

11 | Natural Resources

11.A OVERVIEW

The Town of Waitsfield lies within the heart of the Mad River Valley, defined by the Northfield Range to the east, and the main range of the Green Mountains to the west. The physical features of Waitsfield's landscape have greatly influenced local patterns of human activity, settlement and commerce. Waitsfield Village developed around the most reliable source of power at the time, the Mad River. The town's traditional agricultural base, which once extended into the surrounding hills, is today largely confined to its most productive soils, found along the river valley and the broad plateau around Waitsfield Common. Those areas least desirable for development, Waitsfield's remote and rocky uplands, form a scenic backdrop and include productive forest lands, headwaters and important wildlife habitat.

Though waterpower has long been replaced by other sources of energy, and the town has slowly shifted away from its agricultural base, the physical landscape and the quality of the natural environment continue to attract visitors and residents and influence local development patterns. Waitsfield's natural setting offers a range of cultural, environmental and economic opportunities, while at the same time posing a number of significant constraints and challenges.

The town's natural landscape is enhanced by its built environment. This integration of natural and cultural features create a distinct sense of "place" that is unique to Waitsfield. The following describes the natural features that contribute to the town's unique sense of place, and options for conserving and protecting these resources for existing and future generations.

11.B CLIMATE

Climate and weather patterns are important planning and design considerations because of their effect on such things as soil erosion, plant growth, air quality, storm water runoff and flooding, groundwater supplies, road maintenance, energy demand for cooling and heating, access to alternative energy sources and the viability of weather dependent industries such as skiing.

Vermont's northern climate is dominated in winter months by cold, dry Canadian air, and in summer by warm moist air from the Gulf of Mexico. Weather patterns vary locally with topography and relief. Located on the eastern side of some of the state's highest mountains, Waitsfield experiences slightly lower average winter temperatures and higher rates of precipitation than other parts of Vermont. On average, the town receives over 43 inches of precipitation (measured as rainfall) annually.

Much attention has been given to global climate change in recent years. The effects of climate change are already evident in Vermont, including more intense storms linked to rising average temperatures. Over the next 50 years, climate change models have projected that the average temperatures in the state will increase five to nine degrees Fahrenheit. Such an increase would reduce the number of months with average low temperatures below freezing from the current six to four, and increase the number of months with average highs above 80°F from two to three or four.

While some of us human residents may not miss the extra months of winter weather, the plants and animals around us will. Climate change will alter the town's natural environment by changing the plant species that can thrive in Waitsfield, the migrating patterns of birds, the temperature of rivers and ponds, and countless other changes throughout the interconnected web of life.

If climate change proceeds as currently anticipated, the climate and natural environment in Vermont will become more like that of the mid-Atlantic region by the end of the 21st century. Waitsfield should anticipate that a changing climate will bring dramatic social, economic, and environmental change to the valley. For more than 50 years, Waitsfield has been a winter tourism and recreation destination. Climate change has the potential to undermine this critical component of the valley's economy, pointing to a need for both diversification of the local economy and action to limit future emission of climate changing air pollutants.

11.C AIR QUALITY

Weather patterns, especially wind, impact air quality. Like most of Vermont, Waitsfield's is fortunate to enjoy exceptional air quality. The town lies within a Class II attainment or clean air region as defined by Vermont's Air Quality Implementation Plan. As such, moderate changes in existing air quality are permissible, although a maximum level of pollution cannot be exceeded in accordance with Vermont's Air Pollution Control Regulations.

Given the absence of large-scale pollution generators in the community, local air quality concerns are limited mainly to emissions from traffic, inefficient or improperly operated heating systems and some agricultural practices. While no existing problems have been identified, the cumulative effect of these sources may increase with additional growth.

Of more immediate concern are impacts on air quality resulting from pollution generated far from Vermont. Most notably, the coal-burning power plants of the Midwest have been cited as the main cause of airborne pollutants that are detrimental to the health of forests and pond ecosystems, particularly fragile high-elevation ecosystems, throughout the Northeast. These impacts, in addition to global climate change, are arguably the largest challenges facing Waitsfield in the next several decades.

11.D TOPOGRAPHY

Waitsfield, Warren and Fayston comprise the upper watershed of the Mad River, which drains northward into the Winooski River and ultimately into Lake Champlain. Much of Moretown and a portion of Duxbury also share the watershed to the north. Waitsfield's topography is characterized by a mountainous eastern border, marked by the ridge line of the Northfield Range; the broad plateau west of the range that runs from East Warren to the south of Waitsfield Common; the Mad River Valley below; and a series of steep, intermittent ridges and hills bordering the river valley, leading west into Fayston.

Elevation. Elevation in Waitsfield ranges from a height of 2,911 feet above mean sea level at the summit of Scrag Mountain, the town's most prominent peak, to 608 feet at the point where the Mad River flows into Moretown. Dramatic changes in elevation affect local climate, weather and growing seasons, which vary throughout town. Traditionally, settlement has been

concentrated in the valley, between the elevations of 650 and 1,500 feet. Land over 1,500 feet in elevation (4,507 acres) remains largely undeveloped, although some residential development has occurred in recent years. Land over 2,500 feet in elevation (393 acres) is somewhat protected from incompatible development through Act 250, although that law does not prohibit development.

Slope. Waitsfield's steeper slopes and hillsides are poorly suited for most types of development, posing serious limitations for site clearance, construction and the installation of infrastructure and utilities; and serious risks for storm water runoff, slope failure, soil erosion, and the sedimentation of surface waters. The U.S. Natural Resource Conservation Service (NRCS) has identified general development constraints and management recommendations for different slope categories.

According to the NRCS, careful management to limit site disturbance is necessary on slopes in excess of 15 percent. All construction activities should be avoided on slopes in excess of 25 percent. State regulations also prohibit the installation of on-site wastewater systems on slopes in excess of 20 percent. General areas of steep slope are identified on Map 3 in Appendix B; however site assessments may be needed to determine slope limitations and management requirements for a particular development site.

In addition to physical constraints, development on steep slopes and prominent ridge lines can adversely impact the town's scenic landscape. Development in such areas, particularly at higher elevations, is often highly visible from numerous vantage points, and contrasts dramatically with the scenic backdrop provided by unbroken forest cover. Land above an elevation of 1,500 feet and the steep hillsides and prominent knolls rising from the valley floor have been identified through computer-based visual sensitivity analysis and community visual assessments as being especially vulnerable. Special measures have been incorporated in local land use regulations to prevent such development, or otherwise minimize its aesthetic impact through careful siting, landscaping and screening.



11.E WATER RESOURCES

Clean, plentiful water is a basic resource that is too often taken for granted. Waitsfield's water resources include abundant, naturally replenished surface and ground water supplies that sustain the natural environment and support a variety of human activities. Surface waters include upland headwaters and tributaries of the Mad River, the main stem of the Mad River, and small ponds scattered throughout town. Local ground waters include one of the largest identified aquifers in the state. The quality of these waters, which is thought to have improved over the past 30 years, must continue to be maintained and enhanced.

Rivers and Streams. Waitsfield is located entirely within the Mad River watershed (with the very minor exception of limited high elevation acreage located east of the ridge line of the Northfield Range). The river, which flows 7.5 miles through town, is fed by upland headwaters, and a number of major tributaries including: Folsom, Pine and High Bridge Brooks which form in the Northfield Range, and the lower sections of Mill and Shepherd Brooks flowing in from Fayston (see Map 6 in Appendix B). The Mad River and each of its major tributaries are distinct in character, and serve a number of important ecological, cultural, recreational, and aesthetic functions.

Most surface waters in Waitsfield are designated by the state for management purposes as Class B waters, which are intended to support a variety of environmental, public and recreational uses. Headwater streams, defined by the Vermont Environmental Board as all year-round and intermittent streams above an elevation of 1,500 feet are provided limited protection if a development is subject to Act 250 re-

view. Headwaters above 2,500 feet in elevation are defined as more pristine Class A waters.

Surface waters can serve as a barometer of environmental well-being. The 1991 report, *Watching the River's Health: The Condition of the Mad River and How to Improve and Protect It*, resulted in the formation of the Friends of the Mad River, a nonprofit river advocacy group. The organization's mission is to restore and maintain the physical, chemical and biological integrity of the river system, and build public support for clean water.

In 1995, a river management plan, *The Best River Ever*, was developed that identified the following major problems and threats to the river and its tributaries:

- ◆ Accelerated erosion and stream sedimentation resulting from poor construction, road and land management practices;
- ◆ Impacts from stormwater including altered hydrology and sedimentation;
- ◆ Lack of stream bank vegetation, resulting in stream bank erosion and higher water temperatures that affect local trout habitat;
- ◆ Threats to biodiversity and ecosystems from invasive species such as *Didymosphenia geminata* (rock snot) and Japanese knotweed;
- ◆ Water pollution from failing on-site septic systems, storm water runoff, and poor agricultural practices;
- ◆ Threats to public river access from development, overuse, misuse and changes in land ownership;
- ◆ Other threats, from contaminants, excessive water withdrawal for snow making, and gravel removal; and
- ◆ Lack of information and education about the river, including how the river functions, and how we contribute to the river's problems.

The *Best River Ever* also included over 100 specific recommendations to address each of these areas, many of which have been implemented.

The Friends of the Mad River have sponsored a number of programs and projects over the years to monitor and enhance water quality, support recreational

uses, and learn more about how the river functions. These include:

- ◆ Annual river cleanups;
- ◆ Assisting riparian landowners with stream bank stabilization and tree planting projects;
- ◆ Completion of extensive geomorphic (physical) assessments of the river leading to the development of the Upper Mad River Corridor Plan;
- ◆ Wildlife monitoring through sponsorship of Keeping Track®;
- ◆ Publication of a Mad River resource guide for teachers;
- ◆ Publication and distribution to every valley household of a guide for protecting the Mad River; and
- ◆ The Mad River Watch Program, which is an ongoing lay monitoring program that collects and publicly reports water quality data.

High bacteria (E.coli) counts have long been documented through local monitoring data and also in a 1998 study of selected tributaries of the Mad River. This pollution results from failing septic systems, agricultural runoff, and other sources. Currently the Folsom Brook and the Mad River, from the covered bridge in Waitsfield Village to its mouth, are included on the state's list of impaired waters targeted for improvement. These surface waters are listed because monitoring data indicate that bacteria levels currently exceed state water quality standards and impair the use of these waters for swimming and other contact recreation.

A total maximum daily load (TMDL) will be developed that will establish maximum pollutant levels from various sources and/or land uses. TMDL development will involve pollutant source assessments, the calculation of pollution loading rates that meet water quality standards, and associated source reduction requirements.

Gaining and protecting public access to the river is also a local priority. For many years, the only permanent access to the Mad River in Waitsfield was the Couples Club Recreation Field. In 1993, the town acquired the six-acre Lareau Swim Hole parcel for use as a wayside park. Since then, the town has also acquired: the five-acre former Austin parcel adjacent

to the swim hole; a deeded access to the river on the former Woliner (now Neill) parcel, which includes a segment of the Mad River Greenway and a small parking area for the greenway adjacent to the Meadow Road; and land with river frontage immediately upstream of the swim hole (Tardy parcel).

Groundwater. Fractured bedrock in the high elevations of the Northfield Range and gravel deposits in the lowlands and along the valley floor serve as the principal recharge areas for local groundwater supplies. Groundwater sustains base flows for the Mad River and its tributaries. It also currently provides potable water supply to all Waitsfield's homes and businesses, through a combination of private and small community wells and springs.

While the town benefits from generally abundant groundwater supplies, this dependence on scattered wells, particularly along Route 100 and in village areas, poses risks of potential groundwater contamination from a variety of sources. Once a groundwater source is contaminated, remediation, if feasible, is typically very expensive. There are a number of known contamination sites in Waitsfield, most of which are associated with leaking underground fuel storage tanks. The state requires remediation and/or monitoring of these sites to prevent further contamination of groundwater and potable water supplies.

Groundwater supplies are also affected by periods of drought. During droughts many shallow wells and springs may temporarily dry up. With climate change, weather patterns should be expected to change, but it is difficult to predict at the local level whether this will result in increased or decreased precipitation.

Aquifer recharge areas have yet to be adequately mapped, but source protection areas (SPAs) have been delineated as required by the state to protect public community water systems serving 15 or more service connections, or 25 or more users year-round. Under new state and federal regulations, source protection plans also must be developed for non-transient, non-community public water systems, which serve more than 25 people for at least six months of the year. SPAs are delineated for the Fly-In business park, Verd-Mont mobile home park, the elementary and Spring Hill schools, the shopping centers in Irasville, Mad River Meadows, the Eagles, and Butternut Hill .

Within designated SPAs, special consideration must be given to prohibiting, or carefully managing, development and practices that could contaminate local ground water supplies. These include poorly designed or failing septic systems, underground storage tanks, and the storage of hazardous materials and road salt.

There is currently no municipal water system in town, although final permitting and engineering is underway for a water system to serve Irasville and Waitsfield Village. Given the density of development and the lack of a centralized sewer system, the source areas in Irasville and Waitsfield Village are particularly at risk for contamination. Concerns over potential contamination have been a driving force in the effort to provide these centers with municipal water.

11.F EARTH RESOURCES

Geologic Features & Hazards. The bedrock underlying Waitsfield consists largely of highly metamorphosed graywacke, phyllite, gneiss and schist. Despite its location in the heart of the Green Mountains, there are no large-scale commercial rock quarries or mineral deposits in town. Only two small-scale quarry operations exist, both of which are operated on a limited basis. The Mad River does offer the recreational collector a chance to find small amounts of placer gold in return for a hard day's work; hand panning for recreational purposes does not require a state permit.

Geologic hazards are minimal, though isolated rock falls and slides are common on steep or unstable slopes. Regional earthquakes, typically centered in the Adirondack Mountains or southern Quebec, occur with enough frequency and strength that public infrastructure, buildings and utility systems should incorporate basic seismic standards for earthquake resistance.

Sand and Gravel. Sand and gravel, found in association with glacial and stream deposits, are locally more abundant and economically viable to extract for commercial and municipal purposes. The total extent of these deposits is unknown, although soils maps indicate roughly 2,200 acres of sand and 1,900 acres of gravel in town. There are two permitted sand and gravel pits in town, but only one is active.

Historically, gravel extraction from the Mad River was common. In the 1980s, it was recognized that gravel extraction was depriving many of the state's river systems of the sediment needed to maintain its

stability and causing extreme streambed degradation. Gravel extraction from the rivers and streams is now carefully regulated by the state.

Upland extraction operations also raise a host of potential conflicts. Active extraction operations result in noise, dust, truck traffic and visual blight. Such operations also can create safety hazards, affect ground-water supplies, and result in the deterioration of local roads and infrastructure.

However, road maintenance and construction projects are dependent upon sand and gravel, which if not available locally much be hauled from more distant locations at great expense. In order to maintain safe, attractive roads in a cost-effective manner, the town has secured a reliable and economic source of gravel.

The adverse impacts of sand and gravel operations can be addressed to a certain extent through local and state regulations, and good management practices. Regulations can ensure that extraction operations have minimal impact on the town and neighboring properties, and that sites are adequately reclaimed to allow for subsequent use once extraction is completed.

11.G SOILS

Agricultural Soils. Within the Mad River Valley, Waitsfield contains the greatest concentration of soils defined by the National Resource Conservation Service (NRCS) as primary agricultural soils. This includes 1,200 acres of prime agricultural soils and another 3,100 acres of soils of statewide agricultural importance. Most of these soils are found in valley bottomlands, but also extend along the broad plateau south of Waitsfield Common (see Map 4 in Appendix B).

The town's less fertile upland soils went out of production a century ago with the abandonment of hill farms, but local farmers continue to rely on the best soils to remain economically viable. The location of active farmland in town strongly correlates with the location of primary agricultural soils. Because these soils are relatively well-drained and support on-site septic systems, they are also inexpensive to develop for a variety of other uses. Subdivision and associated development continue to threaten productive farmland, particularly outside of designated floodplain areas.

Primary agricultural soils are a finite resource. Once converted to other uses, they are rarely returned to agriculture. They sustain and enhance local capacity for food production, and support existing and future farming operations. For these reasons, the town's best agricultural soils must be protected from other forms of development.

Farmers are also required to observe accepted agricultural practices, including the maintenance of buffer strips along waterways, to help minimize soil erosion and loss from farming operations.

Forestry Soils. NRCS also has identified the best soils to support commercial forestry, including many upland soils that are too shallow, rocky or steep to support other types of development. As a result, primary forestry soils are generally less threatened by development, but are more sensitive to site disturbance and erosion. To help prevent soil erosion, the state has adopted acceptable management practices to prevent soil erosion and maintain water quality on logging jobs.

Development Suitability. Currently, all the town's sewage needs are addressed through individual or clustered on-site systems. Soil suitability for on-site septic systems, as determined from state design standards, varies widely throughout town. Map 5 in Appendix B gives an indication of soil suitability for on-site septic systems under state standards. Under this soil classification system, approximately half of the total acreage of Waitsfield is considered either marginally suitable or unsuitable for on-site systems. The majority of the unsuitable soils are located on very steep slopes, with the heaviest concentration being above 1,500 feet in the Northfield Range.

State standards adopted in 2002 reduced required isolation distances to bedrock and groundwater and allow for alternative technologies, which may open up more land to development over time. Local land use regulations should adequately safeguard these areas from incompatible forms of development rather than relying on state septic regulations to limit development.

11.H FOREST RESOURCES

Forest is the dominant land cover in Waitsfield, accounting for almost 12,300 acres, or approximately 75 percent, of the town's total land area. Forest resources provide a number of benefits, including an

economic return for local landowners, water quality, wildlife habitat, recreation opportunities for town residents and visitors, and an important visual backdrop to most scenic vistas. In assessing issues relating to forest resources in town, an understanding of concerns relating to timber management and ownership patterns is important and are addressed under the land use chapter of this plan (Chapter 12).

Forest Management. Sound forest management results in a stable economic return for landowners, local resources to support local industry, and perhaps most importantly, an incentive for keeping large tracts of land free of development and available to the public for recreation, wildlife and scenic enjoyment. However, poor forest management can result in the degradation of biological diversity and can damage scenic landscapes.

Generally, a sound forest management plan should be based on a number of objectives, including sustainable timber production, the protection of water quality, maintaining a diversity of wildlife habitat, and aesthetic enhancement. Whatever the objectives of a forest property owner, developing and implementing a forest management plan is the best means of managing a forest parcel for long term, sustainable forest production. Such a plan also provides an opportunity to balance timber production with other important objectives including wildlife protection and recreation.

Private Forest Lands. The majority of town forestland is under private ownership. While much of the private forest is made up of large parcels associated with single-family residences, many undeveloped parcels of managed timber lands also exist. Much of this privately-owned forestland is located in the Northfield Range, although large tracts of managed woodlands are located adjacent to the valley bottom. Of the privately-owned forestland in town, more than 4,000 acres are currently enrolled in the state current use program, and are therefore managed in accordance with a forest management plan approved by the county forester. In addition to land under forest management, small saw mills currently operate in Waitsfield, providing a value added industrial base utilizing local forest resources.

Scrag Municipal Forest. In 1991, the town received a gift of 360 acres located on the southern portion of Scrag Mountain, including much of the summit.

This land provides recreation, wildlife, scenic and timber management benefits to the town. The town has since acquired an additional 20-acre adjacent parcel. The nature and location of the property, however, creates limitations for multiple-use management of the parcel. Limited access, previous logging practices and fragmented land ownership within nearby watersheds, all present management constraints.

Opportunities to expand the municipal forest through the purchase or gift of land may exist. Any expansion, however, should be based on a comprehensive management plan for the municipal forest, and should result in the acquisition of lands that will enhance the town's ability to manage the forest for a range of management objectives. Regardless of whether the forest is expanded, the acquisition of a better access for forest management and recreation from the Bowen Road and/or Palmer Hill Road should be explored with adjacent landowners.

Camels Hump State Forest (Howe Block). Approximately 550 acres of the Camels Hump State Forest are located in Waitsfield, in the Howe Block, along the Fayston boundary immediately south of Irasville on Dana Hill. This land is under multiple use management, subject to a Land Management Plan developed by the Vermont Department of Forest, Parks and Recreation. In addition to protecting much of a highly visible hillside, the state forest is actively used by local residents for hunting, hiking, skiing and biking.

11.I ENVIRONMENTALLY SENSITIVE AREAS

Environmentally sensitive areas include those areas or features that serve important ecological functions, and are especially susceptible to degradation from land use and development activities. As such, they are generally considered for protection through both regulatory and non-regulatory means.

Wetlands. Wetlands historically were viewed as worthless, mosquito-ridden bogs best suited for draining and filling for more productive uses. Wetland areas are now known to serve a variety of important ecological functions, including but not limited to storm water management and flood control, surface and ground water recharge and protection and wildlife habitat. Thus, they are now protected under state, federal and local regulations. Wetlands also present significant development constraints associated with poor drainage and high water tables.

There are no extensive wetland areas in Waitsfield, but many smaller wetlands are scattered throughout town (see Map 6 in Appendix B). The largest concentrations are found in the flood plains of the Mad River and in poorly drained areas in higher elevations south of Bald Mountain, including Printice Swamp.

As of the writing of this plan, there are roughly 640 acres of mapped wetlands regulated by the state as shown on the Vermont Significant Wetland Inventory (VSWI) map for the town. This VSWI maps are being updated and it is expected that more of the small wetlands, not previously shown, will be included. Even when this process is complete, site specific information and delineations may be required for the review of impacts associated with a particular development. Protection is provided through the designation of buffer areas at least 50 feet in width within which very few activities are allowed.

The loss of wetlands, especially upland (palustrine) wetlands, is an issue of national, state and local concern. In some circumstances, mitigation analysis may result in no net loss of wetland area or function may be appropriate. Wetlands have been identified in areas designated for development within Irasville. In 2001, a functional evaluation of delineated wetlands in Irasville was completed, which showed that the majority of the wetlands in the district were classified as wet meadows and had limited wetland functions.

To the extent feasible, Irasville's wetlands should be incorporated in site planning, design, and storm water management systems. However, in order to achieve higher densities of concentrated development as envisioned for this area, some may need to be developed and mitigation provided. Further planning for Irasville should continue to explore options for wetlands mitigation with state and federal officials.

Flooding and Fluvial Erosion. Mapped floodplains include those areas that have a one percent chance of flooding in any year. These areas serve as a safety-valve by temporarily carrying and retaining bank overflow from spring runoff and heavy storms; and are vital to the health of the river and the safety of the community. Waitsfield's mapped 100-year flood plain extends mostly along the Mad River and the lower reaches of its major tributaries (see Map 6 in Appendix B). Over the past several years, the flood plain maps have been reviewed and updated.



In addition to the risks associated with inundation, there is the related hazard posed by storm-swollen streams and rivers, which may unexpectedly jump their banks and cut new channels. Due largely to human influences, many stream and river channels are no longer stable. Their instability creates an erosion hazard during major storms, which are becoming more common as a result of climate change. Fluvial erosion hazards often exist in locations that are unlikely to be inundated with flood waters. Eroding stream banks are also a significant source of sediment and polluting nutrients entering major rivers and lakes, which decreases water quality.

Management efforts, directed toward long-term solutions that help curb escalating costs and minimize the danger posed or damage caused by storm-swollen streams, can help reduce flood and erosion hazards along river and stream corridors, improve water quality and aquatic habitat, and enhance aesthetic and recreational values of the town's rivers and streams.

The town has adopted flood hazard area regulations to limit development within flood hazard areas, as required for municipal participation in the federal flood insurance program. These regulations are intended to protect life and property, and to allow property owners to obtain NFIP flood insurance and mortgages at relatively affordable rates. As of the writing of this plan, the town was in the final stages of adopting new floodplain and erosion hazard regulations and maps as mandated by FEMA and the NFIP.

Wildlife Habitat. Waitsfield is home to a variety of plant and animal species that contribute to local biological diversity and ecological integrity, and support traditional activities such as hunting, fishing, and foraging. Forested upland areas harbor bear, deer, bobcat, moose, coyote and rumored catamount populations. The Mad River and its tributaries support natural and stocked populations of brook, brown and rainbow trout. Wetlands, road and field edges also provide critical habitat for a variety of species. Wetlands supporting wildlife habitat, although not common in Waitsfield, are essential for the survival of mink, otter, beaver, black bear, moose, ducks, herons, other wading birds and shore birds and other species.

Human activities, however, can have devastating impacts on local wildlife populations, including:

- ◆ The fragmentation and loss of contiguous habitat areas due to subdivision and development;
- ◆ The fragmentation or interruption of seasonal travel corridors;
- ◆ Habitat degradation from air and water pollution; and
- ◆ The introduction of exotic species.

The extent of knowledge about wildlife habitat in Waitsfield has been significantly bolstered by the 2007 *Natural Heritage Element Inventory and Assessment for Waitsfield and Fayston*. The purpose of this inventory was to map and assess the natural heritage elements that are important to the preservation of biological diversity. The scope of the project included the identification, inventory, assessment and ranking of five resource elements: wetlands, vernal pools, upland natural communities, wildlife habitat and connecting lands and rare elements.

For planning and development review purposes, the Vermont Fish and Wildlife Department maintains a

database of known threatened and endangered species, and has generally mapped known habitat. The department is continuing to improve its statewide GIS database of wildlife habitat and travel corridors. The Vermont Biodiversity Project has also identified areas of contiguous habitat and potential travel corridors in a generalized manner using satellite land use/land cover imaging. The Keeping Track® program, sponsored by the Friends of the Mad River, has started to systematically monitor wildlife populations in the valley, which should provide more detailed information about contiguous habitat areas and travel corridors.

The town continues to support a healthy deer population, although the 2008 harvest of 44 deer was down from recent years. Several deer wintering areas (deer yards) that provide critical winter cover and browse have been identified in town (see Map 6 in Appendix B). These are composed of coniferous forest on predominately south or west facing slopes, typically below elevations of 2,000 feet. Not only are such areas critical to deer, but nearly half of Vermont's vertebrate wildlife species rely on coniferous forests for at least part of their life needs. Past development activities in Waitsfield have resulted in the loss of some deer winter habitat. The extent to which town can suffer continued loss of this important habitat and still sustain a regionally viable deer population is not clear.

In Waitsfield, deer yards cover approximately 4,000 acres, and are concentrated primarily along the valley wall that runs parallel to the Mad River, and in the Folsom Brook drainage. Most of these areas are relatively steep, otherwise unsuited for development, and merit protection. In a few areas, however, the protection of local deer yards may be in conflict with other town land use policies intended to protect active farmland from development (by siting homes in adjoining woodland areas), or to accommodate development on land close to town roads and services. These include areas south of the Tremblay Road and east of Route 100, wooded areas adjacent to Brook Road, and land to the south of the Airport Road, west of Route 100 and north of the Center Fayston Road.

Black bear habitat in Waitsfield has been identified in upland areas of the Northfield Range, east of the Mad River and Route 100, and near Camel's Hump State Park west of the river and Route 100. Identification of these areas is based upon a very broad, statewide assessment of potential habitat performed on a very

large scale. Anecdotal information is that the Northfield Range is regularly inhabited by black bear and, providing it continues to contain a large tract of unfragmented forest, should be expected to continue serving as bear habitat. In particular, mast stands (American beech, oak, mountain ash, and cherry) are critical feeding habitat for black bear. They provide an essential source of nutrition in the fall and spring that directly affects survival and cub production. It is important to identify, map and protect these habitats.

The lower elevation habitats within the Mad River Valley support a diversity of vegetation types including early succession forest, and grassland habitat. These areas support an array of wildlife that may not be found at the higher elevations in Waitsfield. Special consideration should be given to land conservation in these biologically rich areas of Waitsfield, as well as focusing on the conservation of the town's upland areas.

The Mad River System is a popular cold-water fishery, and is stocked annually with brook and rainbow trout from state fish hatcheries in Roxbury and Grand Isle. Some natural regeneration of local trout populations also occurs, although generally upstream in the Mad River and in smaller tributary streams.

11.J GOALS

- 11.J-1 The responsible stewardship and sustainable use of Waitsfield's natural resources in a manner that protects and enhances the town's environmental well-being for the benefit of future generations.
- 11.J-2 The preservation of natural features that contribute to Waitsfield's ecological health and biological diversity.

- 11.K-4.c High elevation land (above 1,500 feet) in the Northfield Mountain Range;
- 11.K-4.d Contiguous wildlife habitat and travel corridors;
- 11.K-4.e Trail corridors, river accesses and areas for dispersed recreation (e.g., hunting, hiking, biking and other non-motorized activities);
- 11.K-4.f Riparian lands, river corridors and floodplain; and
- 11.K-4.g Identified scenic viewsheds.

11.K POLICIES

- 11.K-1 Continue to support efforts to identify and protect fragile features and important natural resources, including primary agricultural soils, forest soils, contiguous wildlife habitat and deer yards, water resources and other features described in this plan.
- 11.K-2 Accomplish the protection of identified natural resources through measures and programs that support, where appropriate, the sustainable use of those resources, including management of productive forests, agricultural use of productive soils, commercial and non-commercial recreational use of land and water, and the generation of renewable energy in appropriate locations.
- 11.K-3 Support the continuation and expansion of the state current use program to tax farm and forest properties at their productive value rather than their development potential. Encourage the participation of Waitsfield property owners in that program.
- 11.K-4 Support the efforts of local, regional and statewide conservation organizations to protect open space in Waitsfield through voluntary programs (e.g., purchase or donation of development rights). Priorities for open space protection include:
 - 11.K-4.a Productive agricultural land and working farms;
 - 11.K-4.b Primary agricultural soils, including those not presently in production, unless such soils are located on parcels identified as appropriate areas for future development ;

- 11.K-5 Pursue land conservation projects in accordance with the overall policies of this plan, including, but not necessarily limited to, those related to land use, housing and economic development.
- 11.K-6 Support the efforts of the Mad River Valley Planning District, Mad River Valley Rural Resource Commission and other organizations to implement and update the Mad River Valley Rural Resource Protection Plan.
- 11.K-7 Expand the Green Mountain National Forest proclamation boundary to encompass land located in the Forest Reserve District.
- 11.K-8 Conduct the extraction of finite earth resources, including sand and gravel, carefully to minimize adverse impacts on surrounding properties and the community at large, and to ensure restoration of the site upon completion of the extraction activity. Development of such resources should be carefully sited to retain, to the extent possible, future access.
- 11.K-9 Prohibit land development on slopes of 25% or greater.
- 11.K-10 Enact, incentivize and support measures to preserve primary agricultural soils for continued and future agricultural use and prevent the fragmentation and development of these resources through the town's land use regulations.

Draft for Review (7 May 2010)

- 11.K-11 Design land subdivisions and land development, outside of designated growth centers, to prevent development on, and minimize fragmentation of, land characterized by primary agricultural soils.
- 11.K-12 Prohibit land development on wetlands, unless it can be done in accordance with appropriate mitigation analysis, particularly with regard to any critical ecological function that may be compromised by development.
- 11.K-13 Design all land subdivision above an elevation of 1,500 feet carefully to minimize or mitigate adverse impacts to contiguous wildlife habitat, productive forest land, scenic viewsheds, shallow soils and headwater streams. Appropriate methods to avoid or mitigate such impacts include clustering development on the least sensitive portion of the site and retaining the bulk of the subdivided parcel(s) as open space.
- 11.K-14 Prohibit land development, including the construction of roads and extension of utilities, above an elevation of 1,700 feet, with the exception of activities related to non-commercial recreation, forest management and low-impact seasonal camps.
- 11.K-15 Design land subdivisions carefully to avoid the fragmentation and/or development of identified wildlife travel corridors, including those in the 2007 Natural Heritage Inventory.
- 11.K-16 Design land subdivision and land development to protect deer wintering areas located outside of designated growth areas, including village and industrial districts and appropriate areas for residential hamlets.
- 11.K-17 Protect and enhance the quality of Waitsfield's surface waters through the maintenance of vegetated buffers and river corridors along all streams.
- 11.K-18 Prohibit the removal of gravel from the Mad River and tributaries in excess of volumes presently allowed by the state.
- 11.K-19 Design land subdivisions and land development to control storm water runoff, increase infiltration and avoid adverse off-site impacts to water quality. Post-development storm water should infiltrate or flow off the property at similar rates and locations to pre-development conditions.
- 11.K-20 Consult with the Friends of the Mad River and local fishery groups on projects that may potentially impact the Mad River and tributaries.
- 11.K-21 Support the efforts of the Friends of the Mad River and other organizations to implement and update the Best River Ever: A Conservation Plan to Protect and Restore Vermont's Beautiful Mad River Watershed.
- 11.K-22 Support the establishment of municipal water and the further investigation of wastewater options to serve designated growth centers as a means of avoiding contamination of ground and surface waters.
- 11.K-23 Maintain the existing classifications of the town's surface waters, with the exception of headwater streams above an elevation of 1,500 feet which should be upgraded to Class A.
- 11.K-24 Develop and implement a plan to allow the encroachment into wetlands with limited ecological functions within the Irasville Village District. Such a plan should include clear strategies for the maintenance or replacement of any lost ecological functions either within or outside of the district.
- 11.K-25 Design land development within mapped water supply source protection areas carefully to avoid groundwater contamination, and uses posing a high risk of contamination shall be avoided.
- 11.K-26 Control the extraction of groundwater for commercial purposes carefully to ensure that water is extracted at sustainable rates and to prevent the depletion of water supplies in the community.

- 11.K-27 Promote forest management in accordance with Best Management Practices (BMPs) to ensure the maintenance of water quality, the enhancement of wildlife habitat and the avoidance of adverse impacts on scenic resources, including upland areas in the Northfield Mountain range.

- 11.K-28 Continue to evaluate development proposals against the policies of this plan during local and state regulatory processes to ensure that such proposals are in conformance with the plan.