Natural Environment

3.1 Natural Features

Natural Setting

Montpelier is located in the upper watershed of the Winooski River. This river cuts a path through the Green Mountains and connects the region with Chittenden County and the communities of the Champlain Valley. The surrounding Green Mountains play a key role in the landscape of the region and the city. Many of the higher peaks of the main range and of the Worcester Range are visible from within the city, including Camel's Hump, Worcester Mountain, and Mount Hunger. The North Branch River basin forms another watershed that shapes the city's northern reach, coming to confluence with the Winooski in the downtown.

Montpelier's natural setting is particularly attractive. Its location at the confluence of the Winooski and North Branch Rivers has influenced development not only along the valleys, but also on the hillside slopes that overlook the valley. Higher elevations are 400 to 500 feet above these valleys, providing a contrast strong enough to be apparent anywhere in the city.

Figure 4 indicates this general pattern of topography which shapes development and the city's image, form, and character. Montpelier's steeper slopes (Figure 5) provide a strong visual benefit and physical edge to the downtown area, and are an important feature which defines Montpelier's central business district. Vistas along several downtown streets, such as State and Main Streets, are terminated by the steeper wooded slopes that occur at the base of the surrounding hills.

Water Resources

Earth Charter Principle II.5(e): *Manage the use of renewable resources such as water, soil, forest products, and marine life in ways that do not exceed rates of regeneration and that protect the health of ecosystems.*

Montpelier's Waterways

Montpelier's four rivers are important features within the city's landscape. The Winooski River meanders from east to west through the central area, and extends approximately four and one-half miles within the City limits. The smaller North Branch extends for a similar length to the city's northern border and the Wrightsville Reservoir. A small portion the city's southeastern boundary is formed by the Steven's Branch of the Winooski; the Dog River forms a portion of the western boundary.

Montpelier's zoning regulation includes provisions for the protection of streams and rivers, and the City also has extensive regulations concerning stormwater mitigation, both in the zoning and within the review role played by the Department of Public Works. In addition, site plan review provisions require the information about streams and rivers in any proposal, and applicants are directed to present a plan that protects these resources, both within the Growth Center boundary and outside it.

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Figure 4 - Topography & Ridgelines

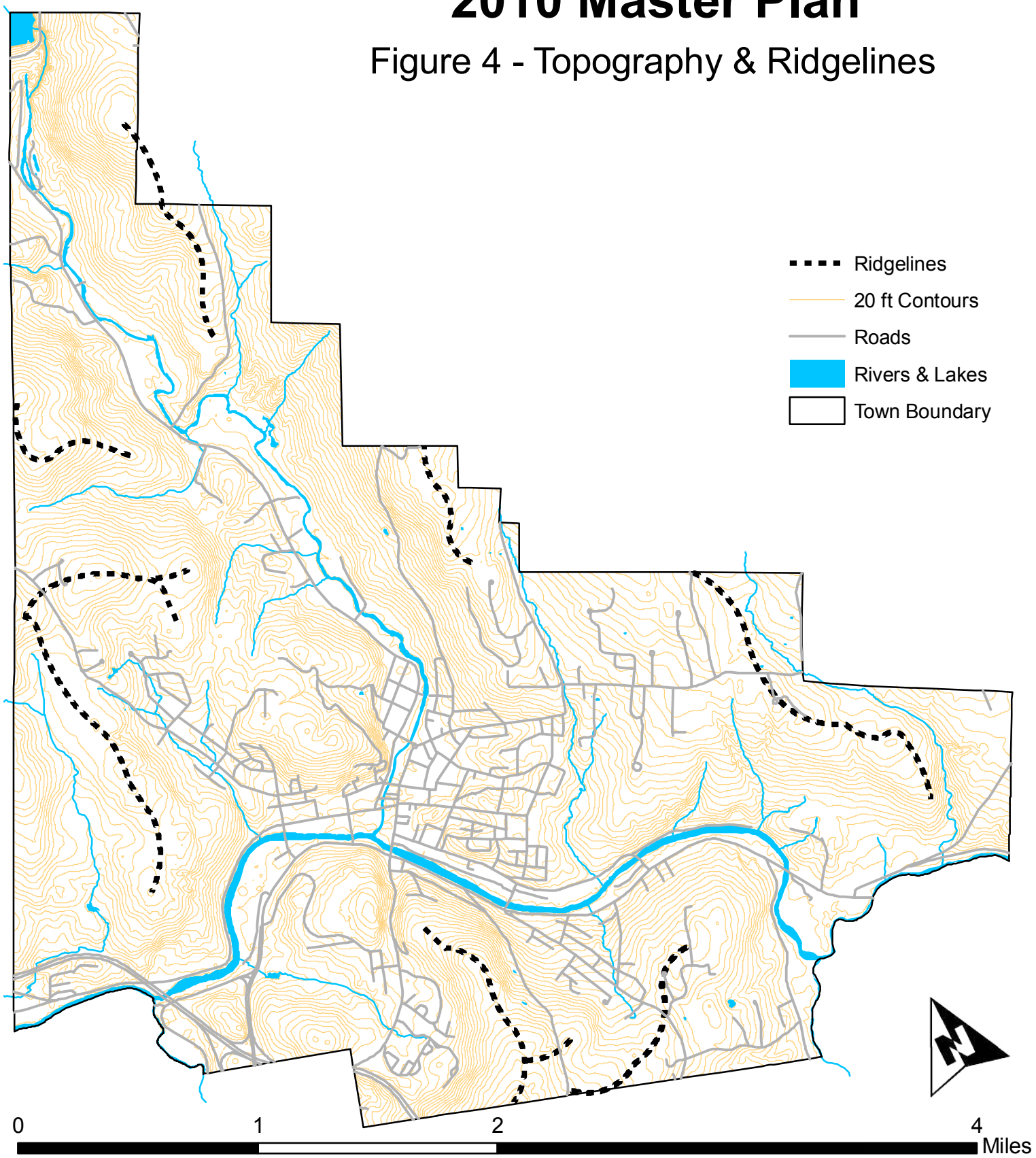

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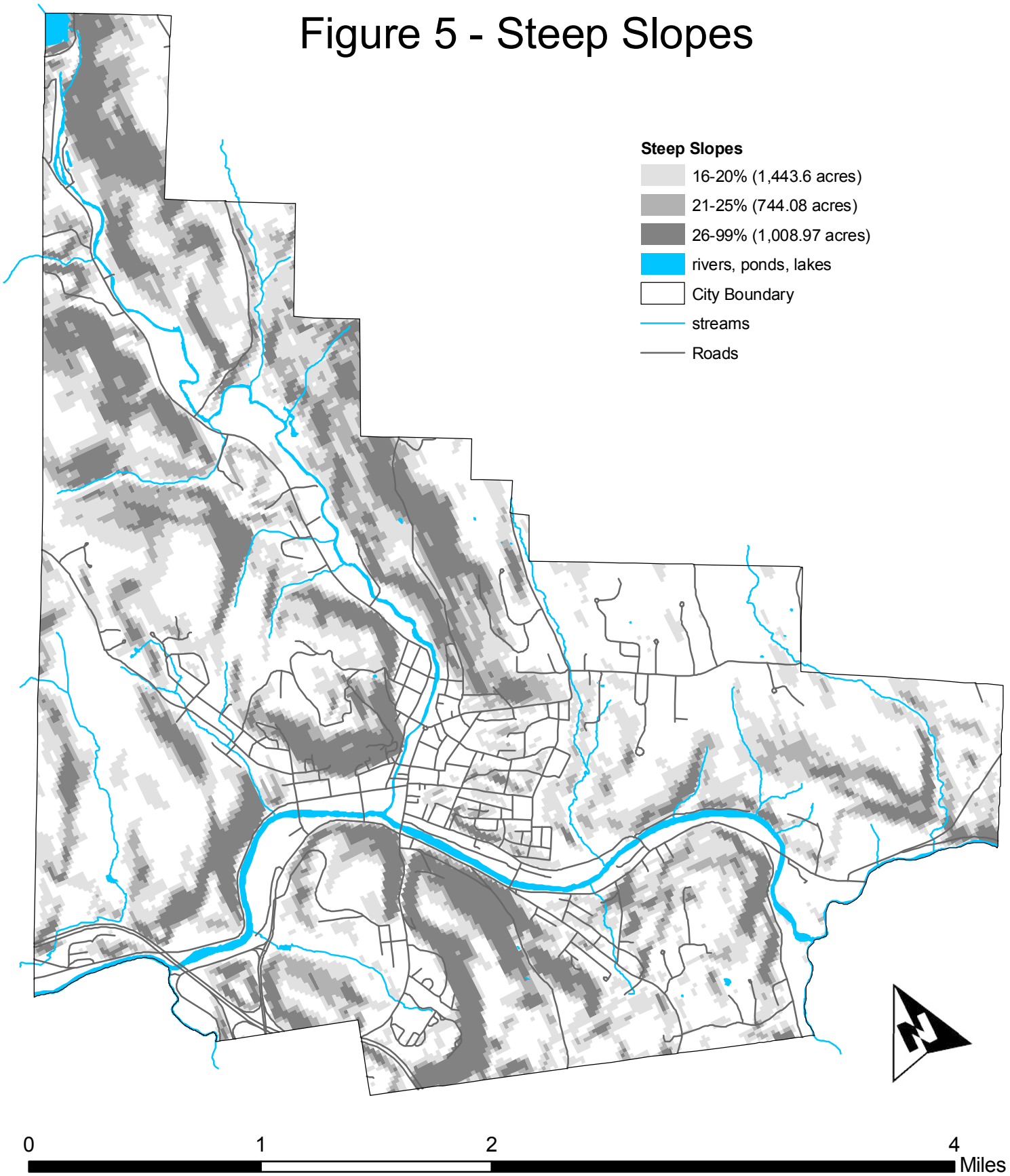
Figure 5 - Steep Slopes



A number of additional resources are available to aid in the protection and restoration of Montpelier's local waterways. The North Branch of the Winooski Corridor Plan, prepared by Johnson Group, Inc., 2009, identifies potential restoration projects in the North Branch river system where a balance can be reached between human development and the river's health and well-being. The Winooski Basin Plan, in development in 2010, identifies watershed protection and restoration projects to protect the value of high quality water resources and restore the waters which do not meet the Vermont Water Quality Standards. Additionally, the Vermont Department of Environmental Conservation's (DEC) River Management Program has a number of resources, such as a technical river corridor planning guide, which aid in the planning, designing, and protecting of river corridors to accommodate stream meander and floodplain processes as the most economically and environmentally sustainable river management alternative.

Flood Mitigation

Although flooding along riverbanks, both from runoff and ice jamming, has been partly mitigated through flood mitigation programs implemented by the City, the potential for flooding still remains. According to the "Montpelier Flood Hazard Mitigation Plan" (July 1998), over 478 acres, or 7.2% of the entire city is in the 100-year floodplain; an additional 86.5 acres is in the 500-year floodplain. While most of the areas affected by flooding are near the waters' edge, nearly the entire downtown area is within the 100-year floodplain (Figure 6).

Earth Charter Principle I.2(a): *Accept that with the right to own, manage, and use natural resources comes the duty to prevent environmental harm and to protect the rights of people.*

The City's ongoing mitigation measures include early warning and emergency response, building and property improvements, and participation in programs such as the Community Rating System (CRS), National Flood Insurance Program (NFIP), and Flood Mitigation Assistance Program through the Federal Emergency Management Agency (FEMA). In order to participate, our community must adopt and administer regulations that meet or exceed NFIP requirements. As a CRS community, we have worked hard to keep the floodplain regulations up to date and to work with landowners to make them aware of all the requirements.

The Planning & Zoning Administrator, as the CRS Coordinator, carries out a number of activities each year and then makes a submission to FEMA by the end of the year. Activities include: maintaining records of development in the floodplain and other information necessary to preserve the CRS flood hazard mitigation certification, and a mailing to each property owner in the floodplain, to lenders, and to realtors.

Montpelier is one in three communities in Vermont that participates in the CRS. The City's CRS rating is currently a Class 9. Class 9 gives Montpelier a premium discount of 5%. It is likely that the City will maintain the rating of Class 9. However, there is a possibility that Montpelier's rating may increase to a Class 8, which would give a discount of 10%. The Department of Planning and Community Development carried out a wide range of on-going flood hazard mitigation activities to reduce or eliminate losses to life and property due to flooding.

Additionally, in 2010, the Army Corp of Engineers (ACOE) began the Winooski River Flood Damage Reduction Project, a study to assist in protecting the City from flooding due to ice jams along the Winooski River. The ACOE, the State, the City and the consultant, Dubois and King, along with other agencies (Cold Regions Research and Engineering Laboratory and other Federal and State Agencies), will look at various project options and their permitting processes, in order to create a Project Management Plan. A cost/benefit analysis and environmental impact assessment of the various alternatives will also be included; however, the study does not currently include an implementation plan. The Project Management Plan is expected to be completed by 2013. At that time, the project will be permitted and ready to build.

Stormwater Management

Montpelier has traditionally relied on highly engineered stormwater management practices that channel stormwater quickly and efficiently away from the development site and into storm sewers, detention ponds or nearby water bodies. Such practices, however, can lead to increased flood losses, public safety hazards, sediment accumulation, erosion, and damage to expensive infrastructure.

Earth Charter Principle II.5(a): *Adopt at all levels sustainable development plans and regulations that make environmental conservation and rehabilitation integral to all development initiatives.*

In contrast, low-impact development (LID) stormwater management maintains natural drainage patterns on-site and retains more stormwater where it falls. For example, in lieu of a municipal storm sewer serving a new subdivision's runoff needs, the development site can integrate lot-level practices throughout, such as maintaining native vegetation, incorporating rain gardens, and diverting water from downspouts into planting beds (and away from driveway surfaces). This type of integrated approach costs less than conventional methods because the total volume of runoff to be managed is significantly minimized, or even eliminated, when stormwater is absorbed into the soil, and evaporated and transpired from plant surfaces.* LID practices should be incorporated in the development process whenever possible in order to manage Montpelier's stormwater in a more effective and ecologically-sound manner.

A new generation of *green roofs* – roofs that are planted with anything from meadow grass to formal gardens - are becoming popular in cities around the world, and the studies that have been done on these new roof treatments demonstrate a spectrum of benefits to both the private and public sectors. Green roofs reduce the energy and costs of heating and cooling buildings, pull CO2 out of the atmosphere, minimize the stormwater runoff that goes into city collection systems, reduce noise inside buildings, and make the roofs themselves last a lot longer because of the protection of the roofing materials the plants provide.

Earth Charter Principle II.7(c): *Promote the development, adoption, and equitable transfer of environmentally sound technologies.*

* For more information about low impact development in Vermont, see the Vermont League of City and Towns Municipal Assistance Center Technical Paper #5, "Managing Stormwater through Low Impact Development (LID) Techniques." http://resources.vlct.org/u/o_LID-secured.pdf

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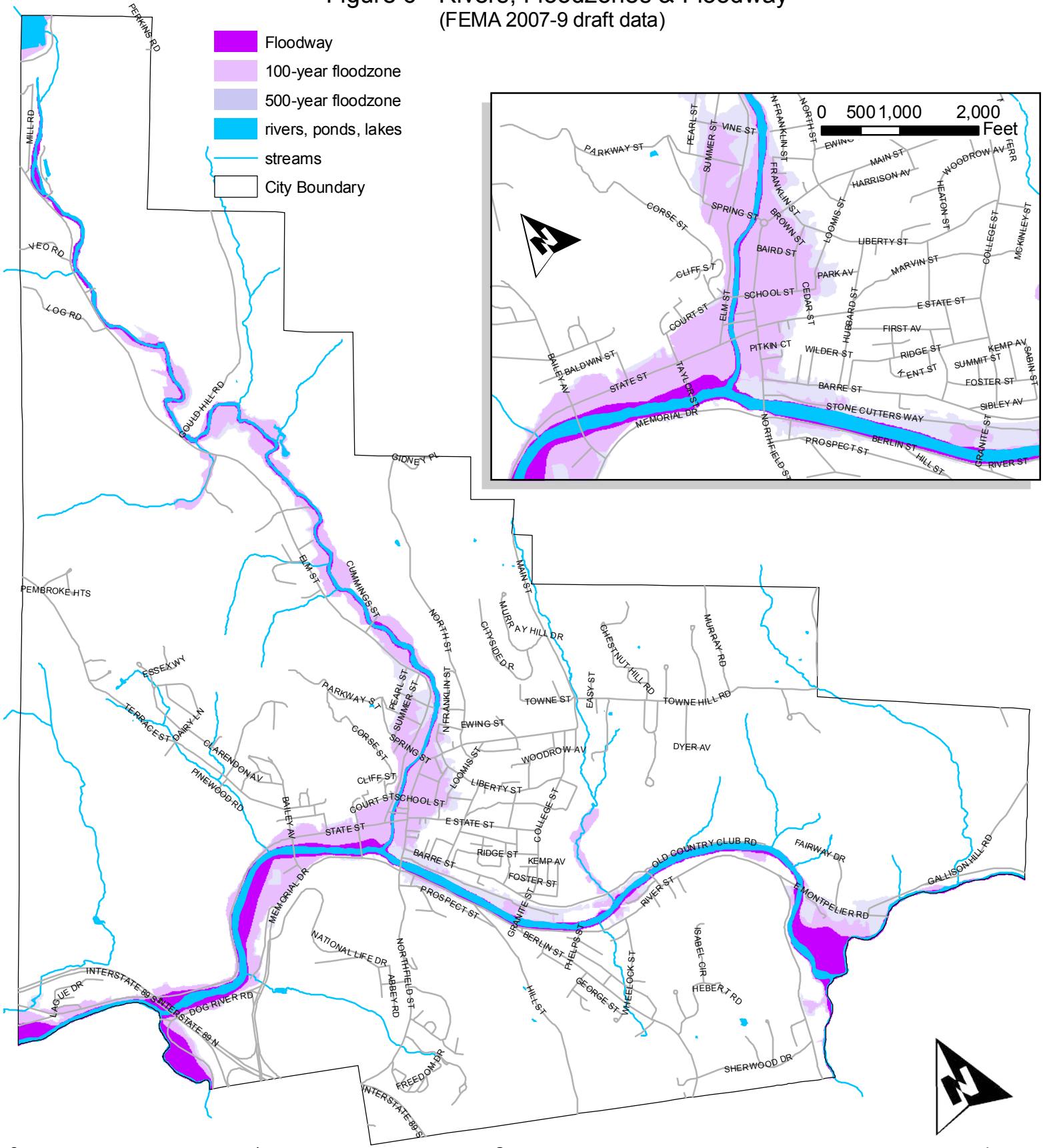
Figure 6 - Rivers, Floodzones & Floodway
(FEMA 2007-9 draft data)



The extensive roofs are the lightest and easiest to maintain. Composed of a light soil of 1-7 inches with hardy plants like moss, sedum, and grasses, they typically weigh only 13 – 30 pounds per square foot. The semi-intensive and intensive roofs range from more designed roofs to real gardens with trees and shrubs. The semi-intensive and intensive roofs generally require flat surfaces, whereas the extensive variety can be built on flat roofs or roofs with a pitch up to 45 degrees.

The extensive roofs are designed to be low maintenance. They are planted with a mix of plants that can survive in dry, hot conditions and can withstand the sudden inundation from storms. Ideally, they are slightly sloped, so the water can drain naturally. While they're being installed and the plants are getting established, they take some watering and weeding. But after that, they might only need some fertilizer a couple times a year to make sure the plants stay healthy.

Municipal Water Service

The City of Montpelier distributes an average of 1 million gallons of water to Montpelier and Berlin residents each day. (Montpelier provides municipal water service to over 2,500 commercial and residential customers within the city limits and about 500 customers in Berlin Fire District 1, and the Montpelier Junction Railroad Station, the U-32 Junior/Senior high School, the Hill Top Apartments in Berlin, as well as four residences in Berlin. In addition, there is one private water system—a private well and storage tank serving the Murray Hill development. All other home owners are on private wells.)

The city's municipal water is drawn by siphon from its source at Berlin Pond, and passes through a rapid sand filtration plant before being transmitted into the city's grid of mains. The system has capacity to about 900 feet. Special pressure districts operate in the Terrace Street area and on Towne Hill. Potential service areas are generally established below the 900 foot elevation, except where special infrastructure can be installed, as on Terrace Street and Towne Hill. The approximate existing service areas are shown in Figure 7.

The purity and security of its water supply is one of the city's greatest concerns. While Montpelier appears to have an adequate supply of water, there is some concern over the yield and quality of the system over time.

The City's water engineering consultants estimate that the current peak demand is approximately 3 million gallons per day (MGD) in the summer months, and 2.1-2.2. MGD in the winter. The water works system was thoroughly analyzed in 1974 and again in 2001. The dependable yield of the system was estimated to be 4.2 MGD, and sufficient capacity was projected into the year 2025, including the Berlin Fire District 1, given its present geographic and supply limits. This would allow for an approximate doubling of the service demand of the system, assuming some additional summertime conservation measures. Currently, the state of Vermont has assessed the system and placed the safe yield level of Berlin Pond at 1.7 MGD, in order to protect the wetlands. To go beyond this level, a Conditional Use Determination would have to be made.

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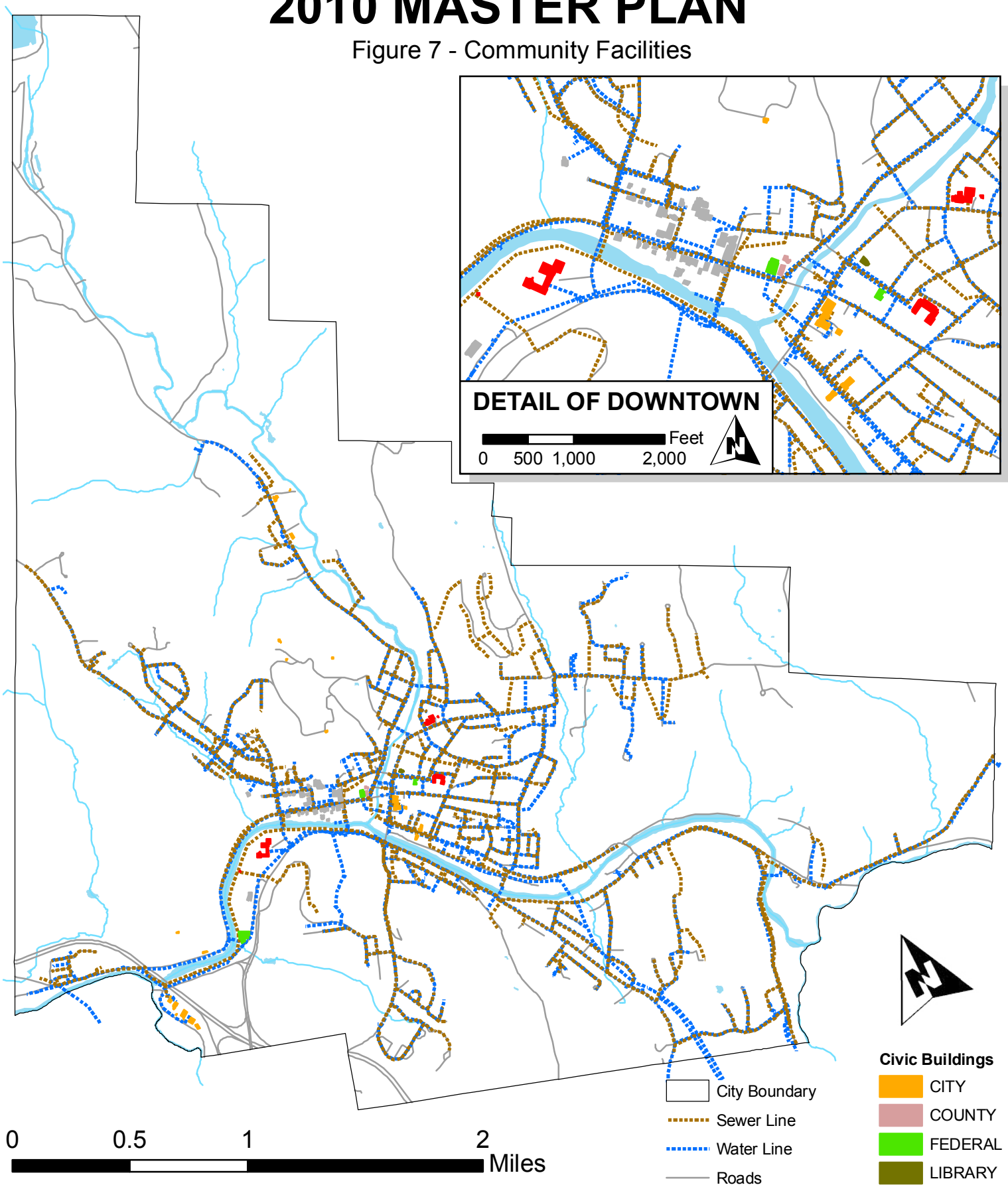
Figure 7 - Community Facilities



The system, with components ranging in age from 5 to 95 years, has developed many leaks, especially in the downtown area where the dimensions of the distribution system are reduced, and where water pressure has not been regulated. While most of these leaks have been eliminated, a recent water rate study estimated that leakage of 10% is still occurring.

Other system problems include the need to:

1) regulate pressure and reduce potential leaks in the smaller downtown mains;
2) upgrade and add major transmission mains; and
3) address community water needs
4) address sprinkler system needs.

For example, the City, working with the Towne Hill Road Association, organized Montpelier Fire District 1 in order to obtain financing to construct a water storage tank with sufficient capacity to serve the District and the City. Now completed, the City is leasing and operating the Fire District 1 system.

Water Quality

The Water Treatment Facility continuously monitors water quality through laboratory analysis, use trends, and source protection inspections in order to provide high-quality drinking water to residents. The Division also fulfills State reporting requirements, prepares the Consumer Confidence Report every spring, and performs equipment, facility, and grounds maintenance to keep the plant in excellent running condition. In calendar year 2008, no violations occurred (Table 3-1).

On average, the water the City returns to the rivers meets about 97% of permit requirements for contaminant removal. Biochemical oxygen demand (BOD), total suspended solids (TSS), and turbidity are usually in the drinking water range (less than 1-nephlometric turbidity units).

Water Conservation

Annual water usage decreased more than 9 percent over the last three years. This reduction of water use by the city residents and businesses is producing shortfalls in revenue for the Water Fund. Future rate increases will be considered to cover prior year deficits caused in part by reduced water usage. The recently enacted Growth Center Designation addresses this concern by concentrating growth in areas where water and sewer hook-up are available, thereby increasing customers.

Sewers

The city's municipal sewage system roughly corresponds to the water service areas. Approximately 150 residences outside this area use private septic systems. The sewer system includes about 38 miles of line installed from 1898 to the present. About 64 percent of the system was constructed after 1950. However, 23 percent of the system dates from before 1923.

Table 3-1: 2008 Detected Contaminants, Montpelier Water System							
	Date	**Highest Value**	**Range**	**Unit**	**MCL**[i]	**MCLG**[ii]	**Typical Source**
Microbiological							
Coliform (TCR)	2008	n/a	n/a	n/a	MCL: systems that collect fewer than 40 samples per month – no more than one positive sample monthly	0	Naturally present in the environment
E. Coli	2008	n/a	n/a	n/a	MCL: A Routine Sample and a Repeat Sample are Total Coliform Positive, and One is also Fecal Positive/E. Coli Positive.	0	Human and animal fecal waste
Chemical Contaminants							
Fluoride	2008	0.9	0.9	ppm	4.0	4	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories
Nitrate	2008	0.07	0.07	ppm	10	10	Runoff from fertilizer use; Leaching from septic tanks; sewage; erosion of natural deposits.
Iron	2008	0.045	0.045	MG/L	0.3		
Sodium	2008	18	18	MG/L	250	20	
Lead and Copper							
Copper, free	2005-2007		0.032-0.875	ppm	AL[iii] = 1.3	0 Sites over AL	
Lead					AL = 15	0 Sites over AL	
Disinfection By-Products							
Total Haloacetic Acids (HAA5)	2008		11.3-16	ppb	60	0	By-product of drinking water disinfection
Total Trihalomethanes (TTHM)	2008		12.7-22.9	ppb	80	0	By-product of drinking water chlorination

[i] *Maximum Contamination Level (MCL): The "Maximum Allowed" MCL is the highest level of a contaminant that is allowed in drinking water. MCL's are set as close to the MCLG's as feasible using the best available treatment technology.*

[ii] *Maximum Contamination Level Goal (MCLG)**:** The "Goal" is the level of a contaminant in drinking water below which there is no known or expected risk to human health. MCLG's allow for a margin of safety.*

[iii] *Action Level (AL): The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.*

Data from the Spring 2009 Water Quality Report

Many of the smaller lines in the older sections of the city were combination systems that carried storm and waste water. These lines were subject to overflow during periods of heavy rainfall, about two or three times a year. Points of the combined sewer outflow (CSO) are located along the Winooski and North Branch Rivers. By 2003, The City completed a CSO elimination project where the combination lines were separated.

Follow up work took place in 2006 and 2007 to clean the "trunk line" or main line sewer to the wastewater treatment plant, in order to reduce the occurrence of sewer overflows during storms. According to Public Works staff, there are still a few overflow points open for health reasons. The Department of Public Works is currently working on follow up reporting and recommendations to meet the intent of the 1272 Order (a portion of the Wastewater Discharge Permit that deals with Combined Sewer Overflow elimination).

The sewage treatment facilities on Dog River Road received a major upgrade in 1979 and again in 2005. The facility will continue to have a design capacity of 3.97 MGD. Current use is approximately 2 MGD, including about 0.25 MGD from the Berlin Sewer system, which has the right to use a maximum of 0.6 MGD through an inter-municipal agreement.

For years, the City disposed of the final sludge byproduct from the treatment process by land applying to agricultural fields. More recently, this byproduct has been disposed of in approved landfills. The City is currently working on an alternative to land filling, which involves composting and reuse of the byproduct.

Another alternative for wastewater management that the City could consider is the development of an intensive bioremediation system, often known by the brand name, Living Machine. The system is designed to mimic the cleansing functions of a wetland, removing sediments and pollutants with biofilters. Aquatic and wetland plants, such as bacteria, algae, protozoa, plankton, snails, clams, fish and other organisms are used in the system to provide specific cleansing. In colder climates, like in Vermont, the system of tanks, pipes, and filters is housed in a greenhouse to raise the temperature and thus, the rate of biological activity.

Potential Service Areas

Given the existing capacity of the water and sewer systems service areas can be expanded without danger of shortage or system failure. Potential water and sewer service areas are most effectively defined where infrastructure currently exists or can be easily extended without great cost and where induced development will not be detrimental to the goals and objectives of the city.

There are requests pending from developers and town officials from the towns of Berlin and East Montpelier for the extension of water, sewer service, or both. Only Union School District 32 in the town of East Montpelier, Berlin Fire District #1, and Hill Top Apartments, and four residences on the border of Montpelier in the Town of Berlin are served by treated water. A single connection upstream of the chlorinating facility was granted to the former Pike farm when the water main intake was extended to Berlin Pond. The railroad station at Montpelier Junction is also connected to the city's water system. Sewer service is provided to the Town of Berlin

under a 1982 agreement. While it is practical that development in adjoining towns could use the city's water and waste treatment facilities, no mechanism is in place for the city to receive the benefits of induced development.

One mechanism being explored elsewhere in the state is the creation of a regional authority which would enable the benefits of induced development to be distributed on a regional basis through public works projects. Using this mechanism, a portion of the tax benefits, such as rooms and meals taxes, sales taxes, and other benefits, would be applied to the authority.

The Town of Middlesex and Montpelier have an arrangement at the Montpelier/Middlesex Industrial Park whereby Montpelier will receive tax sharing from development in the Town of Middlesex, which occurs as a result of water and sewer service extensions. This tax sharing has not yet occurred, primarily due to the scarcity of Federal funds to assist in the previously planned water/sewer line extensions, and the fact that the Industrial Park has substantially developed in spite of the delay in water and sewer services.

There is potential and adequate capacity to extend the water system to adjoining towns, in particular, the Town of Berlin. The provision of this service to adjoining communities should be contingent on the availability of water, adequate user fees, establishment of conservation efforts, and the potential for intergovernmental tax sharing from the induced development.

In cases where utility extensions are constructed by private developers, the City should ensure they are constructed to the same standards and quality as the city's systems to facilitate the efficiency of future connections. This policy would facilitate the absorption of these private systems into the municipal systems.

Earth Charter Principle II.5(b): *Establish and safeguard viable nature and biosphere reserves, including wild lands and marine areas, to protect Earth's life support systems, maintain biodiversity, and preserve our natural heritage.*

Natural Communities and Biodiversity

Montpelier is home to a diverse range of plant and animal species. A 2003 Montpelier Natural Resource Inventory identified a number of significant natural resources within the city limits, including 76 Class II and III wetlands, which exhibit a diversity of functions and values, and 24 wildlife habitat units, providing refuge for a wide range of animal species. In 2008, the North Branch Nature Center conducted a 24-hour BioBlitz, inventorying all living species in a given area, and found a wide variety of plant and animal species, including over 86 bird species and over 96 fungi species. The Nature Center plans to hold periodic, smaller scale events – mini-Blitzes – that focus on a single species group.

Seventeen areas, called "biodiversity conservation areas," have been recommended for their importance to the overall biodiversity within the City of Montpelier in a report prepared for the city in 2007 (Figure 8 and Table 3-2). These areas are recommended based on the presence of two or more natural community occurrences of municipal level significance, with the exception of four sites along the Winooski and Dog Rivers where the sites are recommended based on the presence of remnant floodplain forests. Floodplain forests are a special case for biodiversity conservation. Because of invasive plant species and their diminishing size (as a result of development and former conversion to agricultural fields), floodplain forests are in poor

Figure 8 – Biodiversity Conservation Areas

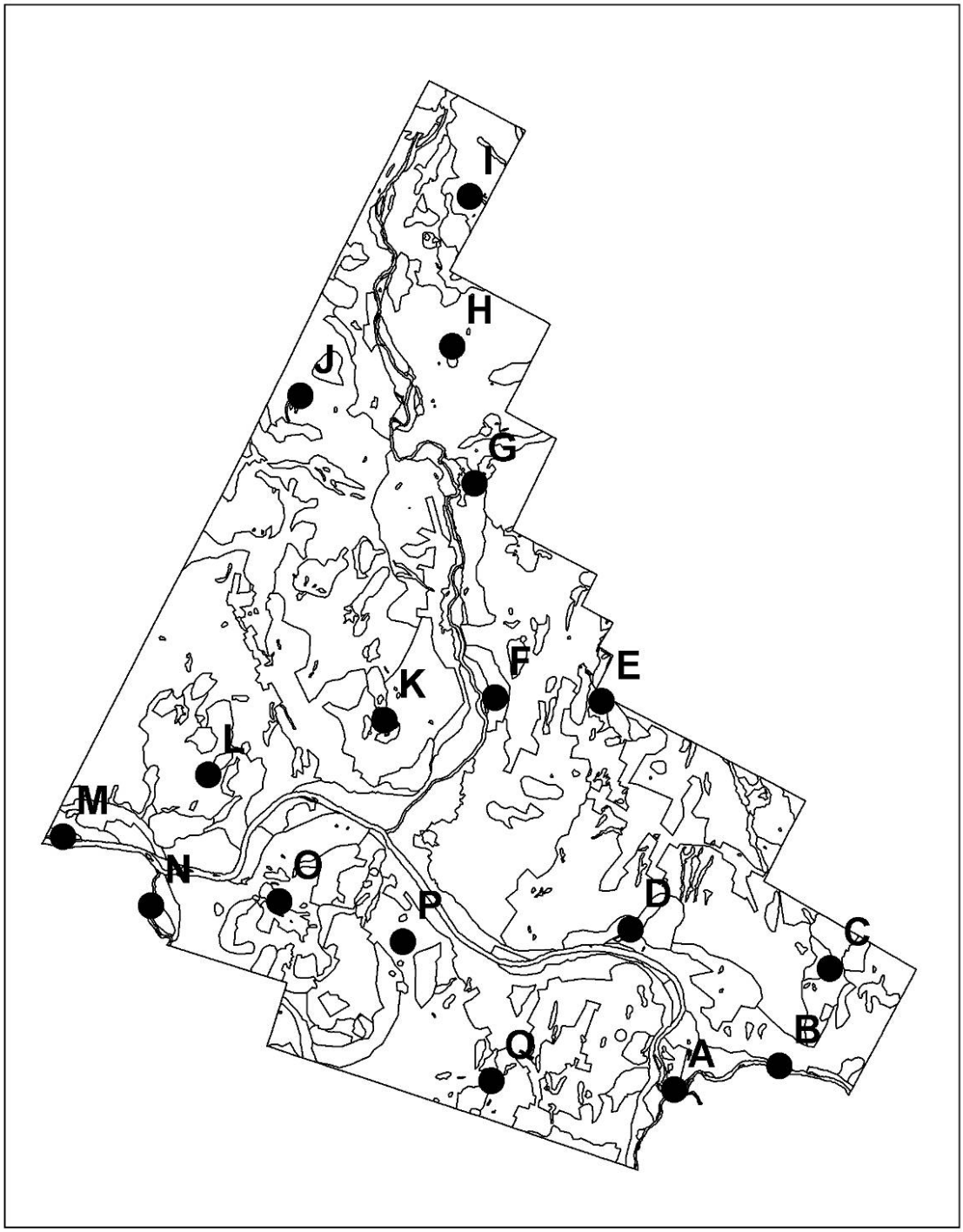


Table 3-2: Biodiversity Conservation Areas			
Site	**Site Name**	**Location**	**Significant NC Occurrences**
A	Two Rivers	North bank of the Winooski at Dog River confluence	Floodplain, with remnant floodplain forest (Sugar Maple-Ostrich Fern Floodplain Forest)
B	Gallison Hill Road Floodplain	Small floodplain along Winooski S. of Gallison Hill Rd.	Remnant floodplain forest (Sugar Maple-Ostrich Fern Floodplain Forest)
C	East Brook	Vicinity of brook north of Gallison Hill Road	Rich Northern Hardwood Forest, N. White Cedar Sloping Seepage Forest, Hemlock-NHF, brook & ravine
D	Old Country Club Road Slope	Slope N. of Winooski and E. of Barre St. bridge	Rich Northern Hardwood Forest, Hemlock-Northern Hardwood Forest
E	Upper Blanchard Brook	Blanchard Brook vicinity above Towne Hill Rd.	fenny wetlands, Mixed Sloping Seepage Forests, Hemlock-Northern Hardwood Forest, Alder Swamp
F	Lower North Branch Slope	East of North Branch fromHillhead St.to Cummings St.	Northern Hardwood Seepage Forest, Semi-rich Northern Hardwood Forest, floodplain forest (Sugar Maple-Ostrich Fern Floodplain Forest)
G	North Branch River Park	Mostly E. of North Branch N. of Cummings St. bridge	Floodplain (some forest), Seeps, Hemlock-N. Hardwood Forest, Rich &Semi-rich N. Hardwood Forest, Hemlock Forest, Shallow Emergent Marsh,
H	Gould Hill West	W. of Gould Hill Rd.and E. of the North Branch	Hemlock-Northern Hardwood Swamps, Vernal Pool, Hemlock-N. Hardwood Forest, undeveloped floodplain, floodplain forest, Alder Swamp, Seeps
I	North Hill	Hill in N. end of City, SE of Wrightsville Dam	Vernal Pools, Hemlock Swamp, N. Hardwood Talus Woodland, Hemlock Forest, N. Hardwood Forest, Rich N. Hardwood Forest, Alluvial Alder Swamps
J	Boundary Hill	1040' hill summit W. of North Branch and Gould Hill Rd. bridge	Hemlock Swamps, N. Hardwood Talus Woodland, Hemlock Forest, Hemlock-N. Hardwood Forest, Seeps, Sloping Seepage Forest
K	Capitol Hill/Hubbard Park	Hill behind state capitol including Hubbard Park	Red Oak-N. Hardwood Forest, Seeps, Mixed Sloping Seepage Forest, Rich N. Hardwood Forest, Hemlock Forest
L	West Hill	Hill N. of Green Mount Cemetery	Red Oak-N. Hardwood Forest, Hemlock-N. Hardwood Forest, Shallow Emergent Marsh (Beaver Meadow), Red Maple-Black Ash Swamps
M	West Corner Floodplain	N. side of Winooski in far W. corner of City	Floodplain Forest, and undeveloped floodplain
N	Dog River	E. bank of Dog River in City	Floodplain Forest, and undeveloped floodplain
O	Double Hill	Two summited hill W. of Northfield St. (Rt. 12)	Rich N.Hardwood Forest, Hemlock-N. Hardwood Forest, Shallow Emergent Marsh, Hemlock Forest, Seeps
P	South Hill	Hill E. of Northfield St. and W. of Hill St.	Rich Northern Hardwood Forest, Hemlock-N. Hardwood Forest
Q	Fenny Lane	West of Berlin St. near Berlin town line	fenny wetland, Hemlock-N. Hardwood Forest, Rich N. Hardwood Forest

condition. Yet, they remain reservoirs of natural biological diversity, as shown by the discovery of several native floodplain species still present at these sites. The natural flood processes of deposition and erosion are still present in floodplain forest, which leads to their very unique ecological character. They retain high biodiversity values, as well as educational value, and can be restored. Hence, they are included as biodiversity conservation areas among the larger and much more intact recommended areas up in the hills.

Invasive Species

> **Earth Charter Principle II.5(d):** *Control and eradicate non-native or genetically modified organisms harmful to native species and the environment, and prevent introduction of such harmful organisms.*

Municipal and community groups, such as the Parks Department, Conservation Commission, and Vermont Nature Conservancy continue to coordinate efforts to remove invasive species, such as honeysuckle and Japanese knotweed, which adversely affect local habitats; where possible, these species are being replaced by native plants, which offer a number of benefits, including soil stabilization and biodiversity restoration. Residents, too, play an important role in preserving biological diversity and wildlife habitats. When choosing plants for landscaping, residents should choose native species and refrain from using invasive species. Residents can refer to the Nature Conservancy's invasive species list. More information can be found on their web site: http://www.nature.org/wherewework/northamerica/states/vermont/.

The Montpelier Tree Board, which seeks to plan for the health of, and work to maintain, the city's urban forests, continues to play an active role throughout the city with a number of projects, including:

- Continuing efforts on the Municipal Street Tree Inventory;
- Updating the Municipal Street Tree Plan;
- Undertaking an Urban Tree Canopy Assessment;
- Maintaining the Tree Nursery at North Branch Nature Center; and
- Planting and maintaining downtown trees.

Community programs and activities, such as the BioBlitz inventory and invasive species removal workshops, provide residents with the opportunity to learn about Montpelier's many natural communities. Such educational opportunities are essential to increasing public awareness of the importance of biological diversity, thereby ensuring that our natural resources are protected now and in the future.

Open Space and Recreation

The city's open spaces and recreational facilities provide important recreation, visual, and environmental benefits (Figure 9). "Open space" is defined as any land area, either publicly or privately owned, that is relatively undeveloped and unobstructed by man-made objects.

Open space provides a number of benefits to the community, including protecting the health of residents and visitors, both physically and mentally, by improving air quality and reducing noise

pollution; promoting outdoor exercise, enjoyment, and appreciation of the natural world; providing recreational opportunities for all residents, regardless of income; enhancing residential and commercial property values; and supporting a diversity of wildlife and wildlife habitats. Vegetated open spaces can preserve water quality and mitigate flooding by absorbing stormwater runoff and filtering contaminants.

The city's park and recreation facilities are the responsibility of the Montpelier Park Commission and the Montpelier Recreation Department, with support from the Conservation Commission and the Cemetery Superintendent. The Recreation Department operates the City's recreation programs and is responsible for operation and maintenance of the recreation building on Barre Street, the City's school fields, and two recreation fields. The following areas and facilities provide our residents with recreational opportunities and places they can be outdoors.

The **Recreation Center** on Barre Street, built in 1932 as an armory, includes a gymnasium, game room, and meeting rooms and is a venue for a variety of special events and recreation programs. It is generally open to the public from September through May. Youth basketball, adult basketball, and other indoor activities are found here.

The **Elm Street Recreation Field**, about 18 acres, includes the City's public swimming pool, public playground, basketball courts, four tennis courts, a running track, a skateboard park, two softball fields, a little league field, a baseball field, and football and soccer fields. The fields are also used for field hockey and lacrosse. Lighting is available for baseball, soccer, and football on the Babe Ruth baseball field, as well as on the tennis and basketball courts. The complex also contains a 2 ½ acre picnic are with horseshoe pits, grass volleyball courts, grills and tables. The Dog River Recreation Area, about 11 acres, includes two softball fields, a small picnic area, and river access for fishing. In the summertime, the field is the home of the Mountaineers, a college level professional baseball team.

The **Central Vermont Memorial Civic Center (CVMCC)**, a four-season, 28,000 ft^2 arena on Gallison Hill Road, was completed in 1998. It is owned and managed by CVMCC, Inc., a non-profit community organization. From October to March, the regulation-size ice arena provides man-made ice for hockey, figure skating, speed skating, broom ball, or special events; the rest of the year the space is used for a variety of indoor sports, cultural events, fairs, and other activities.

Public Parks

Hubbard Park: Named for John E. Hubbard's 125-acre gift in 1899, Hubbard Park is a major recreational resource in the middle of the city. Several parcels have since been added, including a nine acre addition in 2009, formerly owned by Gary and Frances McAvoy. This newest park addition is located just north of the Park Office and Ranger House and fills in a very narrow section of the park that already had two important trails on it, which could be used only by generous permission of the McAvoys.

Hubbard Park now has over 190 acres and includes two picnic shelters, about 10 miles of cross country skiing and hiking trails, a soccer and ball field, a small pond, a sledding hill, and a 54-foot stone observation tower. As a backdrop to the State House, the park is a major visual

resource in the city and an important natural area with several impressive stands of white pine, red pine, and hemlock and a variety of wildlife habitats.

North Branch River Park is a shared responsibility of the Conservation and Park Commissions. Assisted by numerous organizations and volunteers, the Montpelier Conservation Commission spearheaded the creation of this park by raising funds to purchase the two parcels which comprise the 180-acre park in 1995 and 1997. It has approximately four miles of hiking and skiing trails and connects with East Montpelier trails, passing through a rich variety of habitat and terrain. The North Branch Nature Center, adjacent to North Branch River Park and connected by public footbridge, offers a number of nature programs for both youth and adults throughout the year.

Montpelier has several neighborhood parks. **Blanchard Park**, about two wooded acres behind City Hall, is basically undeveloped. Its severe topography suggests that it would be most suited for passive uses, with public access potentially from Wilder Street and from behind City Hall. **Summer Street Park** is a 0.10 acre parcel in the Meadow area. A **Peace Park** along Montpelier's Winooski West Bike Path was created in 1998 by a group of citizens and has been the site of several civic events. **City Hall Plaza Park** was built in 2000 and updated in 2009 to enhance the downtown area and provide a place for gathering. **Mill Pond Park**, **Gateway Park**, **Harrison Preserve, Summer Street Park**, and **Elm Court Park** are small pocket parks located throughout the city, which provide a place for residents to relax and enjoy their surroundings. A new park on Stonecutter's Way, called Turntable Park, is scheduled for construction in 2010. It will preserve an historic railroad turntable and will clean up a contaminated site.

Table 3-3 Areas of Land with Full or Limited Public Access

	Area	Size (Acres)	Neighborhood	Access*
1	Hubbard Park	194	Park West	F
2	Redstone	10.08	Park West	F
3	Peace Park	1.36	Northfield Street	F
4	North Branch Park	192	Upper Elm	F
5	North Branch Nature Center	27.34	Upper Elm	F
6	Dog River	6.02	Northfield Street	F
7	Blanchard Park	1.82	Downtown	F
8	Turntable Park	0.15	Barre Street	F
9	Town Rec Fields and Pool	15.17	Lower Elm	F
10	Wrightsville Reservoir	35.34	Upper Elm	F
11	City Stump Dump	27.32	Upper Elm	L
12	State House Lawn and area behind State House	23.9	Downtown	F
13	Elks Club	144	Towne Hill Road	L
14	Green Mountain Cemetery/ Gateway Park	35.4	Toy Town	F
15	Dog River	24.87	Northfield Street	F
16	Summer St. Park	0.1	Meadow	F
17	Vermont College Green	4.5	College Hill	L
18	Elm Court Park	0.21	Downtown	F
19	Harrison Preserve	10.29	College Hill	F
20	Mill Pond Park	0.15	Meadow	F
21	City Hall Plaza	1.22	Downtown	F

** F = Full Access; L = Limited Access*

In addition to these municipal facilities, the State House lawn, about five acres in front of the State House, is used by area residents, workers, and visitors for passive activities and for civic festivals and events. There are also about 20 acres behind the State House with a path leading to the Hubbard Park Tower. The 4.5 acre green at the Vermont College of Fine Arts campus serves a similar function to the State House lawn.

Montpelier is also served by the recreation area at Wrightsville Dam. This dam, located in Middlesex, Montpelier and East Montpelier, was constructed for flood control, and now serves as a recreation area with boating, swimming, and fishing. The City is a partner with adjoining towns in the maintenance of recreation facilities at the dam through contributions to the Wrightsville Beach Recreation District.

Taken together, there are approximately 400 acres of public parks and recreation areas in the city, not including the bike paths, parks not yet completed, or privately-owned land with public access. Table 3-3 lists areas of land in Montpelier that have full or limited public access. According to national park and recreation standards, Montpelier is very well served. However, the concentration of these facilities is in large areas outside the center of population, suggesting that the City should continue to pursue opportunities to develop recreation space in the urban core whenever possible.

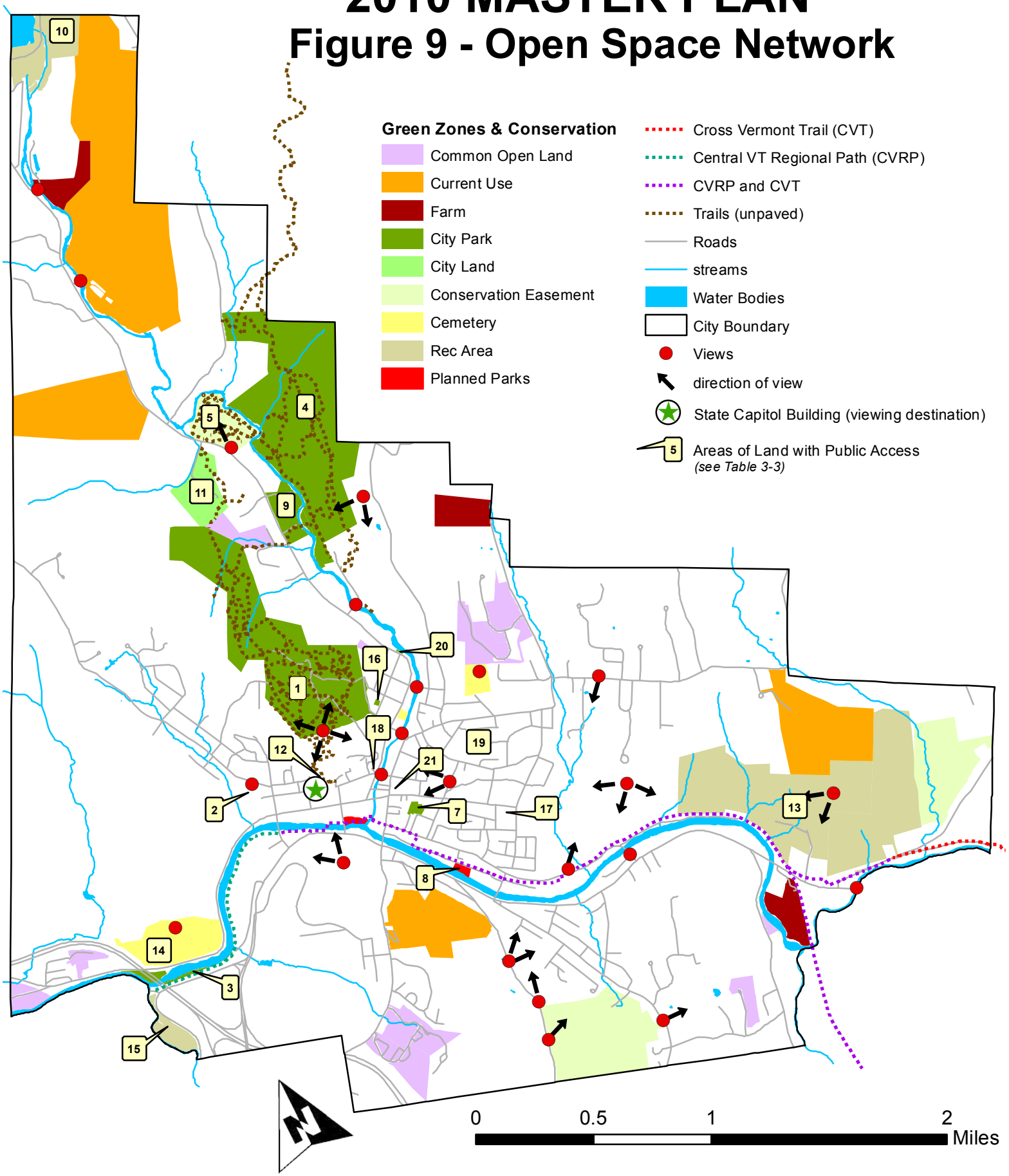
Earth Charter Principle II.5(b): *Establish and safeguard viable nature and biosphere reserves, including wild lands and marine areas, to protect Earth's life support systems, maintain biodiversity, and preserve our natural heritage.*

Views and Vistas

In 2002, the Montpelier Conservation Commission produced "Views and Vistas," a report that inventories the community's scenic resources and provides recommendations for protection and enhancement. Important viewpoints in the report were identified through public surveys and through a walking and driving tour of city streets and pathways. Scenic views were characterized by at least three of the following criteria: intact and healthy natural landscape; historic settlement patterns predominate visually; distinct cultural or natural focal points are included in the scene; overall diversity or dramatic contrasts exist in the landscape; and any eyesores are a minor part of the scene. Important viewpoints are identified in Figure 9. In addition to inventorying scenic viewpoints, the report also notes areas in the city, such as open space and river corridors, that contribute to scenic views.

The "Views and Vistas" study identifies 16 properties that are high or medium priorities for protection based upon the following criteria: property's scenic values are immediately threatened by development; property is visually prominent in the cityscape (is seen from many vantage points); property received a high scenic value ranking in applied methodology; or property received a high scenic value ranking in the public survey. The Conservation Commission also provided specific recommendations as to how these areas could be protected or enhanced. The protection of these important scenic resources must be taken into consideration when determining how to accommodate future urban growth.

CITY OF MONTPELIER
2010 MASTER PLAN
Figure 9 - Open Space Network



Recreation Paths

Biking and walking are popular means of getting to and through Montpelier. Currently, the Central Vermont Regional Path, known as Winooski West, runs from the Dog River Recreation Area, near the Town of Berlin, along the Winooski River to downtown Montpelier. It was divided into two stand-alone segments due to budget and other constraints at that time. Segment I, which is 1.3 miles long and runs from the Dog River Recreation Area to Taylor Street, was completed in 1999. It meanders along the banks of the Winooski River and connects to the Vermont State Employees Credit Union, Montpelier High School, Green Mountain Power, State offices and free parking at the Department of Employment and Training, and the Peace Park.

Segment 2 of Winooski West, which has not been designed or built yet, is intended to continue the path from Taylor Street, along the Winooski River, across the North Branch River and into the downtown, to connect to Winooski East, on Stone Cutters Way. A Conceptual Alignment Analysis was completed in 2002, which studied the range of possible ways to connect section one of the Winooski West Bike Path, which begins or ends at Taylor Street (depending on whether you're coming or going), with the Winooski East Path at Stone Cutters Way. The City Council endorsed a preferred alignment, and the project is now part of the Capital Improvement Plan.

The Central Vermont Regional Path system is proposed to extend from the Dog River Recreational Area in Montpelier through Berlin, Barre City, and Barre Town, terminating in the villages of Websterville, Graniteville, and East Barre.

Waste Management

Montpelier generates approximately 4,268 tons of solid waste each year. Solid waste is privately hauled by Casella Waste Management to two privately owned landfills: Waste USA in Conventry, Vermont, and North Country in Bethlehem, New Hampshire. The effective life of these facilities is estimated to be at least twenty years. The Central Vermont Landfill, located in East Montpelier, was closed in 1992, and currently acts as a transfer station for waste haulers in the Central Vermont Solid Waste Management District. Montpelier residents can contract with haulers for curbside or dumpster pickup or haul their own to the transfer/recycling station on Route 2 in East Montpelier.

Earth Charter Principle II.7(a): *Reduce, reuse, and recycle the materials used in production and consumption systems, and ensure that residual waste can be assimilated by ecological systems.*

The Central Vermont Solid Waste Management District (CVSWMD) provides leadership, education, and services for residents and businesses in reducing and managing their solid waste in order to protect public health and the environment to the greatest extent feasible. The CVSWMD Solid Waste Implementation Plan, *Working Toward Zero Waste*, initiates new programs and processes that not only reduce waste but help to eliminate it. This Zero Waste plan, approved by the CVSWMD Board of Supervisors in 2003 and by the Vermont Agency of Natural Resources in 2006, will guide the organization's work for the next 10 years.

In 1995, CVSWMD implemented a mandatory recycling program for all communities in the District, of which Montpelier is one. Recyclable glass, aluminum, paper, and plastic are transported to District operated Material Recycling Facilities in Montpelier, Hardwick, Williston and Randolph, Vermont, where they are subsequently shipped to a variety of out of state processing facilities.

The recent economic crisis has led to a reduced need for raw materials for manufacturing, which, in turn, has led to greatly reduced income from collecting used paper, plastic, and metal. Instead of making some money on these materials, the CVSWMD, like other municipalities across the country, must now pay to drop off recyclables at material recovery facilities where they are baled and then sold on the market.

In addition, when trash generation rates drop, the CVSWMD collects less revenue from the surcharge tax paid when trash is hauled to a landfill. This is a critical revenue source for the District and is used to fund programs and services, including the recycling depots. The combination of paying for recycling and a considerably lower trash revenue led to a significant loss for the District in FY 2009. Facing a similar situation in FY 2010, the CVSWMD had little choice but to raise the fees charged for trash collection and recyclables at its depots, and close some of their facilities.

Montpelier should consider the following actions related to solid waste management: reduction of waste generated, recycling, re-use of materials, waste processing to reduce volume, and lastly, land disposal options or energy generation. Despite local responsibilities, solid waste is most effectively managed on a regional basis. The City, together with the Solid Waste Management District, should work with local retailers, offices, and the State to encourage programs for waste reduction and should lead by example.

Air Quality

The Vermont Air Pollution Control Division currently operates air quality monitoring stations in Underhill, Burlington, Rutland, and Bennington to measure ozone, nitrogen oxides, carbon monoxide, particulate matter, sulfur dioxide and toxic elements. A monitoring station used to operate in Barre, but it has been inactive since 2003. The City of Montpelier is working with the high school and the Conservation Commission to establish an ongoing air quality monitoring program to establish a baseline of air quality parameters in the City and monitor changes on an annual basis.

Although Montpelier does not currently have an air quality monitoring station, some basic information is known. Currently, no major industries operate in Montpelier to negatively impact our air quality. Facilities within and surrounding Montpelier that have the largest emissions impact include National Life Insurance, the Vermont State Office Complex, Green Mountain Power Corporation, Central Vermont Hospital, the State District Energy plant, and granite companies. Plans are underway to upgrade the district energy plant and install state-of-the-art boilers and emissions controls, so its impact will be reduced.

Even with these large facilities, however, the greatest threat to our air quality lies in automobile-emissions and residential heating sources. Emphasis on public transit and bicycle and pedestrian travel to reduce automobile use is needed, as are local regulations that significantly reduce idling by vehicles in town.

The Healthy Homes initiative is an effort to raise awareness among Montpelier residents regarding health hazards in the home, such as lead paint, mold, radon, and carbon monoxide. In 2009 and 2010, workshops were offered that provided residents with information about how they could improve indoor air quality by reducing hazards.

Land and Soil

Agricultural Soils

> **Earth Charter Principle III.9(a):** *Guarantee the right to potable water, clean air, food security, uncontaminated soil, shelter, and safe sanitation, allocating the national and international resources required.*

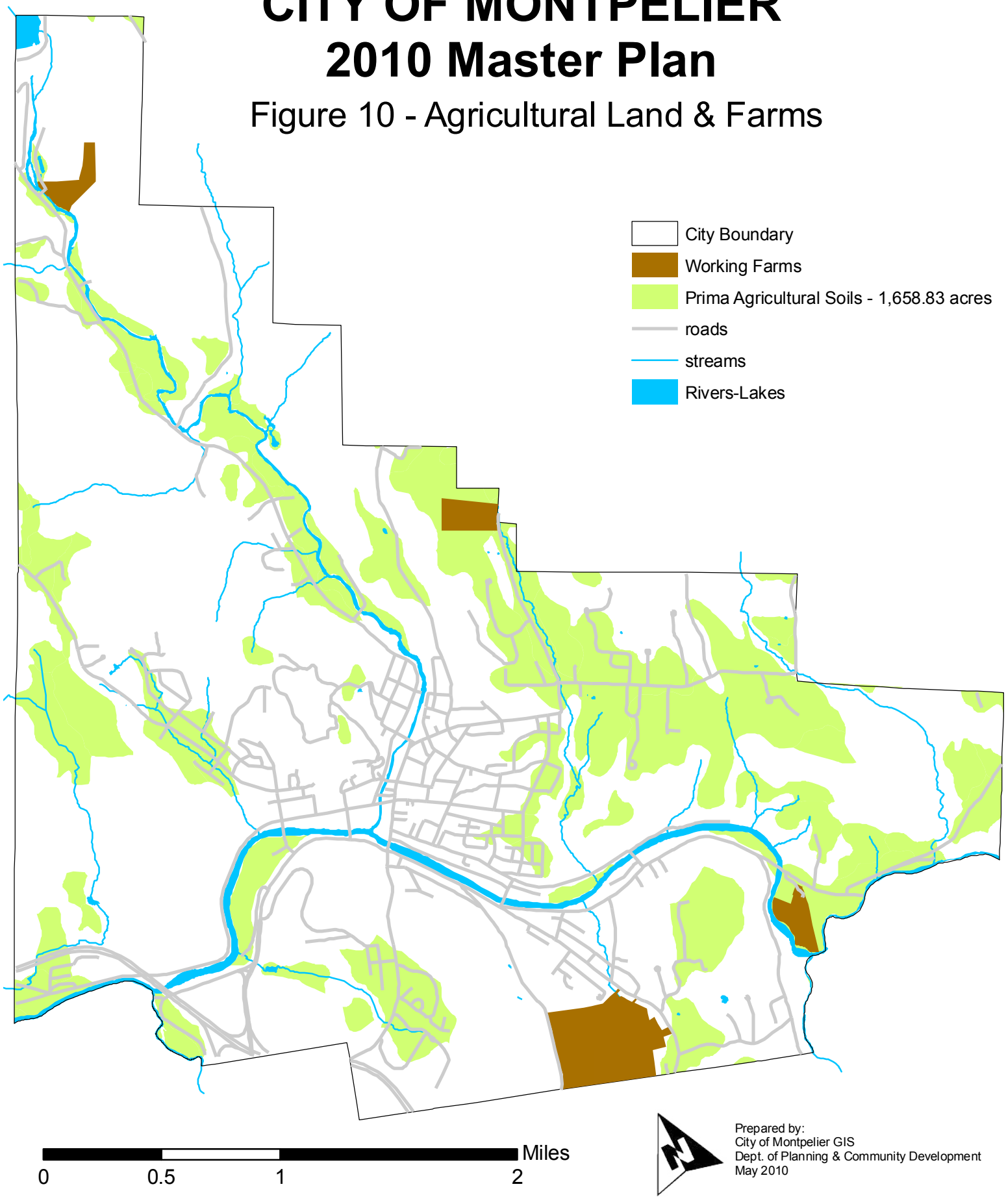
The total prime agricultural land in the city is 1,658.83 acres, 39% of which is within the Growth Center boundaries (Figure 10). Unfortunately, almost all of the prime agricultural land within the Growth Center is already developed. One of the largest undeveloped parcels of prime agricultural land remaining is the home of the Two Rivers Center for Sustainability, which is a working farm with plans to expand their operations into an educational facility with a café and a root cellar to help preserve and provide fresh local produce through the winter months. A map of agricultural soils and farms in operation is included on the next page.

By creating new, energy efficient and attractive housing within walking and biking distance of stores and employers, the City of Montpelier will be reducing the pressure on the agricultural and forest industries in the region by both providing a greater customer base and also by keeping new development out of areas where they are operating.

In addition to the land use controls that limit or discourage the fragmentation of land, the city has created a $40,000 Conservation Fund for conserving lands and waters within the City for agricultural, forest, wildlife, recreational, or natural area use. The Conservation Commission has also worked cooperatively with the Berlin Conservation Commission and the Vermont Land Trust to conserve priority parcels in the Berlin Pond watershed, using information from the recent natural community mapping project and geographic information system analysis of parcel and stream data which identified priority parcels in the watershed for conservation. A 48 acre parcel that adjoined two previously protected parcels was conserved and added to the Berlin Town Forest to bring the total of conserved land in the 6660 acre watershed to over 1400 acres. Berlin Pond is the primary drinking water supply for the City of Montpelier. Figure 11 shows Conservation Lands in Montpelier.

CITY OF MONTPELIER
2010 Master Plan

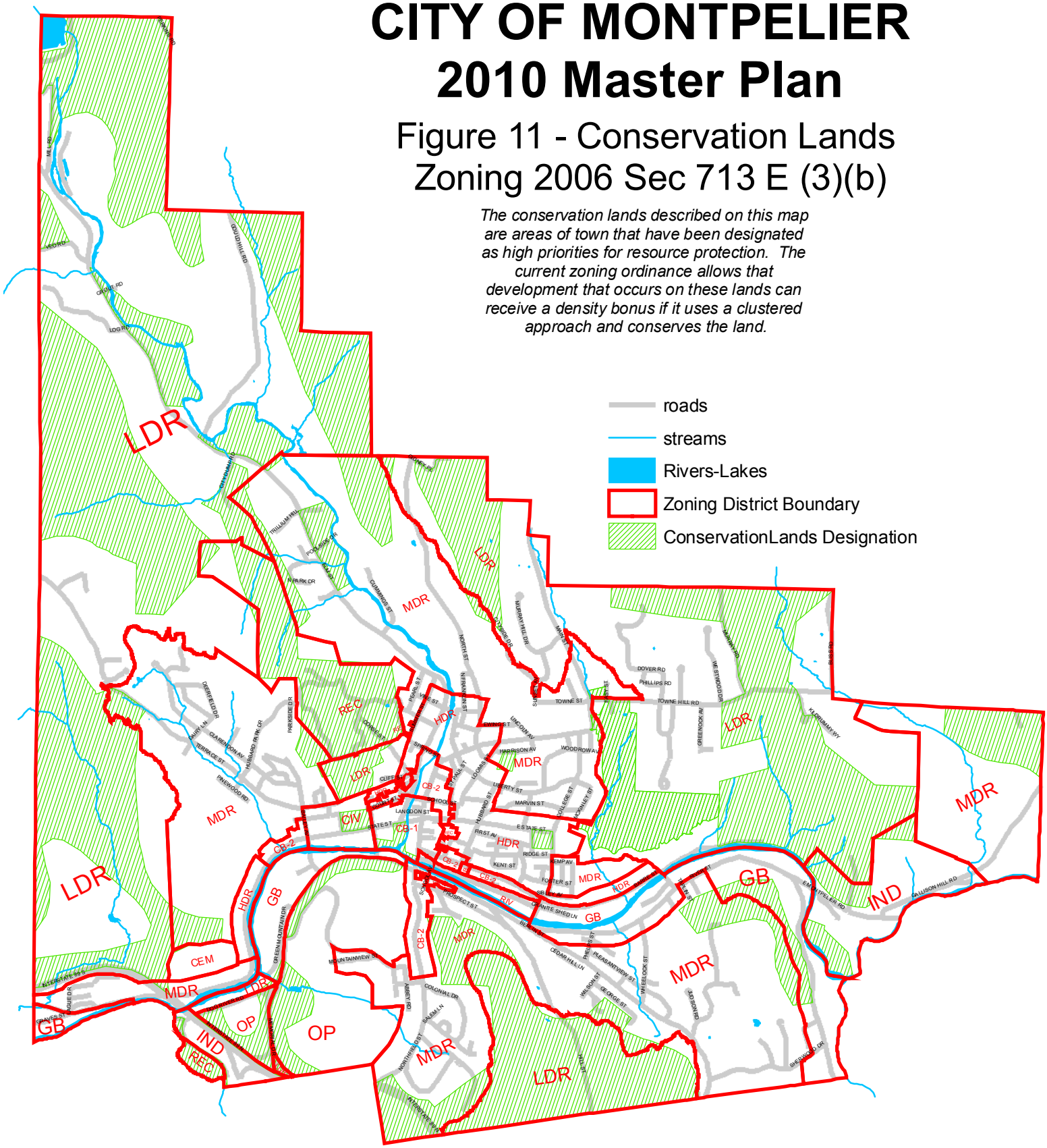
Figure 10 - Agricultural Land & Farms



CITY OF MONTPELIER
2010 Master Plan

Figure 11 - Conservation Lands
Zoning 2006 Sec 713 E (3)(b)

The conservation lands described on this map are areas of town that have been designated as high priorities for resource protection. The current zoning ordinance allows that development that occurs on these lands can receive a density bonus if it uses a clustered approach and conserves the land.



0 0.25 0.5 1 1.5 2 Miles

Prepared by:
City of Montpelier GIS
Dept. of Planning & Community Development
January 2006

CITY OF MONTPELIER
2010 MASTER PLAN

Figure 12 - Wetlands & Water Bodies

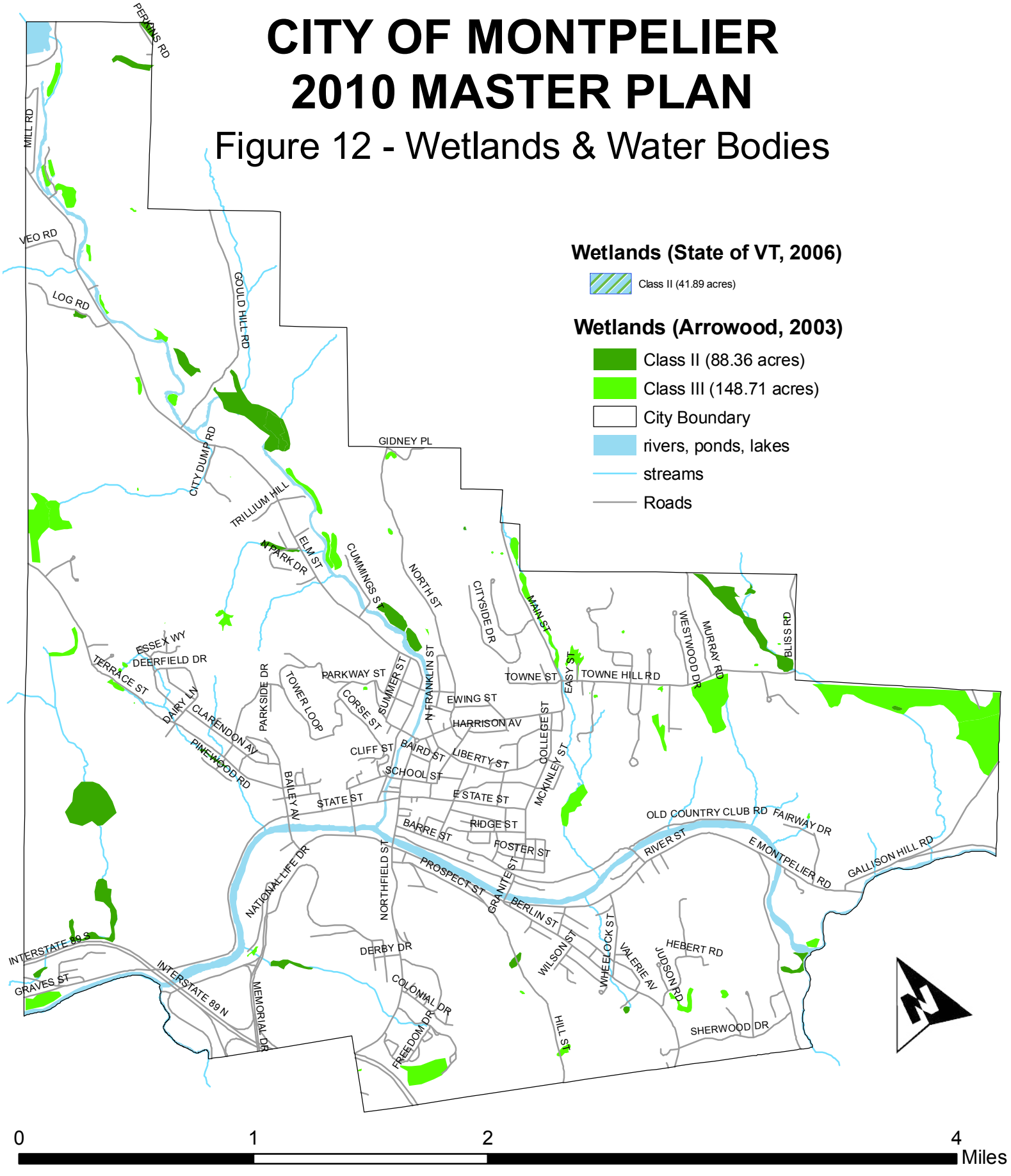


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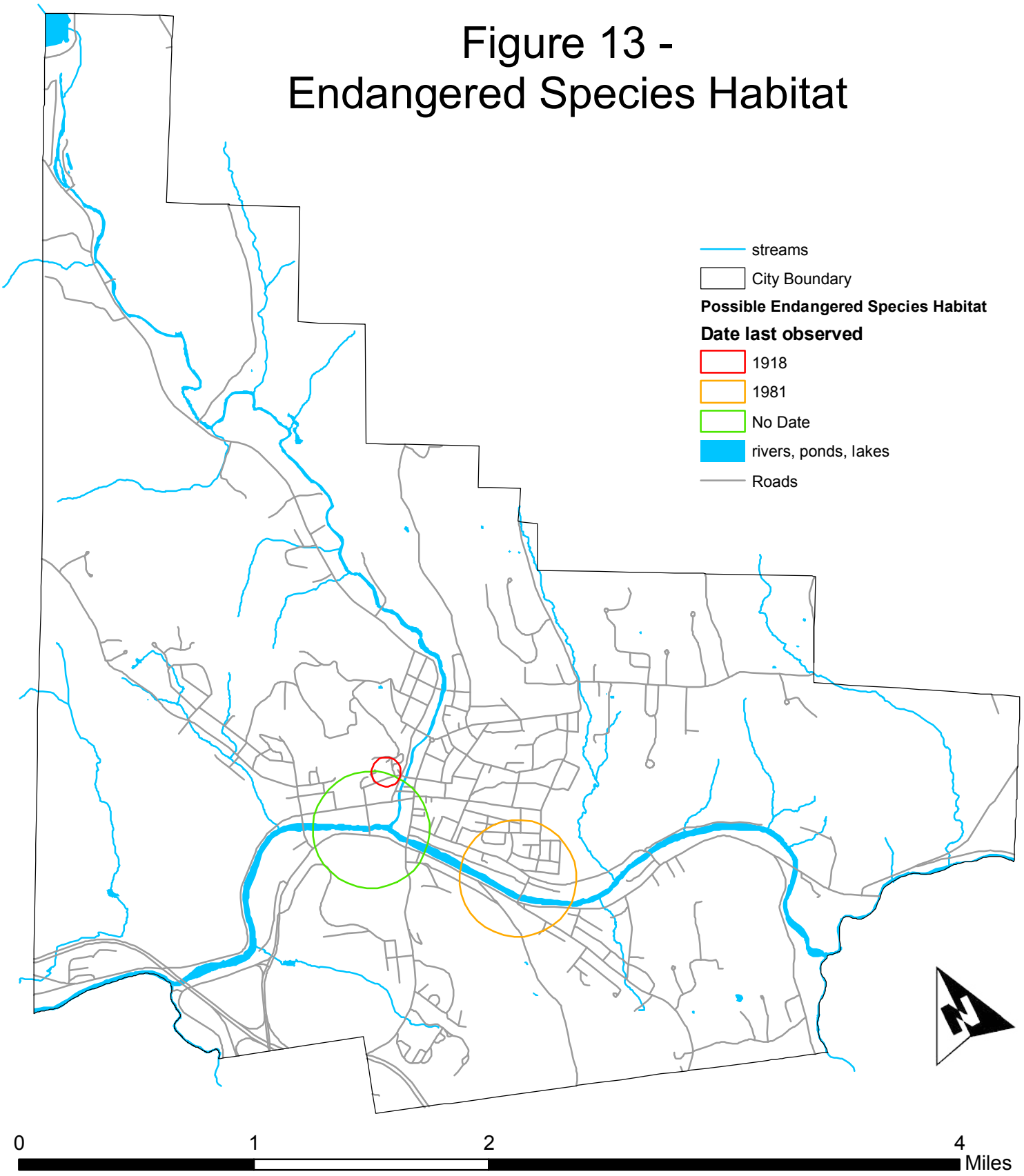
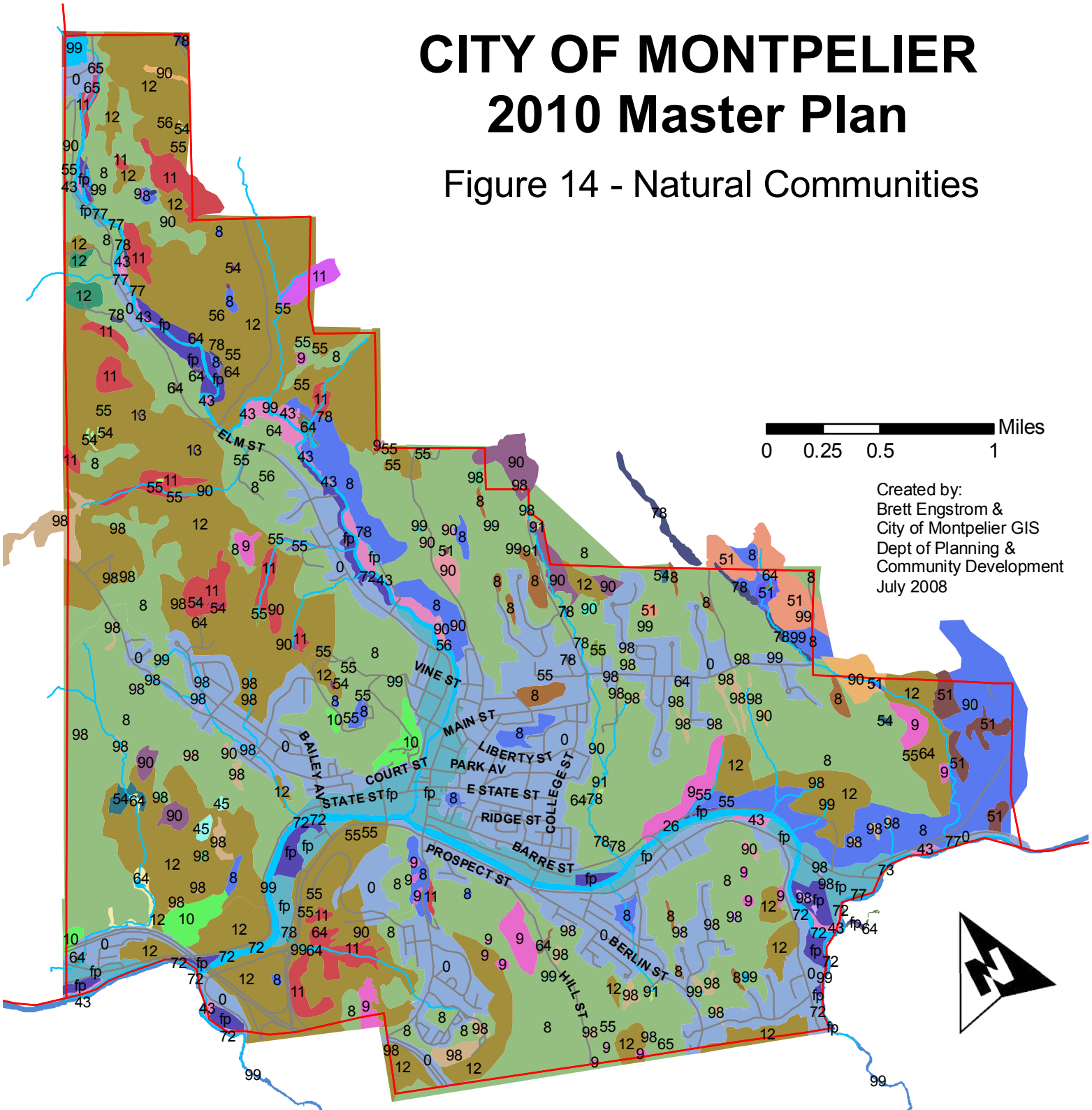
Figure 13 -
Endangered Species Habitat



CITY OF MONTPELIER
2010 Master Plan

Figure 14 - Natural Communities

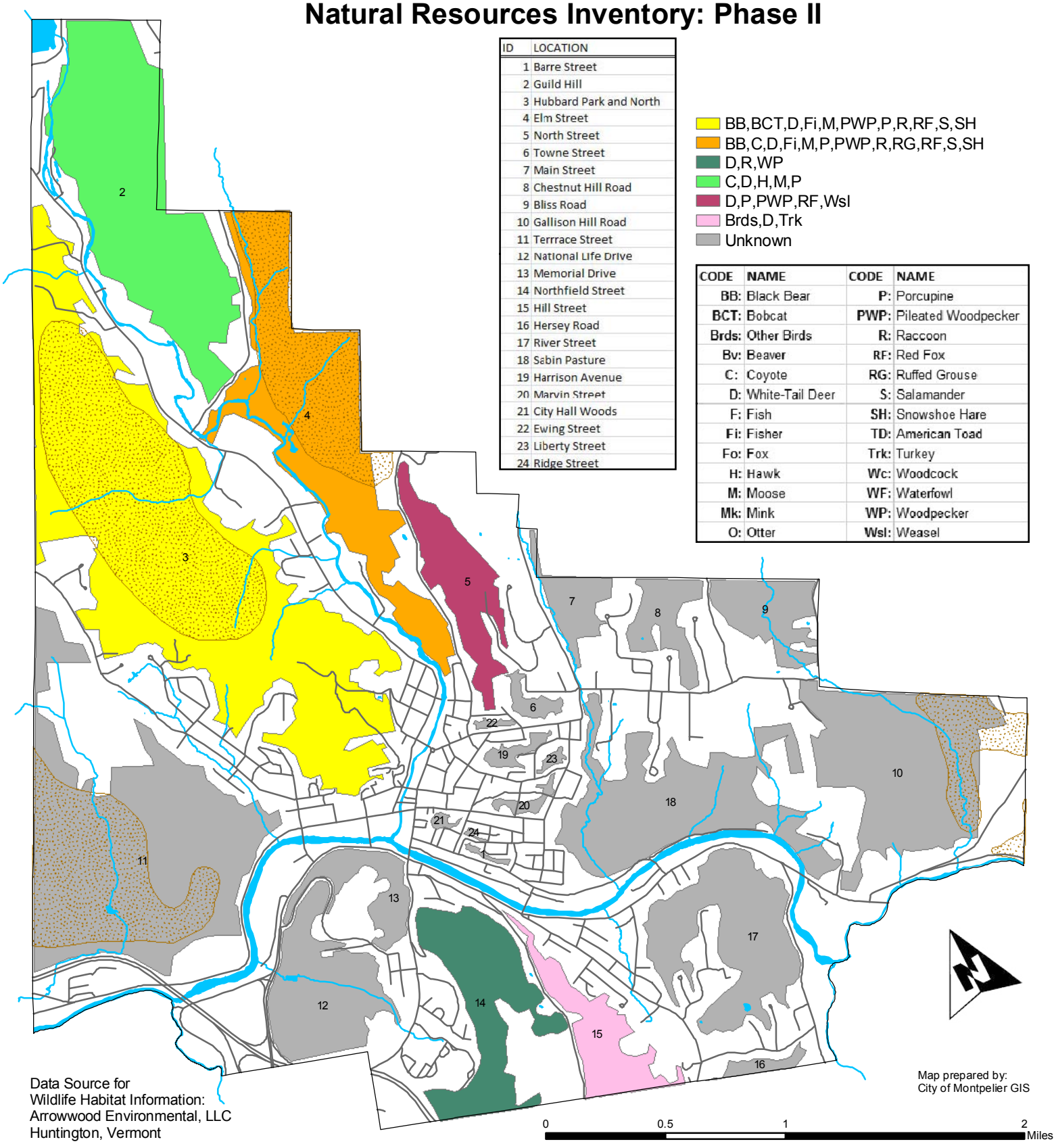


Community Type, Community Name

- 0, developed uplands, artificial fill, etc
- 10, Mesic Red Oak-Northern Hardwood Forest
- 11, Hemlock Forest
- 11, Hemlock-Red Spruce Forest
- 12, Hemlock-Northern Hardwood Forest
- 12, Hemlock-White Pine-Northern Hardwood Forest
- 13, Northern Hardwood Talus Woodland
- 26, Riverside Outcrop
- 43, Sugar Maple-Ostrich Fern Floodplain Forest
- 45, Red Maple-Black Ash Swamp
- 51, Northern White Cedar Sloping Seepage Forest
- 51, potential n. white cedar sloping seepage forest
- 51, potential northern white cedar swamp
- 54, Hemlock Swamp
- 54, Hemlock-Hardwood Swamp
- 54, potential hemlock-hardwood swamp
- 55, Seep
- 55, Semi-alluvial Seep
- 56, Vernal Pool
- 64, Beaver Meadow
- 64, Oxbow Marsh
- 64, Shallow Emergent Marsh
- 65, Sedge Meadow
- 72, River Sand or Gravel Shore
- 73, River Cobble Shore
- 73, River Sand or Gravel Shore
- 77, Alluvial Shrub Swamp
- 78, Alder Swamp
- 8, Northern Hardwood Forest
- 8, Semi-rich Northern Hardwood Forest
- 8, potential rich northern hardwood forest
- 9, Rich Northern Hardwood Forest
- 90, Hemlock Seepage Forest
- 90, Mixed Sloping Seepage Forest
- 90, Mixed Sloping Seepage Forestt
- 90, Northern Hardwood Seepage Forest
- 90, Sloping Seepage Forest
- 91, fenny wetland
- 98, wetland - perched basin
- 98, wetland - small drainage
- 98, wetland - swale
- 99, water - artificial pond
- 99, water - river
- fp, floodplain - developed
- fp, floodplain - undeveloped
- City Boundary
- Rivers & Lakes
- streams

CITY OF MONTPELIER
2010 MASTER PLAN

Figure 15 - Wildlife Habitat
Natural Resources Inventory: Phase II



ID	LOCATION
1	Barre Street
2	Guild Hill
3	Hubbard Park and North
4	Elm Street
5	North Street
6	Towne Street
7	Main Street
8	Chestnut Hill Road
9	Bliss Road
10	Gallison Hill Road
11	Terrrace Street
12	National Life Drive
13	Memorial Drive
14	Northfield Street
15	Hill Street
16	Hersey Road
17	River Street
18	Sabin Pasture
19	Harrison Avenue
20	Marvin Street
21	City Hall Woods
22	Ewing Street
23	Liberty Street
24	Ridge Street

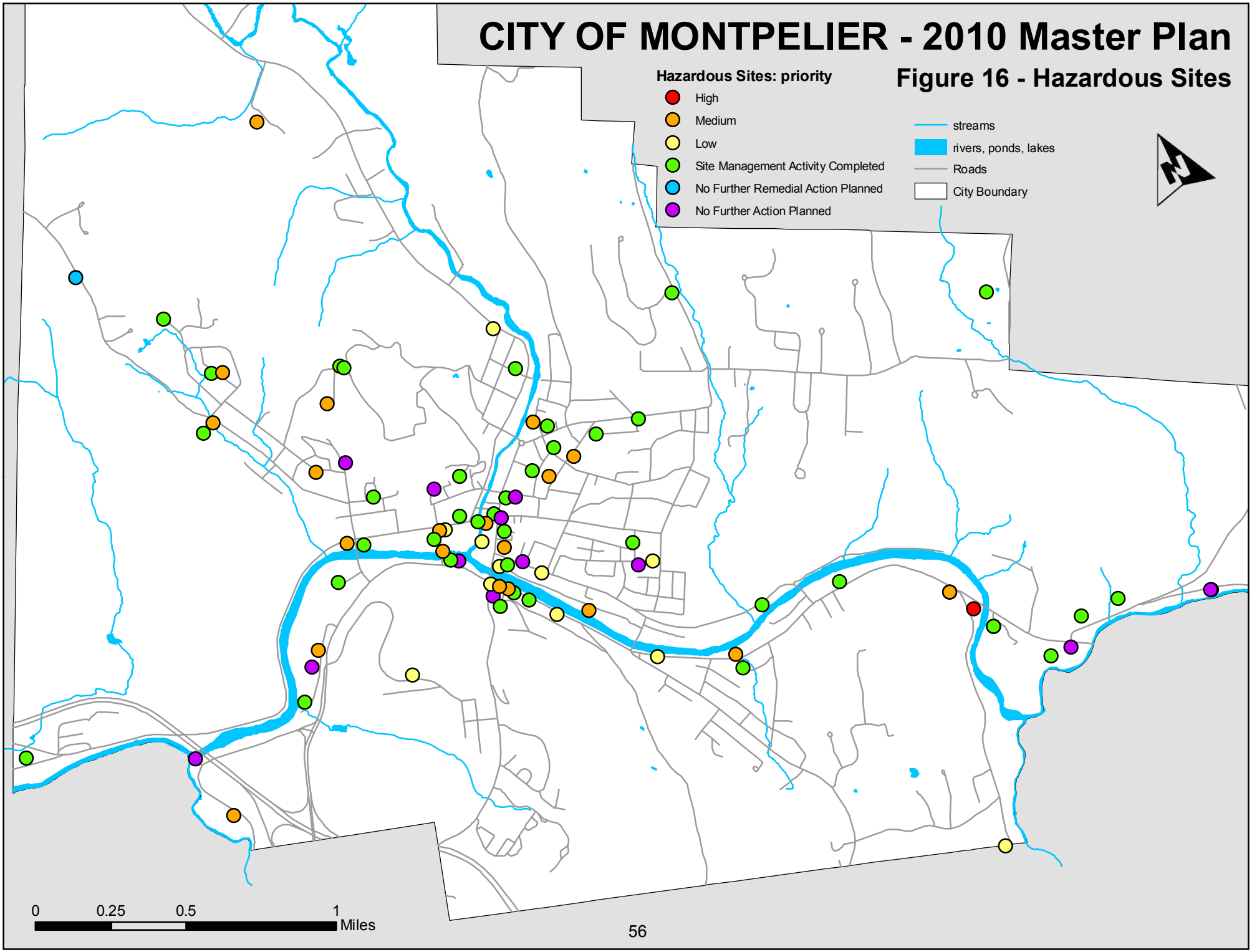
CODE	NAME	CODE	NAME
BB:	Black Bear	P:	Porcupine
BCT:	Bobcat	PWP:	Pileated Woodpecker
Brds:	Other Birds	R:	Raccoon
Bv:	Beaver	RF:	Red Fox
C:	Coyote	RG:	Ruffed Grouse
D:	White-Tail Deer	S:	Salamander
F:	Fish	SH:	Snowshoe Hare
Fi:	Fisher	TD:	American Toad
Fo:	Fox	Trk:	Turkey
H:	Hawk	Wc:	Woodcock
M:	Moose	WF:	Waterfowl
Mk:	Mink	WP:	Woodpecker
O:	Otter	Wsl:	Weasel

Data Source for
Wildlife Habitat Information:
Arrowwood Environmental, LLC
Huntington, Vermont

Map prepared by:
City of Montpelier GIS

CITY OF MONTPELIER - 2010 Master Plan

Figure 16 - Hazardous Sites



3.2 Goals for the Montpelier Natural Environment

Citizens of Montpelier developed a number of long-range goals for Montpelier's Natural Environment. The goals are meant to reflect the vision of the City that community members would like to leave for future generations.

Water Resources

Montpelier residents value water as a precious resource and guarantee equitable access for all living things. We live in harmony with the natural rivers, and have protected and recaptured historic floodplains. We are stewards of water, protecting its quality and quantity by maintaining the integrity of the hydrologic cycle and the integrity of our watersheds, including the waters that flow to Lake Champlain. Our water supply is sufficiently secure, flexible, and adaptable to changing conditions and circumstances.

Natural Communities and Biodiversity

Montpelier is rich with intact ecosystems and their diverse natural communities. We protect and restore our natural heritage, rare and endangered species and communities, wildlife corridors, and the overall biodiversity of the city. There are strong links to larger ecosystems surrounding the city, and we are mindful of our regional and global assets and impacts.

Open Space & Recreation

Montpelier residents and visitors have opportunities to recreate outdoors and to learn about the natural environment. There are abundant green and open spaces throughout the city for both natural ecosystems and recreation. The city parks are linked to each other, to neighborhoods, and to surrounding open spaces, forming green spaces, pathways, trails, and corridors for the benefit of people and wildlife.

Waste Management

The citizens of Montpelier work toward zero waste by using materials responsibly and minimizing consumption. We reuse, recycle, and reduce the materials we consume. Wastes created are safely managed without harm to other species or systems.

Air & Climate

Montpelier residents value the quality of clean air, recognizing it as the most basic need for survival. Treasuring clear, bright skies, we steward our air shed and responsibly address climate change. Economic and social activities protect all living things by ensuring healthy air quality indoors and out.

Land & Soil

Fertile soil is vital to maintaining life. Montpelier community members are responsible stewards of land, maintaining the life-supporting processes integral to healthy, intact ecosystems. The

City will promote a compact, efficient, and equitable pattern of land use and growth that balances development with conservation of the natural environment.

Key to Recommendations (next page)

Goals are long-range visions for the community. Goals are identified by letters (A, B, C, etc.) at the top of each page.

Targets are measurable benchmarks toward the goals. Targets are identified by numbers (1, 2, 3, etc.) at the top of each table.

Recommended Strategies are action steps toward the targets. Recommended strategies are listed by number/letter (1a, 1b, 1b.1, etc.) within each table.

Norman James, *Montpelier resident*

Montpelier youngsters enjoy the Recreation Department baseball field.

3.3 Natural Environment Recommendations

Goal A: Water Resources

Montpelier residents value water as a precious resource and guarantee equitable access for all living things. We live in harmony with the natural rivers, and have protected and recaptured historic floodplains. We are stewards of water, protecting its quality and quantity by maintaining the integrity of the hydrologic cycle and the integrity of our watersheds, including the waters that flow to Lake Champlain. Our water supply is sufficiently secure, flexible, and adaptable to changing conditions and circumstances.

		1	**By 2015, where possible, Montpelier rivers and wetlands have an expanded buffer to filter polluted runoff, mitigate flood damage, and improve aesthetics.**	**Responsible Party**
Recommended Strategies		**1a**	**Expand set-backs and buffer ordinances around water-ways to increase natural flood protection.**	**Planning Commission, City Council**
		1b	**Replace invasive species along waterways with non-invasive species and fruit and nut trees, in order to enhance the appearance and ecological integrity of waterway buffers. The City adopts and utilizes a standard list, such as the Vermont Nature Conservancy quarantine list, so that appropriate invasive species are identified and removed.**	**Property Owners, Planning Commission, Tree Board**
		1c	**Alter mowing practices to ensure that landowners near waterways allow natural vegetation to re-emerge for flood protection.**	**City Council, Conservation Commission**
		1d	**The Conservation Commission takes a lead role in planning and developing riverfront parks and walkways, in order to preserve and increase access to and recreation near local waterways.**	**Conservation Commission**
		1e	**Consider the addition of a Shoreland Overlay District to the zoning ordinance and design guidelines that can preserve and enhance the pollution filtering, flood mitigating, aesthetic, and recreational value of riverfronts.**	**Planning Commission**
		1f	**The City adopts standards for all wetlands to protect them from filling, encroaching, polluting, and draining. One member of the Conservation Commission will be included in the Technical Review Committee (TRC) meetings when developments involving wetlands are reviewed.**	**Conservation Commission**

Goal A: Water Resources

2		By 2015, Montpelier encourages water conservation and source protection efforts.	Responsible Party
Recommended Strategies	2a	Take all legal and necessary steps to protect our drinking water sources, particularly Berlin Pond.	Department of Public Works (DPW), City Manager (CM)
	2b	Identify other potential drinking water sources, including springs, and increase protection through easements and acquisition, in coordination with surrounding municipalities.	DPW, CM
	2c	Identify and protect viable groundwater sources.	DPW, CM
	2d	Educate homeowners, landlords, renters and businesses about ways in which to reduce water consumption, and connect them with such organizations as Efficiency Vermont that provide water-reducing aerators for faucets.	DPW, Homeowners, Private Businesses, Efficiency Vermont
	2e	Expand partnerships with water conservation organizations and government agencies that can provide financial and technical assistance to public and private water conservation efforts in the city.	DPW, CM

Goal A: Water Resources

3		By 2015, storm water runoff is reduced by the maximum extent practicable through a variety of low impact development techniques.*	Responsible Party
Recommended Strategies	3a	Implement a monitoring program to establish a baseline measurement for stormwater runoff so that appropriate mitigation can be implemented to control the quantity and quality of said runoff.	Conservation Commission
	3b	Encourage new and existing development to incorporate low-impact development elements, including but not limited to permeable pavement, on their property.	Planning Commission
	3c	Establish green roofs for storm water control on available and appropriate municipal roofs.	DPW
	3d	Create and implement a stormwater management plan that is designed to remove at least 80% total suspended solids (TSS) and the percentage of average total phosphorous (TP) required to comply with or exceed requirement of applicable Lake Champlain and Winooski river cleanup plans through strategies such as, but not limited to, gravel wetlands, grass swales, and bioswales, that capture, retain, and clean runoff from roads and parking lots.	DPW, CM
	3e	Regulate developments to ensure that the peak flow of stormwater runoff from each site will be no greater than the runoff from the site before it was developed.	DPW, Planning Department
	3f	Regulate developments according to a watershed management master plan that analyzes the combined effects of existing and expected development on drainage through and out of the watershed.	Planning Department
	3g	Consider requiring that all new buildings (not just those within the floodplain) be protected from local drainage problems.	City Council
	3h	Regulate activities throughout the watershed to minimize erosion that results from sedimentation.	Planning Department

* Low-impact development, or LID, is a stormwater management technique that mimics a site's predevelopment hydrology by using design techniques that infiltrate, filter, store, evaporate, and detain stormwater runoff close to its source. Rain gardens, permeable pavement, rain barrels, green roofs are all examples of LID techniques.

Goal A: Water Resources

4		By 2015, Montpelier enhances floodplain management so that the capacity of our flood storage and mitigation areas has expanded by 25% of their 2010 levels.	Responsible Party
Recommended Strategies	**4a**	**Conform and comply with existing National Flood Insurance Program (NFIP) requirements by analyzing and updating our existing floodplain regulations as per the NFIP Community Floodplain Management Regulations Review Checklist and Agency of Natural Resources suggestions.**	**Planning Department, Planning Commission, City Council**
	4b	**Articulate a pattern of safe and flood-resilient growth by designating zones of uses and densities in flood hazard areas.**	**Planning Department, Planning Commission, City Council**
	4c	**Develop higher standards of review and/or regulatory requirements in the floodplain, such as:** • Requiring lowest floors of residences to be higher than the Base Flood Elevation; • Protecting foundations to reduce damage resulting from scour and settling; • Prohibiting fill or by requiring compensatory storage; • Requiring full compliance with floodplain management regulations when proposed improvements or repairs are less than 50% of the building's value; • Protecting critical facilities to higher levels; • Identifying and regulating areas subject to special flood hazards; and • Changing the zoning to maintain a low density of floodplain development.	**Planning Commission, City Council, Planning Department**
	4d	**Consider policies that provide density bonuses for development that avoids the floodplain.**	**Planning Commission**
	4e	**Preserve and promote open spaces and the natural and beneficial functions of floodplains.**	**Property Owners**
	4f	**Work with State and Federal authorities to reduce the risk of ice jam flooding.**	**Planning Department, DPW, State**

Goal A: Water Resources

5		By 2015, the number of activities aimed at increasing public awareness of local water issues increases.	Responsible Party
Recommended Strategies	5a	Create, implement, and maintain a student water quality curriculum for all Montpelier students, grades K-12.	Public and Private Schools
	5b	Encourage students to educate the community about water quality issues with public service announcements.	Public and Private Schools
	5c	City officials and local non-profits circulate informational materials about the proper disposal of harmful effluents to the general public.	Stakeholders
	5d	Increase community awareness of water contamination sources and risks, through local press coverage and signage near waterways.	Stakeholders
	5e	The City of Montpelier embraces and celebrates its river heritage.	Stakeholders

6		By 2015, the city has reduced the impacts of pollutants from the wastewater treatment plant and the stormwater systems on the rivers that flow through the city.	Responsible Party
Recommended Strategies	6a	The city explores the construction of an intensive bioremediation system* to reduce phosphorous loading and other impacts of the treated wastewater.	DPW
	6b	The city pilots a green roof tax credit in the downtown to promote stormwater management and improve air quality.	City Council

* Intensive bioremediation systems are a form of biological wastewater treatment designed to mimic the cleansing functions of wetlands.

Goal A: Water Resources

7		Montpelier works with surrounding communities to maximize the chemical, physical, and biological integrity of all waters that flow through and downstream of the City by eliminating the discharge of pollution from Montpelier-based sources.	Responsible Party
Recommended Strategies	7a	The City uses the North Branch of the Winooski River Corridor Plan[1] to guide restoration projects.	Conservation Commission
	7b	Public and private entities minimize the use of pollutants, including pesticides, herbicides, and chemical fertilizers.	Stakeholders
	7c	The Department of Public Works and community groups continue to monitor waterways for pollutants and identify opportunities for restoration.	DPW, Stakeholders
	7d	Montpelier Parks and Public Works Departments utilize biodegradable lubricants in all applicable power tools, saws, and machinery.	Parks Department, DPW, School District, Recreation Department
	7e	Utilize existing resources, such as the Vermont Agency of Transportation and City of Burlington, to explore and implement an alternative to salt on sidewalks and roadways.	DPW
	7f	Create and implement a city-wide road and sidewalk cleaning program in order to reduce the amount of pollutants and debris flowing into the stormwater system and natural waterways.	DPW
	7g	The City mandates that local businesses, including dry cleaners, salons, and restaurants, properly dispose of harmful effluents.	City Council
	7h	The City designs and implements an effective program for achieving full compliance with ordinances requiring pet owners to clean up and properly dispose of pet waste.	City Council

Goal B: Natural Communities & Biodiversity

Montpelier is rich with intact ecosystems and their diverse natural communities. We protect and restore our natural heritage, rare and endangered species and communities, wildlife corridors, and the overall biodiversity of the city. There are strong links to larger ecosystems surrounding the city, and we are mindful of our regional and global assets and impacts.

1		By 2015, the number of educational programs about biodiversity and natural communities increases.	Responsible Party
Recommended Strategies	1a	Promote educational programs about biodiversity, and provide interpretive materials throughout Montpelier, including in the downtown area, that identify natural resources.	Stakeholders
	1b	Encourage all students to successfully complete a curriculum exploring local biodiversity and natural communities during their K-12 experience.	Public and Private Schools

2		By 2040, the number and/or size of protected or restored habitats increases with the intent to improve their health and functionality.	Responsible Party
Recommended Strategies	2a	Ensure no viable wetlands (Class 1, Class 2) are lost, which means that when wetlands are destroyed or damaged, at least, if not more, acreage of wetlands are re-established elsewhere in Montpelier, if possible.	Conservation Commission, Planning Commission, City Council
	2b	Use the rural-urban fringe to create new, living landscapes. Provide opportunities to regenerate land and develop communities using the best available knowledge in building, landscape design, and management practices.	Landowners, Stakeholders
	2c	Secure land in environmentally-sensitive areas through fee simple transactions, partnerships, and other legal vehicles, like land trusts and conservation easements.	Conservation Commission, Stakeholders

	2d	**When a standard evaluation of services has been established and adopted by the State of Vermont, the City uses the values to inform the value of natural assets into infrastructure and utility decisions.**	**State of Vermont, City Council**

Goal B: Natural Communities & Biodiversity

3		**By 2040, native biological diversity is protected and maintained, as measured through Bio-Blitzes every 10 years and local key indicator species. (The 2008 Montpelier Bio-Blitz coordinated by the North Branch Nature Center and Montpelier Conservation Commission identified approximately 1,500 species within Montpelier).**	**Responsible Party**
Recommended Strategies	**3a**	**Protect and manage species and establish recovery measures for threatened species.** • Establish linked networks of representative reserves in the city and throughout the bioregion, so that wildlife corridors are protected and restored. • Develop proactive management strategies to protect species and preserve ecosystems.	**Conservation Commission, Planning Commission, Landowners**
	3b	**Encourage the use of native plants, and prevent the proliferation of invasive species by removing them and discouraging their use. The City adopts and utilizes a standard list, such as the Vermont Nature Conservancy quarantine list, so that appropriate invasive species are identified and removed.** • Monitor and track current and emerging non-native invasive species. • Approve only non-invasive plants on the appropriate municipal panel. • Encourage and promote the sale of native plant species at nurseries. • Host invasive species outreach activities or eco-landscaping workshops to increase awareness about native species. • Utilize town office buildings as demonstration sites for native landscaping techniques.	**Conservation Commission, Planning Commission, City Council, Design Review Committee, Development Review Board, Landowners, Conservation Organizations**

	3c	**Establish planning policies/bylaws that promote biodiversity conservation.**	**Conservation Commission, Planning Commission, City Council**

Goal C: Open Space & Recreation

Montpelier residents and visitors have opportunities to recreate outdoors and to learn about the natural environment. There are abundant green and open spaces throughout the city for both natural ecosystems and recreation. The city parks are linked to each other, to neighborhoods, and to surrounding open spaces, forming green spaces, pathways, trails, and corridors for the benefit of people and wildlife.

1		By 2015, greater than 55 percent of Montpelier residents report that the ease of bicycle travel in Montpelier as "good" or "excellent." By 2015, greater than 85 percent of Montpelier residents report that the ease of walking in Montpelier as "good" or "excellent."	Responsible Party
Recommended Strategies	1a	Develop and extend a wagon-wheel network of trails throughout downtown Montpelier and to other neighboring communities.	Parks Department, Conservation Commission
	1b	Construct the bike path link between Taylor Street and Stonecutter's Way, and extend the path so that it is tied into larger, regional transportation path plans.	DPW
	1c	Develop and implement a wide range of material that promotes walking and bicycling as healthy forms of exercise and transportation.	Stakeholders
	1d	Increase Montpelier parkland to provide recreational opportunities within walking and biking distance of all city residents.	Stakeholders, Parks Department
	1e	The Parks Department increases walking access points to Hubbard Park and also, creatively educates the public about existing access points to the Park.	Parks Department
	1f	Expand public transportation services to public green spaces, including Hubbard Park.	Green Mountain Transit Agency (GMTA), Rural Elder Assistance for Care and Health (REACH), City Council

Goal C: Open Space & Recreation

2		By 2015, guidelines are created and enforced to ensure that new construction and re-development downtown is carefully planned to maintain open space and important natural features, including the city's riverfront, the backdrop of wooded hillside and primarily unbroken ridgelines, the Capitol lawn, and other open spaces.	Responsible Party
Recommended Strategies	**2a**	**Focus in-fill development according to Growth Center goals.**	**Property Owners, Developers**
	2b	**Adopt an open space protection plan supporting conservation education, and a development review process to assure that there is accessible, well-maintained open space in all neighborhoods.**	**Conservation Commission, Planning Commission**
	2c	**Utilize "three dimensional" planning, using computer and physical modeling to identify areas where building density and heights can increase while maintaining critical open space, views, air flow, and sunlight.**	**Planning Department**
	2d	**Convert landscapes, both downtown and throughout the rest of the city, into non-invasive "edible landscapes"* or low-maintenance landscapes.**	**Montpelier Alive!, DPW**
	2e	**Maintain Montpelier's Community Rating System (CRS) standing by preserving the natural and beneficial functions of the floodplain. Consider:** • Identifying all portions of the city and county parks, forest preserves, state parks and state forests, publicly owned beaches, or natural areas within the floodplain that may be counted for open space credit. • Maintaining private wildlife or nature preserves for open space purposes.	**Planning Commission, City Council**
	2f	**Protect and maintain existing city-owned parks and open spaces, including Blanchard Park and the park on Harrison Avenue.**	**Parks Department**

* Edible landscapes are an alternative to conventional ornamental landscaping. Edible landscapes consist of food-producing plants, such as fruit and nut trees, berry bushes, vegetables, herbs, and edible flowers, which are arranged into aesthetically pleasing designs. Landscapes can be a mix of food and ornamentals and can include anywhere from1-100 percent edible species.

Goal C: Open Space & Recreation

3		By 2015, greater than 75 percent of Montpelier residents report that recreational opportunities are "good" or "excellent."	Responsible Party
Recommended Strategies	3a	**Assess existing recreational facilities and ensure that all recreation facilities are meeting the needs of residents, ADA accessible, energy efficient, and up-to-date.**	**Recreation Department**
	3b	**Improve outreach to increase the use of existing recreation facilities and ensure affordable access to all citizens.**	**Stakeholders, Recreation Department**
	3c	**Encourage local employers to subsidize gym memberships for employees in order to encourage healthy lifestyles.**	**Stakeholders**
	3d	**Survey citizens about what recreational opportunities are lacking in the community.**	**Recreation Department**

Sidewalk Tanka Haiku #1

In several (13) tanka haiku's -7

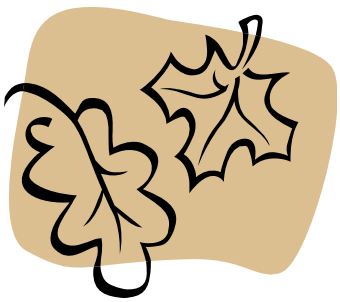
I'll try to passably praise -7

the modest sidewalk. -5

Each 31 syllables -7

Note ways they amaze. -5

- Harris Webster, 2010
  Montpelier resident



Sidewalk Tanka Haiku #2

Sidewalks when maintained and used

cut car traffic, health care costs/obesity

the carbon footprint,

Crime, delinquency

And taxes eventu'lly

- Harris Webster, 2010
  Montpelier resident

Goal D: Air & Climate

Montpelier residents value the quality of clean air, recognizing it as the most basic need for survival. Treasuring clear, bright skies, we steward our air shed and responsibly address climate change. Economic and social activities protect all living things by ensuring healthy air quality indoors and out.

1		Montpelier maintains excellent air quality levels, as indicated by local and state data.	Responsible Party
Recommended Strategies	1a	Provide incentives for maintaining home wood stoves to standards that insure safe nitrogen-oxide and particulate levels.	State of Vermont
	1b	The City of Montpelier considers the impact of the potential air quality issues associated with new development and industry projects in the permitting process.	Planning Commission
	1c	Ban non-compliant outdoor wood boilers.	City Council
	1d	Improve air quality by striving to achieve a transportation and parking system which minimizes automobile emissions due to idling and congested traffic.	City Council
	1e	Increase the number of homes heated by clean-burning fuel sources, including natural gas, solar, and geothermal.	Clean Energy Assessment District (CEAD), Property Assessed Clean Energy (PACE)
	1f	Consider an anti-idling ordinance that reduces idling by city-owned vehicles, school buses, commercial vehicles, and passenger cars.	City Council
	1g	Implement an energy district in the city where residents can make energy improvements on their homes and pay it back as a ratable charge against their property instead of needing a commercial loan.	Montpelier Voters

Goal D: Air & Climate

	1h	**The City helps establish and support an ongoing air quality monitoring program to establish a baseline of air quality parameters in the City (EPA pollutants Ozone, particulates, carbon monoxide, nitrogen oxides, sulfur dioxide, lead- *CO_2 might also need to be added to the list)* and monitor changes on an annual basis.**	**District Energy Plant, Conservation Commission, MHS**
	1i	**Montpelier develops a means of providing consistent review of: 1) new and/or potential climate-related impacts to the City 2) emerging community adaptation and mitigation strategies that may prove beneficial for the City to adopt 3) the efficiency and effectiveness of currently employed climate initiatives.**	**Conservation Commission**
Additional Indicators		**By 2015, greater than 85 percent of Montpelier residents report that air quality is "good" or "excellent." (Currently 85%)** **By 2015 80% of Montpelier's current residential and small business outdoor wood-fired boilers (OWB) are compliant with state implemented Phase 2 particulate matter emission limits**	

2		**By 2040, indoor air contaminants are significantly reduced.**	**Responsible Party**
Recommended Strategies	**3a**	**Establish criteria for healthy indoor air quality.** • Identify contaminants. • Coordinate actions that focus on indoor air quality. • Collaborate with building contractors on contaminate standards (e.g., LEED program, Built Green, etc.).	**State of Vermont Health Officer, Building Inspector**
	3b	**Support the Housing Task Force's Healthy Homes initiative.***	**Stakeholders**

* The Healthy Homes initiative is an effort to raise awareness among Montpelier residents regarding health hazards in the home, such as lead paint, mold, radon, and monoxide.

Goal E: Land & Soil

Fertile soil is vital to maintaining life. Montpelier community members are responsible stewards of land, maintaining the life-supporting processes integral to healthy, intact ecosystems. The City will promote a compact, efficient, and equitable pattern of land use and growth that balances development with conservation of the natural environment.

1		By 2015, the brownfields sites in the city along the river in the downtown are cleaned up. This includes the Turntable Park area, the former Pyralisk building, and the Carr Lot.	Responsible Party
Recommended Strategies	1a	Work with private landowners and the state to insure that the properties the city doesn't control stay on track for being cleaned up.	City Manager
	1b	Secure funding and resources to complete the cleanup of these properties.	Planning Commission

2		Land use and growth in Montpelier enhances, rather than impairs, the city's natural resource and environmental attributes, while also preserving agricultural and forest land where appropriate.	Responsible Party
Recommended Strategies	2a	Establish priorities and tools for open space and natural resource protection, including fee purchase, transfer or purchase of development rights, acquisition of easements conservation overlay districts, or other appropriate zoning.	Planning Commission
	2b	Prepare a complete inventory of productive agricultural and forestlands within the City of Montpelier and assess the resource values of each parcel in the inventory.	Planning Commission
	2c	The City will continue to support the reallocation and use of Conservation Fund[2] for conserving lands and waters within the City for agricultural, forest, wildlife, recreational, or natural area use.	Conservation Commission

Goal E: Land & Soil

	2d	**Consider a ridgeline protection ordinance that may include the following provisions:** • Residential, commercial, and industrial buildings should avoid areas subject to strong crosswinds, without natural protection and with limited solar exposure, in order to maximize efficient use and recovery of energy. • Any residential, commercial, or industrial buildings which potentially break the skyline when viewed from a public highway should be carefully reviewed using specific site plan and/or design review criteria.	**Planning Commission, City Council**
	2e	**Enact zoning policies to protect hillsides and ridgelines, productive agricultural and forestlands, preserve and enhance riverfronts, and existing neighborhoods.**	**Planning Commission, City Council**
	2f	**Enact zoning regulations to insure that any extraction of earth resources is in compliance with best practices to minimize harm to all other resources and insure that site restoration is completed so that the aesthetic qualities of the area are preserved and enhanced.**	**Planning Commission, City Council**

Alexandria Heather, *Montpelier resident*

Goal F: Waste Management

The citizens of Montpelier work toward zero waste by using materials responsibly and minimizing consumption. We reuse, recycle, and reduce the materials we consume. Wastes created are safely managed without harm to other species or systems.

1		By 2020, Montpelier reduces total municipal solid waste by 60% and creates new targets by 2025.	Responsible Party
Recommended Strategies	**1a**	**The City of Montpelier reduces waste and provides leadership in green purchasing for its businesses and residents.** • Work with waste haulers that serve the Montpelier area to establish financial incentives for better waste management. • Advertise Montpelier's commitments to waste management to businesses and residents through educational programs and media outreach. • Follow the City's Green Purchasing Policy. • Encourage the use of public water faucets in City buildings for visitors to re-fill water bottles and reduce the use of disposable water bottles. • Establish cooperative buying systems for biodegradable products.	**Central Vermont Solid Waste Management District, City Departments, Stakeholders**
	1b	**Montpelier residents, on a per capita basis, consume fewer disposable and non-reusable goods.** • Implement a pilot educational program for city residents on how to minimize and reduce waste generation, in cooperation with Central Vermont Solid Waste Management District (CVSWMD). • Encourage resource-sharing in neighborhoods (e.g. automobiles, snow-blowers, tools, etc). • Provide "individual action steps" and other incentives to residents and businesses so that they can learn how to consume in a more sustainable way (e.g. reusable shopping bags; compost; etc). • Encourage residents to buy and sell items at second-hand stores and web-based sites that promote re-use. Include links to local businesses and websites on the City website.	**Central Vermont Solid Waste Management District, Montpelier CAN!, Stakeholders, City Residents**

Goal F: Waste Management

	1c	**Montpelier businesses and institutions reduce their waste.** • Encourage organizations to establish green procurement policies to reduce their amounts and types of waste. • Encourage businesses to provide incentives for those who bring their own reusable containers for bulk items, salad and soup bars, and beverages. • Recognize businesses that reduce their waste.	**Stakeholders, Local Businesses**
	1d	**Create a zero-waste farmers' market. Use other cities as a model.**	**Farmer's Market**

2		**By 2020, Montpelier increases the overall waste diversion by 60% and creates new targets by 2025.**	**Responsible Party**
Recommended Strategies	**2a**	**Undertake a study in cooperation with the Central Vermont Solid Waste District to analyze how much of the city's waste stream is being diverted through recycling and composting. Develop and implement a program to increase diversion levels.**	**Planning Commission**
	2b	**The City of Montpelier provides leadership in recycling for its businesses and residents.** • Mandate recycling and composting at City-sponsored events. Ensure signage is clear and educational for those attending the event. Encourage recycling and composting at all non-City-sponsored events. • Ensure that all City buildings are equipped with recycling receptacles.	**City Council, City Departments**
	2c	**Educate residents about waste-sorting and management.**	**CVSWMD**
	2d	**Assist businesses and others in the development of markets that use waste as a resource. Enable opportunities for waste generated from construction activities to be utilized by individuals or other businesses.**	**CVSWMD**

Goal F: Waste Management

	2e	**Develop a variety of ways for the City, residents, and businesses to divert food and organic residuals.** • Support the Central Vermont Solid Waste Management District in promoting backyard composting and supplying bins, digesters, and other mechanisms that allow residents to compost at home. • Encourage residents to share compost facilities with neighbors when they do not have a compost pile of their own. • Establish a community compost pile at the Stump Dump. Develop smaller neighborhood compost sites. • Support and promote the school systems' efforts to reduce waste and compost. • Experiment with programs that allow Montpelier High School students to share knowledge with residents about composting.	**CVSWMD, City Council, DPW, Public and Private School**

3		**The City serves as a leader in green purchasing, waste diversion, and recycling. By 2020, 60% of City residents self-report that they are aware of Montpelier's waste management commitments.**	**Responsible Party**
Recommended Strategies	**3a**	**Montpelier's commitments to waste management are well-advertised to businesses and residents through educational programs and media outreach.**	**Stakeholders**
	3b	**A waste reduction challenge or program allows city government employees to lead by example.**	**City Departments**