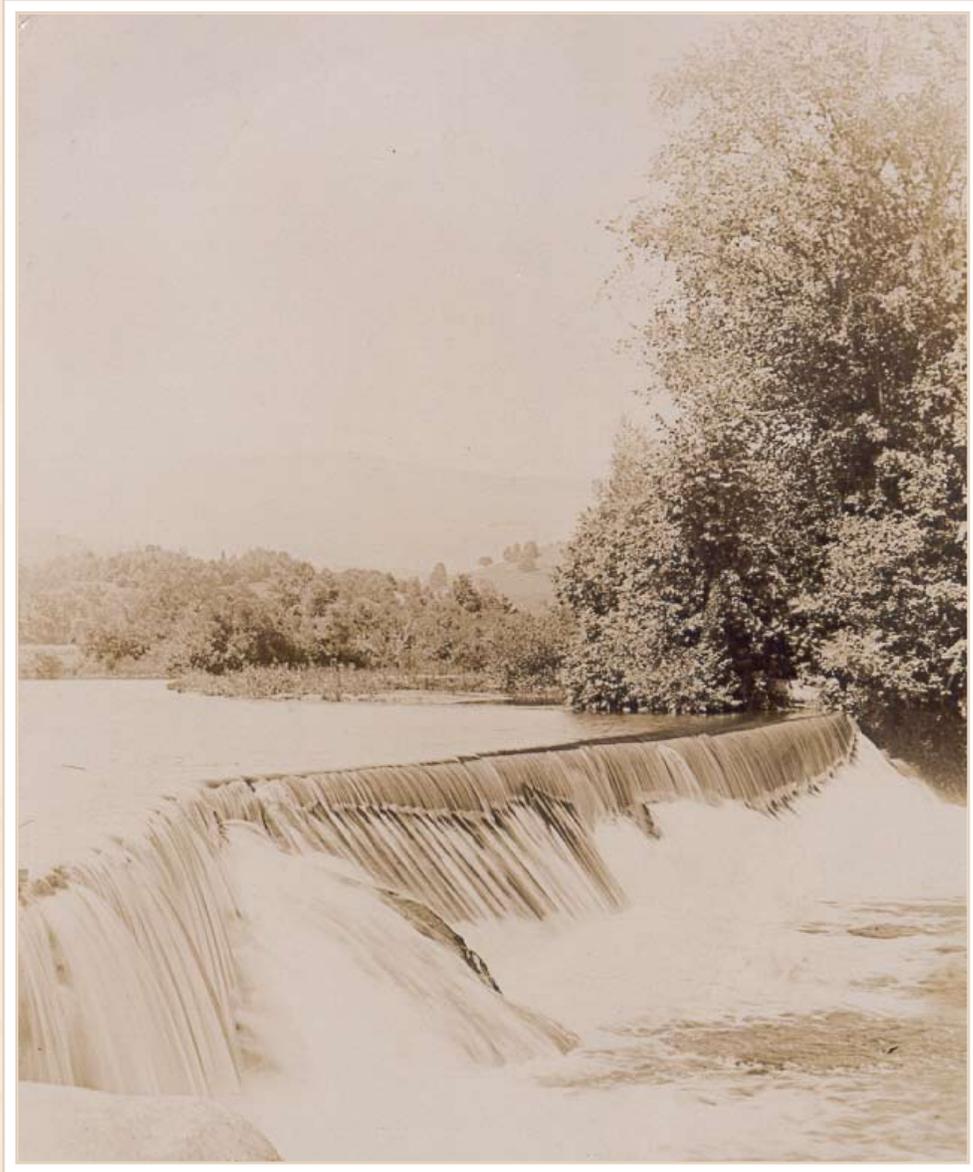


3. Natural Resources



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Though water power has long been replaced by other sources of energy, and the town has slowly shifted away from its agricultural base, the physical landscape and the quality of the natural environment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, described in the following chapter. 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.

CLIMATE

Climate represents the average weather conditions characteristic of an area over time. Weather patterns are an important planning and design consideration 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 experiences over 43 inches of precipitation (measured as rainfall).

Vermont may come to resemble New Jersey, in more ways than one...

Some climate models predict that average temperatures in Vermont could increase by 6°F over the next several decades, resulting in a climate more like that of New Jersey. The result:

- ◆ More volatile and variable weather conditions
- ◆ More frequent dry spells and water shortages
- ◆ Increases in heat-related illnesses and deaths
- ◆ Increased storm events and stormwater runoff
- ◆ Decreased water quality
- ◆ Loss of hardwood forests, including sugar maples
- ◆ Loss of migratory bird and endangered species
- ◆ Introduction of warmer climate species and pests
- ◆ Loss of cold water fisheries
- ◆ Shorter ski and fall foliage seasons

Source: *Climate Change and Vermont*, US EPA 1998



Much attention has been given to global climate change in recent years. The vast majority of scientists studying the earth’s evolving climate agree that average temperatures are rising, which raises a host of considerations regarding the fate of the planet and humankind. Waitsfield should anticipate that a changing climate may bring dramatic social, economic, and environmental change to the Valley.

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, especially traffic congestion and associated idling at busy intersections, heating systems (e.g. woodstoves) and some agricultural practices. While no existing problems have been identified, the cumulative effect of these sources may increase with additional growth and may have a greater impact on air quality in the future. Efforts to avoid periods of congestion, such as at the Route 100/17 intersection, can help to maintain local air quality. Of more immediate concern are impacts on air quality resulting from out of state activities, such as coal-burning power plants, which pose a particularly serious threat to fragile, high elevation ecosystems.

TOPOGRAPHY

Waitsfield, Warren and Fayston comprise the upper watershed of the Mad River, which drains northward into the Winooski River and 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 ridgeline 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

Elevations range from a height of 2,911 feet above mean sea level (MSL) at the summit of Scrag Mountain, the town’s most prominent peak, to 608 feet MSL 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

ELEVATION	
Local Elevations • Above mean sea level in feet	
Scrag Mountain	2,911
Bald Mountain	2,668
Kew Hill	1,961
Waitsfield Common	1,073
Waitsfield Village	698
Mad River-Warren Line	780
Mad River/Moretown Line	608

TABLE 3.1 SLOPE CONSTRAINTS	
Slope	Management Considerations
0-3%	Suitable for development; may require drainage improvements
3-8%	Most desirable for development, having the least restrictions
8-15%	Suitable for low density development with consideration given to erosion control, runoff & septic design
15-25%	Unsuitable for most development and septic systems; Construction costly, runoff & erosion problems likely
25+%	All construction should be avoided; careful land management required

US Natural Resource Conservation Service

installation of infrastructure and utilities; and serious risks for stormwater 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 (Table 3.1).

According to the NRCS, careful management to limit site disturbance is necessary on slopes in excess of 15%. All construction activities should be avoided on slopes in excess of 25%. State regulations also prohibit the installation of on-site wastewater systems on slopes in excess of 20%. General areas of steep slope are identified on Map 3; 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 ridgelines 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 must be incorporated in local land use regulations to prevent such development, or otherwise minimize its aesthetic impact through careful siting, landscaping and screening.

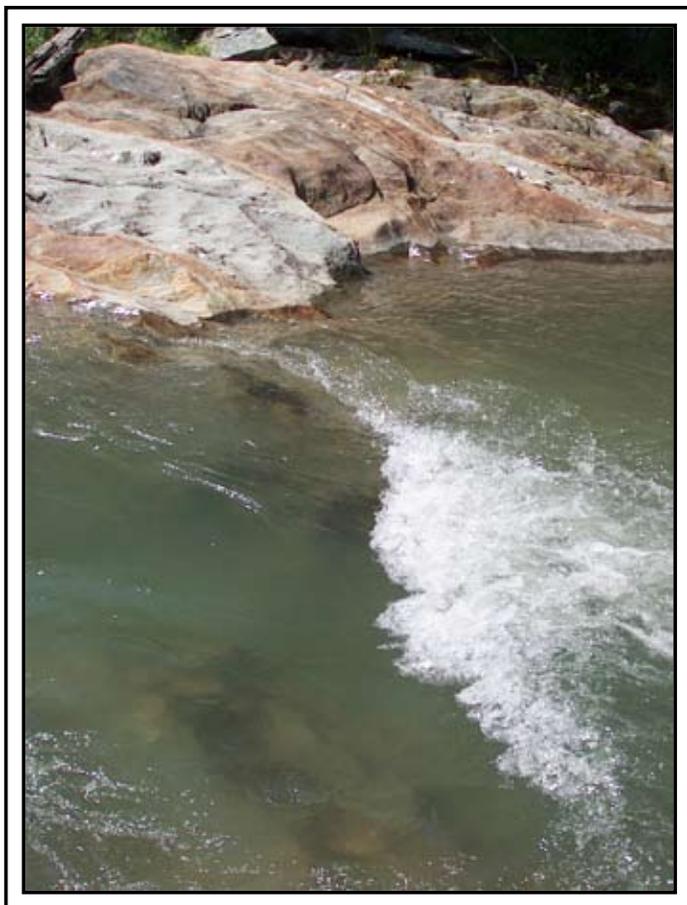
WATER RESOURCES

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, 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 & Streams

Waitsfield is located entirely within the Mad River watershed (with the very minor exception of limited high elevation acreage located east of the ridgeline of the Northfield Range). The river, which extends 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 1). 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 MSL are provided limited protection if a development is subject to Act 250 review. 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. In 1991, the Mad River Valley Planning District issued a report prepared by the Montpelier-based River Watch Network entitled *Watching the River's Health: The Condition of the Mad River and How to Improve and Protect It*. This report included analyses of five years of water quality monitoring data, a survey of aquatic life, and a streambank inventory of the river and its tributaries. It identified issues to be addressed, including water quality, streambank erosion and sedimentation, and recreational access; and also recommended a coordinated, multi-town approach to river conservation. This effort supported the formation of the **Friends of the Mad River**, a nonprofit river advocacy group, and the subsequent development of an award-winning river management plan, *The Best River Ever*, in 1995.

Major problems and threats to the river and its tributaries identified in *The Best River Ever* included:

- ◆ **Accelerated erosion and stream sedimentation** resulting from poor construction, road and land management practices;
- ◆ **Lack of streambank vegetation**, resulting in streambank erosion and higher water temperatures that affect local trout habitat;
- ◆ **Water pollution** from failing on-site septic systems, stormwater 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 snowmaking, 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 one hundred specific recommendations to address each of these areas, many of which have been implemented.

The Friends 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 streambank stabilization and tree planting projects; wildlife monitoring through sponsorship of Keeping Track®; the publication of a Mad River resource guide for teachers; the publication and distribution to every Valley household of a guide for

Significant Resources of the Mad River Watershed

- ◆ **Healthy populations of native brook trout and introduced rainbow and brown trout.**
- ◆ **Swimming holes which have been rated among the best in the state.**
- ◆ **Forest cover (86%) which provides scenic beauty and an economic resource.**
- ◆ **Boating opportunities for people of all ages and abilities.**
- ◆ **Active farms in the valley that contribute to its pastoral and scenic beauty.**
- ◆ **Mountains that form the watershed's boundaries, direct water into upland brooks and groundwater aquifers, and provide critical wildlife habitat, spectacular views, and a variety of recreational opportunities.**

Source: *The Best River Ever*. 1995

protecting the Mad River; and the **Mad River Watch Program**—an ongoing lay monitoring program that collects and publicly reports water quality data, including bacteria (*E. coli*) counts—an indicator of the presence of human and animal waste, acidity (pH) and nutrient loading (total phosphorous and phosphates). The ultimate goal of the Friends is to restore and maintain the physical, chemical and biological integrity of the river system, and build public support for clean water.

High bacteria counts have long been documented through local monitoring data, and also in a 1998 study that examined spatial and temporal distributions of *E. coli* in selected tributaries of the Mad

River in relation to predominant land uses and storm events. 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 through the development of total maximum daily loads (TMDLs) by 2007. These surface waters



are listed because monitoring data indicate that bacteria levels—resulting from failing septic systems, agricultural runoff, and other sources—currently exceed state water quality standards, and impair the use of these waters for swimming and other contact recreation. 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. Prior to 1993, the only permanent access to the Mad River in Waitsfield was the Couples Club Recreation Field. In 1993 the town, with contributions from the Valley Rotary Club, the Mad River Planning District (from Sugarbush Resort environmental mitigation funds), and a grant from the Vermont Housing and Conservation Board, acquired the six acre Lareau Swimhole parcel, accessed from Route 100, for use as a wayside park. Improvements to the park, which were delayed pending the removal of the state salt shed, were finally completed in 2001.

Other river accesses acquired since 1993 include the five acre former Austin parcel, adjacent to the Lareau Swimhole, 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. In 2003, the town acquired additional land with river frontage immediately upstream of the Lareau Swimhole (Tardy parcel). In addition to Waitsfield's efforts, the Town of Warren also has secured at least two additional river accesses in recent years.

Groundwater

Groundwater sustains base flows for the Mad River and its tributaries. It also currently provides 100% of the potable water supply for 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 six known contamination sites listed on the state's hazardous sites list [October 2002]. All

are located along Route 100, and were the result of leaking underground fuel storage tanks. Three sites are under active investigation; the other three have undergone remediation and are being monitored. Groundwater supplies are also affected by periods of drought—2001 was the fifth driest year on record in Vermont, and many shallow wells and springs dried up temporarily.

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. Aquifer recharge areas have yet to be adequately mapped, but five “source protection areas” (SPAs), comprising



2,427 acres, have been delineated to date, as required by the state to protect public community water systems (PCWSs) 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” (NTNC) public water systems which serve more than 25 people for at least six months of the year— including individual water systems serving schools and office buildings.

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.

The largest source protection area, located in the Northfield range east of Waitsfield Common, supplies an artesian well permitted by the state for a withdrawal of up to 600 gallons per minute. The water supply has been considered for a commercial water extraction and bottling operation—currently a growth industry in Vermont. It is critical that private commercial use of water resources not adverse-

ly impact current or future public or private water supplies.

There is currently no municipal water system in town. Most community system sources in Waitsfield are located in areas of higher density development served by those systems—including the Industrial Park, the Verd-Mont Mobile Home Park, and the entire Irasville commercial district. Given the density of development, and the lack of a centralized sewer system, these source areas are particularly at risk for contamination, and underscore the need for the town to develop a municipal water system to serve Irasville and Waitsfield Village [see Chapter 9].

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—and 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 & 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 1,875 acres of gravel in town. There are two permitted sand and gravel pits in town, but only one is active.

Until the late 1980s, gravel extraction from the Mad River was common. Through most of the 1970s and 1980s, rapid economic development in the Valley prompted an unprecedented local demand for con-

struction gravel, and many upland sources were exhausted. The value of river gravel reached \$2.00 per cubic yard, sitting in the river. Many landowners were selling 1000–5000 cubic yards annually, and a few up to 10,000 cubic yards. By 1985 gravel extraction had deprived the river system of the sediment needed to maintain its stability, resulting in extreme streambed degradation [Options for State Flood Control Policies and a Flood Control Program, Vermont Water Quality Division, 1999]. Gravel extraction from the rivers and streams is now carefully regulated by the state.

Upland extraction operations also raise a host of potential conflicts. On one hand, few people would choose to live near an active pit because of the associated noise, dust, truck traffic and visual blight. Such operations also can create safety hazards, affect groundwater supplies, and result in the deterioration of local roads and infrastructure. On the other hand, in order to maintain safe, attractive roads in a cost-effective manner, the town must secure a reliable and economic source of gravel. Construction concerns also rely on local sources of sand and gravel to help contain construction costs.

Given the importance of sand and gravel resources to the town, and to the local economy, commercially viable deposits should be identified and reserved for future use. The Waitsfield Selectboard has been investigating potential gravel sources for several years, recognizing that a municipally-owned source of sand and gravel is in the long-term interest of the town. A reserve fund was established several years ago for the purpose of acquiring such a site.

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 restored to allow for subsequent use once extraction is completed.

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**”—including 1,232 acres of “prime” agricultural soils, and another 3,098 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).

The town's less productive upland soils went out of production during the last century 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 farm land, particularly outside of designated floodplain areas.

Primary agricultural soils are a finite resource. Once converted to other uses, they are rarely returned to production. 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 (AAPs)**, 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 develop-

ment, but are more sensitive to site disturbance and erosion. To help prevent soil erosion, the state has adopted **acceptable management practices (AMPs)** 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 gives an indication of soil suitability for different types of systems under state standards in effect through 2002. 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 MSL in the Northfield Range.

New state standards adopted in 2002, however, which reduce required isolation distances to bedrock and groundwater and allow for alternative technologies, may open up more land to development. The potential impact of new on-site system design criteria should be assessed, particularly in upland areas, to ensure that local land use regulations adequately safeguard these areas from incompatible forms of development. New state regulations also may allow for higher densities of development in areas currently served by on-site systems, where the town wants to promote more concentrated patterns of development.



FOREST RESOURCES

Forest land is the dominant land use in Waitsfield, accounting for almost 12,300 acres, or approximately 75%, 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 forest land is under private ownership. While much of the private forest is made up of large parcels associated with single family residences, many undeveloped parcels under forest management also exist. Much of this privately owned forest land is located in the Northfield Range, although large tracts of forest currently under timber management are located adjacent to the Valley bottom. Of the privately owned forest land in town, over 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. The 360 acre parcel provides recreation, wildlife, scenic and timber management benefits to the town. An additional 20 acre adjacent parcel was acquired by the town in subsequent years. The nature and location of the property, however, create 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 of the forest, however, should be based on a comprehensive management plan for the municipal forest, and should result in the acquisition of those lands which 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 (last revised in 1986). 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.

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 stormwater management and flood control, surface and ground water recharge and protection, and wildlife habitat— that have garnered their protection 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). 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. At present 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. Not all wetlands appear on this map; site specific information and delineations also may be required for the review of impacts associated with a particular development. Protection is provided through the designation of buffer areas at least fifty 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 func-

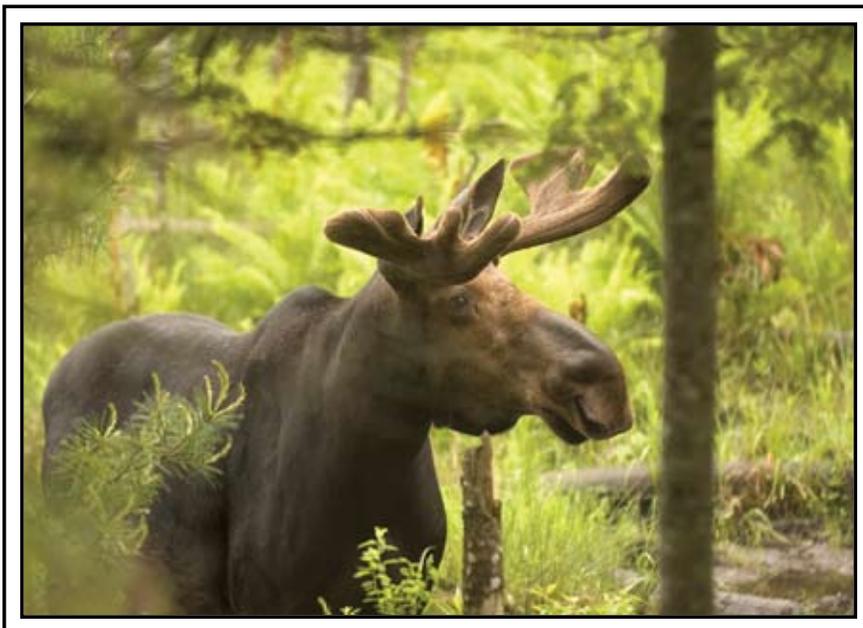
tion may be appropriate. Wetlands have been identified in areas designated for development within the Irasville Growth Center. In 2001, the town retained the services of Lamoureux & Dickinson Consulting Engineers to perform a functional evaluation of delineated wetlands in Irasville. They determined that the majority—though not all—of the wetlands in the district were “wet meadow,” characterized by limited wetland functions.

To the extent feasible, Irasville’s wetlands should be incorporated in site planning, design, and stormwater management systems; however, in order to achieve higher densities of concentrated development as envisioned for this area, mitigation analysis will be necessary. The town is currently exploring its options for wetlands mitigation with state and federal officials. The purpose of such mitigation analysis is to examine whether a concentrated development pattern may be allowed to encroach upon a portion of the wet meadow located between Mad River Green and the Carroll Road.

Flood Plains

Mapped flood plains include those areas that are anticipated to flood at least once every 100 years. 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 over 755 acres, mostly along the Mad River and the lower reaches of its major tributaries (see Map 6). Recent flooding episodes, however, including a “500-year” flood in 1998, indicate that additional mapping is needed to more clearly identify flood hazard areas associated with more dynamic segments of the Mad River, particularly from the Warren town boundary to the Lareau Swimhole. In 2004, the Federal Emergency Management Agency (FEMA) is in the early stages of an effort to verify floodplain boundaries and revise the National Flood Insurance Program (FIRM) floodplain maps.

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 flood insurance and mortgages at relatively affordable rates. The town should continue to enforce regulations to strictly limit—or preferably prohibit—development on these lands.

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 chart on page 38 generally illustrates the impacts of land subdivision and fragmentation of large tracts of forest land on wildlife populations in northern New England. The left-hand column identifies expected species in large (3,000+ acres) tracts of undeveloped forest, while each subsequent column depicts the species likely to be extirpated as the land is subdivided into smaller parcels for scattered development. Certain species such as black bear, which require large contiguous habitat areas that also support a variety of other species, serve as indicators of the health and diversity of local wildlife populations.

The extent of knowledge about wildlife habitat in Waitsfield is surprisingly limited, in part because of the amount of field work and mapping needed to document local populations. For example, there are no known **endangered or threatened species** in Waitsfield, but much of the town has yet to be sur-

veyed. For this reason, site specific evaluations may be required to determine the potential impacts to wildlife and important habitat associated with a particular subdivision or development proposal and to identify appropriate management strategies.

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 developing a statewide GIS database of wildlife travel corridors that should prove useful for conservation of habitat connectivity in Waitsfield. 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—in the 2000 hunting season, 78 deer were harvested (4% of the county total), representing a harvest of 3.44 deer per square mile (compared with 3.24 for the county and 2.62 statewide). Several **deer wintering areas** (deeryards) that provide critical winter cover and browse have been identified in town (see Map 6). These are composed of coniferous forest on predominately south or west facing slopes, typically below elevations of 2,000 feet MSL. Not only are such areas critical to deer, but nearly half (169 species) 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, deeryards cover approximately 4,000 acres, and are concentrated primarily along the valley wall which 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 deeryards 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 de-

IMPACT OF FOREST FRAGMENTATION ON WILDLIFE SPECIES



TIER 1: Undeveloped Forest	TIER 1: 500-2,500 Acres Developed Parcels	TIER 3: 100-499 Acres Developed Parcels	TIER 3: 20-99 Acres Developed Parcels	TIER 3: 1-19 Acres Developed Parcels
Raccoon	Raccoon	Raccoon	Raccoon	Raccoon
Hare	Hare	Hare	Hare	
Coyote				
Small Rodent	Small Rodent	Small Rodent	Small Rodent	Small Rodent
Porcupine	Porcupine	Porcupine	Porcupine	
Bobcat				
Cottontail	Cottontail	Cottontail	Cottontail	Cottontail
Beaver	Beaver	Beaver	Beaver	
Black Bear				
Squirrel	Squirrel	Squirrel	Squirrel	Squirrel
Weasel	Weasel	Weasel	Weasel	
Mink	Mink	Mink		
Fisher				
Woodchuck	Woodchuck	Woodchuck	Woodchuck	
Deer	Deer	Deer		
Muskrat	Muskrat	Muskrat	Muskrat	Muskrat
Moose	Moose			
Red Fox	Red Fox	Red Fox	Red Fox	Red Fox
Songbirds	Songbirds	Songbirds	Songbirds	Songbirds
Sharp-Shinned Hawk	Sharp-Shinned Hawk	Sharp-Shinned Hawk		
Bald Eagle	Bald Eagle			
Skunk	Skunk	Skunk	Skunk	Skunk
Cooper's Hawk	Cooper's Hawk	Cooper's Hawk		
Harrier	Harrier	Harrier		
Broad Winged Hawk	Broad Winged Hawk	Broad Winged Hawk		
Goshawk	Goshawk			
Kestrel	Kestrel	Kestrel		
Red-Tail Hawk	Red-Tail Hawk			
Horned Owl	Horned Owl	Horned Owl		
Raven	Raven			
Barred Owl	Barred Owl	Barred Owl		
Osprey	Osprey	Osprey		
Turkey Vulture	Turkey Vulture	Turkey Vulture		
Reptiles	Reptiles	Reptiles	Most Reptiles	Most Reptiles
Garter Snake	Garter Snake	Garter Snake	Garter Snake	
Ring-Neck Snake	Ring-Neck Snake	Ring-Neck Snake	Ring-Neck Snake	
Amphibians	Amphibians	Amphibians	Most Amphibians	Most Amphibians
Wood Frog	Wood Frog	Wood Frog		

Source: *Designing Communities to Protect Wildlife Development and Accommodate Development*, a report of the *Patterns of Development Task Force*, Maine Environmental Priorities Project. July, 1997

velopment 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 in the vicinity of 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.



PHOTO: SANDY MACYS

NATURAL RESOURCES

GOALS:

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.

The preservation of natural features that contribute to Waitsfield's ecological health and biological diversity.

NATURAL RESOURCES

POLICIES:

- 1) The Town will continue to support efforts to identify and protect fragile features and important natural resources, including primary agricultural soils, forest soils, contiguous wildlife habitat and deeryards, water resources and other features described in this plan.
- 2) The protection of identified natural resources shall be accomplished 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 (see Chapter 11).
- 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 (i.e., highest and best use value). Encourage the participation of Waitsfield property owners in that program.
- 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:
 - a. productive agricultural land and working farms;
 - b. primary agricultural soils, including those not presently in production, unless such soils are located on parcels identified as appropriate areas for future development (e.g., village districts, rural "hamlets"—see Chapter 12);
 - c. high elevation land (above 1,500 feet MSL) in the Northfield Mountain Range;
 - d. contiguous wildlife habitat and travel corridors;
 - e. trail corridors, river accesses and areas for dispersed recreation (e.g., hunting);

- f. riparian lands and floodplain;
 - g. identified scenic viewsheds; and
 - h. the above features where they serve to characterize and/or support the Valley's historic landscape, including land in the Mad River Valley Rural Agricultural District and land adjacent to designated growth centers which reinforce the contrast between compact village and open countryside.
- 5) Notwithstanding policy #4, above, land conservation projects should be pursued in accordance with the overall policies of this plan, including, but not necessarily limited to, those related to land use, housing and economic development.
 - 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.
 - 7) The Green Mountain National Forest proclamation boundary should be expanded to encompass land located in the Forest Reserve District.
 - 8) The extraction of finite earth resources, including sand and gravel, shall be carefully conducted 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.
 - 9) Prohibit land development on slopes of 25% or greater and, outside of the Waitsfield Village Business District, on 100 year floodplains.
 - 10) Outside of designated growth centers (see Chapter 12), land subdivisions and land development shall be designed to prevent development on, and minimize fragmentation of, land characterized by primary agricultural soils.
 - 11) Land development on slopes between 15% and 25% shall be carefully designed to control erosion and avoid off-site impacts associated with stormwater run-off.
 - 12) Land development shall be prohibited 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.
 - 13) All land subdivision above an elevation of 1,500 feet MSL shall be carefully designed 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.
 - 14) Land development, including the construction of roads and extension of utilities, shall be prohibited above an elevation of 1,700 feet MSL, with the exception of activities related to non-commercial recreation, forest management and low-impact seasonal camps.
 - 15) Land subdivisions shall be carefully designed to avoid the fragmentation and/or development of identified wildlife travel corridors.
 - 16) Land subdivision and land development shall be designed to protect deer wintering areas located outside of designated growth areas, including village and industrial districts and appropriate areas for residential hamlets (see Chapter 12).
 - 17) The quality of Waitsfield's surface waters shall be protected and enhanced through the maintenance of vegetated buffers along all streambanks.
 - 18) The removal of gravel from the Mad River and tributaries in excess of volumes presently allowed by the state shall be prohibited.
 - 19) Land subdivisions and land development shall be designed to control stormwater runoff and avoid adverse off-site impacts to water quality.
 - 20) 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*.
 - 21) Support the establishment of municipal water and sewer facilities to serve designated growth centers as a means of avoiding contamination of ground and surface waters.
 - 22) Existing classifications of the Town's surface waters shall be maintained, with the exception of headwater streams above an elevation of 1,500' which should be upgraded to Class A.
 - 23) A plan to allow the encroachment into wetlands with limited ecological functions within the Irasville Village District should be developed and implemented. Such a plan should include clear strategies for the maintenance or replacement of any lost ecological functions either within or outside of the district.
 - 24) Land development within mapped water supply source protection areas shall be carefully designed to avoid groundwater contamination, and uses posing a high risk of contamination shall be avoided.
 - 25) Extraction of groundwater for commercial purposes shall be carefully controlled to ensure that water is extracted at sustainable rates and to prevent the depletion of water supplies in the community.
 - 26) Forest Management should comply 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.

NATURAL RESOURCE TASKS:

- 1) Enact, through zoning and/or subdivision regulations, measures to preserve primary agricultural soils for continued and future agricultural use and prevent the fragmentation and development of these resources. *[Planning Commission]*
- 2) 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. *[Board of Adjustment, Planning Commission]*
- 3) Update the Town's zoning and subdivision regulations to incorporate appropriate resource protection standards in accordance with the aforementioned policies. *[Planning Commission]*
- 4) Form a committee, to include willing landowners, to develop a multi-property management and conservation plan for lands in the Forest Reserve District. *[Conservation Commission, Planning Commission, Tree Warden]*
- 5) Implement a master plan for Irasville (see Chapter 12), including the development of a municipal wastewater system and comprehensive stormwater man-



- agement system, to correct and avoid contamination of surface and groundwaters. *[Selectboard, Town Administrator, Planning Commission]*
- 6) Appoint representatives to participate, on behalf of the Town, in the preparation of TMDLs (total maximum daily load) for the Mad River and larger Winooqui River watersheds. *[Planning Commission, Friends of the Mad River*]*
- 7) Consult with the Friends of the Mad River and local fishery groups on projects that may potentially impact the Mad River and tributaries. *[Planning Commission, Friends of the Mad River*]*
- 8) Acquire a long term source of gravel for municipal purposes. *[Selectboard, Town Administrator]*
- 9) Work with private conservation organizations and the Vermont Department of Fish & Wildlife to inventory critical wildlife habitat in Town, including wildlife travel corridors, and to develop strategies for the preservation of that habitat. *[Conservation Commission, Planning Commission]*
- 10) Participate in the review and revision of the Camels Hump State Forest (Dana Hill Forest) management plan to ensure that wildlife habitat, recreation opportunities and aesthetic resources are protected and enhanced. *[Selectboard, Town Administrator, Conservation Commission]*
- 11) Develop a management plan for all Town-owned lands to ensure sustainable use and management. *[Conservation Commission, Selectboard]*
- 12) Develop a criteria/ranking system with which the Town can evaluate proposed conservation projects for conformance with this plan. *[Conservation Commission]*
- 13) Consider preparing and/or adopting Best Management Practices (BMPs) to guide for forest management activities in Waitsfield, and explore appropriate means with which to encourage or require local compliance with those BMPs. *[Tree Warden, Planning Commission]*
- 14) Coordinate with land conservation organizations to ensure that conservation projects in Waitsfield are consistent with the goals and policies of this plan. *[Selectboard, Town Administrator, Planning Commission, Conservation Commission, Mad River Watershed Conservation Partnership*]*
- 15) Maintain a reserve fund to support local land conservation efforts, with annual allocations included in the capital budget and program. *[Selectboard, Town Administrator]*
- 16) Explore ways to educate landowners, especially new arrivals to the community, about techniques for good land stewardship and natural resource conservation. *[Planning Commission, area real estate brokers*]*

* Participation strongly encouraged

