NATURAL & CULTURAL RESOURCES

GOALS

1. **Protect significant natural resources, including air, wetlands, wildlife, lakes, ponds, woodlands, earthresources, open spaces, groundwater resources and wildlife habitat.**
2. **Protect and conserve historically significant buildings and locations, archaeological resources, and important scenic and aesthetic resources, starting with those identified in local and regional plans.**
3. **Maintain and wherever possible improve the quality of lakes, ponds, rivers, streams and groundwater.**

ASSETS AND VALUES

The region is a reflection of its people and its land. With a traditionally agrarian, working landscape framed by the Green Mountains and Lake Champlain, Franklin and Grand Isle Counties are still heavily dependent on the natural resource base. With a built environment largely defined by compact villages surrounded by open countryside, the region retains much of its rural character.

The region is home to an abundance of archaeological, historic, and cultural resources. The archaeological resources provide clear evidence of the region's extensive and longstanding indigenous habitation, while many of the historic resources are tangible reminders of the communities built following the arrival of Europeans in North America. Cultural value is attached to events and physical items from prehistory through to the present day.

Archaeological resources include the villages, hunting camps, trade networks and burial grounds associated with indigenous people. Significant indigenous archaeological resources are known to be located in the vicinity of Route 78 in Swanton and Monument Road in Highgate. The location of many other such sites in the region remains private to protect their integrity. The Vermont Division for Historic Preservation maintains a listing of the 522 known archaeological sites within the region, of which 410 have detailed data. This figure likely represents a small fraction of significant sites in the region given that indigenous peoples lived in many places and intensive investigation of site locations has not been undertaken. The Abenaki of Missisquoi continue to maintain a deep connection to the area in many ways, including via their tribal headquarters in Swanton.

Similarly, several historic settlements, sites and structures in the region (most reflecting post-colonial settlement) have been identified and entered into the State Register of Historic Places. In addition, over 75 properties within the region are included in the National Register of Historic Places. These include historic districts, as well as bridges, border stations, places of worship, and farmsteads. They also include two historic sites: the Hyde Log Cabin in Grand Isle (managed by the Grand Isle Historical Society) and the Chester A. Arthur Birthplace in Fairfield (managed by the Vermont Division for Historic Preservation). The region also hosts 10 museums, including St. Albans's Museum in St. Albans and the Hyde Log Cabin in Grand Isle, and a growing roster of art-focused venues, such as the Cold Hollow Sculpture Park. The region's 18 community-based historical societies work ever more diligently to document the diverse history of the region and its communities.

Long-standing cultural events such as the Vermont Dairy Festival in Enosburg Falls and Franklin County Field Days reflect the important role that agriculture continues to play in the region. For example, in St. Albans City, the Vermont Maple Festival typically draws more than 50,000 participants each year in honor of maple syrup, Vermont's "liquid gold." Newer and smaller cultural events, including those increasing awareness of the culture of the Region's indigenous people, are also noteworthy. These and other cultural events, from farmers' markets to concerts and parades too numerous to name, provide invaluable contributions to the local sense of place. Another event long considered symbolic of Vermont culture is Town Meeting Day. Indeed, residents in municipalities across the Region gather annually on or near the first the Tuesday in March to vote and make decisions that affect their local communities. Some municipalities have changed to Australian ballot voting combined with a public information session. Many municipalities temporarily halted in-person Town Meetings to respond to the COVID-19 pandemic, though by 2023 all communities in the region have returned to in-person Town Meetings or information sessions.

Beyond the historical richness of the region, Northwest Vermont boasts a robust mosaic of diverse landscapes, from the Adirondacks-backed agricultural viewsheds of the Lake Champlain islands to the heavily wooded western slopes of the Green Mountains. With sensitive siting and design, it's possible for scenic landscapes to be developed and still retain much of their intrinsic character. Aesthetic considerations are recognized as a legitimate public concern under Criterion 8 of Act 250. Conserving the region's aesthetic resources is crucial to maintaining its sense of place.

Our downtowns and village centers provide a gathering place for the community, a sense of identity and are commonly anchored by historic settlements with a unique heritage that is an important cultural and historic resource. State programs that "designate" centers provide a mechanism to access grants and tax credits to assist redevelopment projects and promote growth in these places. The Certified Local Government (CLG) program establishes a preservation partnership between a local historic preservation commission, the State Historic Preservation Office, and the National Park Service. St. Albans City achieved CLG designation in 2020. As such, the city can access CLG grant funding for locally-based preservation projects.

Natural Resources

Bedrock and the Physical Landscape: The Foothills of the Green Mountains are separated from the Champlain Lowlands by a series of thrust faults running north–south through Franklin County. The Hinesburg Thrust Fault and related erosional remnants—including Aldis Hill, Prospect Hill and Georgia Mountain—are among the most prominent landscape features in this part of the region. The Foothills are characterized by rolling hills and valleys ranging in elevation from 500 to around 1,000 feet above mean sea level. This area is differentiated from the Green Mountain chain more by elevation and topography than geology. Many of the region's more picturesque villages and hamlets are located there.

The Green Mountains—which are part of the Appalachian chain and once stood higher than the Rockies—now reach heights within the region of less than 4,000 feet. Nevertheless, these old mountains still present a formidable barrier along Franklin County's eastern border. Exposed bedrock, boulder surfaces, steep slopes and shallow soils are common. Because of its remoteness, elevation, steep slopes, shallow soils and poor drainage, this area of the region has not been heavily developed. Farming historically has been confined to stream and river valleys. Forestry remains the predominant use of the land in this part of the region.

Climate: The climate of Northwestern Vermont is dominated by prevailing Westerlies—cold, dry air from Canada in winter; warmer, moist air from the Gulf of Mexico in summer; and occasionally damp, cold air moving in from the North Atlantic. The area enjoys the strong seasonal variations that are characteristic of northern New England. The diversity of elevation and proximity to Lake Champlain that define the region contribute to substantial differences in micro-climate between the Champlain Valley and the hill country of eastern Franklin County. Grand Isle County, which benefits from the moderating effects of Lake Champlain, tends to have milder weather, longer growing seasons and less snowfall than the more mountainous parts of the region.

Global climate change may have significant implications for our region. According to the U.S. Environmental Protection Agency (EPA), over the past century, Burlington, Vermont, has seen an average temperature increase of 0.4°F. By 2100, it predicts an additional increase of up to 4 or 5°F. This could significantly alter weather patterns and have implications for agriculture, forestry, maple production and tourist-related industries. Vermont's Global Warming Solutions Act required the adoption of a Climate Action Plan that will reduce greenhouse gas emissions and address climate resilience and adaptation. "As climate change continues to be observed in Vermont, the characteristics of these hazards are also changing and this sets up cultural, socioeconomic and policy implications for Vermonters as individuals, municipalities, communities, and indigenous peoples, as well as for the built and natural environments." (Vermont Climate Action Plan, 2021)

Soils: Soils are an important environmental factor influencing the use of land in rural areas. Within the context of land use planning, the characteristics that are of primary concern are bearing capacity, erodibility, drainage, septic suitability and resource value. Resource values may include productivity for growing crops or for sustaining specific species or communities.

"Primary agricultural soils," as defined for use in Act 250 proceedings, are soils mapped as important farmland soils according to the Natural Resources Conservation Service (NRCS). NRCS classifies many soils as having prime, statewide or local importance for agriculture. Soils designated as having prime or statewide importance cover 41% of the region, the majority of which are in Franklin County (Map 6). Franklin County contains one category of local importance soils, defined as Missisquoi loamy sand, with 8% to 15% slopes.

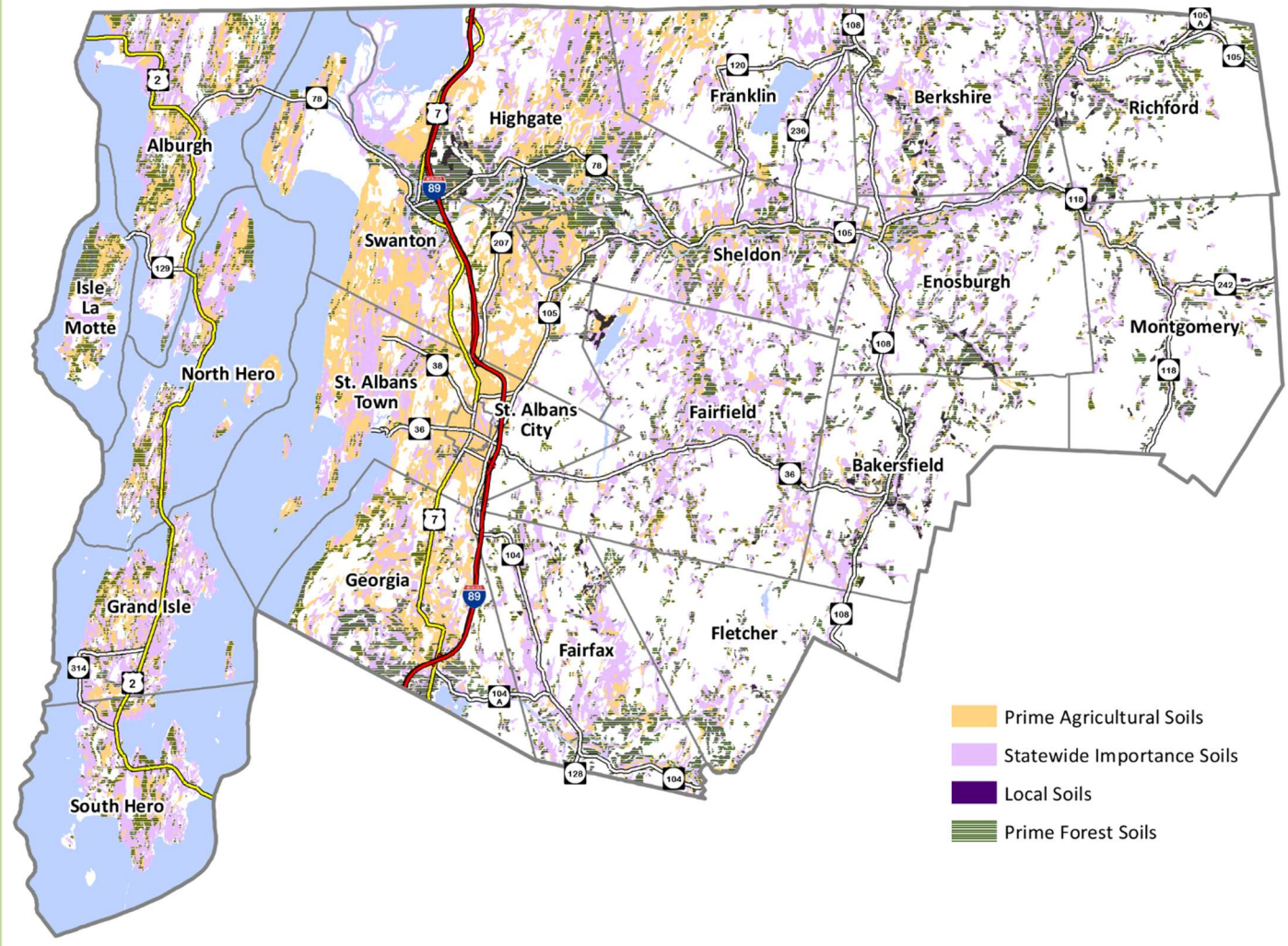
Many of the region's agricultural enterprises depend upon the availability of high-quality soils in sufficiently large, contiguous parcels to allow for economical hay and field crop production. Because of their physical qualities, however, these soils are often also considered the best suited for land development and corresponding subdivision. Farmland conversion and fragmentation are a concern both regionally and statewide. The parcelization and development of good farmland effectively takes it out of production over the long term and reduces an already limited resource base.

The NRCS has also identified "prime forest soils," which are important to sustaining commercial forestry operations in the region. Prime forest soils can be classified according to their relative productivity (Map 6). These soils cover 12% of the region and in some cases overlap with important agricultural soils signifying areas of high soil quality. Similar concerns exist regarding the development and fragmentation of forest soils.

Other Earth Resources: A prominent geological site, the Chazy Reef—the oldest reef in the world—is visible and accessible in Isle la Motte. Other earth resources—including sand and gravel deposits and quarry stone—

are of critical importance to road maintenance and construction and their use in products or industrial processes. An example of the latter is Isle La Motte's high quality black marble. Resource value asides, improper or excessive resource extraction is extremely damaging to the natural and scenic resources of the area, with far-reaching implications for surface and ground water quality as well as the archaeological and aesthetic resources of the region. Sand and gravel deposits often serve as important areas for aquifer recharge and filtration, so they are vital for high-quality sources of drinking water.

MAP 6: Agricultural and Forestry Soils



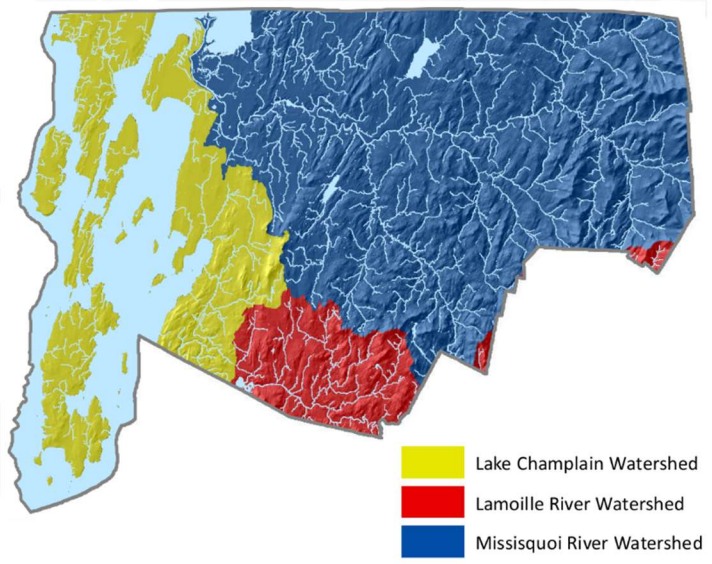
SOURCE: *Natural Resources Conservation Service (NRCS)*

Rivers and Watersheds: Rivers and streams offer sustenance, scenic beauty and recreational opportunities, and they heavily influence the cultural, social and economic environment in Northwest Vermont. Within Franklin and Grand Isle Counties they form three major drainage basins, all of which empty into Lake Champlain (Map 7). Watersheds are a critical geographic unit when planning for natural resources. The Department of Environmental Conservation (DEC) has worked with NRPC and communities to complete

Tactical Basin Plans for these watersheds. These basin plans are prepared to protect each basin's surface waters and ensure that they meet or exceed the Vermont Water Quality Standards.

Development in and around the region's rivers can significantly affect the health of the river by reducing water quality, impacting the lives of stream biota, and increasing flood hazards. Of particular concern is development within a river's floodplain. During flood events, the floodplain provides an area for flood waters to spread out, slowing down their flow and depositing sediment. Development in the floodplain restricts the flood waters and decreases the area available for flood storage. Channelization of streams, creeks and rivers also increases the severity of flooding and erosion by increasing the velocity of water and the amount of suspended sediment in the water. Much of the region's floodplain is currently used for agriculture, taking advantage of the rich soils.

MAP 7: Northwest Region Watersheds



SOURCE: *Vermont Open Geodata Portal*

The Federal Emergency Management Agency (FEMA) requires communities to adopt flood hazard regulations under the National Flood Insurance Program (NFIP) for property owners to be eligible for flood insurance and home mortgages. Floodplain delineations provided by FEMA have traditionally been inaccurate and/or difficult to interpret and did not serve as robust planning tools for floodplain management. All municipalities in the region are enrolled in the NFIP. Most NFIP maps in the region are over 40 years old and need updating. FEMA has begun work on new and improved flood maps for communities in the Northwest region. NRPC anticipates working with many communities on flood bylaw updates based on these maps.

Previously the NRPC has worked with local communities to complete studies known as stream geomorphic assessments. These assessments found that the lack of riparian buffers and past channel management practices—including channel straightening— are the two main stressors for the streams and rivers within the region. The absence of trees and other woody vegetation along stream banks can accelerate the rate of erosion and—since soil particles will bind with nutrients— increase the amount of phosphorus that is entering Lake Champlain in places like Missisquoi Bay. Due to these local conditions, and due to similar conditions in other watersheds, VANR has designated "river corridors" for streams and rivers across Vermont to ensure that new development does not further contribute to fluvial erosion and degradation of surface waters.

Vegetative stream buffers along rivers provide bank stability and shade the water, contributing to cooler water temperatures and lowering suspended sediment concentrations. Vegetation growing on the river banks also helps regulate flow, absorbing water to mediate the effects of flooding and releasing water during periods of low flow.

Many of Vermont's major wildlife species depend on riverine areas for various habitat needs. Several areas along the Missisquoi and Lamoille Rivers, including many tributaries, have been identified as optimum or critical habitat for deer, moose and water birds by the Vermont Department of Environmental Conservation (DEC). These sites are found mainly in eastern and southern Franklin County, and in many cases, they correspond to the location of deer wintering habitat.

The region's rivers also support a variety of game fish species, including wild populations of rainbow, brown and brook trout; northern pike; largemouth bass; smallmouth bass; and walleye. Muskellunge have also been periodically stocked in the Missisquoi River since 2008 to restore a self-sustaining population in the lower portion of the river. Many non-game fish species can also be found in the region including several rare (R), threatened (T), or endangered (E) fish species including lake sturgeon (E), Eastern sand darter (E), stonecat (E), American brook lamprey (T), greater redhorse (R), and silver redhorse (R).

Lakes and Ponds: Lake Champlain is without a doubt among the most treasured of Vermont's waters. At more than 400 square miles in size (158 square miles within Franklin and Grand Isle Counties), the lake—aside from the Great Lakes—is among the largest fresh waterbodies in the United States, and it is a dominant feature in the natural and cultural landscape of the region.

Other waters in the region—which are defined as lakes and ponds of state jurisdiction when 10 acres or larger in size— include Fairfield Pond, portions of Arrowhead Mountain Lake, Lake Carmi and Metcalf Pond. Across the region, particularly in Franklin County, these lakes and many smaller water bodies serve critical functions in the provision of wildlife habitat and migratory corridors, overland nutrient filtration, opportunities for recreation and public water supply. Shorelands along water bodies larger than 10 acres are subject to state regulations aimed at enhancing the vegetative and pervious cover along the shoreline to protect water quality and aquatic habitat.

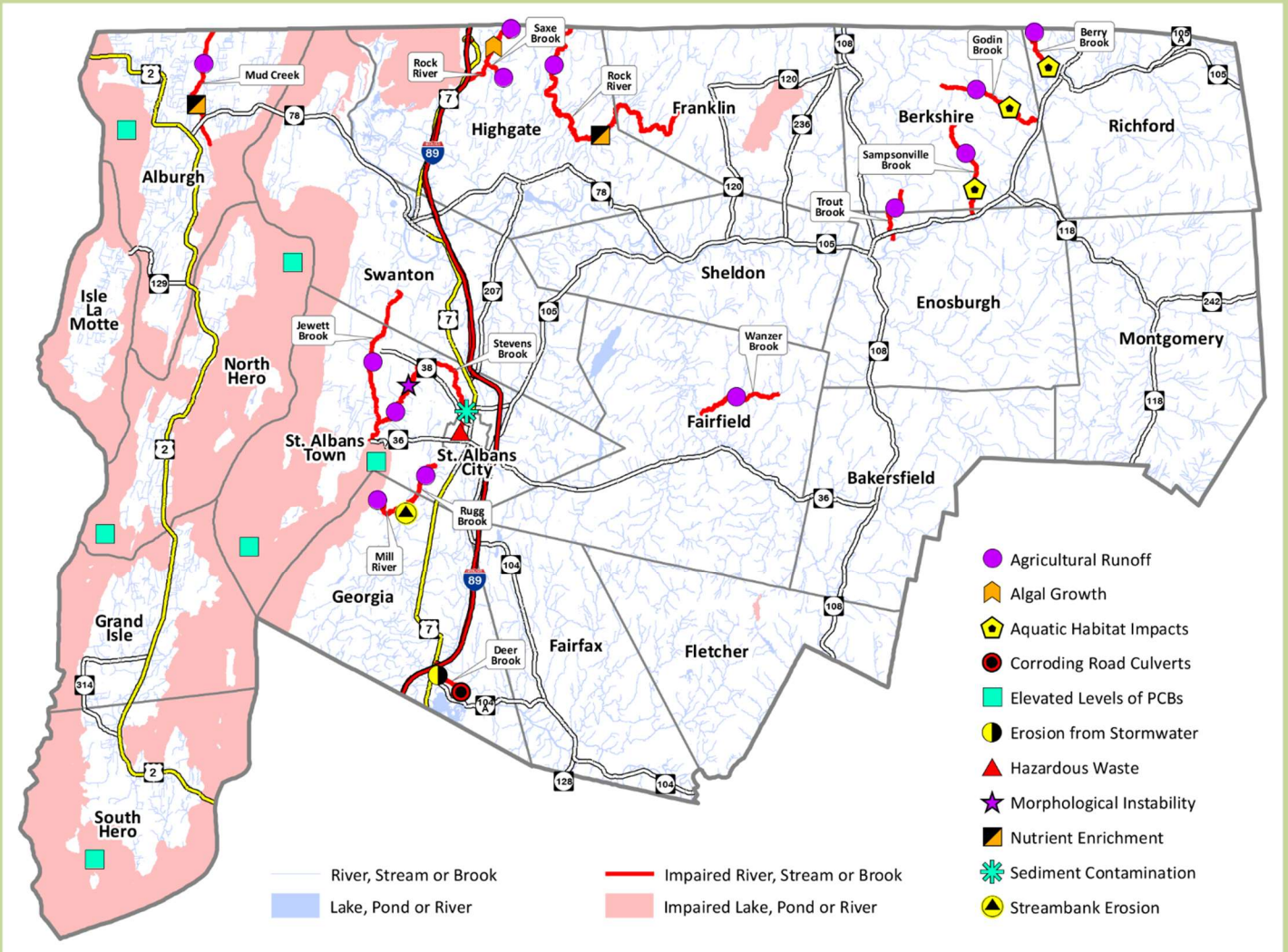
Wetlands: Although wetlands often serve as transition areas between dry land and open water, they can also be isolated from any obvious connection to water. Franklin and Grand Isle Counties include approximately 46,200 acres of wetlands. Vermont's wetlands—including the extensive wetland complexes found in Franklin and Grand Isle Counties—serve numerous functions, including flood control, shoreline anchoring, water quality, habitat and contributing to socio-economic value. They account for 2.7% and 7.5% of the total land area for each, respectively. These counties rank among the top four in the state for the highest ratio of wetlands to total land area, with Grand Isle County being number one by a wide margin.

Wetlands are protected through local, state and federal regulations; the state wetland rules identify the types of wetlands that fall under state-level jurisdiction. The majority of wetlands in the Region are Class II wetlands. The wetland complex at the mouth of the Missisquoi—parts of which lie within the Missisquoi National Wildlife Refuge—is considered by some to be a candidate for class I wetland status. The Refuge was established in 1943 and now occupies an area of over 7,200 acres. The U.S. Army Corps of Engineers has jurisdiction over Class III wetlands. The Vermont Wetlands Program launched an effort to update Vermont's wetland maps in 2021. State official posted materials on their website and sought public comment on the draft documents through July of 2022, when associated Wetland Rule changes were filed. A final version of the revised wetland maps is expected to be published in 2023.

Groundwater: The region enjoys a general abundance of groundwater supplies, though yields and quality vary depending on local hydrology. Groundwater is a critical resource to the region for its obvious importance as a drinking water source. Approximately 66% of Vermont residents rely on groundwater as a source of drinking water. Although the quality is generally good, the resource is nonetheless fragile. Once supplies are contaminated, cleanup is difficult and comes at great public cost.

Water Quality: Many surface waters in the region, such as Lake Champlain, do not meet federal or state standards for water quality. These "impaired" areas have been identified across Vermont. Impaired waters located within the Northwest region are depicted in Map 8. Threats to water quality come from a variety of stressors. The underlying causes of these stresses include urban and agricultural runoff, invasive species, hazardous waste disposal and septic systems. See Table 4 for a list of stressors impacting the region.

MAP 8: Targeted Impaired Areas



SOURCE: *Vermont Agency of Natural Resources*

TABLE 4: Major Surface Water Stressors in the Region and Underlying Causes

STRESSOR	UNDERLYING CAUSE
ACIDITY from:	• atmospheric deposition • mine tailings runoff
ALTERED HYDROLOGY resulting in periodic dewatering or inundation of habitat (including extremely high velocities and rapidly changing flow) from:	• non-natural variation in flows due to withdrawals • decreased/altered flows from flood control and hydropower dams • lake or reservoir fluctuations • ditching of wetlands
AQUATIC INVASIVE SPECIES that cause loss of recreational opportunities and habitat/ecological integrity of aquatic or riparian habitats, due to:	• human dispersion (aquaria release, ballast release, boat/trailer transfer, fish tournaments) • natural spread (avian transfer)
CHANNEL EROSION causing increased sediment & nutrient loading due to mass wasting and stream disequilibrium (erosion/transport/deposition) from:	• increased flow peaks (watershed ditching/draining, impervious cover runoff, dams, and climate change) • sediment discontinuity (dams, diversions, and culverts) • channelization practices (channel dredging, straightening, berming, and armoring) • bed and bank disturbance
ENCROACHMENTS from loss of habitat, equilibrium, and ecological process due to encroachments within or adjacent to floodplains, wetlands, lakes, streams, and rivers from:	• earthen fills • roads • buildings • utilities • stream crossings • dams
LAND EROSION causing increased sediment & nutrient loading due to erosion of exposed soils and gully erosion from:	• ditching (conveyed surface flow) • cropland • forestland uses • construction sites • stormwater runoff
NUTRIENT LOADING (non erosion) to surface waters from:	• over-fertilization (urban, agriculture) • inadequately treated domestic waste • animal and milk house wastes
PATHOGENS from anthropogenic waste attributable to:	• poorly functioning septic systems • domestic animals • agricultural runoff • nuisance wildlife
TOXIC SUBSTANCES in surface water and groundwater from:	• atmospheric deposition • inorganic and organic contaminant releases • pesticides • contaminants of emerging concern • biologically derived toxins
THERMAL STRESS	• removal of woody and herbaceous riparian/shoreland vegetation • impoundment • climate change

SOURCE: *Vermont Surface Water Management Strategy*

When land is developed, there is a related increase in impervious surfaces, particularly pavement and roofs. As the area of impervious surface increases, the landscape's capacity to absorb and filter nutrients is reduced, resulting in higher levels of phosphorus and other nutrients running overland into water bodies and accelerating the process of eutrophication.

As noted in the basin plan for the Missisquoi Bay basin, agricultural runoff, if not properly managed, can negatively impact water quality. "Without proper management of fields and farmsteads, agricultural land use can be a source of nutrients, sediment, pathogens and toxins to surface waters." Improving the soil health of fields as well as managing application of nutrients through use of Agricultural Best Management Practices helps address water quality concerns and protect surface waters.

Toxic substances can be defined as chemicals capable of causing harm to plants and animals including humans. Vermont's Statewide Surface Water Management Strategy notes several classes of toxic substances have potential to affect surface waters in Vermont, including mercury, organic and inorganic contaminants, metals, and pesticides. Two significant threats of emerging concern being addressed statewide are chlorides and a class of chemicals knowns a PFAS. Inadequate or poorly maintained on-site septic systems also can impact water quality as noted in the Missisquoi Bay basin plan.

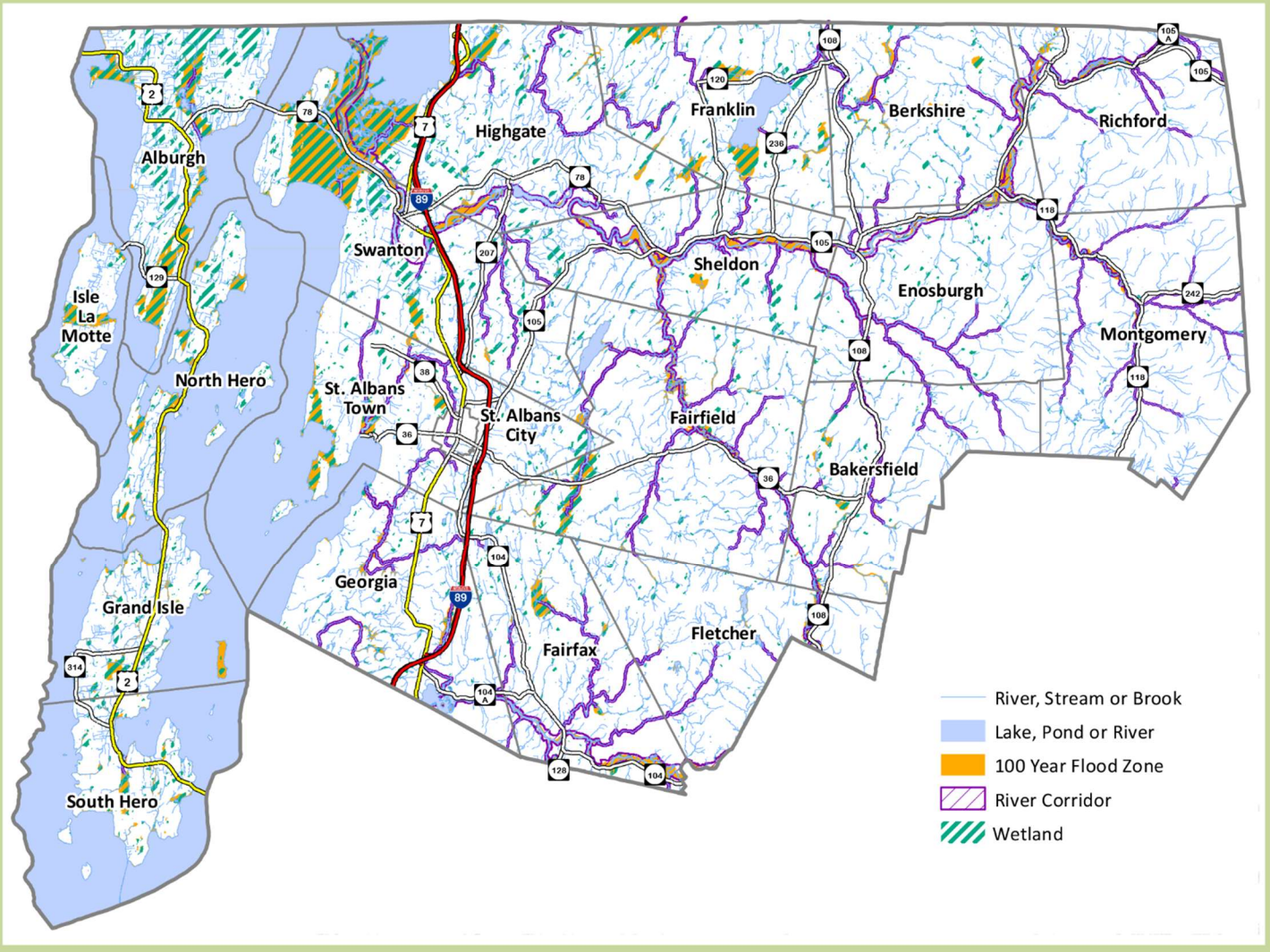
Management of shorelands, both developed and undeveloped, is also an important challenge for the region. Grand Isle County, which contains an overwhelmingly large ratio of lakeshore to land area, continues to experience development pressures due to second-home construction, the ever-expanding commuter shed of Chittenden County, and "COVID migration." Franklin County's Lake Champlain shorelands face similar development pressures in part because of their close proximity to Interstate 89. Because of the variety of issues associated with these stressors, there is no "one size fits all" solution. Instead, several approaches are needed to deal with each problem effectively.

Water Quality Initiatives: Several initiatives are underway in Vermont to reduce the amount of phosphorus entering Lake Champlain and other waterbodies. Phosphorus is naturally occurring, but excess phosphorus due in large part to human activity, has significant negative impacts on water quality. Efforts to control phosphorus focus on a range of land use sectors, including agricultural land, developed land, forestland and stream corridors. They include regulations as well as voluntary actions. To achieve targets agreed to by the State of Vermont and the Environmental Protection Agency, phosphorus loading within the region will need to be reduced as much as 66% in some basins. Lake Carmi is also a focus of efforts to reduce its high phosphorus levels. Both water bodies experience blue-green algae blooms and growth of invasive weeds fed by the elevated phosphorus levels. Lake Carmi has been designated a "Lake in Crisis" by the State of Vermont and as such has a specific management plan and dedicated resources to address ongoing water quality issues.

In 2019, the Vermont General Assembly approved the Clean Water Service Delivery Act, also known as Act 76. Act 76 provides a long-term funding source for water quality projects, prioritizes financial support for voluntary projects, and establishes a network of decentralized Clean Water Service Providers (CWSPs) and Basin Water Quality Councils (BWQCs) to identify and implement voluntary projects. CWSPs have multifaceted responsibilities. Their role includes establishing partnerships with non-profit groups and landowners, creating and supporting BWQCs, and identify and implementing projects to meet Phosphorus reduction targets established to clean up Lake Champlain. CWSPs are also responsible for verifying and inspecting projects over

time and ensuring consistency with Tactical Basin Plans. NRPC serves as the Clean Water Service Provider for the Missisquoi and Lamoille Basins and will also be an active participant in the BWQC representing interests in northern Lake Champlain. Improving water quality will require a long-term, sustained effort.

MAP 9: Water Resources



SOURCE: *Vermont Agency of Natural Resources and Flood Insurance Rate Maps*

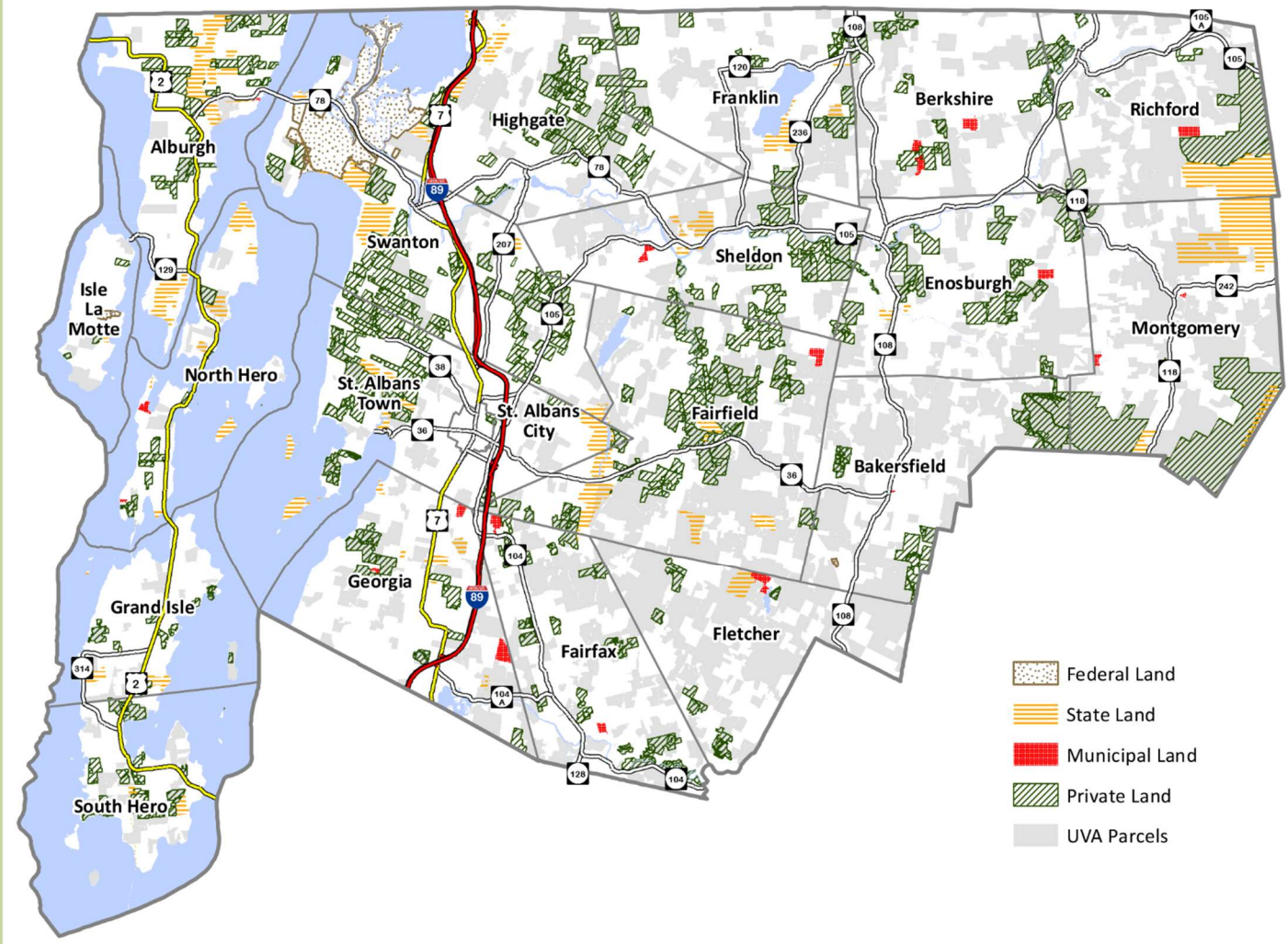
Forest Resources: The region's forests play an important role as a natural, cultural and economic asset to the local communities. Indeed, several communities in the region maintain town forests. These and other forests throughout the region are used for recreational and educational purposes and activities. Northwestern Vermont is part of the Northern Forest, an area stretching across northern New York and New England and encompassing 26 million acres of forestland. The region's eastern upland area ~~of northwestern Vermont~~ contains its ~~the~~ largest tracks of contiguous woodland ~~in the Northern Forest~~. This area is characterized by steeply sloping mature softwood and hardwood forests as well as streams that flow into the Missisquoi and Lamoille Rivers. The region's uplands strongly correlate with the preferred habitat for Vermont's black bear population, and these areas are generally the most undeveloped lands in Franklin County.

Forest products are a vital component of the local economy. According to the United States Department of Agriculture (USDA), Vermont produced 53% of the nation's maple syrup in 2024, with Franklin County a leading production area in the state. Even with diminishing production, timber remains an essential industry in the region. In 2022, 6,364 green tons of pulpwood and 6,257 cords of fuel wood were produced by Franklin County.

Fifty percent of the land in the region is enrolled in Vermont's Current Use or Use Value Appraisal (UVA) Program, which means the land is being actively managed for agriculture or forestry (Map 10). The amount of forestland enrolled in the program has increased from 72,500 acres in 2000 to 166,860 acres in 2020. UVA is a temporary land conservation measure, unlike other more permanently conserved lands shown on the map.

The extensive, relatively undeveloped tracts of forested uplands in the region have the potential—with proper management—to serve as areas of core wildlife habitat substantial enough to support viable populations of

MAP 10: Conserved Land



SOURCE: *Vermont Open Geodata Portal and Use Value Appraisal (UVA) Program*

large mammals, such as moose and black bear. The area also serves as a resource for the forest products industry. These two uses can be compatible with the use of sound forestry practices that protect the environment such as the Agency of Natural Resources "Acceptable Management Practices for Maintaining Water Quality on Logging Jobs in Vermont." Additional information on the characteristics and values of the forest in the region along with measures that can be taken to ensure good forest stewardship can be found in the Northwest Regional Forest Stewardship Plan (2015).

Fragile Areas: In 1977, the Vermont Legislature established the Fragile Areas Registry (10 VSA Chapter 158). The goal of the Fragile Areas Registry is to protect significant natural areas through a process of site identification and documentation, resulting in heightened public awareness and serving as aids in state and local planning. Three areas in Franklin and Grand Isle Counties are currently listed in the Fragile Areas Registry:

- **Missisquoi River Delta:** This 1,500-acre area of freshwater marsh and forest is recognized for its significance as a large, diverse, rich ecosystem supporting populations of several rare birds and game fish.
- **Chazian Coral Reef:** Found in numerous outcroppings in Isle La Motte, the Chazian Coral Reef is more than 480 million years old and is the oldest coral reef in the world. The reef represents a valuable resource for paleontological research.
- **Franklin Bog:** This 300-acre bog is located one-quarter of a mile north of Lake Carmi. Franklin Bog is exemplary for its size and its corresponding species and landscape richness, which includes several interpenetrating zones of conifer forest, open bog mat and streams with active beaver populations.

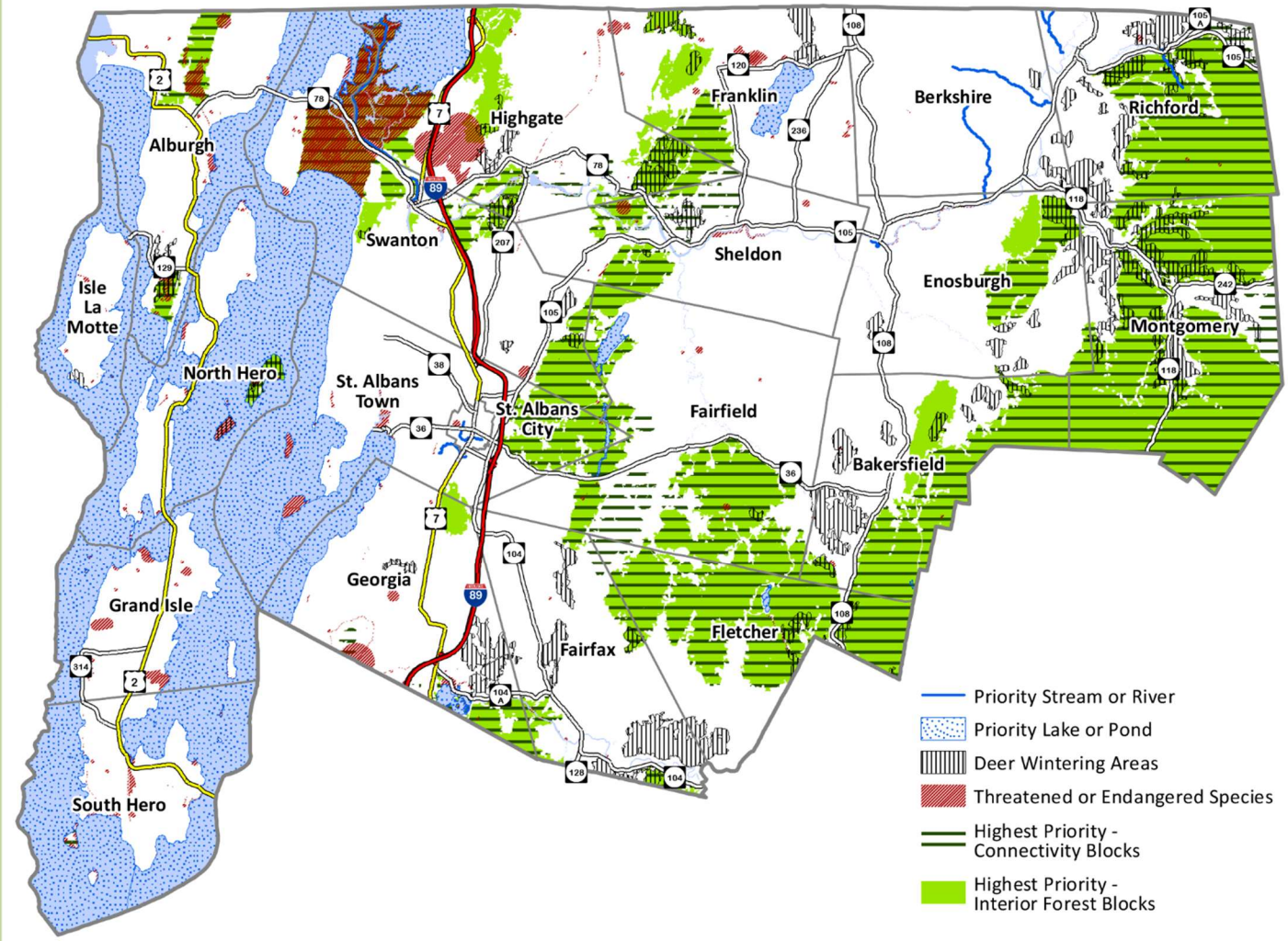
In the years since the creation of the Fragile Areas Registry, Vermont has created and expanded its Natural Heritage Inventory. The inventory includes data about both individual species and natural communities and supports conservation and monitoring at local, regional, and state levels.

Wildlife and Plant Habitat: The region provides critical habitat to a variety of wild animals as shown in Map 11. Development must be planned properly to ensure habitat conservation and to avoid fragmenting habitat and negatively impacting the local wildlife. Steps also must be taken whenever possible to prevent the degradation of habitats by invasive species. Map 11 shows some of the region's important habitat areas. Many habitat areas in the region are not depicted but nonetheless should be considered when planning for the future. Habitat for plant and animal species can occur within many landscapes present in the region such as wetlands, forestland, riverine and riparian environments. Indeed, wetlands serve as habitat for 95 species of threatened or endangered plants nationwide, and more than 43% of all federally recognized threatened or endangered plant species are found in Vermont wetlands (VT DEC).

Act 171 revised state law to encourage municipalities and regions to address protection of forest blocks and habitat connectors—which are vital to wildlife conservation—while also supporting forest industries. The highest priority forest blocks provide "core forest habitat," or interior forest not impacted by surrounding human uses. These more substantial undisturbed areas are particularly necessary for animals whose habitat requirements include large home ranges. Systems of core habitat—connected by smaller "connectivity blocks"—provide wildlife travel corridors between core areas and promote healthy animal populations by ensuring genetic mixing among animals from different core habitat areas. The highest priority connectivity blocks often feature water and may consist of surface water and riparian areas or riparian wildlife connectivity areas. Riverine areas support fish and wildlife species for various habitat needs, including winter shelter, food

supply, breeding and use as travel corridors and migratory bird staging sites. Several areas along the Missisquoi and Lamoille Rivers, including many tributaries, have been identified as optimum or critical habitat for deer, moose and water birds.

MAP 11: Wildlife Habitat



SOURCE: *Vermont Open Geodata Portal*

Invasive species can be harmful to native wildlife and their habitats by "out competing" native species and displacing them. According to DEC, significant aquatic invasives found in Franklin and Grand Isle Counties include plants such as such as purple loosestrife, water chestnut, or Eurasian milfoil, and animals like zebra mussels, spiny water flea and white perch. Significant terrestrial invasive species include plants like garlic mustard, buckthorn and Japanese knotweed that can poison soils, cause streambank erosion, and crowd out native plants. Forest pest insects of concern include the Asian long-horned beetle, emerald ash borer, and hemlock wooly adelgid.

Numerous locations in the region support populations of designated rare, threatened or endangered plants and animals. The species identified have very particular habitat requirements, or they are at the edge of their

natural range, are vulnerable to collection or disturbance, or have difficulty reproducing. The majority of identified sites are located in Grand Isle County and in western Franklin County. Many are found on the lesser islands of Grand Isle County and its shoreland areas.
Although not endangered, black bears are at risk. Black bears prefer mountainous and forested landscapes on the wooded slopes of the Green Mountains. Thus, a significant amount of regional bear habitat exists in eastern Franklin County. Because of its large home range, the black bear is vulnerable to habitat loss through the fragmentation of large forested areas into smaller units and isolated "forest islands."

Deer wintering areas, or "deer yards," provide critical habitat for white tail deer and other species of vertebrates. These areas of hemlock, spruce, fir, cedar and pine species provide shelter from deep snows and permit easier winter travel for deer, compared to deciduous forests. Deer yards also benefit 169 of Vermont's 386 vertebrate species (excluding fish). Of these, five species are threatened or endangered, and four are of special concern due to their limited population size. Numerous deer wintering areas have been identified throughout Franklin and Grand Isle Counties, the most extensive of which are located in the heavily forested areas of eastern Franklin County.

For habitat serving large mammal populations, the area along the Green Mountains on the eastern boundary of the region is critical. The Cold Hollow to Canada initiative is a partnership of community members in Franklin and Lamoille Counties. Its mission is to work together toward the common goal of land stewardship and wildlife habitat conservation across property and municipal boundaries through education, outreach and conservation of land and water resources. On a larger scale, several state and federal organizations have mapped large contiguous habitat blocks in the Green Mountains and vital corridors that connect them; these connectors are important for enabling the movement of large mammals (Map 11).

Scenic Resources: The region's scenic resources are plentiful and include both natural and human-influenced elements. Undeveloped ridgelines are among the region's highly valued natural scenic resources, serving both as vantage points (the areas we enjoy views from) and as terminal views (and create the scene we are enjoying through our observation). Several municipalities identify specific scenic resources within their municipal ~~regional~~ plans and NRPC may wish to incorporate a scenic resource assessment as part of future planning processes.

Moose in a Highgate Wetland
PHOTO CREDIT: *Bill Ashton*

GOALS AND POLICIES

1. **Protect significant natural resources, including air, wetlands, wildlife, lakes, ponds, woodlands, earth resources, open spaces, groundwater resources and wildlife habitat.**
   a. Support efforts to reduce air pollutants generated in the region from the residential, commercial, industrial and transportation sectors.
   b. Ensure that development will not present an undue risk of degrading the region's air quality.
   c. Plan, construct and manage mineral and earth resource extraction and processing facilities to

ensure that negative impacts are limited and rehabilitation is certain. Minimize noise and adverse impacts on existing or planned uses within the vicinity of the project, fish and wildlife habitat, water quality, prime agricultural soils and scenic resources. Ensure projects do not interfere with the function and safety of all modes within the transportation system.

d. Ensure that development in floodplain or river corridor areas does not impede the flow of flood waters or endanger public health, safety and welfare.
e. Locate and configure land development to avoid the fragmentation of and adverse impacts to natural areas, forest blocks, critical wildlife habitat and connectivity areas identified in the regional plan or local plans by the Vermont Agency of Natural Resources, or through site investigation.
f. Ensure that outdoor lighting is designed to minimize the amount of light leaving development sites, overly bright areas or hot spots, and the amount of light pollution illuminating the night sky.
g. Assist in efforts to combat the spread of invasive species.
h. Ensure that new or expanded development on slopes greater than 15% mitigates erosion risks.

2. Protect and conserve historically significant buildings and locations, archaeological resources, and important scenic and aesthetic resources identified in local and regional plans.

a. Ensure that new land development minimizes impact on archaeological sites.
b. Ensure that land development along prominent ridgelines and hilltops is designed to fit within the landscape and avoid undue adverse visual impacts.
c. Encourage communication facilities to limit their impact on scenic resources by reducing their size or location so that exterior lighting is not required, by seeking opportunities for co-location, and by choosing sites, shapes and colors of structures that reduce visual impact.
d. Encourage energy generation and distribution facilities to minimize their visual impact on ridgelines, slopes and open areas.
e. Ensure that historically significant buildings and locations are conserved and/or made available for adaptive reuse whenever feasible considering their cost and condition.

3. Maintain and wherever possible improve the quality of lakes, ponds, rivers, streams and groundwater.

a. Forbid the use of persistent harmful and toxic pollutants in groundwater recharge areas or in areas where they could enter surface or sub-surface waters.
b. Ensure that development mitigates the anticipated effects on water quality through Low Impact Development techniques, such as limiting the amount of impervious surface on a site and incorporating adequate amounts of vegetation, trees and shrubs to aid in stormwater treatment.
c. Improve surface water quality and protect it from point and non-point nutrient loading.
d. Maintain and expand vegetative buffers along surface waters of sufficient width as a tool for improving water quality and protecting habitat.
e. Support efforts to remove as much of the Missisquoi and Carry Bay causeways as possible given permitting and funding constraints.