginning of the Taunton River; there are 233 square miles of basin above Bridgewater that eventually flows into the Taunton River before its beginning. Consequently, there is a significant impact on the condition (and volume) of the River (from) areas outside of Bridgewater." Thus both water quality and flooding in Bridgewater are partially affected by upstream pollution controls and storm water management practices with results noted in the 2006 Integrated List of Waters.

Water quality is particularly problematic on the Matfield River which drains developed portions of Brockton and East Bridgewater and carries treated effluent from Brockton's Advanced Waste Water Treatment plant. Thus, low oxygen levels and high nutrient levels were found by the Water Access Laboratory at Bridgewater State College over the ten years up to 2005. Reflecting this, the Category 5 table, "Waters requiring a TMDL" lists the Matfield entering Bridgewater near Bridge Street as needing TMDLs for nutrients, organic enrichment, low dissolved oxygen, pathogens, noxious aquatic plants, and "taste, odor and color."

Similarly, Brockton's upstream Salisbury Plain River receiving the Brockton effluent and flowing to the Matfield is listed as needing TMDLs for organic enrichment /low dissolved oxygen, nutrients, pathogens, "taste, odor and color," noxious aquatic plants, and turbidity. However the on-going upgrade of the Brockton Waste Water Treatment Plant is expected to ease these conditions.

In addition, Meadow Brook, which flows to the Matfield in East Bridgewater, downstream of the Brockton plant is listed as needing a TMDL for pathogens.

Further, the Satucket River, another Matfield tributary issuing from East Bridgewater's Robbins Pond, is listed as Category 2, attaining the standards for aquatic life, primary and secondary contact, and aesthetics, while the Winnetuxet River which joins the Taunton in Halifax is listed as only attaining aesthetic standards on the table of Category 2 bodies "Attaining Some Uses; Others not Assessed." Poor Meadow Brook flowing to the Satucket River in East Bridgewater is listed as Category 3, insufficient information for an assessment.

Finally, Queset Brook, rising in Easton and flowing through West Bridgewater to the Town River via the Hockomock River, is also in Category 3, as is the Town River itself from Lake Nippenickett to its confluence with the Matfield River. No uses are assessed for the Town River in Bridgewater.

The Taunton River itself is listed with no significant impairments in Bridgewater though conditions worsen to the south with organic enrichment/low dissolved oxygen and pathogens.

Water Quality Protection

Water quality is protected by the town's aquifer protection zoning limiting potentially hazardous uses in aquifer recharge areas, by enforcement of the state Sanitary Code (Title V), by the functioning of the Advanced Waste Water Treatment plant operating under the National Pollution Discharge Elimination System Permit (NPDES), and by any provisions encouraging LID practices to reduce direct storm runoff to storm sewers, streams and ponds.

Riverside Acquisitions

Major recently-acquired town holdings along the rivers are:

- The 20-acre Iron Works Site
- The 70-acre Stiles and Hart Site
- The 32-acre Tuckerwood site
- The 35-acre Wyman Meadow next to 15 acres of water land

All but the donated Iron Works Park were acquired through the State's Self Help program.

These join the Self Help-aided 1978 purchase of the 27.8 acre Titicut Conservation Parklands in protecting much river frontage.

Other important riverside properties are

- The 41.2-acre Wildlands Trust of SE Massachusetts North Fork Preserve

- The Highway Department's 20.2-acre riverside sand pit property
- The Water Department's 18.0 acres next to the Titicut Conservation Parkland
- The extensive BCC/Old State Farms lands legislatively protected under Article 97

In addition, the town owns a 2.6-acre unprotected house lot (Map 25/ Lot 81) running from Plymouth Street steeply down to the Taunton River just west of Jillian's Way; and further downstream, west of Routes 18/28 the Wildlands Trust of Southeastern Massachusetts has a Conservation Restriction on a12.69-acre parcel (lot 118/4) off of South street, just east of Dickens Street. This preserves the land, but offers no public access

In all the town, the Wildlands Trust, and the state control at least 3.7 miles of protected river frontage on the Town and Taunton Rivers and about 1.6 miles of partially ("limited") protected Taunton River frontage is owned by the Highway and Water departments, along with a .66 mile stretch of partially ("limited') protected Water Department lands on the Matfield River. These are discussed below in Chapter V, Lands of Conservation and Recreation Interest.

Recently, two federally-supported Taunton River Wild and Scenic Feasibility Studies for the upper and lower rivers were combined in one nomination which led to the federal designation of the Taunton River as a Wild and Scenic River. The study was facilitated by the National Park Service in partnership with Bridgewater, West Bridgewater, Halifax, Raynham, Middleborough and Taunton, along with many agencies, most notably the Southeastern Regional Planning and Economic Development District (SRPEDD) and citizen groups such as the Taunton River Watershed Alliance and the Taunton River Stewardship Program.

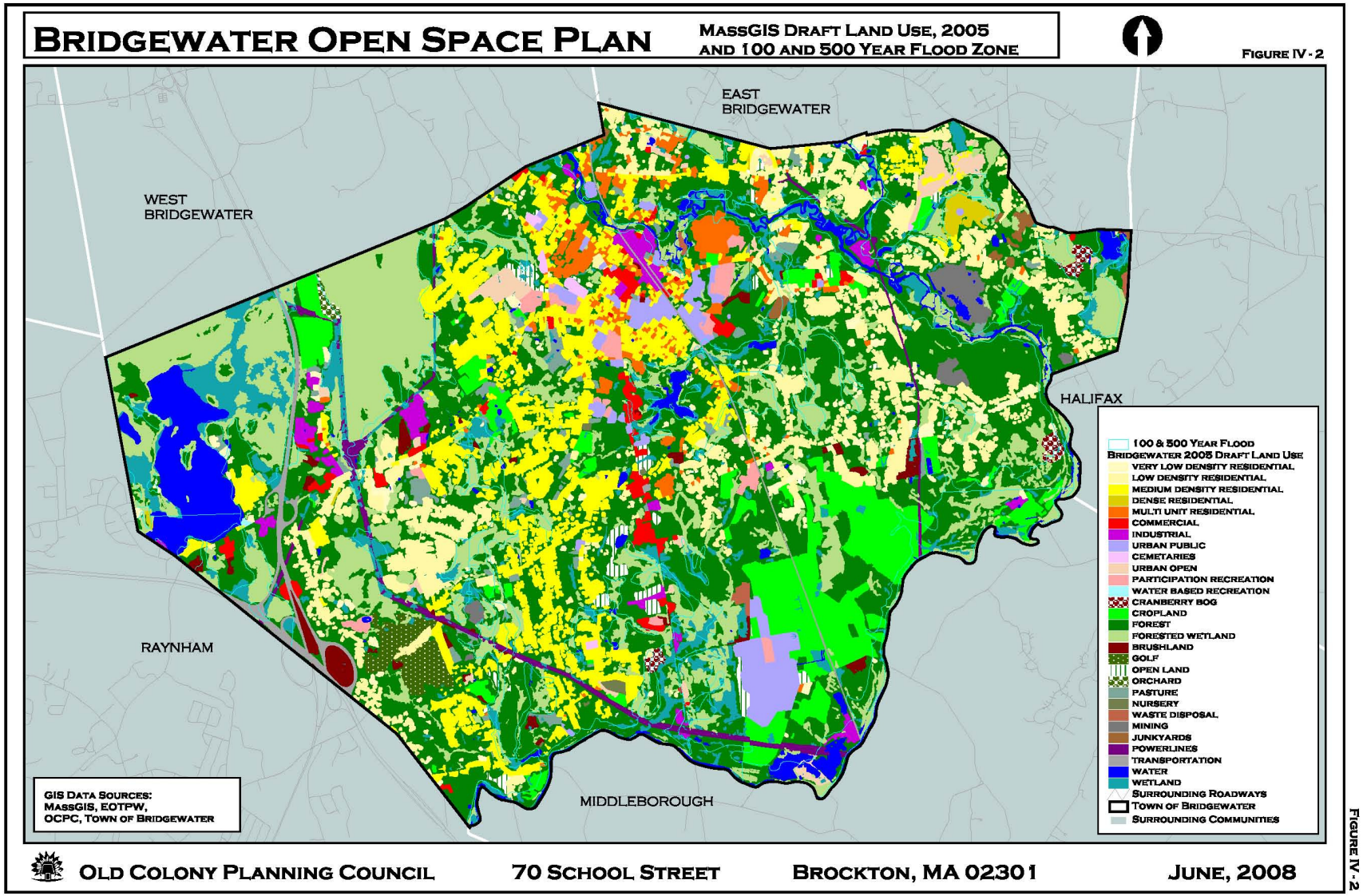
This study drew on more detailed studies such as the 2003 Town River Shoreline Survey Report and its Action Recommendations for that major Taunton River tributary. The recommendations for areas along the Town and Taunton Rivers are discussed in Chapter V, Land of Conservation and Recreation Interest, and in the later Goals and Objectives and Five Year Action Plan sections.

Lakes, Ponds and Vernal Pools

The town's major water body, Lake Nippenicket, is a natural lake, while Carver's Pond, the next biggest, and the town's smaller ponds like those described below are generally impoundments. They are behind dams or smaller control structures commonly located above road culverts.

In addition to "The Nip" and Carver's Pond, Skeeter Mill Pond ("Flynn's Pond") and Sturtevant's Pond, there are other, largely privately-owned, smaller ponds which provide habitat, fishing and limited canoeing/kayaking boating opportunities, but may be unattractive for swimming or too small to be publicly accessible as Great Ponds. Some may have a potential to be managed for flood control purposes.

The mapped lakes and ponds include:


BRIDGEWATER OPEN SPACE PLAN
MASSGIS DRAFT LAND USE, 2005
AND 100 AND 500 YEAR FLOOD ZONE
FIGURE IV - 2
EAST
BRIDGEWATER
WEST
BRIDGEWATER
HALIFAX
RAYNHAM
MIDDLEBOROUGH
100 & 500 YEAR FLOOD
BRIDGEWATER 2005 DRAFT LAND USE
VERY LOW DENSITY RESIDENTIAL
LOW DENSITY RESIDENTIAL
MEDIUM DENSITY RESIDENTIAL
DENSE RESIDENTIAL
MULTI UNIT RESIDENTIAL
COMMERCIAL
INDUSTRIAL
URBAN PUBLIC
CEMETARIES
URBAN OPEN
PARTICIPATION RECREATION
WATER BASED RECREATION
CRANBERRY BOG
CROPLAND
FOREST
FORESTED WETLAND
BRUSHLAND
GOLF
OPEN LAND
ORCHARD
PASTURE
NURSERY
WASTE DISPOSAL
MINING
JUNKYARDS
POWERLINES
TRANSPORTATION
WATER
WETLAND
SURROUNDING ROADWAYS
TOWN OF BRIDGEWATER
SURROUNDING COMMUNITIES
GIS DATA SOURCES:
MASSGIS, EOTPW,
OCPC, TOWN OF BRIDGEWATER
OLD COLONY PLANNING COUNCIL
70 SCHOOL STREET
BROCKTON, MA 02301
JUNE, 2008
FIGURE IV - 2

Lake Nippenicket - (See cover) A shallow, but nearly 500-acre regional recreation resource and the headwater of the Town River. The water is light brown from iron (and /or tannic acid or decaying vegetation) but clean. It offers water-based recreation opportunities, though a sign indicates that the State has "permanently closed the beach" after a drowning.

Much of the west shore is owned by the state with scattered town holdings, and 102 acres on the east shore were recently acquired by the Wildlands Trust of SE Massachusetts and the Nature Conservancy as described in Chapter V.

Nitrogen loading has been cited as a major problem on the Lake, but more recently attention has gone to the increased sedimentation on this shallow lake and to accelerated eutrophication. It is listed in Category 5, "Waters requiring a TMDL", as needing TMDLs for metals and exotic species.

Carver's Pond - An estimated 25-acre former mill pond and ice pond listed as Category 4c. It is an impoundment of South Brook just west of Summer Street and abuts wetlands and town wells. Most of the shore is town-owned water supply protection and conservation land, and surrounding paths allow low impact recreational use. The pond has a partially-breached, but since repaired, earthen dam and a deteriorated control structure rated "Poor" by the state's Dam Safety Program. The Highway Department's studies have recommended further repairs including filling the breach with clay, but work has been constrained by incomplete public ownership.

Sedimentation and eutrophication are reported to be increasingly evident in Carver's Pond. In addition the Massachusetts Year 2006 Integrated List of Waters has the Pond in Category 4c, "Impairment not caused by a pollutant" by rather by "exotic species." There is a potential for raising the pond during a storm if the boards were made operable, but there is no provision for significantly lowering the pond before a storm as is done at the downstream Skeeter Mill Pond. Highway Superintendent Andrew Bagas reports that it is important to maintain a significant level since the adjacent town wells are probably influenced by the pond's level. He also reports that the dam has handled all recent storms without damage to the downstream woods and wetlands. Thus Bridgewater's one rated dam (the High Street / Town River dam) is listed as in poor condition, but it is unlikely to cause significant downstream damage.

Skeeter Mill Pond (aka Flynn's Pond) - The estimated 5-8 acre pond is on South Brook at Water Street downstream from Carver's Pond and just above the State Forest. Sedimentation and eutrophication are increasingly evident here as in other ponds.

The pond is impounded by a control structure with boards and slots covered by a heavy grate. Water flows through a low opening and over internal boards before dropping to the much lower South Brook via a culvert under Water Street. Any water flowing over the structure would enter the culvert via the grate without topping the road. The Highway Department removes boards before major storms and replaces them after the peak flow, thereby protecting pond-side property and potentially slowing flood flows while the pond refills.

Skeeter Mill Pond/Flynn's Pond north of Water Street (Note unfortunate sluice in foreground carrying road o runoff directly to the pond.)

The most accessible part of the pond along Water Street is largely privately-owned and is notable for benches and fishing space provided for public use by the generous private owner, who intends to keep it available to the public, as discussed later. Much of the rest of the pond is state-owned.

There may be a potential to restore a herring run here but some observers feel that it would be too difficult/expensive to install a needed fish ladder here and at the upstream Carver's Pond dam.

Sturtevant's Pond - This estimated 8.9-acre pond at the end of South Street, with access from Green Street is an impoundment of Snow's Brook which flows south to the Taunton River. It has two modern concrete control structures with boards allowing the pond to be raised or lowered. The town owns an estimated one third of the pond shore with access from Green Street.

Blood Pond - A small (estimated 2-3 acre) impoundment of Blood Pond Brook just north of the Taunton River and Plymouth Street and accessible from Plymouth Street. The earthen and stone dam has a fixed outlet via a corrugated pipe dropping water to a much lower channel under Plymouth Street. There is no apparent provision for lowering or raising this small pond.

Ice Pond – This is a small wooded impoundment at the north end of the BCC grounds having no apparent control structure and draining to a tributary of Sawmill Brook. It was used for ice harvesting and has been used more recently for skating and as a water source for community gardens.

Skeeter Mill Pond on an April Day

Small Blood Pond (left) and its fixed outlet (right), essentially a spillway for high water

Cross Street Pond - This 6.4 acre pond south of Cross Street, and east of South Street is listed as Category 3, as it has no uses assessed.

The Town River Impoundment at High Street in the Stanley Ironworks neighborhood. The Town River flows through stone culverts under High Street and it is later impounded for over a mile by the deteriorated privately-owned former mill dam. The total pond is listed at 18 acres in the West Bridgewater Open Space Plan, suggesting that Bridgewater's portion is 1.5 to 2 acres. The Stanley Dam is quite deteriorated, but impounds a significant section of the Town River and has a long fish ladder. The sluiceway is deteriorated and its mechanism is

frozen, but the dam still holds the water level close to the top of the stone culvert. There are no apparent working controls. See photos in Chapter V.

The Paper Mill Village Backwater above the ruins of the collapsed former milldam on the Taunton River just downstream of Mill Street is perhaps a vestigial pond. The mill-dam collapsed some years ago, but the remnant continues to raise the Taunton River a foot or two, causing a backwater and providing rapids enjoyed by some daring canoers. Since the rapids can be passed in a canoe and presumably present little obstacle to fish, it is understandable that some sources refer to the Taunton River as being un-dammed.

Backwater formed by dam remnants at Paper Mill Village

Vernal Pools The town's thirteen Certified Vernal Pools and many Potential Vernal Pools (PVPs) provide habitat for vernal pool species. These pools are good breeding habitat, especially for salamanders, frogs and other small amphibians because the seasonal natures of the pools prevent predator fish populations. Many pools are in clusters which provide extra habitat value since each pool is somewhat different and provides alternate habitats in different years and seasons.

While there are three certified vernal pools on the east side of Lake Nippenicket, they are found throughout the town as are the far more common PVPs. The Natural Heritage and Endangered Species Program (NHESP) map of "Conservation Land, 1830s Forest, and PVPs" below shows that few of the pools appear to be on protected conservation land though there are clusters of PVPs on the Stiles and Hart land and around Carver's Pond.

Wetlands

The town has an estimated 3,048 acres in wetlands. These include 459.4 acres of non-forested wetlands such as streamside marshes and wet meadows, and extensive areas of wooded swamp. (The last are difficult to measure by aerial photography since they can look much like upland forests. However USGS sheets do have a separate pattern for wooded wetlands.) Some wetlands are along streams or contain streams as the state's largest, the Hockomock Swamp, does, while others are isolated. Very few are along the edge of the Taunton River because its banks are generally fairly steep.

Slow section of Taunton River above Plymouth Street (Rte.104) Bridge and vestigial Paper Mill Village dam; rapids going through undeveloped land below dam

D. Vegetation, Rare and Endangered Species

Sizable tracts of conifer forest and red maple and cedar swamps are found throughout the town. These offer important wildlife habitat and their upland portions offer hiking opportunities much of the year. Selective installation of boardwalks and removal of some trailside briars and brambles could increase these opportunities particularly during the wet seasons. Another, more basic, concern is keeping the areas large enough and/or well enough connected to give wildlife needed range.

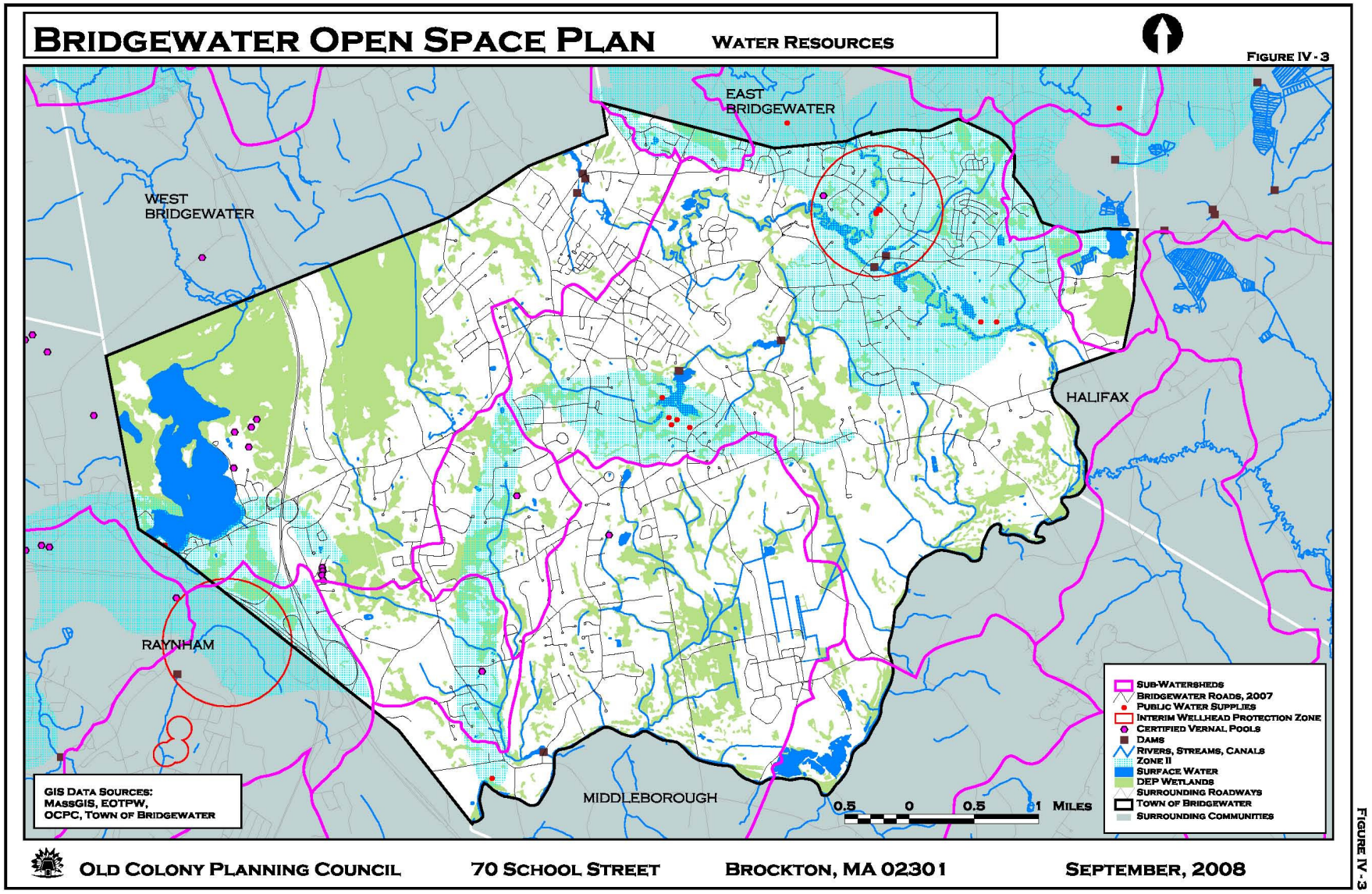
Table IV-1
Bridgewater Watersheds and Wetlands

Watersheds	Acres	Square Miles	% of town	Number of Ponds	Acres of Ponds	% of area in Ponds	Acres in Wetlands	% of area in Wetlands
Lake Nip. & Upper Town River	4,652	7.27	26.6	3	370	8.2	1,355	29.1
Town and Upper Taunton River	1,735	2.71	9.9	0	0	0	81	4.7
South Brook Basin	2,272	3.55	13	3	42	1.8	226	9.9
Matfield River Basin	322	.5	1.8	0	0	0	11	3.4
Blood Pond Brook	417	.65	2/4	1	4	1	77	18.4
Spring and Beaver Brook	716	1.12	4.1	2	3	0.4	76	10.6
Saw Mill Brook	2,191	3.42	12.5	3	16	0.7	257	11.7
Snow's Brook	2,539	3.97	14.5	2	4	0.2	231	9.1
Other	2,622	4.1	15	3	48	1.3	734	24.2
	17,466	27.29		17	487		3,048	121.1

Sources: Bridgewater GIS /MassGis.

Fields Elsewhere there are some open fields (619 acres of pasture in1999) offering grasslands depending on mowing practices. An example is the town-owned Wyman Meadow land discussed below. There are also small areas of fresh marsh with 459 acres of non-forested wetlands reported by MassGIS in 1999.

Wetlands Several rare communities of acidic fens, and white cedar swamps and bogs are found in the town's diverse Hockmock swamp lands, and the Alluvial Atlantic White Cedar Swamp habitat occurs in spots along the Taunton River where it floods in the Spring and remains wet most of the year. The Natural Heritage and Endangered Species (NHESP) Program notes that "Fortunately much of the land in and around the Hockomock where these occur is protected for conservation by the town and Commonwealth."


BRIDGEWATER OPEN SPACE PLAN
WATER RESOURCES
FIGURE IV - 3
EAST BRIDGEWATER
WEST BRIDGEWATER
HALIFAX
RAYNHAM
MIDDLEBOROUGH
GIS DATA SOURCES:
MASSGIS, EOTPW,
OCPC, TOWN OF BRIDGEWATER
0.5 0 0.5 1 MILES
SUB-WATERSHEDS
BRIDGEWATER ROADS, 2007
PUBLIC WATER SUPPLIES
INTERIM WELLHEAD PROTECTION ZONE
CERTIFIED VERNAL POOLS
DAMS
RIVERS, STREAMS, CANALS
ZONE II
SURFACE WATER
DEP WETLANDS
SURROUNDING ROADWAYS
TOWN OF BRIDGEWATER
SURROUNDING COMMUNITIES
OLD COLONY PLANNING COUNCIL
70 SCHOOL STREET
BROCKTON, MA 02301
SEPTEMBER, 2008
FIGURE IV - 3

Forests As noted above, 8,155 of the town's 18,181 acres (44.9%) are in the town's mixed hardwood and softwood forests. These are found in both uplands and wetlands. These extensive forests reflect untouched land and reforested former farmland. With increasing low-density development on both forest and farm land, solid blocks of forest are probable being lost more rapidly than new forest is replacing farmland.

While the acreage is impressive, many former solid blocks of forest are broken up by development along existing roads leaving few unbroken tracts of woodlands. Indeed, some of the mapped and tabulated forest is behind houses and surrounded by development. It is important to leave gaps in such development where wildlife may cross between isolated blocks of forest.

Another important factor affecting forest is whether the land, even reforested land, has ever been tilled. According to the NHESP, Primary Forest wood lots and wooded pastures "have greater biodiversity than areas that have been tilled. These are not Old Growth, they have been harvested and pastured, but the ground may not have been tilled….soil fauna and flora, micro-organisms and plants that reproduce primarily vegetatively contribute to the higher biodiversity. In addition, a variety (of) wildflowers are more common in untilled forests…"

Bridgewater is one of the towns which mapped lands in forest in the 1830s as mandated by the Legislature. The NHES Program has compared these with more recent land use maps to identify possible remaining untilled forest. These areas, shown on the following NHESP map of Natural Communities and Primary Forests, are in the periphery of the town. One is south of Lake Nippenicket in a proposed retail complex; one is a red maple swamp just west of Route 24 and extending into West Bridgewater (largely Ch. 61B land and state land); another is along the East Bridgewater and Halifax town lines north of the Taunton River; and an another is an irregular patch north of the Cumberland Farms land, across from the Wyman Meadow, and just northwest of the Lehtola Farm's Ch. 61a land. Some of this land is already developed or is under development pressure as shown by its removal from Ch. 61A. See Figure IV-4, Natural Communities and Primary Forest.

The NHESP notes that "The areas of 1830s forest on private land would be good targets for conservation acquisition to maintain the biodiversity of the town and region." Such data should be considered in setting priorities for protection in the Five Year Action Plan.

Street Trees/Shade Trees According to the Bridgewater Forestry Department the town has about 200 flowering decorative shade trees in the town center. These are primarily cherry trees and pear trees. The Forestry Department replaces about 10 a year when necessary. This is generally funded by the Bridgewater Improvement Association and the Mass Releaf Program through the Department of Conservation and Recreation. The department also sprays trees in the Central Square area and in several roadside planting areas for periodic pests such as the Winter Moths which eat buds and emerging leaves on certain host trees. In addition, the department also replaces a few roadside annually year when needed and when resources allow.

Rare and Endangered Plant Species The following draws on information from the Natural Heritage and Endangered Species program of the Division of Fish and Wildlife.

Bridgewater's rare plants are generally found in wetlands. The two species of orchid are found in historic records from along the Taunton River and Lake Nippenicket while Long's Bulrush is found in open wet meadows often maintained by fire, such as Acidic Graminoid (grassy) Fens and Sedge Meadows. The spectacular pink-and-yellow flowered Plymouth Gentian and the Round-fruited False-loosestrife grows on the wet shores of ponds and lakes and require fluctuating water levels to maintain their populations.

Table IV-2
Rare Plant Species Documented in Bridgewater

Scientific Name	Common Name	MESA Status	Most Recent Year Seen
Vascular Plants			
Ludwigia Sphaerocarpa	Round Fruited False-loosestrife	E	2005
Platanthera ciliaris	Orange Fringed Orchis	Historic	1970s
Platanthera flava var. herbiola	Pale Green Orchis	T	1912
Sabatia Kenndyana	Plymouth Gentian	SC	2005
Scirpus longii	Long's Bullrush	T	2003

E= Endangered T=Threatened SC=Special Concern Historic=No longer occurs in Massachusetts.
DL=Delisted See Priority and Estimated Habitats on Fig.IV-4

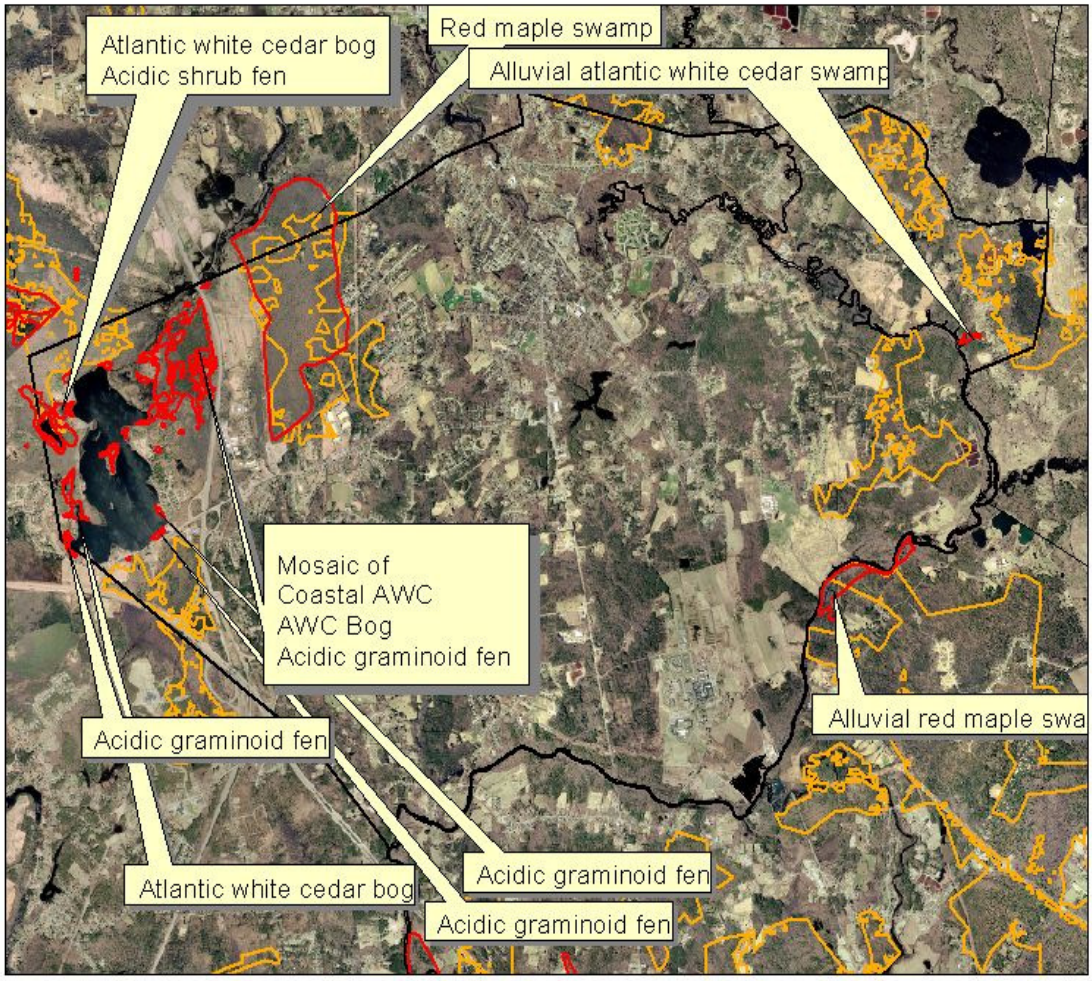
E. Fisheries and Wildlife, Rare and Endangered Species

Diverse wildlife habitat exists along the Town, Matfield and Taunton Rivers as well as along lesser brooks and streams and in varied upland areas. Habitat along the Town and Matfield rivers is limited by relatively high-density development while the Taunton River flows though the town's longest stretch of undisturbed habitats in Bridgewater. Yet the view from the canoe can be illusory. The river's riparian areas need to be protected vigorously as continuing nearby development can be disruptive even if outside of the Rivers Act's 200-foot buffer. This buffer is far less than that defined by the Wild and Scenic River Campaign.

Despite the limited buffer area, white-tailed deer, coyote, fox and wild turkey are plentiful here along with varied small mammals common to northeastern forests and wetlands. The migratory habits of some large mammals have changed with the 1998 commuter rail restoration leaving the fields along Summer Street bisected by a 6-foot high chain link fence. Yet these grasslands and farm fields are still a vital component of the regional habitats and flyway for migratory birds and the occasional Bald Eagle is seen. See Fig-IV-4, "Natural Communities and Primary Forest"

Figure IV-4

Natural Communities and Primary Forest Bridgewater



NHESP Natural Communities
Bridgewater Town Lines
forested 1830 and 1999

N

Data Source: NHESP and MassGIS
Map printed August 22 2007

The greatest natural setting in the community remains the several hundred acres of land surrounding Lake Nippenicket. This nearly 500-acre great pond attracts a diversity of waterfowl, amphibians and mammals indigenous to the greater Hockomock Swamp. Other significant functioning reserves for wildlife are Carver's Pond, Ice Pond, Sturdevant's Pond, and Skeeter Mill Pond and their surrounding landscapes.

As far back as 1994 the Massachusetts Natural Heritage Program's Watch List included 14 plants and animals in Bridgewater. The categories used are in descending order of risk are Endangered (E), Threatened (T), of Special Concern (SC) and Delisted (DL). Three plants were considered to be endangered and two others were "threatened" while only one animal, the Upland Sandpiper was considered to be endangered. The current situation is discussed below.

The joint West Bridgewater-Bridgewater Town River Fishery Committee was established by the two towns in 1994 for restoration, protection and management of the herring fishery while respecting competing needs for stream flow, and working to improve public viewing and catching areas. Fish ladders exist at the town-owned War Memorial Park dam in West Bridgewater and at the deteriorated privately-owned and maintained dam at Iron Works Park near High Street in Bridgewater. There are none on South Brook connecting the Town River to Skeeter Mill Pond and Carver's Pond. The need for such ladders and their cost/benefit require study.

Downstream from these sites the NRTB and Trout Unlimited have worked to protect wild and native trout streams in portions of the Old State Farm /BCC land.

Rare and Endangered Species Many of Bridgewater's rare animal species are associated with the town's extensive wetlands. The endangered Northern Red-bellied Cooters (nee Plymouth Red Belly Turtle) are the most aquatic local vertebrates, living in ponds and nesting in adjacent open beaches. Many wetland species like spotted salamanders, Wood Turtles, and Spotted Turtles use upland forests for most of their lives. Wood Turtles (SC) are found in large streams and rivers, adjoining forests. They spend more time in the water than the delisted Spotted Turtle (DL) or the Box Turtle (SC), but travel overland between rivers and to upland nesting places.

It is important to protect both the wetlands forests used by Spotted Turtles and the dry oak and pine forests used by Eastern Box Turtles along w ith the vernal pools and open, often sandy nesting areas which they all use.

The listed and delisted birds; Cooper's Hawk (DL), the Grasshopper Sparrow (T), Long-eared Owl (SC), Upland Sandpiper (E), and Barn Owl (SC) include species primarily found in grasslands and open areas near forest (using open land for hunting and forest for nesting and roosting). Bridgewater's remaining farm fields and the riparian areas along the rivers, particularly on the Old State Farm/BCC lands supply such habitat.

The town's rare invertebrates include freshwater mussels in the Taunton River and Lake Nippenicket, and two types of damsel flies breeding in small ponds and living in nearby wetland and forests. Both require clean water. This suggests protecting the Town and Taunton Rivers with riparian buffers, ongoing pollution control (by the upgraded Brockton and Bridgewater waste water treatment plants) and flow maintenance. The flies are found in the mosaic of wetland types in the Hockomock swamp. These also provide habitat for the Water Willow Stem Borer Moth.

Table IV-3
Rare Animal Species Documented in Bridgewater

Scientific Name	Common Name	MESA Status	Most Recent Year
Vertebrates			
Accipter Cooperii	Cooper's Hawk	DL	1978
Ambystoma maculatum	Spotted Salamander	DL	???
Ammodramus savannarum	Grasshopper sparrow	T	1997
Asio otus	Long-eared Owl	SC	1997
Bartramia longicauada	Upland Sandpiper	E	1980
Clemmys Gupta	Spotted Turtle	DL	2000
Glyptemys inscultpta	Wood Turtle	SC	2004
Hemidactylium scutatum	Four-toed Salamander	SC	2007
Pseudemys rubriventris pop. 1	Northern Red-bellied Cooter	E	2005
Terrepene Carolina	Eastern Box Turtle	SC	2006
Tyto alba	Barn Owl	SC	1985
Invertebrates			
Alasmidonta undulata	Triangle Floater Mussel	SC	1999
Crangonyx aberrans	Mystic Valley Amphipod	DL	1989
Engallagma laterale	New England Bluet Fly	SC	1994
Engallagma pictum	Scarlet Bluet Fly	T	2004
Leptodea ochracea	Tidewater Mucket mussel	SC	1997
Ligumia nasuta	Eastern Pond Mussel	SC	1997
Papaipema sulphurata	Water-Willow Stem Borer	T	1994

E= Endangered T=Threatened SC=Special Concern Historic=No longer occurs in Massachusetts. DL=Delisted See Priority and Estimated Habitats on Fig.IV-4

Priority and Estimated Habitats, Bio Map areas and the Living Waters Core.

The NHES Program identifies and maps Priority Habitats and Estimated Habitats for rare and endangered species as well as BioMap areas and land in the Living Waters Core.

See Figure IV-4 following, "Natural Features and Protected Land." This includes the contents of the separate NHESP maps of "Priority and Estimated Habitats"; "Conservation Land, 1830s Forest and PVPs;" and the "BioMap-Guiding Land Conservation for Diversity."

The Estimated Habitats are wetland-related areas significant for rare wildlife. They are intended to be used in enforcing the Wetlands Protection Act while the slightly more inclusive Priority Habitats are the probable habitats of State listed rare species to guide protective activities. The combined areas cover the end of the town west of Route 24; a sizable area bracketing the Taunton River and extending into Halifax on the eastern end of the town; and another area running north of the river roughly along Route 18 to Forest Street/ Winter Street and including upland fields in the northeast corner of the BCC/Old State Farm lands.

As explained by the NHES Program, the more extensive BioMap and the Living Waters Cores "were produced… to identify the areas of most importance for biodiversity; they are based on known locations of rare species and uncommon natural communities, and incorporate the habitats needed by rare species to maintain the local populations. The BioMap focused on species of uplands and wetlands; Living Waters focused on aquatic species. Large un-fragmented conservation land provides the best opportunities to maintain populations of species and limit further species loss from the town." Hence, protection of land adjacent to existing public or private open space locally and across town lines "is one way to provide important large areas of biodiversity protection."

As can be seen on Figure IV-5; the identified BioMap area and "supporting Natural Landscape" cover much of the northwest and southeast corners of the town and generally include more than the Estimated and Priority Habitats. The Living Waters are mapped along the Taunton River to its junction with Halifax's Winnetuxet River which is also mapped as Living Waters.

Inclusion in any of these four categories would increase the value of an area of conservation and recreation interest and add to its priority for acquisition or increased protection.

Wildlife Corridors

Bridgewater has vast areas supporting wildlife as shown in the BioMap areas, the Priority and Estimated Habitats and the Living Waters Core land on Figure IV-5 "Natural Features and Protected Lands" but as the map also shows, the largest ones are discontinuous. Thus the extensive areas of BioMap, BioMap Supporting Natural Landscape, and key Priority and Estimated Habitats around Lake Nippenicket and the easternmost portion of the Hockomock Wildlife Management Area are all north of Rte. 104 and west of Route 25, while their southern counterparts around the BCC land and Cumberland Farms land are south of Flagg Street, east of South Street and along the Taunton River almost to the Town River/ Matfield River junction.

The intervening lands are largely, though not entirely built up, impeding free movement of larger wildlife or putting others at risk as they forage through human neighborhoods. Some opportunities for enhancing corridors may exist along streams such as South Brook, Snow's Brook, Spring Brook that starts south of the State Forest, and an un-named stream that runs

south from Route 104 east of Pleasant Street. Use of these assumes that streamside greenways for human use can work for wildlife too, at least after dark.

Possibilities for further study include:

(1) A corridor running along South Brook from the Town River through the State Forest, then through wooded swamp and uplands to Auburn St. and south along an un-named stream just east of Summer Street through Bridgewater Correctional Complex land to the Taunton River.

As an alternative, this corridor could swing east though the Cumberland Farms lands and run along the larger Spring Brook through BioMap lands to the Taunton River

(2) A greenway/corridor suggested for further study by the Natural Resources Trust of Bridgewater (NRTB) would run south from Carver's Pond west of Conant Street to the wooded former town dump off Winter Street and then either:

A. Go through intervening largely developed land to Flagg St. and on to the extensive BCC land the Taunton River lands; or:

B. Go south from the Winter Street dump through rear lots to a 26-acre state holding starting north of Flagg St. and running south through a strip parallel to Bedford St and Conant Streets and then through intervening woodlands west of Conant St. and on to the BCC land.

The latter would be the more feasible by making good use of present state land.

(3) A wider wildlife corridor/greenway running south from Cottage Street, across a tributary to Carver's Pond , south behind the Willow Range Drive, Wally Kruger Way and Jennifer Circle development , across Winter Street, between the Chris John way and Fireworks Circle subdivisions, on across Colonial Drive, and on through undeveloped land along Sawmill Brook to the Taunton River. Fortunately none of the subdivisions connect Bedford Street and South St., so some passable land may the left between them.

(4) A significant connection would be between the east and west portions of the Hockomock Wildlife Management Area divided by Rte. 24. This would run along the Town River through Estimated and Priority Habitat and BioMap land, under Rte. 24 and on through comparable habitat and by many vernal pools to the northern end of Lake Nippenicket.
This could depend on opportunities to increase the passageway under Route 24.

(5) An emerging protected corridor is that along the Town and Taunton Rivers. The present protected riverside lands along this corridor are:

- The Stiles and Hart Conservation Parkland
- The Ironworks Park,
- The Tuckerwood Conservation Parkland l
- The Pheasant Lane cluster open space across the Town River from Tuckerwood
- Wyman Meadow and closely linked Water Department lands

- The Wildlands Trust of SE Massachusetts (WTSEM) North Point Preserve next to Wyman Meadow
- The Town's inactive sand pit and riverside wildlands at the Halifax line
- The WSEM conservation restriction (CR) between Bridgewater Ave. and Dickens Street.
- The Titicut Conservation Parklands at the Raynham line and adjacent Water Department land, and the
- Estimated 6700 feet of BCC (Old State Farm) land protected under Article 97 of the State Constitution
- The town' s Water Department land bracketing the junction of the Matfield, Town and Taunton Rivers

In addition there is:

- About 4300 feet of riverfront protected under a Conservation Restriction as part of the Child's Bridge cluster development across from and down the Taunton River from Wyman Meadow/ North Point
- About 4200 feet of Taunton River frontage on the Lehtola Farm being purchased by the WTSEM - reportedly across from significant state holdings
- The possibility of protecting about 4000 feet of very irregular Town River frontage as part of a town-approved mixed use expansion of the Waterford Village apartment development under Ch.40R, and.
- Much land under Chapter 61 along the eastern and southern portions along the Taunton River particularly just south of the BCC land as shown on Figure V-1.

These present and potential protected streamside land offer much possibility of a near continuous protected corridor from the Stiles and Hart land to the Raynham line. The length of the possible corridor offer much opportunity for stream-dependant species to move up and down the streams while its width gives good access to the upland and wetlands forests and Vernal pools used much of the time by salamanders, Box Turtles, Spotted Turtles, and Wood Turtles.

These various potential upland and streamside wildlife corridors all require further study with close attention to preserving needed connections between habitats. This calls for coordination with the Planning Board, Zoning Board of Appeals, developers, landowners and wildlife agencies. This is because it is crucial to be aware of various creatures' needs, and then to retain needed habitats and to preserve connections between or behind subdivisions. In many cases an Open Space Community Development approach would allow preservation of such d connections while allowing the desired degree of development.

E. Scenic Resources and Unique Environments

Landscapes The town's most compelling landscapes are its open fields, particularly along Summer Street through the inactive BCC/ Old State Farm, and Flagg Street soccer fields on BCC land, the riverside Lehtola Farm at the end of Auburn Street, the long view up Lake Nippenicket and many shorter views along the rivers from bridges, such as the view up the Matfield River from High Street. The extensive, inactive approximately 200-acre Cumberland Farm fields are significant despite being hidden from upland view by woodlands

and development, except from along Curve Street south of Auburn Street. This is because of the view from their approximately 2,400 feet of river frontage. This view is key part of the river's wild and scenic, yet sometimes pastoral character. Some views have been degraded by alterations such as the paved wellfield access drive bisecting the Wyman Meadow on rather than running along one side.

There are also closer-up developments such as the remaining farm fields and horse fence in front of the Harvest Lane development off of South Street. Other iconic landscapes are the fleeting view of the former McIntyre's farm field from Plymouth Street and the charming town center views of Central Square. The town's landscapes are discussed further under B "Landscape Character" above.

The town has a number of potential Scenic Ways proposed in the 1995 Open Space Plan. These include:

Auburn Street
Spruce Street
Summer Street (South of Flagg Street)
Elm Street (Northern portions)
Plymouth Street (East of Pond Street)
South Street (South of South Drive)
Lakeside Drive along the edge Lake Nippenicket

These roads have not been yet officially designated by Town Meeting according to the Town Clerk and the Planning Board.. Thus they do not have the protection offered by a mandatory Planning Board hearing before road- side trees can be cut or stonewalls may be altered. Yet they add to the town's character and should be protected. .

Characteristic Geologic Features and other Resources The town's main geologic feature is its virtual enclosure by the Town and Taunton Rivers. Opportunities to view them, to protect their water quality and to increase usable access are central to this plan and its recommendations. The town's two main hills, Great Hill on the BSC campus (157 feet above mean sea level [msl] and Sprague's Hill (170'feet msl) on the East Bridgewater line, could be pleasant viewing points except that each is dominated by a large water supply tank and is otherwise largely tree covered. However such opportunities might well be explored consistent with tank security since each is accessible by the water tank access road.

Hockomock Swamp Area of Critical Environmental Concern The16,950- acre Hockomock ACEC was designated by the Secretary of Environmental Affairs in the 1990 after extensive research and advocacy led by Bridgewater residents concerned with the implications of potential commercial and residential growth, particularly around Lake Nippenicket.

In Bridgewater the ACEC includes the western end of the town west of Pine Street, and much land east of Route 24 about two thirds of the way to North Street. It includes much Ch. 61 B land and land in the Hockomock Swamp Wildlife Management Area. This is only a small portion of the ACEC which extends far into Raynham, Easton, Taunton, Norton and

West Bridgewater. The designation does not prevent development but it requires lower thresholds for jurisdiction and a higher standard of review than apply elsewhere.

Cultural, Archeological and Historic Sites. Bridgewater's cultural and historic sites are largely around the Central Square area. They have been discussed in Chapter III where all the major historic structures and places are listed. Native American archeological sites might be expected along the rivers and nearby fertile fields, but apparently the seasonal movements along the river system involved very few permanent settlements and left few artifacts.

In addition to the churches and former schools listed above, most notably the Academy Building and the Unitarian-Universalist Church with its Off the Common (folk music) Coffeehouse, the town's major cultural resource is Bridgewater State College. This is the flagship of the state college system and brings many classes, concerts, plays, athletic events and other cultural happenings to the town and the region. Bridgewater's Historic District around Central Square is shown on Figure III-2.

F. Environmental Problems

Environmental issues are often water related and the above-described zoning provisions for Aquifer Protection and Flood Plain management do much to limit problems from future development while the non-zoning local Wetlands Protection Bylaw goes a long way to extend the protection of the state's Wetlands Protection Act.

Reviewing the major areas of concern, the Town's Health Agent, Stanley Kravitz reports that there are no significant environmental problems or threats.

As in many communities the town's environmental issues include:

1. Protection of Drinking Water Supplies.

The present sources are covered by the Aquifer Protection bylaw, by specific processes like the Carver's Pond water treatment plant, by upgrading and expanding the Advanced Waste Water Treatment, by close attention to on-site sewage disposal systems, and by increased use of protective Low Impact Development strategies. The town's Aquifer Protection Bylaw reflects new DEP standards and includes Zone II areas of adjacent communities.

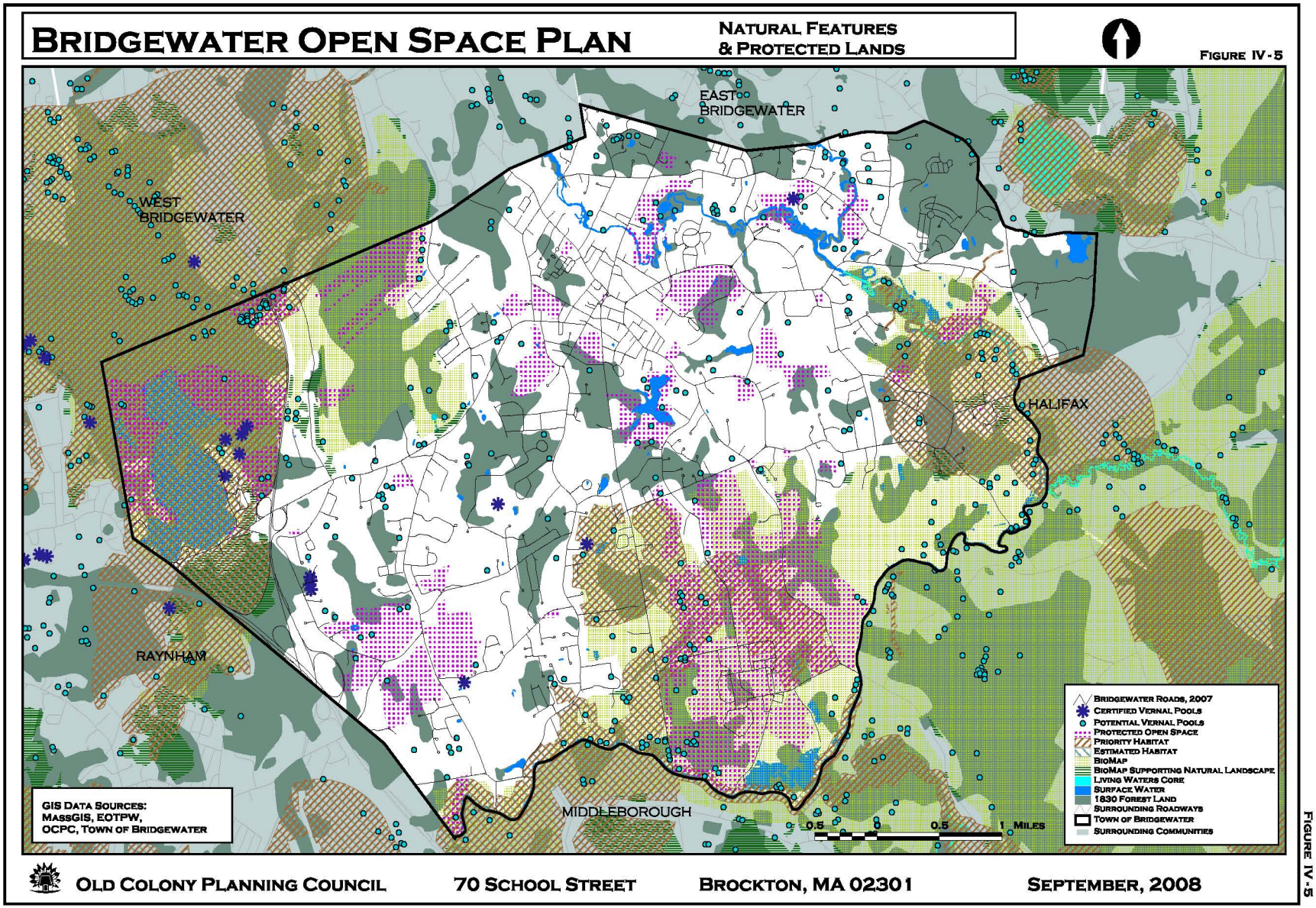
On-site septic systems meet the needs of most development in all but the sewered areas. Generally these systems pose few environmental problems and they have the benefit of recharging the groundwater. Still there can be isolated areas where poorly-drained soils or excessively well-drained soils and/or a high water table make subsurface disposal less effective, or where nitrate, phosphorous or sodium levels may be excessive for human health, or for the health of the stream and pond systems.

The Matfield River just above the High Street Bridge

However the health agent reports that a least 2000 of the town's remaining estimated 3500 septic systems have been built or rebuilt with the last 9 years and present few problems of concentrated failing systems. Instead, there are scattered problem spots, usually close to water bodies. These are examined in the town's 2001 Comprehensive Waste Water Management Plan, and potential regional solutions are being examined in the on-going Upper Taunton Basin Waste Water Evaluation Study.

Low Dissolved oxygen and high nutrient levels in the Matfield River were tested by Prof. Kevin Curry's Water Access Laboratory at Bridgewater State College from 1995-2005, and the rankings of the major water bodies have been discussed above. These contaminants can affect drinking water supplies if they are quite close to the wells, but Bridgewater's supplies are considered to be sufficiently distant from such sources.

Old landfills can be a problem but the health agent reports that the capped but unlined former town landfill at Conant and Winter Streets presents no problems because the groundwater flows south, away from the Carver Pond wells. In addition, in its later years the site was a "burned landfill" in that waste was burned in cells before they were covered,


BRIDGEWATER OPEN SPACE PLAN
NATURAL FEATURES & PROTECTED LANDS
FIGURE IV-5
EAST BRIDGEWATER
WEST BRIDGEWATER
HALIFAX
RAYNHAM
MIDDLEBOROUGH
GIS DATA SOURCES: MASSGIS, EOTPW, OCPC, TOWN OF BRIDGEWATER
0 0.5 0.5 1 MILES
BRIDGEWATER ROADS, 2007
CERTIFIED VERNAL POOLS
POTENTIAL VERNAL POOLS
PROTECTED OPEN SPACE
PRIORITY HABITAT
ESTIMATED HABITAT
BIOMAP
BIOMAP SUPPORTING NATURAL LANDSCAPE
LIVING WATERS CORE
SURFACE WATER
1830 FOREST LAND
SURROUNDING ROADWAYS
TOWN OF BRIDGEWATER
SURROUNDING COMMUNITIES
OLD COLONY PLANNING COUNCIL
70 SCHOOL STREET
BROCKTON, MA 02301
SEPTEMBER, 2008
FIGURE IV-5

leaving very little to decay and produce harmful leachate. (This assumes that no non-degradable harmful materials were originally put in the landfill.)

The BCC to the south formerly was self-sufficient with on-site wells. These were closed when the facility tied into the City of Taunton system about 15 years and no problems were found. The health agent also reports that the commercial Chuckran landfill to the south off Rte.18 also presents no problems. The owner maintains monitoring wells around the site and the results are reviewed by DEP.

2. Protection of key habitats

Nitrate, Oxygen, and Nutrient levels. In the past, nitrogen loading as been a major problem at Lake Nippenicket, but more recently there has been greater concern with sedimentation and eutrophication. These are also increasingly evident in the town's other major ponds, Carver's Pond and Skeeter Mill Pond. These are thought to partially reflect nearby failing septic systems.

As noted elsewhere, the Matfield River showed low oxygen levels and high nutrient levels when tested by the Water Access Laboratory at Bridgewater State College from 1996 to 2005. Upgrading of the upstream Brockton wastewater treatment plant is expected to improve the situation.

Aquatic Vegetation. A related need is management of invasive aquatic vegetation or marine life in those ponds since these can heighten eutrophication and threaten native species. One action is the signing of the Town River Landing canoe/kayak boat launching area warning users to clean off boats and equipment before moving from one stream or pond to another.

Forest Health According to the Highway and Forestry Superintendent Bridgewater presently has no major infestations affecting its trees other than periodic Winter Moth or Gypsy Moth infestations. The European Winter Moths were first noticed in Nova Scotia in the 1930s and now range through coastal Massachusetts from Gloucester to Orleans on the Cape and a few areas to the west and south of the turnpike. The larvae hatch when the temperatures average 55 degree and begin eating buds and leaves on many local trees and shrubs including apples, elm, maple, ash, crabapple, cherry, and blueberry until mid-June. There are no local natural controls, but UMASS is collecting and breeding a parasitic fly that has been effective elsewhere.

The Superintendent notes that the extremely destructive Asian Long Horned Beatle found in the Worcester area has not progressed far in this direction.

3. Flooding

According to Highway Superintendent Andrew Bagas, frequent, relatively minor flooding requiring temporary road closures occurs along South Brook at Skeeter Mill Pond on Water Street, at Water and Wood Streets, and at Hayward Street; on Snow's Brook at Cross Street; and on the Matfield River at Bridge Street. These have resulted in no or very minimal property damage.

Development in the flood hazard areas is often limited by the terrain and by regulation through the town's Flood Plain Zoning Bylaw, the Rivers Protection Act, and the Wetlands Protection Act. The minimal risks and damage so far are is shown by the fact that the town has 58 flood insurance policies in force, but had only 4 claims totaling $5,119,with payments averaging $1,280, from *1978 to 2004

Some of these loses could be reduced and others be prevented by careful management of selected town dams to lower pond levels before a big storm and then slowly release water after the storm, as discussed later. Use of low impact development (LID) principles maximizing recharge and storm water storage and reducing runoff could also help to lessen flood damages. For further information see the Council's 2005 Regional Multi-Hazard Pre-Disaster Mitigation Plan and its Bridgewater Annex.

4. Erosion and Sedimentation

As note above, Highway Superintendent Bagas reports that stream or pond sedimentation from agricultural or construction erosion is not a significant problem. Construction erosion is limited largely because the land is largely level and because most projects involving excavation and grading are required to use straw bales, settling basins and other sedimentation control measures. Agricultural erosion and sedimentation are also limited because most cultivated farmland is separated from streams and ponds by bands of varied natural vegetation which trap water-borne sediment.

One remaining concern is streamside erosion caused by inappropriate bank alterations. To prevent this the Management Plans for the riverside parklands generally discourage bank alterations for canoe/kayak landings where such erosion might occur.

5. Clean Up and Monitoring of Hazardous Waste Sites

The following describes sites in Bridgewater and their status.

Bridgewater has 112 - 21E sites as summarized below. These sites have summary codes. The key codes are:

NDS = Not a Disposal Site according to DEP
NFA = DEP finding that No Further Action is needed
RAO = Response Action Outcome, a statement filed by the owner or its agent that no significant risk or substantial hazards remain.
Tiers 1A, 1B, 1C and 2 = Sites ranging from the most severe to the least 1A requires a clean-up permit and direct DEP supervision of responses while 2 requires no permit or DEP approval.
Pre-Classified = Not yet classified
Hours/Days = required response time; the shorter, the riskier.

The Reportable Release Look-Up Table as of 12/20/07 lists 112 sites. All but 21 reflect oil alone or list no type of contaminant. The twenty one are listed as "hazardous material" or "oil and hazardous material" combined.

Of the 112 sites, 65 are reported as RAO, three are labeled as "RTN Closed," 10 are rated as low risk Tier 1-D and Tier 2, and two were listed as "Adequate." Of all these sites, it is notable that the best known, the Cannon Engineering site of near Rte. 24 has been cleaned up to an "Adequate" level.

Of the remaining undefined sites, two have no reported response times after clean-up of episodes in the late 1980s; one undefined site of a 1997 event at the old highway barn; and two "unclassified" sites all have lower-risk 72-hour to 120-day response times, as does the site of a 1995 event at a MHD rest area.

Finally, one site has a 2-hour response time because the owner has an adjacent private well. This is a dry cleaning site where the released solvents have been breaking down to less harmful forms and it is being monitored. In all, the health agent reports that Bridgewater has no serious hazardous waste sites.

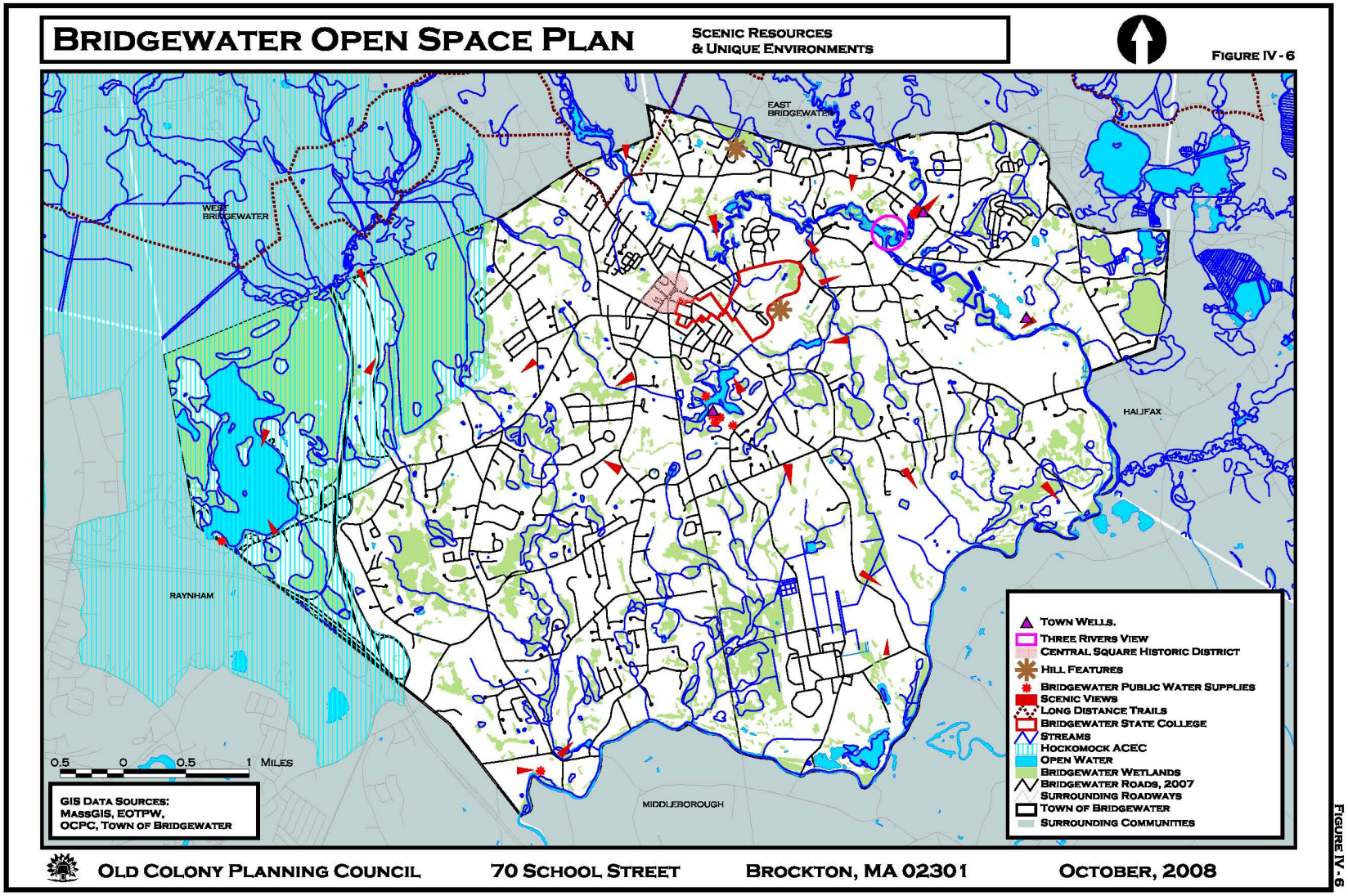
6. Environmental Justice / Environmental Equity

As discussed in Chapter III, Environmental Justice (EJ) intends that "low income and minority communities should neither be subject to disproportionate hazards and negative impacts of development nor be denied proportionate access to public facilities, services and various amenities." Environmental equity goes further in seeking equal treatment of neighborhoods and access to amenities community-wide.

The map, "Bridgewater-Environmental Justice" (Figure III-6) reflects income and racial patterns to identify the vulnerable "Environmental Justice Neighborhoods" in terms of census tracts as discussed in Chapter III. As observed there and shown by comparison of the Environmental Justice map (Fig. III-6), the map of Lands of Conservation and Recreation Interest (Fig.V-1), and the Five Year Action Plan (Fig V-1), there are many existing and proposed open space and recreational areas in or abutting the EJ neighborhood.

The southern portion of the neighborhood contains much protected open land and agricultural land on or near the BCC grounds, and abuts areas of special interest along the Taunton River. Many of these lands of special interest are proposed for study and potential protection in the Five Year Action Plan.

The more developed northern portion of the EJ neighborhood includes the Mitchell Elementary school and its playgrounds; abuts the major Legion Field complex; is very near the new Crescent Street/Hogg Farm/Starr Park complex to the west, and the State Forest and related town holdings to the east; and wraps around the Carver's Pond holdings. While the area's resources are already major, the Carver's Pond holdings and recreation facilities are proposed for expansion, and other protected areas are proposed at the nearby Skeeter Mill Pond (Flynn's Pond") and along South Brook. Thus the Environmental Justice Neighborhood is and will remain well-served with open space and recreation areas.


BRIDGEWATER OPEN SPACE PLAN
SCENIC RESOURCES
& UNIQUE ENVIRONMENTS
FIGURE IV - 6
EAST BRIDGEWATER
WEST BRIDGEWATER
HALIFAX
RAYNHAM
MIDDLEBOROUGH
0.5 0 0.5 1 MILES
GIS DATA SOURCES:
MASSGIS, EOTPW,
OCPC, TOWN OF BRIDGEWATER
TOWN WELLS.
THREE RIVERS VIEW
CENTRAL SQUARE HISTORIC DISTRICT
HILL FEATURES
BRIDGEWATER PUBLIC WATER SUPPLIES
SCENIC VIEWS
LONG DISTANCE TRAILS
BRIDGEWATER STATE COLLEGE
STREAMS
HOCKOMOCK ACEC
OPEN WATER
BRIDGEWATER WETLANDS
BRIDGEWATER ROADS, 2007
SURROUNDING ROADWAYS
TOWN OF BRIDGEWATER
SURROUNDING COMMUNITIES
OLD COLONY PLANNING COUNCIL
70 SCHOOL STREET
BROCKTON, MA 02301
OCTOBER, 2008
FIGURE IV - 6

Looking at town-wide Environmental Equity issues, it can be seen that the largest concentration of usable open space (the Lake Nippenicket holdings, the Olde Scotland Links golf course, and a portion of the Hockomock Swamp Wildlife Management Area) is in the western end of the town since that is where those resources are. However, the more intensely used sports-oriented sites are in the center of town and the multi -purpose riverside holdings (the Stiles and Hart, Ironworks, Tuckerwood and Wyman Meadow Conservation Parklands and the Wildlands Trust's North Point Preserve) run from the north-central to the near-easternmost sections of the town.

Again, reviewing Figures V-1 and IX-1 shows that while most potentially acquired Ch. 61, 61A and 61B lands are on scattered agricultural sites west of Bedford Street, the biggest Ch. 61A sites are in the east largely along the Taunton River, as are the greatest number of the sites proposed for study and possible riverside acquisition.

Another source of local open space is the land preserved in cluster ("Open Space Community") developments. Three of these (Dundee Drive off Vernon St.; Harvest Lane ("Home Nook") off South Street and Paul Joseph Lane/Red Mill Road west of Vernon Street) are in the western portion of town while one, Pheasant Lane off Hayward Street is in the northeast.

In addition the forthcoming Child's Bridge Open Space Community subdivision at the former Perkins Farm on the Taunton River (UPL-4) is planned to have 70.5 acres of preserved streamside land under a Conservation Restriction. This will not be open to the general public, but it will protect riverside land habitat, and preserve the landscape as viewed from the River and from across the River.

Of the present clusters, all but the low, marshy Pheasant Lane site have some useable upland. The Dundee Drive and Paul Joseph Lane lands are owned by the town while the others belong to a developer or a homeowners group. Those like Dundee Drive and Home Nook that abut public land or land of special interest might have the potential to be integrated with the adjoining land thereby increasing the usefulness of each, if required in the Planning Board's Special Permit and acceptable to the developer and residents. The equity issue becomes more sensitive where town-owned cluster land like that at Paul Joseph Lane is surrounded by private land and is inaccessible to the nearby neighborhoods. In such cases the issues of conflicting public interest, optimum use of open space, and privacy need to be resolved if personal privacy and environmental equity are to be reconciled.

In all, Bridgewater's Environmental Justice and Environmental Equity issues are very limited and such equity will increase under the proposed Five Year Action Program. .

7. Development Impacts

The possible impacts of development can take many forms, some of them irreversible, but there are many ways to counter them or to mitigate them.

Increased storm runoff leading to potential flooding and lowered groundwater can result from increased impervious surfaces. These effects are inevitable with development, but vary with the details of storm water management e.g., whether a road or parking lot drains directly to a small stream or to a ponding area allowing absorption and slow release. The effects can be reduced through application of the state's Stormwater Regulations and use of methods such as Low Impact Development (LID). This limits runoff to predevelopment levels through techniques including the use of rain gardens, grass swales, recharge basins, grass pavers, leaching catchbasins or similar mechanisms slowing runoff or recharging it close to its origin. These can be enforced through tools such as stormwater regulations, subdivision rules and regulations, special permit requirements and Conservation Orders of Conditions. Bridgewater's small streams and ponds and its many wetlands offer opportunities to reverse these effects by retrofitting existing development and by applying LID principles to probable new development.

Increased water consumption with development may be inevitable overall, but with conservation and system improvements consumption per capita can drop even in the face of growth. Thus Bridgewater's total consumption rose from 1.41 Million Gallons /Day-MGD) in 1995 to 1.73 MGD in 2007. At the same time consumption per capita dropped from 80.4 gallons/capita/day in 1995 down to 64.24 g/c/d in 2007. This is even lower than the state guideline of 65 g/c/d. None-the-less total consumption continues to grow. Fortunately, with the recent increase in safe yields and its continuing efforts to expand supplies the Water Department does not expect water supply to be a significant development constraint or burden on the townspeople for the foreseeable future.

Decreased water quality with inadequate wastewater management is a potential concern in any growing community. However, as noted above, Bridgewater's present sources are protected by Aquifer Protection zoning, by specific facilities like the Carver's Pond water treatment plant, by upgrading and expanding the Advanced Waste Water Treatment Plant, by closely regulating on-site sewage disposal systems, and by increased use of protective Low Impact Development strategies. The town's Aquifer Protection Bylaw reflects new DEP standards and includes Zone II areas of adjacent communities. For the longer run as growth outstrips local treatment and disposal options, Bridgewater is participating in the ongoing DEP - financed Upper Taunton Basin Regional Wastewater Evaluation Project. This is exploring potential long-term regional solutions to needs over the entire Upper Basin.

Increased land consumption with low density development is inherent in the town's present zoning and common market forces. As has been noted elsewhere, land consumption has risen much more rapidly than population growth over the past few decades. This because most new houses are in outlying areas and occupy an acre or more while households in many older neighborhoods consume a quarter acre or less.

The exceptions are in the town's two major apartment developments, and in Open Space Community (cluster) developments. However, the present zoning does not allow new multi-family projects except under Chapter 40R which as been mapped over the Waterford Village complex. This will allow considerably more housing there at about 20 units /acre subject to a

special permit. As discussed earlier, the 40R zoning will allow some efficient higher-density housing and compatible retail uses according to "Smart Growth" principles, while also offering an opportunity to preserve some open space along the site's extensive Town River frontage.

The Open Space Community Developments (OSCDs) allow smaller lots and higher densities in their developed section so long as there are no more units overall than under conventional development. They then preserve the saved land as open space. Thus, while they require as much land as conventional development, they do leave much of that land in open space. They do not lessen gross land consumption since the saved land is not available for other uses, but they do leave the land in recreation, habitat or other open space-related uses.

While they use land more efficiently, OSCDs do not necessarily control sprawl within the community because the OSCD projects may well be located in outlying areas. Local examples are Harvest Lane off South St., Dundee Drive and Cobblestone Lane off Vernon Street, and the Maura Drive project west of South Street in the southern end of the town. These developments and their resulting open spaces are discussed in Chapter V.

Increased land value constraining preservation follows increased land consumption. This could be particularly true in the more developable sewered areas. However the few acquisitions proposed in such areas tend to be on relatively unbuildable land such as that at the junction of the Matfield and Town Rivers. Possible responses to rising land values are:

- Use of additional resources such as Community Preservation Act funds and state and federal aid through the state LAND (ex-Self Help) and PARC (ex- Urban Self Help) programs, and the federal Land and Water Conservation Fund program.
- Joint efforts with groups such as the Wildlands Trust of SE Massachusetts, the Trustees of Reservations, The Nature Conservancy or the Trust for Public Land.
- Acquiring less than a fee interest such as conservation restrictions (CRs) leaving the owner some use of the land while reducing property taxes
- Seeking donations to the town of surplus land from large projects, or of the preserved open space in Open Space Community Developments.
- Seeking donations from owners who could benefit from income tax savings

Lost views of open back land can result from Form A (Subdivision Approval Not Required or ANR) development along existing roads, particularly if houses are sited parallel to the road rather than at right angles to it. This can be seen in the Whitman Street/Hayward Street area and elsewhere.

Under present Massachusetts zoning and subdivision control provisions communities have little discretion over Form A lots so long as they meet minimum area requirements, the buildings meet minimum yard standards, and the road (accepted or not) is found to be adequate. Possible remedies are statutory revisions proposed by recent the Massachusetts Land Use Regulation Reform effort (MLRA) and the current land Use Partnership Act.

One other approach would be adoption of advisory guidelines encouraging builders to respect views when sitting houses. Another approach would be zoning offer a density bonus to builders doing small subdivisions in place of a given number of Form A lots. This would

save the streetscape, but possibly at the cost of using backland of significant agricultural value. A similar incentive for commercial development is in the South Business District along Bedford Street. This requires 40,000-square feet for lots fronting on Bedford Street, but only 10,000 square feet for lots in subdivision.

Increased traffic on arterials and collector streets may seem inevitable but it can be lessened by concentrating development where transit is available, possibly through Transit Oriented Development, (TOD), or through flexible road network design. This refers to avoiding situations where all traffic uses a few major roads because much development is in isolated subdivisions designed as large cul de sacs. This common pattern has the advantage avoiding through traffic on local streets but it makes local trips to nearby neighborhoods and facilities longer than necessary by preventing direct movement between them. Instead people must now drive on round about routes over major streets.

The present pattern also allows few alternative routes when the major roads are clogged or blocked by an accident and gives such neighborhoods an isolated feeling, especially to non-drivers of all ages. Connections between neighborhoods would reduce local traffic by allowing short car trips and increased walking or bicycling to nearby neighborhoods and local destinations.

If allowing through car movement is unacceptable, much could still be accomplished by connecting neighborhoods with an ultimate town-wide system of bicycle and pedestrian paths. This alone would reduce driving by removing the need for circuitous driving for local trips that can be walked or pedaled. Such a system would allow children to get to friends' houses without being driven by parent and would increase opportunities for beneficial walking to school. This is discussed further in Chapter VII, Goals and Objectives.

Lost "Town Character"/Diminished landscape quality Some lost character is inevitable as continuing development turns farms into subdivision and public facilities; commerce removes historic houses and farm land; ; the view from the road becomes one of houses on frontage lots, and businesses – even ones which could strengthen the Center - spread out along major roads. However, some of these impacts can be lessened through the town's development regulatory power following approaches recommended in recent and past Master Plans and by the use of Smart Growth concepts as found in the Executive Office of Energy and Environmental Affairs' Smart Growth/Smart energy Toolkit produced by the Horsley Witton Group.

These Smart Growth principles as outlined by the Vision 20/20 Partnership for Southeastern Massachusetts and the Commonwealth's related Sustainable Development Principles include:

- Concentrating compact development and redevelopment to better use land and resources and to offer easy access to services and facilities while preserving outlying areas.
- Building on existing infrastructure,
- Allowing complementary mixed uses
- Minimizing storm runoff and maximizing groundwater recharge
- Restoring and enhancing the environment by preserving open space, critical environmental areas, farm land and places of natural beauty
- Preserving a strong sense of place
- Conserving resources

- Provide transportation choices
- Planning Regionally

Relevant recommendations from the recent Bridgewater Master Plan by the firm of Dufresne-Henry include:

- Encourage better cluster development
- Target higher density and senior housing near commercial centers, transit and parks
- Create neighborhoods with well-defined edges and centers
- Provide high quality public spaces
- Improve neighborhood accessibility to desired activities
- Concentrate commercial development in compact districts
- Establish upland buffers around retained wetlands and water bodies
- Create a street network with multiple connections and relatively direct routes
- Provide good networks for pedestrians and bicycles
- Reduce and concentrate the land zoned for retail development
- Provide for alternative development and design measures through new regulations encouraging traditional neighborhood development and improving the cluster bylaw, and by modifying zoning and subdivision regulations to improve the accessibility, amenities and environmental sensitivity of conventional subdivisions.

One recent constructive approach is the Child's Bridge Open Space Community development planned on the riverside Perkins Farm. This will keep most of the houses well back from the Taunton River and preserves relatively deep frontage on the river with a conservation restriction. While the land will not be open to the general public, the plan preserves its habitat value and its scenic value from the houses and from the river. Thus it will protect some of the land of conservation and recreation interest on Figure V-1.

In all, applying the principles and policies reviewed above and acting on many of the recommendations of this plan could do much to preserve Bridgewater's traditional character and landscape.