Franklin County NRCD
Natural Resources Assessment

Written by Jeannie Bartlett, District Manager Submitted March 15, 2017

Summary

Every year each District in Vermont submits a Natural Resources Assessment to the Natural Resources Conservation Council. This report describes the natural features and resources of the District, how they have changed over time, and their current status. This year the District Manager has significantly updated and expanded the Franklin District's Natural Resources Assessment. This Assessment includes information from the Tactical Basin Plans for the three major watersheds in Franklin County. Further research and interpersonal knowledge of the District will lead to updates and improvements in the coming years.

This Assessment begins by laying out the legal and organizational definitions and context for the Franklin County NRCD. We then give the basic geospatial definition of the District, and a basic outline of the watersheds included. A couple of maps help illustrate the watersheds in the District. The next section tells the early history of the landbase, from the most recent glaciation up to European arrival. Future Assessments may add content covering European settlement and industrialization up through the present, as the history of land use provides important context for our use of it today. Next we give an assessment of the District's natural resources in a few categories: soil, water, air, animals, wetlands, and hydrology. The next major section summarizes priority actions to improve the state of our natural resources identified through the 2015 Local Working Group and the District's relevant Tactical Basin Plans. Finally, we give a brief overview of the District's current projects and programs

Mission

The mission of the Franklin County NRCD is to assist farmers, landowners, and the community of Franklin County, VT with resource conservation projects and public education. We believe that our efforts to conserve and protect our soil and water resources will enhance our community and county.

Definition of the Franklin County NRCD

Legal and Organizational Definition

The Franklin County NRCD (Franklin District, or District) was authorized and formed by the State of Vermont on May 1, 1946. The Franklin District is one of 14 Districts covering the state of Vermont and the 3000 covering the entire U.S. These local Conservation Districts were formed in response to the 1936 Soil Conservation Act. The Act established the Soil Conservation Service (now called the Natural Resources Conservation Service, or NRCS) under the USDA, and authorized states to create Conservation Districts to act as local partners to the federal agency. These local Districts are charged with identifying the resource concerns and best management responses specific to their location. Districts are responsible for one third of the ranking questions that determine each NRCS field office's priorities for funding and technical assistance. In some states Districts are responsible for carrying out technical and financial assistance with landowners, and the NRCS field staff play a more minor role. In Vermont, however, NRCS staff far outnumber District staff and the NRCS is responsible for almost all technical and financial assistance.

Vermont's 14 Conservation Districts are represented at the state level by the State Natural Resources Conservation Council, which receives appropriations directly from the Legislature or other state agencies to disperse to individual Districts. The Districts must submit deliverables evidencing that they are functional, effective bodies to receive this funding. The Districts are also members of the Vermont Association of Conservation Districts, a nonprofit organization to which Districts pay dues for support. VACD provides mentoring and managerial support to Districts, develops programs that Districts across the state can implement, testifies to the legislature, provides fiscal sponsorship to Districts, and hires staff to place in regional field offices.

Spatial Definition

The geographic extent of the Franklin County Natural Resources Conservation District is the same as that of Franklin County, Vermont. The District lies in the northwest corner of Vermont, bordering Lake Champlain and Grand Isle County to the west, Chittenden County and the suburbs of Burlington to the south, the forested hills of Lamoille and Orleans Counties to the east, and the Province of Quebec, Canada, to the north. The District encompasses 17 towns: Bakersfield, Berkshire, East Berkshire, Enosburg Falls, Fairfax, Fairfield, Fletcher, Franklin, Georgia, Highgate, Highgate Springs, Montgomery, Richford, Sheldon, St. Albans Bay, St. Albans City, and Swanton (Franklin County Regional Chamber of Commerce).

Watersheds

The Franklin District includes parts of the Missisquoi Bay watershed, Lamoille River watershed, and "North Lake Direct" watershed. Each of these major watersheds is assigned a staff person at the VT Department of Environmental Conservation (DEC) to coordinate information and priorities for the watershed, and much information for this Natural Resources Assessment is drawn from those Tactical Basin Plans.

Watersheds can be any scale, from continental to the area draining into a single road culvert. Geographers use a system of Hydrologic Unit Codes (HUC) to label the scale of a watershed. The Missisquoi Bay, Lamoille River, and North Lake Direct watersheds are HUC-08. Tributaries or sub-basins such as the Rock River or Jewett Brook are HUC-10. Tributaries or sub-basins *of those,* such as the Headwaters of Black Creek, are HUC-12.

Missisquoi Bay Watershed

This watershed includes all the land that drains into the Missisquoi Bay, including the Missisquoi River, its tributaries, and the Rock and Pike Rivers. The major tributaries of the Missisquoi River are Hungerford Brook, Black Creek, Tyler Branch, Trout River, Mud Creek, and the Upper Missisquoi River. The watershed is 42% in Quebec. Within Vermont it is mostly in Franklin County, but some headwaters are in Orleans County and the Orleans County Conservation District.

The VT Department of Environmental Conservation (DEC) Tactical Basin Planner for this watershed is Karen Bates, and the last Tactical Basin Plan (TBP) was written in 2016.

North Lake Direct Watershed

This watershed includes those lands that drain directly or through more minor streams into the northern reaches of Lake Champlain. It includes St. Albans Bay and its tributaries: Jewett Brook, Rugg Brook, Stevens Brook, Mill River, and the St. Albans Reservoirs. Three tributaries considered part of the Champlain Islands Sub-basin are also part of the North Lake Direct watershed: Stonebridge Creek, Trout Brook (not to be confused with the Trout River) and a second Mud Creek (not to be confused with the Missisquoi River tributary).

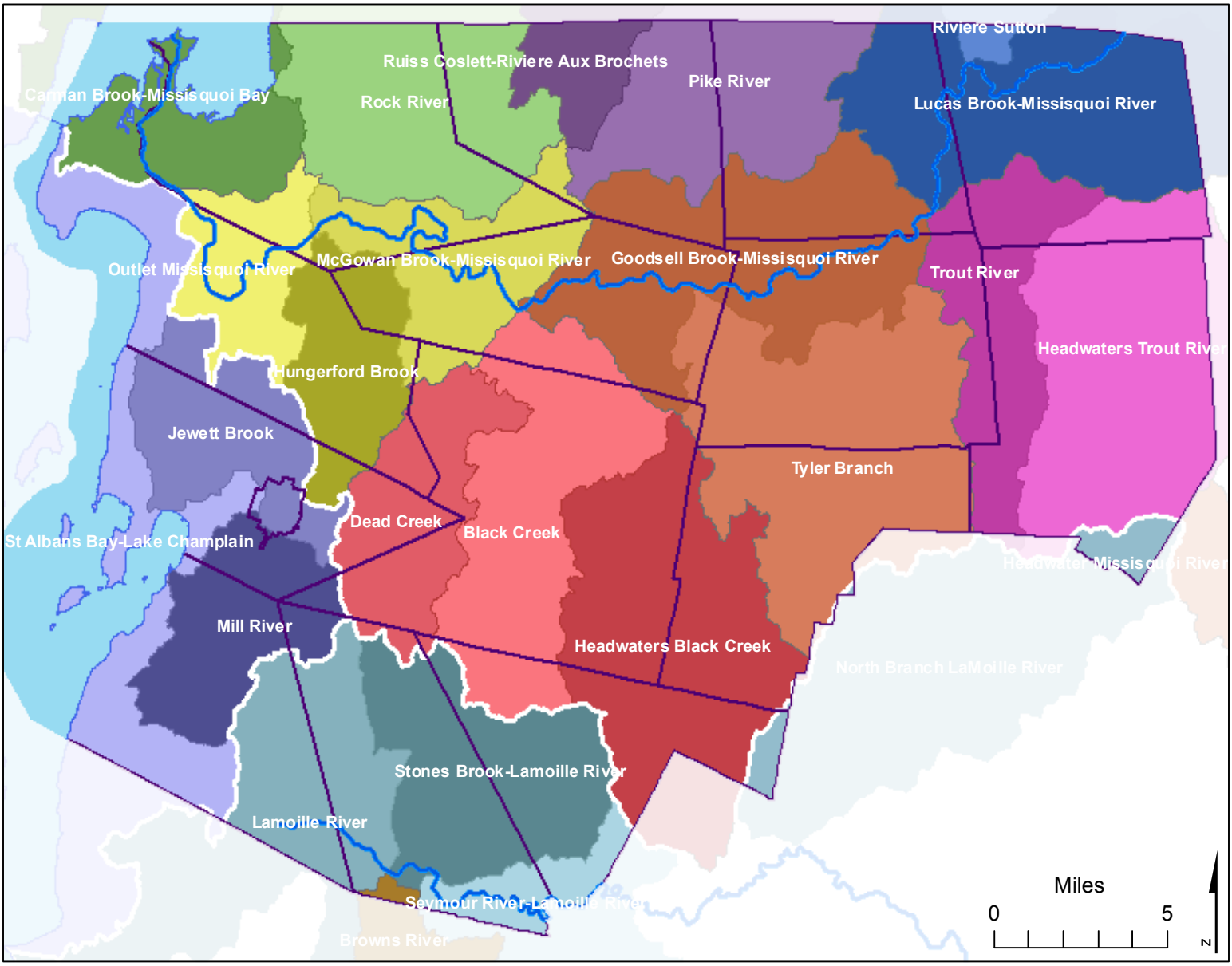
The VT Department of Environmental Conservation (DEC) Tactical Basin Planner for this watershed is Karen Bates, and the last Tactical Basin Plan (TBP) was written in 2015.

Lamoille River Watershed

Fairfax, half of Fletcher, and half of Georgia lie in the lower Lamoille River watershed. The main tributary associated with this reach of the Lamoille is Stones Brook.
Tributaries of Stones Brook include Wilkins Brook, Mill Brook (in Fairfax), and Halfmoon Pond (in Fletcher.)

Tributaries of the lower Lamoille main stem in Franklin County include Beaver Meadow Brook in Fairfax, Deer Brook in Georgia, Arrowhead Mountain Lake in Georgia, and Silver Lake in Fairfax and Georgia.

The VT Department of Environmental Conservation (DEC) Tactical Basin Planner for this watershed is Danielle Owczarski, and the last Tactical Basin Plan (TBP) was written in 2016.



Watersheds of Franklin County

HUC10 Watersheds in the Lake Champlain Direct HUC08

- Lake Champlain Direct-Northeast Arm

HUC10 Watersheds in the Lamoille River HUC08 Sub-basin

- Gihon River-Lamoille River
- Browns River

HUC10 Watersheds in the Missisquoi Bay HUC08 Sub-Basin

- Missisquoi Bay
- Outlet Missisquoi River
- Black Creek
- Trout River
- Riviere aux Brochets
- Riviere Sutton-Missisquoi River
- Tyler Branch-Missisquoi River

Other Legend Items

- Town Boundaries
- Main Rivers

This map shows the watersheds of Franklin County as defined by Tactical Basin Plans and Hydrologic Unit Codes (HUCs). Areas outside Franklin County are in grayed-out color. Major Sub-basins (HUC08) used by Tactical Basin Plans are outlined in thick white line and dictate the legend groupings. HUC10 watersheds are displayed in different colors. HUC12 watersheds are displayed as different gradations within that color, and are labeled on the map. Towns are outlined in dark purple, and the main stems of the Missisquoi and Lamoille rivers are in dark blue. The lowest reach of the Lamoille is missing due to an omission in the source data.

Map created by Jeannie Bartlett
Franklin County NRCD
3/15/2017

All data downloaded from VCGI
wbd_a_vt011
towns_a_vt011
River_Main_Stem_Waterbodies_WBID

History of the Land

The land governed by the District today was built and carved over the course of millennia. Mountains much taller than the Greens we see today were thrust up by colliding continents and are now slowly eroding. The most severe erosion over the landscape was caused by the ice sheets, which covered all of Vermont and down to Cape Cod with ice over a mile thick. The ice sheets advanced and retreated many times during each ice age. The most recent ice age was the Wisconsin, and within that the Laurentide ice sheet was the last. When the ice sheets "retreat," they do not actually *move* north. Rather, the ice continues to "flow" from the north to the south, but the new ice flowing from the north is less than the pace of ice melt on the southern portions, and so the ice shrinks.

As the southern edge of the Laurentide ice sheet melted, a lake formed in its wake, much larger than today's Lake Champlain. Lake Vermont, as it is called, was at times more than seven hundred feet deeper than Lake Champlain (Klyza & Trombulak, 21). Sediments that settled on the bottom of Lake Vermont created the rich agricultural soils that farmers in the Franklin District enjoy today, as well as sand and gravel deposits. About 12,500 years ago, the ice sheet finally left what is now Franklin County and the northern edge of that lake. The ice had acted as a dam holding in the lake, and without it the water suddenly drained into the St. Lawrence Seaway. Ocean water also came rushing back in through the St. Lawrence, creating the Sea of Champlain. This sea existed for 2,500 years and covered all of the more low-lying, plains-like areas in the western portion of the Franklin District. The Champlain Sea was home to a wide diversity of marine life; in fact a full whale skeleton was found in Charlotte in 1848 (Klyza & Trombulak, 23).

As the ice melted, plants, animals, and people moved in behind it. Lichens and grasses were the first plants to colonize behind the glaciers, forming an alpine tundra. Insects, rodents, and large mammals such as wooly mammoths moved in to graze the tundra. Humans followed from the ice-free regions to the south and west. Academics refer to these first people to the region as the Paleoindians. They hunted with spears in the grasslands and in the Champlain Sea, and they moved frequently to follow available food sources. Their population was sparse: around 25 people per 100 square miles, which would put their population in the Franklin District at 175 people.

Even such a sparse human population, however, was likely capable of causing a mass extinction. Around 10,000 years ago the mammoths and about forty other species of large mammals went extinct in North America (Klyza and Trombulak 29). One possible explanation is that is that the mammals died because of the change in climate after the Wisconsin glaciation. The other explanation is that early humans hunted them to extinction.

Because the climate had now warmed further, forests began to replace the tundra. Black spruce and paper birch began to dot the landscape, gradually replaced by a tighter forest of red spruce and balsam fir (Klyza and Trombulak 26). Then even these were pushed to only the higher elevations while hemlock, white pine, and deciduous trees took over the lowlands.

As continents are ever shifting, ours was slowly rebounding from the weight of the ice sheets, expanding up in elevation. The land base gradually tipped all the contents of the Sea of Champlain into the St. Lawrence, draining all of its saltwater. The basin was now fed by a number of rivers originating from the south, east, and west, among them Franklin County's own Lamoille and Missisquoi Rivers. 10,000 years ago Lake Champlain, its drainage basin, and truly all of New England finally had the general topography that we recognize today.

The transitions from grassland to forest and from the Sea of Champlain into the freshwater Lake Champlain had massive impacts on the people living here. The population grew substantially as forests produced butternuts, chestnuts, berries, elk and other game, and the lake provided abundant fish. People gathered in larger settlements on the shores of Lake Champlain, and migrated seasonally to hunting grounds in the forests and mountains. The largest settlements in the Champlain Valley were at the mouths of Otter Creek and the Winooski, Lamoille and Missisquoi Rivers.

The natural resources of the northern Lake Champlain basin provided well for the people living there, who eventually became known as the Abenaki. Whereas native peoples in southern New England managed forests intensively, burning the understory to create better foraging and hunting, residents in the Lake Champlain basin altered the forests little. People farther south and in the Connecticut River Valley also developed agriculture earlier, around 900 years ago, and their larger populations relied on it heavily. Even after Lake Champlain's people began using agriculture, which they didn't until 1600, they continued to rely primarily on hunting and gathering. There are a couple of possible explanations for why Lake Champlain's people affected less change on their landscape than their neighbors to the east and south. One is that the long distance between lakeshore settlements and upland hunting grounds forced them to remain more mobile; they were never in the same place long enough in a season to tend crops. Another explanation is that hunting and gathering provided the resources they needed because they had more land area per person compared to people in the Connecticut River or farther south. They chose not to use agriculture because it is more work.

The Abenaki first encountered Europeans in the form of the French, arriving from the north. The primary interaction at first was to set up trade: French wanted furs the Abenaki were so adept at trapping and preparing, and the Abenaki realized they wanted copper and glass vessels, muskets, and gunpowder from the French. This trade relationship dramatically changed the way Abenaki related to the landscape and each other. Rather than harvesting all they could eat and use from the land, but nothing more, the Abenaki now had a near infinite demand for furs. Access to hunting and trapping grounds became more competitive, and beavers were trapped to local extinction. As Klyza and Trombulak write, "The Vermont landscape became a set of natural resources for a population much larger than those 150,000 people in the state…Beaver populations were now subject to the whims of fashion in Europe" (50). This was the very first in an ongoing string of developments connecting Franklin County's natural resources to global markets beyond the control of local land-users.

Assessment of the Franklin County NRCD's Natural Resources Today:

Soil

About half the county lay under Lake Vermont, and about a third under the Sea of Champlain. This gave all those lower-lying lands lacustrine and marine deposits that make rich agricultural soils. Some of them can be heavy, with a high proportion of clay, but that same clay has excellent cation exchange capacity, or the ability to hold nutrients and then release them to plants. Clayey soils can also have very high organic matter.

Floodplains of the Missisquoi and Lamoille Rivers also have rich, but because they were deposited more by the river than by the lake or sea, they have a lower clay fraction. Their lighter texture makes them easier to work.

In the Green Mountain foothills farther to the east, the soils are more loamy and even gravelly in places, created from glacial till. These soils have better natural drainage, but that drainage can also cause them to leach nutrients.

The District holds a number of sand and gravel deposits that have been mined for use in roads and other construction. In some cases exhausted gravel pits have been leased or sold to farmers, who reclaim the ground by planting corn and later hay. These projects must build soil from sand and gravel, so adding organic material and planting perennial crops that can build organic material is the only way to make these areas productive again.

Water

Water quality is perhaps the most public resource concern the Franklin County Conservation District and the people living and working here are facing. Like the Chesapeake Bay, the Lake Champlain Basin has come under the national spotlight for pollution of our rivers and lakes by nutrients and sediment. Excessive nutrients in the water feed the growth of algae, whose subsequent decomposition consumes oxygen from the water column. This process of losing dissolved oxygen is called eutrophication. Eutrophication is actually a natural process that all lakes go through, but the addition of high nutrient levels speeds the process manifold. Without sufficient oxygen, many native fish and aquatic insects cannot survive. Algae on the surface and suspended sediments in the water column block sunlight from reaching the lake bottom, where native aquatic plants should grow, further changing and degrading the natural ecosystem. One type of algae that responds to excessive phosphorus is blue-green algae, or cyanobacteria, which can be toxic if ingested.

Vermont's first efforts to improve water quality began in 1949 with the formation of sewage-disposal districts by municipalities, at the request of the legislature. Vermont's Water Pollution Control Act in 1970 and its federal counterpart in 1972 created a system of permits to regulate direct discharge of waste into a stream or other body of water. These regulations, and the facilities created to treat waste in response to the regulations, dramatically improved water quality in the state. By the mid 1990s, this direct discharge or

“point source” pollution only accounted for 10 percent of water pollution in the state (Klyza & Trombulak, 143). The rest of the pollution comes from nonpoint-sources such as runoff from agriculture, lawns, parking lots, golf courses, forestry operations, and septic systems. These nonpoint sources are the focus of Vermont’s and particularly Franklin County’s water quality efforts today.

Water quality has also been altered by emissions of pollutants to the west. Emissions of sulfur and nitrous oxides formed acid rain that has acidified lakes. Mercury is also emitted by power plants and vehicles to the west and has been deposited in our lakes, making all lakes in the Franklin County NRCD impaired by mercury.

The water quality concern receiving the most attention is phosphorus loading. The Missisquoi Bay receives about 24 percent of all the phosphorus delivered to Lake Champlain annually, second highest of all the lake segments and more than the total contribution of New York State (MISSISQUOI BAY TACTICAL BASIN PLAN). The EPA’s budget for phosphorus requires that phosphorus delivered to the Missisquoi Bay be reduced by 64.3 percent (MISSISQUOI BAY TACTICAL BASIN PLAN).

Hungerford Brook has been hydrologically modified by intense ditching, causing stream channels to erode more. Intensive cropland use is also increasing erosion. Phosphorus reduction and hydrologic restoration will help alleviate nutrient loading, land erosion, and channel erosion. The priority actions are field BMPs and restoration of floodplains and wetlands.

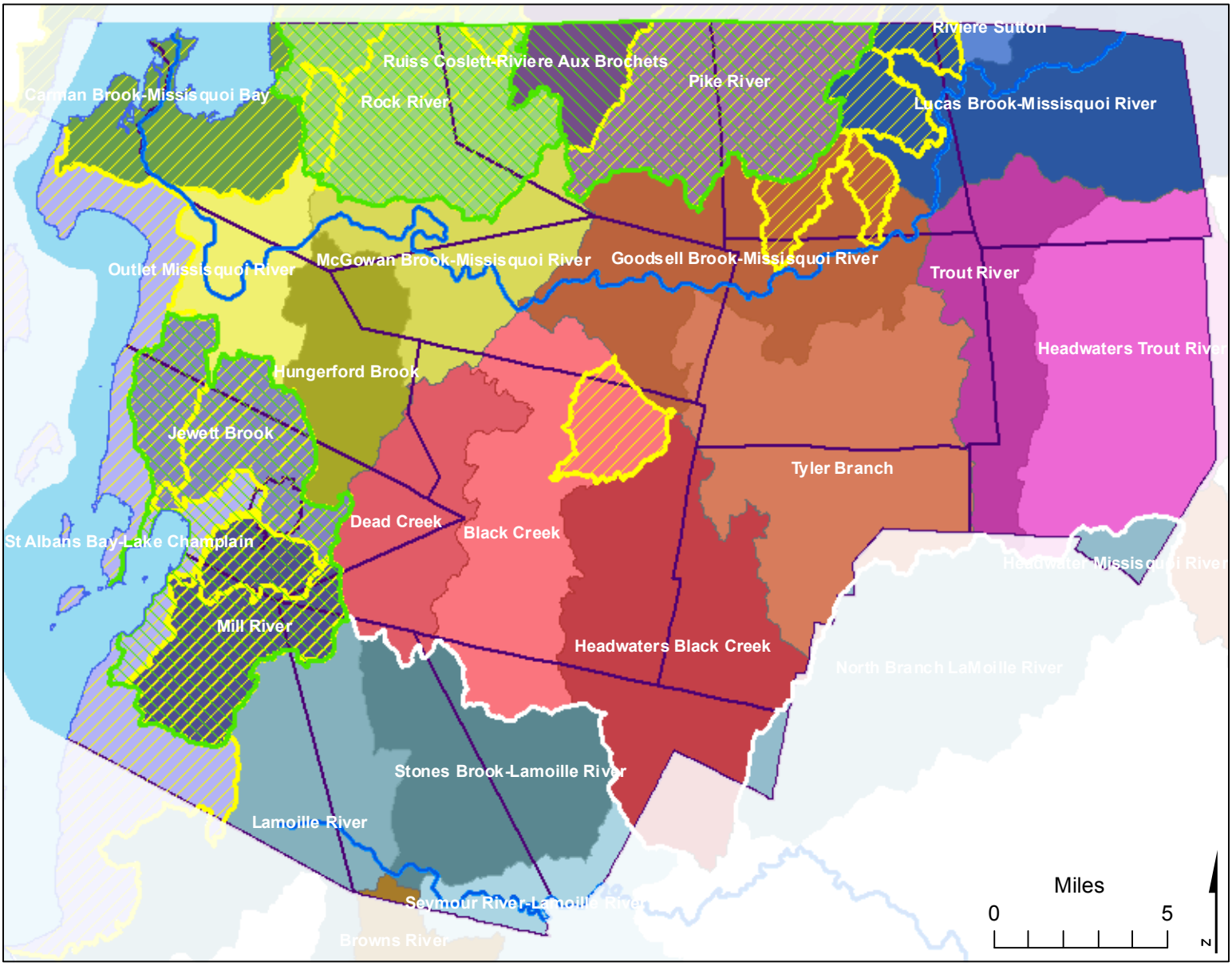
The Rock River’s clay soils, limited floodplain access, intensive cropping, and multiple mass failures in the riverbank contribute to high sediment loads. Field and road BMPs, riparian plantings, and restoration of floodplains and wetlands will reduce this erosion and nutrient loading.

Lake Carmi suffers from intensive agricultural landuse and development of its shorelines. BMPs on fields, residences, and roads, as well as restoration of floodplains and shorelines, will help reduce phosphorus and manage stormwater.

Black Creek has good floodplain access and cohesive soils, but cultivation of annual crops in floodplains causes land erosion while fields are bare. Riparian plantings and field BMPs should be prioritized to reduce nutrient loading and land erosion.

BMPs installed in fields and roads on the Tyler Branch, as well as protection of river corridors, will improve flood resilience and reduce sediment loading. Most of the Branch itself is in good condition.

Three small subwatersheds contribute to the mid-Missisquoi, and the intensive agricultural use there is causing land erosion, nutrient loading, and pathogens in the water. Field, barnyard, and road BMPs will be most effective at reducing phosphorus and pathogens in this stretch of the Missisquoi.



Impaired & Priority Watersheds of Franklin County

HUC10 Watersheds in the Lake Champlain Direct HUC08

- Lake Champlain Direct-Northeast Arm

HUC10 Watersheds in the Lamoille River HUC08 Sub-basin

- Gihon River-Lamoille River
- Browns River

HUC10 Watersheds in the Missisquoi Bay HUC08 Sub-Basin

- Missisquoi Bay
- Outlet Missisquoi River
- Black Creek
- Trout River
- Riviere aux Brochets
- Riviere Sutton-Missisquoi River
- Tyler Branch-Missisquoi River

Other Legend Items

- Town Boundaries
- Main Rivers
- NRCS Priority
- EPA 303-d Impaired

This map shows the watersheds of Franklin County as defined by Hydrologic Unit Codes (HUCs). HUC12 Watersheds are labeled. Overlaid is NRCS Priority Watersheds, in green, and EPA 303-d Impaired watersheds, in yellow.

Data downloaded from VCGI:
River_Main_Stem_Waterbodies_WBID
Data from the St. Albans NRCS Office:
wbd_a_vt011
towns_a_vt011
epa303d_2016_a_vt
PriorityWsheds_2016

Map created by Jeannie Bartlett
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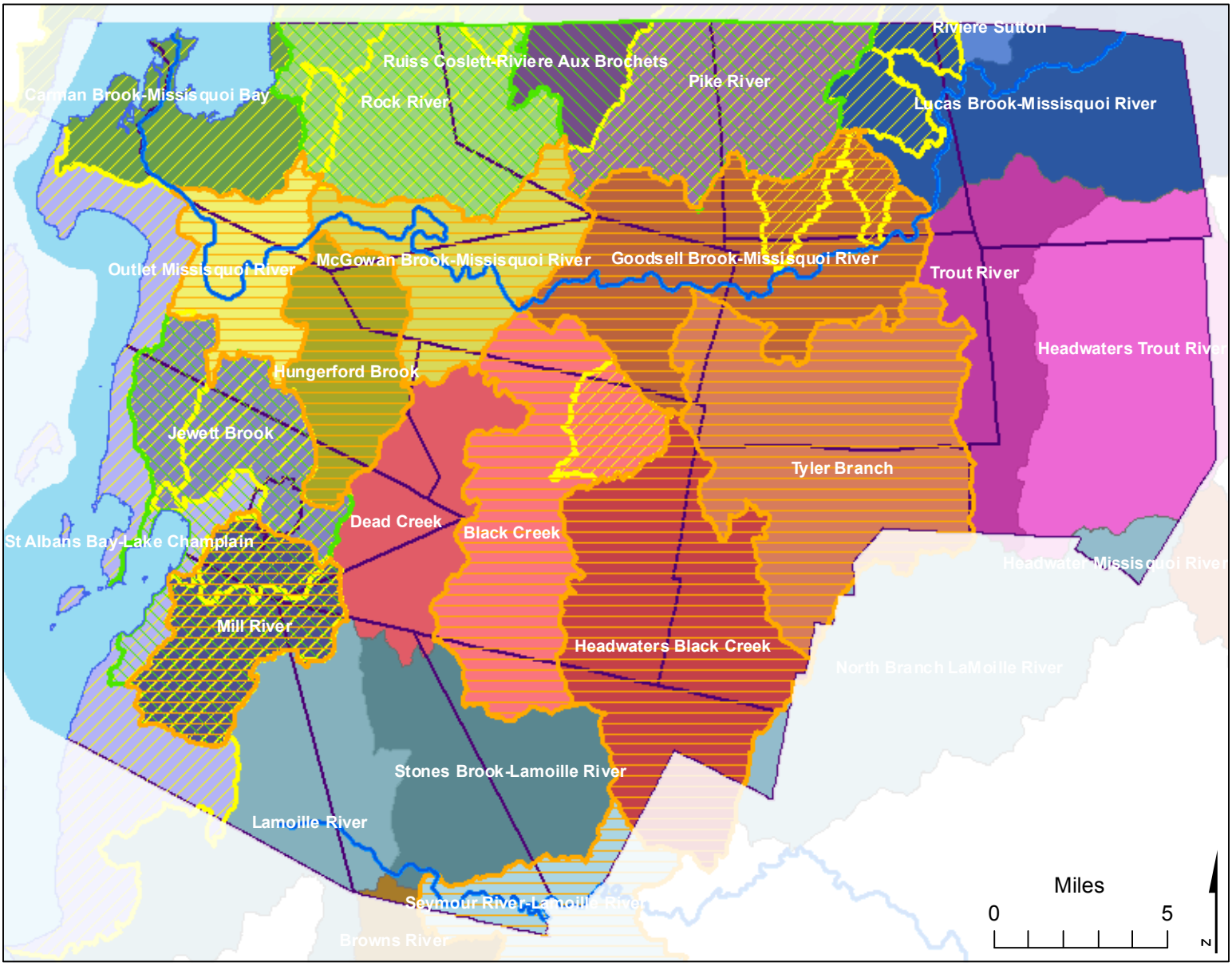

Stressed, Impaired & Priority Watersheds of Franklin County

HUC10 Watersheds in the Lake Champlain Direct HUC08

- Lake Champlain Direct-Northeast Arm

HUC10 Watersheds in the Lamoille River HUC08 Sub-basin

- Gihon River-Lamoille River
- Browns River

HUC10 Watersheds in the Missisquoi Bay HUC08 Sub-Basin

- Missisquoi Bay
- Outlet Missisquoi River
- Black Creek
- Trout River
- Riviere aux Brochets
- Riviere Sutton-Missisquoi River
- Tyler Branch-Missisquoi River

Other Legend Items

- Town Boundaries
- Main Rivers
- Stressed Waters
- NRCS Priority
- EPA 303-d Impaired

This map shows the watersheds of Franklin County as defined by Hydrologic Unit Codes (HUCs). HUC12 Watersheds are labeled. Overlaid is Stressed waters, in orange, NRCS Priority Watersheds, in green, and EPA 303-d Impaired watersheds, in yellow.

Data from the St. Albans NRCS Office:
wbd_a_vt011
towns_a_vt011
StressedWaters_2016_1_vt
epa303d_2016_a_vt
PriorityWsheds_2016

Data downloaded from VCGI:
River_Main_Stem_Waterbodies_WBID

Map created by Jeannie Bartlett
Franklin County NRCD
3/15/2017

Mud Creek's fine soils make agriculture and steep roads increase nutrient loading to the creek more than they might on other soils. Riparian plantings along with BMPs for fields, barnyards, and roads will help reduce erosion and phosphorus loading.

The Upper Missisquoi River and Trout River watersheds are mostly forested, but agriculture in the valleys and roads and development on steep slopes contribute to a high sediment load in the streams. Prioritizing river corridor protection and BMPs for fields and roads will increase flood resilience and reduce erosion and sediment loading.

Stones Brook on the Lamoille River suffers from channel erosion, land erosion, and encroachment. Many of the tributary brooks *to* Stones Brook lack vegetated riparian buffers and have been confined to their channels.

The lower reaches of the Lamoille River main stem suffer from encroachment, land erosion, channel erosion, toxics, flow alteration, and invasive species.

Air

The District generally has good quality air. In 1994, the six ambient air pollutants regulated by the Clean Air Act were less than half of the federal thresholds. These pollutants are carbon monoxide, lead, nitrogen dioxide, particulate matter, ozone, and sulfur dioxide. That is not to say that there can't be localized problems with any of these, such as truck traffic on a dusty road sending fine particulate matter into the air where people or animals may breathe it. Carbon monoxide and hydrogen sulfide poisonings are an occasional but acute danger in and around liquid dairy manure storage facilities.

Similarly, nuisance odors from dairy manure can be a concern. This is of particular issue for liquid manure and when it is agitated or spread near residences. Some farmers have turned to injection as a way of appeasing neighbors, among other benefits.

The District also receives some acidic deposition as a result of coal-fired power plants and auto emissions to the west. Those emissions of sulfate and nitrate pollutants acidified our lakes and soils, and likely contributed to the decline of red spruce. Acid rain was a most notable problem in the 1980s and '90s, and it continues today but with significant improvement as a result of the 1990 federal Clean Air Act amendments. In an interesting interaction of air, soil, and water resource concerns, the decrease in acid rain may play a role in why we are seeing more phosphorus in its soluble form. Phosphorus cannot easily dissolve in highly acidic water, so the improvement in acid rain may be adding complexity to the phosphorus water quality problem.

Animals

Fish from all lakes in the Franklin District carry an FDA advisory about mercury contamination because of high mercury levels in our lakes. This can only be addressed through the EPA's efforts to control emissions of mercury to the air.

Wetlands & Hydrology

Black Creek Marsh, where Jewett and Stevens Brooks outlet into the north end of St. Albans Bay, is a valuable, 360-acre wetland complex. It contains deep rush marshes, cattail marshes, and deciduous forest wetland. It is home to the spiny softshell turtle, which is state-threatened, and the uncommon map turtle (NORTH LAKE DIRECT TACTICAL BASIN PLAN).

The mouth of the Mill River, in Georgia, is also a valuable wetland complex.

These wetlands at the fringes of the lake are important spawning habitat for yellow perch, brown bull head, pumpkinseed, bowfin, largemouth bass, black crappie, carp, mud minnow, and longnose gar. Northern pike require even more specific conditions for spawning: they need meadows that get flooded in the spring so they can swim into them and lay their eggs on the grasses in warm, shallow water. Carmans Marsh in Swanton provides an excellent example of this kind of wetland (NORTH LAKE DIRECT TACTICAL BASIN PLAN).

Priority Natural Resource Concerns & Management Strategies

According to the 2015 meeting of the Local Working Group, the highest priorities are soil stabilization, water quality, soil quality, promotion of harvestable buffers, grassed waterways, and filter strips. Of medium priority are supporting early successional wildlife habitats, pasture practices, and practices to control sheet and rill erosion. Lower priority for the District are controlling invasive species and installing high tunnels.

The 2016 Tactical Basin Plan for the Missisquoi Bay watershed, which includes the Missisquoi River and its tributaries as well as the Rock and Pike Rivers, identifies eight strategies for improving water quality in the bay:

- Protection of river corridors
- Water quality monitoring
- Agricultural Best Management Practices (BMPs), particularly in the Rock, Pike, Hungerford, Black Creek, and Mud Creek watersheds.
- Stormwater masterplanning and installation
- Lake Wise program and lakeshore BMPs
- Road inventories and implementation
- Wetland and floodplain restoration, particularly on agricultural land in the Rock, Pike, and Hungerford watersheds.
- Reduce erosion from forest roads and log landings, especially in sugaring operations in the Upper Missisquoi and Trout River watersheds.

In its Required Agricultural Practices, finalized in December 2016, the State of Vermont required all farms to follow approved Nutrient Management Plans and a number of other in-field requirements such as permanent vegetative buffers on streams and ditches. These requirements are now a priority for many landowners regardless of local perceptions of their efficacy.

While the Watershed Projects Database should be the ultimate reference for projects identified or prioritized in Tactical Basin Plans, the following lists out some project areas or potential priorities in Franklin County:

River Corridor Easements

Priority watersheds are the Trout River, upper Missisquoi, Tyler Branch, and Black Creek.

Water Quality Monitoring

Water Quality Monitoring to detect areas of high erosion would be useful in Mill Brook, particularly in the southern tributaries and first 5.4 river miles of Indian Brook (NORTH LAKE DIRECT TACTICAL BASIN PLAN, 26). Additionally, Cutler Pond in Highgate could be monitored for water chemistry. Little Pond in Franklin could be monitored for water chemistry. Beaver Meadow Road in Bakersfield could be have biomonitoring. McGowan Brook in Sheldon could have biomonitoring. Multiple towns along the Missisquoi River could have monitoring to identify nutrient sources. See Gerhardt 2015 or the Watershed Projects Database for specifically recommended new sampling sites.

Agricultural BMPs

The Northwest Regional Planning Commission (NRPC) made a map of critical source areas from crop fields for St. Albans Bay (NORTH LAKE DIRECT TACTICAL BASIN PLAN). The VT Agency of Ag mapped ditches, streams, tiling, and phosphorus index for the Bay (NORTH LAKE DIRECT TACTICAL BASIN PLAN).

The VT Agency of Ag recently conducted the North Lake Farm Survey, which looked at all 309 agricultural producers in the Missisquoi River Basin and St. Albans Bay watershed. Of the farms surveyed, 45 percent had at least one production area issue, and 41 percent had at least one management issue (MISSISQUOI BAY TACTICAL BASIN PLAN, 74).

The USDA-NRCS has prioritized the Rock River, Pike River, and St. Albans Bay watersheds for prioritized funding on water quality improvement practices. Hungerford Brook watershed will be added to this prioritized list in 2017.

Stone Bridge Brook, in Georgia, was listed as impaired but regained its water quality standards through farmer implementation of BMPs in 2010 and 2011.

The MISSISQUOI BAY TACTICAL BASIN PLAN identifies the need to increase technical assistance in these critical watersheds to work with farms to meet the RAPs.

The MISSISQUOI BAY TACTICAL BASIN PLAN identified grassed waterways a critical practice to expand. It suggests creating a targeted program for grassed waterways, perhaps through an RCPP agreement with the Conservation District.

Rock River, Tyler Branch, Hungerford Brook, Lake Carmi, Black Creek, mid-Missisquoi, Mud Creek of the Missisquoi, Trout River, Upper Missisquoi, Pike River

Stormwater Masterplanning & Green Stormwater Infrastructure

Priority areas are the Missisquoi River, Lake Carmi, Enosburg, Fairfield, Franklin, Highgate, Sheldon, and Swanton.

Lakeshore BMPs

Lake Carmi should be prioritized for lakeshore BMPs.

Road Inventories and BMPs

NRPC and Northern VT Development Association are helping towns begin Road Erosion Inventories. Priority areas are the Trout River, Rock River, mid-Missisquoi, Mud Creek of the Missisquoi, Upper Missisquoi

Stream, Wetland and Floodplain Restoration

The NRPC managed a stream restoration project at Collins Perley in St. Albans, on a north tributary to Rugg Brook. They restored the stream from a culvert to a surface water, planted trees along it, and left it in the stewardship of Bellows Free Academy (NORTH LAKE DIRECT TACTICAL BASIN PLAN).

The Agency of Natural Resources' Wetland Restoration Plan identified 7000 potential wetland restoration sites with over 10,000 acres in the Missisquoi Basin. They're working on creating site specific profiles for over 200 potential restoration sites in the Basin.

Priority areas are Hungerford Brook, Rock River, Tyler Branch (sediment attenuation), Lake Carmi, and Pike River.

Riparian Buffer Plantings

Priority areas are Wanzer Brook, Black Creek, Missisquoi, Trout River, Tyler Branch, Upper Missisquoi, Rock River, and Mud Creek of the Missisquoi.

Dam Removal

Sites that could possibly benefit from dam removal are Trout Brook Reservoir, Sleeper Pond on Mud Creek, and Swanton Dam on the Missisquoi River (MISSISQUOI BAY TACTICAL BASIN PLAN, 41)

Forest Roads and Landings

Programs that protect riparian forests need to be promoted, and logging roads and landings with high erosion potential identified for remediation. Loggers should have access to portable skidder bridges through a rental program, or own their own. The Franklin District has been discouraged from beginning a skidder bridge rental program because there are no sawmills in Franklin County to house it, and because most loggers are moving toward owning their own bridges.

Priority areas are Fairfield, Upper Missisquoi and Trout River watersheds.

Nutrient Management Planning & Training

Assistance with nutrient management planning and other training required for compliance with the Required Agricultural Practices is needed across the District, particularly with newly-regulated small farms.

Current Projects & Programs of the Franklin NRCD

To address the resource concerns in our district and promote the most sustainable and resilient use of our natural resources, the Franklin District currently runs the following projects and programs:

- Nutrient management planning assistance
- Tree sale
- Trout sale
- Public workshops
- Historical documentation
- Facilitation of improved agricultural planning software
- Creation and distribution of outreach materials
- Riparian plantings
- Farmer-to-farmer peer reference systems
- Young farmer meet-ups
- Roadside conservation signage
- Nature-based activities at the free NOTCH Richford summer program

Works Cited:

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