

## Appendix A- Basin 14 Existing Uses

### Introduction

It is VDEC’s long-standing stipulation that all lakes and ponds in the basin have existing uses of swimming, boating and fishing. Likewise, we recognize that fishing activities in streams and rivers are widespread throughout the state and can be too numerous to document. The Vermont Water Quality Standards stipulate that existing uses may be documented in any surface water location where that use has occurred since November 28, 1975. Therefore information presented in Appendix A should be viewed as only a partial accounting of known fishing uses based upon limited criteria and does not change protection under the Clean Water Act or Vermont Water Quality Standards for waters not listed.

**Table A.1. Existing Uses for contact recreation (swimming) in Basin 14 (SH=swimming hole)**

Surface Water	Location of Use	Watershed	Town	Documentation of Existing Use
Waits River	Union 36 SH	Waits River	Corinth	Swimming Hole Study site , Jenkins
Waits River	Waits River Village SH	Waits River	Topsham	Swimming Hole Study site 175, Jenkins
Waits River	Bradford Center Beach	Waits River	Bradford	Swimming Hole Study site 95, Jenkins
Waits River	Baldwin Bridge SH	Waits River	Bradford	Swimming Hole Study site 179 , Jenkins
Waits River	The Twenty Foot SH	Waits River	Bradford	Swimming Hole Study site 180, Jenkins
Waits River	Meadow Brook Road SH	Waits River	Bradford	Swimming Hole Study site 96 , Jenkins
Tabor Branch	East Corinth Village SH	Waits River	Corinth	Swimming Hole Study site 97 , Jenkins
Tabor Branch	East Topsham Cascades	Waits River	Topsham	Swimming Hole Study site 173 , Jenkins
Tabor Branch	East Topsham Village SH	Waits River	Topsham	Swimming Hole Study site 99, Jenkins
Ompompanoosuc River	Sandy Beach	Ompompanoosuc River	Thetford	Swimming hole at USACE land at Union Village Dam
Ompompanoosuc River	Ledges	Ompompanoosuc River	Thetford	Swimming hole at USACE land at Union Village Dam
Ompompanoosuc River	Thetford Center Falls	Ompompanoosuc River	Thetford	Swimming Hole Study site 110, Jenkins
Ompompanoosuc River	East Union Village Dam	Ompompanoosuc River	Thetford	Swimming Hole Study site 111, Jenkins
Ompompanoosuc River	Union Village Dam Outlet	Ompompanoosuc River	Thetford	Swimming Hole Study site 116, Jenkins

Ompompanoosuc-West Branch	South Strafford SH	Ompompanoosuc River	Strafford	Swimming Hole Study site 169, Jenkins
Ompompanoosuc-West Branch	"Bare Assed" Beach	Ompompanoosuc River	Strafford	Swimming Hole Study site 115, Jenkins

**Table A.2. Existing uses of waters for boating in Basin 14 (RM is river mileage measured from the river terminus)**

Surface Water	Location of Use	Watershed	Town	Documentation of Existing Use
Wells River	From the Wells River F&W access to above Adams Paper Company Dam. RM 1.8-2.4	Wells River	Newbury	Wells River F&W access and evidence of white water boating use including annual white water Kayak race. <b>Put in/Take out:</b> Quarry Bridge above Wells River F&W Access
Wells River-South Branch	From Seyon Pond into Groton Village	Wells River	Groton	Multiple runs documented in Trip Reports on Vermont Paddlers Club website. Listed as a regular run in the Whitewater Guide "Let it rain," Alden Bird. <b>Put in-</b> Seyon Pond Road near intersection of Route 302. <b>Take out-</b> Recreation fields, Groton
Waits River	From confluence with Perry Brook to Old Creamery Road in Waits River	Waits River	Topsham, Corinth, Bradford	Rated as highly important for boating (source: Jenkins and Zika 1992) and Multiple runs documented in Trip Reports on Vermont Paddlers Club website <b>Put in:</b> Perry Brook Bridge <b>Take out:</b> Old Creamery Road bridge
Waits River	From the Bugbee landing boat launch to the Connecticut River. RM 0-0.9	Waits River	Bradford	Boating is a regular use from the public Waits River Boat Launch to the Connecticut River
Waits River-South Branch	From Goose Green to confluence with Waits River	Waits River	Vershire-Bradford	Multiple runs documented in Trip Reports on Vermont Paddlers Club website. <b>Put in:</b> Goose Green Bridge <b>Take out:</b> confluence with main stem Waits

Ompompanoosuc River	From F&W access to the Connecticut River. RM 0-0.3	Ompompanoosuc River	Norwich	Boating is a regular use from the Ompompanoosuc River F&W access to the Connecticut River
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**Table A.3. Existing uses of waters for fishing in Basin 14 (RM is river mileage measured from the river terminus)**

Surface Water	Location of Use	Watershed	Town	Documentation of Existing Use
Stevens River	From Patneau Lane to Connecticut River excluding Barnet Falls, RM 0-2.2	Stevens River	Barnet	DFW identifies fishing as an existing use based on fishing stocking criteria
Stevens River	From Peacham Hollow Brook to Barnet Center Road RM 3.8-4.8	Stevens River	Barnet	DFW identifies fishing as an existing use based on fishing stocking criteria
Jewett Brook	Within Roy Mountain WMA. RM 0.1-1.7	Stevens River	Barnet	DFW identifies fishing as an existing use based on public access
Wells River	From Ricker Pond to Newbury/Ryegate town line. RM 6.4-16.2	Wells River	Groton, Ryegate	DFW identifies fishing as an existing use based on fish stocking criteria
Wells River	From below the Boltonville Falls for 0.5 miles. RM 4.6 - 5.1	Wells River	Newbury	DFW identifies fishing as an existing use based on fish stocking criteria
Wells River	From .2 miles above the Tenney Pond tributary to above Adams Paper Company Dam. RM 1.7-2.6	Wells River	Newbury	DFW identifies fishing as an existing use based on fish stocking criteria and public lands
East Brook	Within Pine Mountain WMA. RM 0.9-1.8	Wells River	Topsham/Groton	DFW identifies fishing as an existing use based on public access
Keenan Brook	Within Pine Mountain WMA RM. 1.3-1.6 and 2.25-2.5	Wells River	Topsham/Groton	DFW identifies fishing as an existing use based on public access
South Branch Wells River	From Noyes Pond downstream to South Branch Road bridge. RM3.8-5.0	Wells River	Groton	DFW identifies fishing as an existing use based on public access
Depot Brook	From 0.5 miles upstream of US-232 downstream to Groton Pond. RM 0-0.9	Wells River	Groton	DFW identifies fishing as an existing use based on public access
Beaver Brook	From the west end of Beaver Brook Road downstream to Groton Pond. RM 0-1.7	Wells River	Groton	DFW identifies fishing as an existing use based on public access

Coldwater Brook	From 0.5 miles upstream of Boulder Beach Road downstream to Groton Pond. RM 0-0.75	Wells River	Groton	DFW identifies fishing as an existing use based on public access
Waits River	Upstream of Routes 302 and 25	Waits River	Orange	DFW VHQW determination
Waits River	Riddle Pond outlet	Waits River	Orange	DFW VHQW determination
Waits River	From VT 302 to Bradford Dam. RM 1.1-19.5	Waits River	Orange, Topsham, Corinth, Bradford	DFW identifies fishing as an existing use based on fishing use surveys and stocking criteria
Waits River	Below Route 5 to Connecticut River. RM 0-1.0	Waits River	Bradford	DFW identifies fishing as an existing use based on public access and fishing use
East Orange Branch and Lime Ember Brook	All	Waits River	West Topsham, Orange, and Washington	DFW VHQW determination
Pike Hill Brook	All	Waits River	Corinth	DFW VHQW determination
Tabor Branch, Levi Brook, Hedgehog Brook, and Powder Spring Brook	All	Waits River	Topsham and Newbury	DFW VHQW determination
South Branch, Meadow Brook, Cookville Brook and Center Brook	All	Waits River	Corinth	DFW determination
Chase Brook	All	Waits River	Bradford	DFW determination
Mill Pond Brook and Rowell Brook	All	Waits River	Bradford, West Fairlee and Fairlee	DFW determination
Ompompanoosuc River	Upstream of Brimstone Corner	Ompompanoosuc River	Thetford	DFW VHQW determination

Ompompanoosuc River	From Mill Village to the Union Village Dam. RM 4.2-20.5	Ompompanoosuc River	Vershire, West Fairlee, Thetford	DFW identifies fishing as an existing use based on fish stocking criteria
Ompompanoosuc River	From just below the Union Village Dam to the Connecticut River. RM 0-3.9	Ompompanoosuc River	Thetford, Norwich	DFW identifies fishing as an existing use based on fish stocking criteria and public access
Ompompanoosuc River West Branch	From Strafford Village to South Strafford. RM 7.3-10.2	Ompompanoosuc River	Strafford	DFW identifies fishing as an existing use based on fish stocking criteria
Middle Brook	All	Ompompanoosuc River	West Fairlee	DFW VHQW determination
Bear Notch Brook	All	Ompompanoosuc River	West Fairlee and Vershire	DFW VHQW determination
Old City Brook	All	Ompompanoosuc River	Strafford	DFW determination
Abbott Brook tributary (Podunk WMA)	All	Ompompanoosuc River	Strafford	DFW VHQW determination

**Table A.4. Existing uses for public surface water supplies in Basin 14**

Surface Water	Watershed	Town	Basis for Determining the Presence of an Existing Use
Mill Pond Brook watershed above water intake dam	Waits River	West Fairlee, Fairlee, Bradford	Maintained as an emergency water supply for the town of Bradford

### **Biologically Diverse Stream-Wetland-Pond Complexes as Existing Uses for Habitat- Basin 14 Stevens River and Manchester Brook Examples**

Section 1-03.A.1.e of the Vermont Water Quality Standards indicate that with regard to aquatic life and wildlife, and habitat uses, *“evidence of the use’s ecological significance in the functioning of the ecosystem or evidence of the use’s rarity”* documents a specific existing use. Assessment of the water resources in the Stevens River watershed resulted in identification of two biodiversity “hotspots” that included streams, wetlands, a pond, rare and threatened species, and significant natural communities. These diverse

complexes are the habitat for numerous plant and animal species in unique assemblages which are very important to protect and maintain. These surface waters meet the criteria established by Section 1-03.B.1.e for documentation of existing use of habitat.

**Table A.5. Existing use of ecologically significant habitat in Basin 14**

Surface Water	Location of Use	Watershed	Town	Documentation of Existing Use
Lower Symes Pond & Manchester Brook & adjacent wetland communities	Lower Symes Pond itself, all the adjacent wetlands and Manchester Brook as it leaves the pond and those adjacent wetlands	Manchester Brook	Ryegate	ANR DEC and DFW data on rare species and wetland natural communities and surface waters
Jewett Brook Wetland Complex	Jewett Brook, wetlands along it, and south of Harveys Lake	Stevens River	Barnet	Same as above

## Appendix B- Basin 14 Watershed Partners

**Connecticut River Watershed Council (CRWC)**- is a multi-state non-profit organization covering the entire Connecticut River watershed. The CRWC has been actively involved in river trash clean-ups, dam removal projects, riparian buffer plantings, water quality monitoring, streambank restoration, recreational boating enhancement, and water quality advocacy projects.

**Connecticut River Joint Commissions**- CRJC's mission is to preserve and protect the visual and ecological integrity and sustainable working landscape of the Connecticut River Valley, and to guide its growth and development through grassroots leadership.

**Two Rivers Ottauquechee Regional Commission (TRORC)** is an association of thirty municipalities in east-central Vermont. TRORC is governed by a Board of Representatives appointed by each of our member towns. The Commission's staff provides technical services to local, state and federal levels of government and to the Region's non-profits and businesses. TRORC watershed-related programs include:

- Tropical Storm Irene Recovery and municipality assistance
- Emergency Management
- GIS Services
- Land Use Planning
- Transportation Planning

**Northeastern Vermont Development Association (NVDA)**- is a regional planning commission and regional development association serving 55 municipalities in the Northeast Kingdom. NVDA assists municipalities, organizations, committees and individuals with a wide variety of planning and technical services. From assisting municipalities with regulatory options, to administering grants, creating maps, and implementation of transportation and natural resource plans, NVDA is actively working with land use issues in the region.

**White River and Caledonia County Natural Resources Conservation Districts (NRCD)** is a locally-led and operated organization that promotes and supports soil and water conservation. The mission of the District is to "help provide conservation assistance to the people living in the area through education programs and partnerships with federal, state, and local entities involved in natural resources management." Some specific programs include:

- The Cover Crop Incentives Program
- AEM (Appendix )
- Portable Skidder Bridge Rental Program

**Agricultural Resource Specialist (ARS) Program** is offered by the Vermont Association of Conservation Districts ([www.vacd.org](http://www.vacd.org)) and is supported by funding from the Vermont Agency of Agriculture, Food, and Markets (VAAFMM). Three main services are offered to farmers:

- Accepted Agricultural Practices Assistance (AAPA)
- Agricultural Environmental Management (AEM)
- Farm Well Water Testing (FWWT)

**Vermont Agency of Agriculture, Foods and Markets (AAFMM)**- provides Best Management Practice (BMP) and Accepted Agricultural Practices (AAP) technical assistance and funding, administers the Medium Farm Operation (MFO) and Large Farm Operation (LFO) permits, and provides marketing assistance for agricultural products among other duties.

**Better Back Roads Program (BBR)** provides technical assistance, grant funding, and educational workshops related to transportation infrastructure and water quality. BBR provides funding for municipalities through the Better Back Roads Grants. Grant funding can be used to undertake road erosion inventories and capital budgets and to implement transportation infrastructure best management practices (BMPs) that address road erosion and improve water quality and aquatic habitat

**USDA Natural Resources Conservation Service (NRCS)** provides cost-share, technical assistance, and targeted support of agricultural best management practices. Additionally, NRCS provides funding and technical assistance for forestry and wildlife habitat projects.

**United States Fish and Wildlife Service-** the USFWS provides technical assistance and cost-share funding to watershed restoration and protection projects that enhance and protect fish and wildlife habitats.

**United States Army Corps of Engineers (ACOE)**- administers several flood control dams in the country and Vermont, including the Union Village facility in Thetford. The ACOE serves in a regulatory capacity regarding navigable waters and wetland ecosystems.

**Watershed Municipalities** - there are twenty-nine towns wholly or partially within Basin 14 within the counties of Orange, Caledonia, Washington, and Windsor (Figure XX). Municipalities can protect water resources through town plan language and zoning bylaws. Additionally, towns are responsible for managing large networks of roads, drainage ditches, and stream crossings.

**Vermont Land Trust (VLT)**- is a member-supported, non-profit 501(c)(3) land conservation organization that provides technical and legal assistance to individuals, communities, and local land trusts to help them achieve their conservation objectives. Land conservation of working farms and forestlands, as well as important riparian areas, is generally achieved through conservation easements with an ongoing stewardship relationship with landowners to ensure that conservation goals are upheld in perpetuity.

**Upper Valley Land Trust (UVLT)**- provides conservation leadership, tools and expertise to permanently protect the working farms, forested ridges, wildlife habitat, water resources, trails and scenic landscapes that surround residential areas and commercial centers and make the Upper Valley a truly special place to live. UVLT works with local conservation commissions and volunteer groups to identify and prioritize land conservation opportunities. UVLT provides technical assistance and conservation solutions for landowners and stewards permanent agreements that conserve key properties forever. UVLT focuses its mission in the upper Connecticut River Valley in Vermont and New Hampshire.

**Vermont River Conservancy (VRC)**- is a non-profit organization that works to permanently conserve and protect special lands along waters of Vermont. VRC works in partnership with landowners, municipalities, state and federal agencies, other conservation organizations and private businesses to accomplish land conservation. VRC generally employs conservation easements to protect important lands along the waters of Vermont. Conveyance of a conservation easement protects the land permanently, yet keeps it in private ownership.

**Center for Northern Woodlands Education**- The mission of the Center for Northern Woodlands Education is to advance a culture of forest stewardship in the Northeast and to increase understanding of and appreciation for the natural wonders, economic productivity and ecological integrity of the region's forests.

**Orange County Headwaters Project (OCHP)**- is a non-profit organization located in Orange County, Vermont that assists landowners interested in permanently conserving their properties. OCHP supports sustainable forestry, watershed protection, and conservation goals. Since its formation, the OVHP has conserved over 5,800 acres of land.

**Vermont Agency of Transportation (VTrans)** manages and maintains miles of State highway and stream crossings within the basin including Routes 5, 25, 113, 132, 232, 244, 302, and Interstate 91. VTrans provides technical assistance in the form of hydraulic modeling for bridge and culvert replacements and transportation infrastructure maintenance. VTrans also provides grant funding to basin municipalities including Structures, Town Highways, Better Backroads, and Transportation Enhancement grants.

**ANR Partners**- All Departments within ANR (FWD, FPR, and DEC) and Divisions within them, work collaboratively on a number of watershed assessment, restoration and protection projects. Additionally, FWD and FPR own and manage thousands of acres of state-owned lands within the basin. Annual stewardship plans are prepared by District Stewardship Teams and includes staff from FWD, FPR, and DEC. Long Range Management Plans of state-owned properties include restoration and protection of water resources. Some specific watershed restoration projects are described in this plan.

## Appendix C- Basin 14 Drinking Water Supplies

Drinking water systems within the watershed include impoundments, lakes, ponds, streams, well points, dug wells, gravel, and gravel screened wells, gravel open-end casings, rock wells and springs. Waters within the watershed that are designated as drinking water supplies are listed in Table xx. Most other municipalities in the watershed use ground water wells for drinking water supplies

Waters used as public water supplies are classified A(2). The only class A(2) water in Basin 14 that is currently actively and used as a public water supplies is Mill Pond Brook. Mill Pond Brook and all waters within its watershed above the intake dam in the Towns of Fairlee, Bradford, and West Fairlee serve as the Village of Bradford water supply, reserved for emergency use. A second A(2) waterbody, the Peacham Fire District #1 water supply, is an artificial impoundment on South Peacham Hollow Brook and includes all waters within its watershed above the intake. The intake has been removed, and the town has gone to wells. DEC recommends that it be reclassified from A2 to B to preclude management of the pond as a water supply, as this is no longer appropriate. The number of surface waters used for private drinking water supplies is unknown.

## Appendix D- Basin 14 Fish Habitat and Fisheries

### Stevens River Watershed

There is a diversity of fish habitat in the lakes and streams in the Stevens River watershed. Harveys Lake covers just 351 acres but is a very deep lake that is stocked with lake and rainbow trout. Temperature/dissolved oxygen profiles of Harvey's Lake suggest that the lake is becoming increasingly marginal as trout habitat. Catch rates of lake and rainbow trout were very low when compared with other Northeast Kingdom lakes during electrofishing surveys in 2009, 2010, and 2011. Nevertheless, anglers still fish Harveys Lake in search of lake and rainbow trout, rainbow smelt, yellow perch, and chain pickerel. The smaller Ewell Pond and Martins Pond are stocked with rainbow trout and brook trout, respectively. Martins Pond is one of only five ponds in Vermont known to support fishable populations of wild brook trout. Special regulations at Martins Pond are intended to protect the wild brook trout population while allowing anglers to harvest the stocked trout. The Vermont Department of Fish and Wildlife (DFW) stocks brook trout into the Stevens River from West Barnet Village downstream to I-91. Rainbow trout are stocked below the falls in Barnet Village. Very few wild trout are found in the river downstream of West Barnet Village, and this is presumably due to excessively high water temperatures. Both Peacham Hollow Brook and South Peacham Brook are managed as wild brook trout fisheries (Kratzer 2007).

The Stevens River had been stocked with Atlantic salmon fry as part of an effort to restore salmon to the Connecticut River basin. The Stevens was last stocked with salmon fry in the spring of 2012. The Stevens mainstem contains an estimated 829 100-meter<sup>2</sup> units of salmon rearing habitat. Over the last several years of the salmon program, an average of 25,000 fry were stocked annually, at an average density of 31/unit. Typically it takes salmon fry two years to attain smolt (migratory) size. Growth rates of salmon were consistently higher in the Stevens River than in any other Northeast Kingdom salmon nursery stream, to the extent that in some years young salmon reached smolt size and left after only a single year. Over the last several years of the program, the Stevens River contributed an average of 3,000 smolts annually to the Connecticut River basin outmigration, roughly 3.6/unit. Adult Atlantic salmon, returning from the ocean, are not able to access the Stevens River due to the Dodge Falls Dam on the Connecticut River in East Ryegate, VT.

Fish species collected in the Stevens River during the most recent sampling (2008 to 2012) by DFW at the former salmon monitoring station include: Atlantic salmon, brook

trout, longnose dace, longnose sucker, pumpkinseed, blacknose dace, white sucker, common shiner, slimy sculpin, creek chub, lake chub, common shiner, rainbow trout, and brown trout. There should not be any juvenile Atlantic salmon remaining in the Stevens River after the spring of 2015.

### Wells River Watershed

The Wells River watershed provides a diversity of fishing opportunities ranging from warmwater fish species in some of the large lakes including Lake Groton, and Ricker and Ticklenaked ponds, to self-sustaining brook trout fisheries in Noyes Pond and many headwater streams. As noted in the Draft Groton Management Unit Long Range Management Plan, Noyes Pond is a remarkable fishery resource not only within the Wells River watershed, but within the entire State of Vermont. Sizable ponds in Vermont that support, or have the capacity to support, an entirely wild population of brook trout that sustains a high quality fishery are a rarity. Densities of wild brook trout in Noyes Pond compare favorably with the best brook trout ponds in Maine. Noyes Pond is a *limited-entry* fishery. Angling is prohibited in the tributaries to Noyes Pond, for the purpose of maintaining them as a spawning and nursery refuge (ANR 2007).

Other lakes in the watershed and the Wells River are stocked with trout species. Levi and Osmore ponds are stocked with brook trout while Kettle Pond is stocked with rainbow trout. Within the last decade, anglers have illegally introduced largemouth bass to Levi Pond, and a population has become established. The presence of bass in this pond has eliminated any opportunity to manage this pond as a wild brook trout fishery, unless the largemouth bass can be eliminated from the pond.

Lake Groton, and Ricker and Ticklenaked ponds are regularly fished for warm water species including smallmouth bass, largemouth bass, chain pickerel, yellow perch, brown bullhead, and sunfish. Excessive nutrient levels in Ticklenaked Pond have caused dissolved oxygen levels that are too low to support fish life in the depths, although the pond has very recently been undergoing restoration (see Chapter 4).

Streams in the Groton State Forest and many of the other upland streams in the Wells River watershed including Keenan and Tannery Brooks, provide wild self-sustaining populations of brook trout at an abundance level and growth rate high enough to attract angling interest.

The Wells River is stocked by the Vermont Department of Fish and Wildlife (DFW) with

brook trout from the confluence of the North and South Branches downstream to South Ryegate Village. Rainbow trout are stocked from South Ryegate Village downstream nearly to the confluence with the Connecticut River. The Wells River starts out warm because it flows from Ricker Pond, but tributaries like the South Branch of the Wells River help to cool it as it flows further downstream. The majority of the Wells River is too warm for trout during the summer months, but trout can survive in cold water refugia in the Wells River and its tributaries. The Wells River is currently being stocked with rainbow trout from Ricker Pond to the mouth.

The Wells River had been stocked with Atlantic salmon fry as part of an effort to restore Atlantic salmon to the Connecticut River. The Wells River was last stocked with salmon in the spring of 2011. Returning adult salmon currently can ascend as far up the Connecticut River as the dam at Dodge Falls in East Ryegate, about 4 miles upstream of the mouths of the Wells and Ammonusooc rivers. Salmon are not able to ascend into the upper Wells River because of the dams close to its confluence with the Connecticut River.

Fish species collected at the former Wells River salmon monitoring station from 2006 to 2011 include: Atlantic salmon, brook trout, brown trout, largemouth bass, yellow perch, slimy sculpin, common shiner, longnose dace, blacknose dace, lake chub, white sucker, creek chub, and tessellated darter. There should currently be no juvenile Atlantic salmon remaining in the river.

### **Waits River Watershed**

The Waits River basin is home to a diversity of fish species, some which support popular recreational fisheries. The vast majority of the streams within this watershed provide suitable habitat which support naturally reproducing, i.e. “wild” brook trout populations. Wild populations of native brook trout flourish in the colder, higher elevation streams and in the mainstem above East Corinth. Lower reaches of some tributaries and much of the mainstem support low populations of brook trout, likely due to temperature and habitat limitations. In 2007, temperature monitoring by VDFW observed temperatures exceeding 80° F in three stations between East Corinth and Route 25B in Bradford. Naturalized populations of wild brown trout are occasionally observed in low numbers. Naturalized populations of wild rainbow were once sustained in the Waits River or its tributaries, although none have been observed since 1993.

Tributary streams of the Waits River basin are managed as wild trout waters, i.e. are not

stocked with hatchery-reared trout. The Department of Fish and Wildlife also stocks “catchable” size hatchery-reared rainbow trout to supplement recreational fisheries in the Waits from East Corinth to Bradford.

Trout from mainstem reaches of the Waits River and its larger tributaries may migrate into smaller tributary streams to spawn or seek refuge during stressful environmental conditions. These movements may be localized or may involve large distances. For example, during warm periods in the summer, trout often migrate to coldwater refuges such as the mouths of tributary streams or to areas of groundwater inflow. Likewise, trout may migrate in the fall to areas providing suitable overwintering habitat.

The lowest reach of the Waits River is a low gradient backwater of the Connecticut River and supports a diversity of fish species common to the larger receiving water. The Vermont Department of Fish and Wildlife maintains a formal public access area in this area.

Lake and pond habitat in the Waits basin is extremely limited. There are no significant standing waters with formal public access areas.

### **Ompompanoosuc Watershed**

The Ompompanoosuc River basin is home to a diversity of fish species, many of which support popular recreational fisheries. The vast majority of the streams within this watershed provide suitable habitat which support naturally reproducing, i.e. “wild” trout populations. Wild populations of native brook trout are supported in the colder, higher elevation streams and in the mainstem in Vershire. Lower reaches of the mainstem support low populations of brook trout, likely due to temperature and habitat limitations. In 2004, temperature monitoring by VDFW observed temperatures exceeding 75°F in four stations from West Fairlee to Thetford, with a maximum temperature of 80°F recorded below the Union Village Dam.

The Department of Fish and Wildlife stocks cultured (hatchery-reared) trout in the Ompompanoosuc River between Mill Village and the Union Village Dam to enhance recreational fishing opportunities. Naturalized populations of wild rainbow and brown trout are not found in the Ompompanoosuc River or its tributaries despite decades of past stocking. Tributary streams of the Ompompanoosuc River basin are primarily managed as wild trout waters, i.e. are not stocked with hatchery-reared trout, with the exception of the West Branch in Strafford. Historic impacts from copper mine drainage has limited fisheries management options within the West Branch below Strafford.

[Rich Langdon can provide an overview of copper mine drainage impacts and remediation].

Trout from mainstem reaches of the Ompompanoosuc River and its larger tributaries may migrate into smaller tributary streams to spawn or seek refuge during stressful environmental conditions. These movements may be localized or may involve large distances. For example, during warm periods in the summer, trout often migrate to coldwater refuges such as the mouths of tributary streams or to areas of groundwater inflow. Likewise, trout may migrate in the fall to areas providing suitable overwintering habitat.

The lowest reach of the Ompompanoosuc River is a low gradient backwater of the Connecticut River and supports a diversity of fish species common to the larger receiving water. The Vermont Department of Fish and Wildlife maintains a formal public access area in this area.

Lake and pond habitat in the Ompompanoosuc basin includes natural and man-made ponds which provide additional recreational fishing opportunities, where public access is available. Most notable are Lake Fairlee (Fairlee) and Miller Pond (Strafford) where formal access areas are maintained by the Department of Fish and Wildlife. Lake Fairlee supports a wide diversity of species which provide fishing opportunities for largemouth bass, smallmouth bass, yellow perch, chain pickerel, rainbow smelt, pumpkinseed, rockbass, brown bullhead, rainbow trout (stocked) and brown trout (stocked). Miller Pond is managed with annual stockings of hatchery-reared brook trout and rainbow trout and supports largemouth bass, pumpkinseed and bluegill populations. The CCC Pond in Sharon is a small, shallow pond with abundant aquatic vegetation and supports a marginal largemouth bass and pumpkinseed population. The Vermont Department of Fish and Wildlife maintains a public access area on this pond.

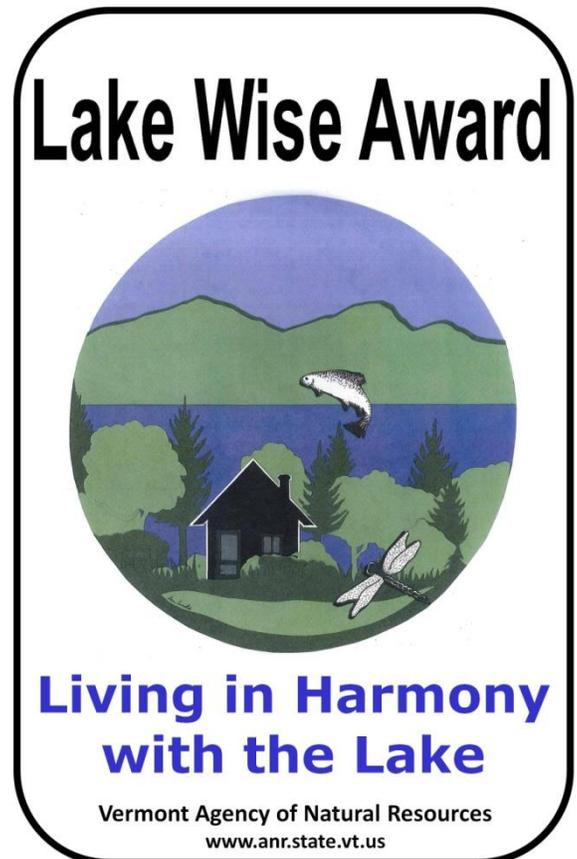
## Appendix E- The Vermont Lake Wise Program

The Lake Wise Program is offered through the Vermont Lakes and Ponds Section to provide trainings in lake friendly shoreland management to Lake Associations and shoreland property owners. Through Lake Wise, participants receive technical assistance to evaluate specific landscaping practices for fixing erosion and polluted runoff, while improving lake quality and wildlife habitat.

Lake Wise participants passing all four categories for driveway; structures and septic systems; recreation areas; and shorefront receive the Lake Wise Award, which can include a beautiful Sign, that can be proudly displayed on the property. Lake Associations are also awarded the “Gold Award,” depending on the percentage of shoreland owners participating in Lake Wise.

The goal of Lake Wise is to improve or maintain water quality and in-lake and on-shore wildlife habitat by encouraging lake friendly landscaping practices. <http://www.vtwaterquality.org/lakes.htm>

To learn more about Lake Wise contact Amy Picotte at [amy.picotte@state.vt.us](mailto:amy.picotte@state.vt.us) or (802) 490-6128



## Appendix F- Invasive Species Stressor

See: [http://www.vtwaterquality.org/wqd\\_mgtplan/stressor\\_AIS.htm](http://www.vtwaterquality.org/wqd_mgtplan/stressor_AIS.htm)

## Appendix G - Vermont's Agricultural Environmental Management (AEM) Program for Basin 14.

### Introduction

The Agricultural Resource Specialist (ARS) Program is offered by the Vermont Association of Conservation Districts (VACD) and supported by funding from the Vermont Agency of Agriculture. One service ARS staff offer to farmers is the Agricultural Environmental Management (AEM) program. The AEM program is a statewide, confidential, and voluntary program that helps landowners protect the quality of their natural resources—the foundation of a farm's economic viability and longevity. Farmers are important stewards of Vermont's working landscape and through the five-tiered AEM program, ARS staff help landowners: 1) assess conservation needs, 2) document farm practices, 3) prioritize farm improvements, 4) gain access to State, Federal and Conservation District cost-share programs, and 5) evaluate results to maximize efficiency of farm management practices.

By farmer request, or through outreach efforts, ARS Staff meet on the farm with stakeholders over several planning visits. Over the course of these visits, ARS Staff draw on local natural resource conservation specialists—engineers, agronomists, and other planners—to ensure that conservation recommendations and practices are planned and tailored to match each farm's unique characteristics. This collaborative process seeks to identify the most effective means to solve a resource concern to benefit both the natural environment and farm efficiency as much as possible. For example, in planning a livestock exclusion project for streambank protection, discussion with stakeholders can bring up points which illustrate both the conservation benefit and the improved farming efficiency of a practice. With the installation of exclusion fencing along the brook, and a watering trough installed in each paddock, thirsty livestock no longer need to travel a half mile to drink in the brook. Now, animals are off of the streambank and more of their time can be spent grazing and ruminating, improving weight gain rates and profits for a beef operation.

The VACD ARS program actively seeks out small farms that are willing to collaborate in the conservation planning process. For 2014, ARS staff statewide are using the AEM process to develop and implement up to nine simple, cost-effective conservation projects funded through an Ecosystem Restoration Grant from Vermont's Agency of Natural

Resources. Project examples include: improvement of animal trails and laneways, upgrading and improving barnyard areas, and installation of fencing and stream crossings to limit uncontrolled access to waterways by farm animals. Where projects identified for implementation are more costly, ARS staff will help farmers apply for alternative funding sources through State and Federal cost-share programs. The AEM process aims to take a holistic look at a farm operation and help farmers connect with the resources required to meet their management challenges.

### **Basin 14 Approach to Small Farm Stressor Remediation and TP Development**

**Background-** DEC has been working closely with both the Caledonia and White River NRCDs and ARS regional staff to better identify sources of ag stressors using a sub-watershed approach in Basin 14. The White River NRCD and WRJ-based ARS cover the Ompomp, Waits, lower Wells River watershed areas and most of the mid CT River direct tributaries. The Caledonia NRCD and Newport-based ARS cover the Stevens, Upper Wells watershed areas, and remaining portions of the CT River tributaries. This approach was based on one we developed in the branches of the White River funded by ERP grant funds.

**TP Small Farm Initial Targeting-** We first identified *Stressed* and *Impaired* waters that could be attributed to agricultural sources. These areas include:

- the bacteria-impaired section of the Ompomp in West Fairlee and Thetford,
- Impaired Tabor Branch tributary in the Waits,
- Stressed areas of the Waits main stem, downstream of the South Branch,
- Impaired Ticklenaked Pond (Wells watershed),
- Stressed lower Stevens main stem,
- Numerous reaches identified as high priority with agricultural sources in completed River Corridor plans- Stevens, lower Wells, Ompomp, and Norwich area

**Windshield Tours-** windshield tours were conducted with DEC and District managers and ARS staff at the sub-watershed level. Three tours were conducted- Ompomp, Waits, lower Wells and CT direct tribs and main stem, and Stevens and Upper Wells.

**AEM Process-** This is a slightly modified version of the original AEM process. As a result of these tours, we identified approximately 2 dozen small farms where potential ag BMP needs were noted. Some of these ag BMP included livestock exclusion fencing, barnyard management, manure storage, and riparian buffers. District and ARS staff have begun following up and meeting with farmers to provide technical assistance and

cost-share program information. In some cases AAFM regulatory staff, and where appropriate, DEC, will be brought in. These steps include:

- **AEM Tier 1-** is a first cut, kitchen table meeting with farmers to start an initial conversation about ag BMP needs and provide cost-share program information
- **AEM Tier 2-** is a farm natural resource inventory and farm stressor identification, with an emphasis on resource concerns impacting water quality and/or aquatic habitat
- **AEM Tier 3-** is a farm natural resource remediation plan, or capital budget, with “pre” photos of resource concerns, maps, remediation narrative/cost estimate/sketch. In some cases, landowner commitments and steward agreements are secured at this level. These capital budgets are the equivalent of “shovel ready” ag BMP projects.

**Basin 14 Agricultural Snapshots** (see Table xx below for more information)

### **Stevens River Watershed**

The Stevens River watershed is home to a wide array of small, diverse farms located along the Stevens River and tributaries. There are a few small dairy operations, one Medium Farm Operation, vegetable farms, sheep farms, and small beef operations. The ARS, DEC Watershed Coordinator and Caledonia NRCD identified eight farms in the watershed where potential AAP and BMP outreach would be beneficial. Five farms have been visited, with additional visits and follow-up meetings with farmers planned.

### **Wells River Watershed**

The Wells River watershed is home to an array of agricultural practices from dairy and beef to small vegetable and diversified farms. Recent projects and watershed tours by local watershed groups, conservation district, VACD staff, and DEC Watershed Coordinator have identified about a dozen farms along the main stem of the Wells River and its tributaries. Dairy is not the leading type of agriculture in this watershed, but at least 2 dairy farms reside directly on the Wells. The remaining agriculture in the watershed is small and diversified farming, with primary income earned off the farm. Many of these small farms continue to hay and crop along the Wells River and its tributaries, raise a few livestock, or grow produce for local farmers markets. Opportunity for outreach, project development, and implementation is present as these small diversified farms are often uninformed of AAP guidelines, funding resources, and water quality concerns.

The Wells River watershed would benefit from small Best Management Practice implementation such as exclusion fencing, barnyard and laneway improvements, roof water diversions, and riparian buffer improvements and establishments. Much of the hay land directly on the Wells River could see improvement in riparian buffers or may be eligible for river corridor or conservation easements. Outreach and project development would need to occur before implementation and would lead to practices that improve water quality in the Wells River.

### **Waits Watershed**

The agricultural demographic of the Waits River Watershed is small secondary farms. Landowners manage a handful of horses, beef cows, chickens, and harvest hay crops, but do not rely on farming as their primary income. Recent projects and watershed tours by local watershed groups, conservation district, VACD staff, and DEC Watershed Coordinator have identified approximately 12-15 farms along the main stem of the Waits River and its tributaries.

On the main stem, 3-4 small primary farmers call the Waits River home including two livestock farms and a large maple operation. The remaining agriculture along the main stem include small vegetable, beef and horse farms that continue to manage the hay fields along the river. Branching out into the tributaries, the trend of small secondary farms continues, but the number of dairy farms is more substantial. Within the Waits river watershed are 4-5 small farms as dairy or beef with agriculture as the main enterprise. Additionally, landowners raise a handful of beef, horses, or larger scale vegetable stands. All of these small farms remain on the fringes of AAP outreach and visits due to their small scale and off the farm jobs. Opportunities along the main stem include outreach and AAP education, Best Management Practice identification and development, and buffer improvements and establishments, and river corridor easements.

### **Ompompanoosuc Watershed**

Similar to the Wells and Waits River watersheds, the Ompompanoosuc watershed follows the pattern of small, diversified farming, with a few primary farms. Recent projects and watershed tours by local watershed groups, conservation district, VACD staff, and DEC Watershed Coordinator have identified approximately 20 farms along the main stem of the Ompompanoosuc and its tributaries.

Most of the agriculture in this watershed is represented by secondary diversified farms. Although there may only be 1-2 primary operations such as dairy or beef, there remains

open hayfields and pastures along the Ompompanoosuc and West Branch of the Ompompanoosuc. One of the largest differences between the Ompomanoosuc and its neighboring watersheds is the density of horse farms. Several large horse operations are established along the West Branch with a few diversified farms scattered between them and on the tributaries. Because of the high population of horse farming in this area, farms may benefit from outreach and AAP education as often horse farms are not targeted recipients of agricultural outreach. Similarly, this area is represented by small farmers who may also benefit from outreach and Best Management Practices such as fence exclusion, barnyard management, composting, riparian buffer plantings, easements, etc.

**Mid-Connecticut direct-** The Connecticut River Valley is dominated by 2 Medium Farm Operations. Small diversified farms are established between the medium farms including vegetable and beef farms.

**Table G.1- AEM Implementation in Basin 14**

Sub-watershed/ Waterway	Completed/planned AEM Tier 1	AEM Tier 2-3 Completed BMPs	Additional BMP Needs
<b>Stevens-</b> <ul style="list-style-type: none"> <li>• East Peacham Brook</li> <li>• Willow Brook</li> <li>• South Peacham Brook</li> <li>• Cloud Brook</li> <li>• Direct tributary to Harveys Lake</li> </ul>	<ul style="list-style-type: none"> <li>• Five Tier 1s completed</li> <li>• Three Tier 1s planned</li> </ul>	One Tier 2s completed: <ul style="list-style-type: none"> <li>• Grazing</li> <li>• Manure storage</li> </ul> Five Tier 2s planned	<ul style="list-style-type: none"> <li>• Buffers</li> <li>• Fencing</li> <li>• Milkhouse waste</li> <li>• Gully stabilization</li> <li>• Culvert upgrades</li> <li>• Barnyard runoff</li> <li>• Manure storage</li> <li>• Laneways</li> </ul>
<b>Wells-</b> <ul style="list-style-type: none"> <li>• Halls Brook</li> <li>• Wells River</li> <li>• Ticklenaked Pond unnamed tributaries</li> </ul>	<ul style="list-style-type: none"> <li>• Three Tier 1s completed</li> </ul>	Two Tier 2s completed: <ul style="list-style-type: none"> <li>• 2 Riparian buffer projects</li> <li>• 1 barnyard improvement</li> <li>• 1 clean water diversion</li> </ul>	<ul style="list-style-type: none"> <li>• Transition to MFO* permit</li> <li>• Buffers</li> <li>• Fencing</li> <li>• Swale management</li> <li>• NMP</li> <li>• Laneway</li> <li>• Milkhouse waste treatment</li> <li>• Access road</li> </ul>

<b>Waits-</b> <ul style="list-style-type: none"> <li>• Tabor Branch</li> <li>• South Branch</li> <li>• Waits River</li> </ul>	<ul style="list-style-type: none"> <li>• Five Tier 1s completed</li> </ul>	One Tier 2 completed: <ul style="list-style-type: none"> <li>• NMP</li> </ul> One Tier 3 completed: <ul style="list-style-type: none"> <li>• Manure storage</li> </ul>	<ul style="list-style-type: none"> <li>• Buffers</li> <li>• Fencing</li> <li>• Manure storage</li> <li>• NMP*</li> </ul>
<b>Ompompanoosuc-</b> <ul style="list-style-type: none"> <li>• West Branch</li> <li>• Main stem</li> <li>• School House Brook</li> </ul>	<ul style="list-style-type: none"> <li>• Three Tier 1s complete</li> <li>• Four Tier 1s planned</li> </ul>	Three Tier 3s completed: <ul style="list-style-type: none"> <li>• NMP</li> <li>• 2 riparian buffer projects</li> <li>• 2 river corridor easments</li> </ul>	<ul style="list-style-type: none"> <li>• Fencing</li> <li>• Manure storage</li> <li>• Barnyard runoff</li> <li>• Grazing systems</li> <li>• NMP*</li> </ul>
<b>Middle Connecticut Direct</b>	<ul style="list-style-type: none"> <li>• One Tier 1 completed</li> <li>• One Tier 1 planned</li> </ul>	Two Tier 2s completed: <ul style="list-style-type: none"> <li>• 2 riparian buffer projects planned</li> </ul> One Tier 3 implemented: <ul style="list-style-type: none"> <li>• Cover crop installed</li> </ul>	

\*NMP= nutrient management plan

\*MFO= medium farm operation

## Appendix H – Basin 14 Stormwater Master Plan Suggested Templates

Table H.1. Basin 14 municipalities with suggested templates municipal stormwater (SW) plans

Municipality with Urbanized Area/Rural Municipality by Sub-watershed	Existing Stormwater Ordinance	Suggested SW Master Planning Template	Growth Center Category
<b>Stevens</b>			
Barnet*	NA	3b	-
Peacham	NA	3b	-
<b>Wells</b>			
Groton/Groton Village	No	2a	-
Ryegate/East Ryegate/South Ryegate	NA	3b	-
Newbury/Newbury Village/Wells River*	NA	3b	-
<b>Waits</b>			
Topsham	NA	3b	-
Corinth	NA	3b	-
Bradford/Bradford Village	No	2a	Bradford Downtown
<b>Ompompanoosuc</b>			
Vershire	NA	3b	
West Fairlee	NA	3b	West Fairlee Village Center
Thetford	NA	3b	
Strafford	NA	3b	South Strafford Village Center
<b>Middle Connecticut</b>			
Fairlee	NA	3b	-
Norwich/Norwich Village*	Yes	2a	Norwich Village Center
Hartford/White River Junction*	No	1, 2b or 3a	White River Junction downtown and Hartford Growth Center

\*Some municipalities located in multiple sub-watersheds. This table slots towns in sub-watersheds where most urbanized portions of town are located. Some towns located in this basin are not listed here, as their urbanized areas are located in other watersheds such as the Winooski or White River.

- 1a=Site, local or small watershed approach with planned build out analysis and traditional stormwater management
- 1b= Site, local or small watershed retrofit approach with traditional stormwater management
- 1c=Site, local or small watershed retrofit approach with LID stormwater management
- 2a= Hybrid site and community retrofit with Low Impact Development stormwater management
- 3b= Regional or multi-town approach

## Appendix I - Regulatory and Non-regulatory Programs Applicable to Protecting and Restoring Waters in Basin 14

The Vermont Surface Water Management Strategy maintains a continually updated roster of regulatory and non-regulatory technical assistance programs.

Regulatory programs may be accessed at:

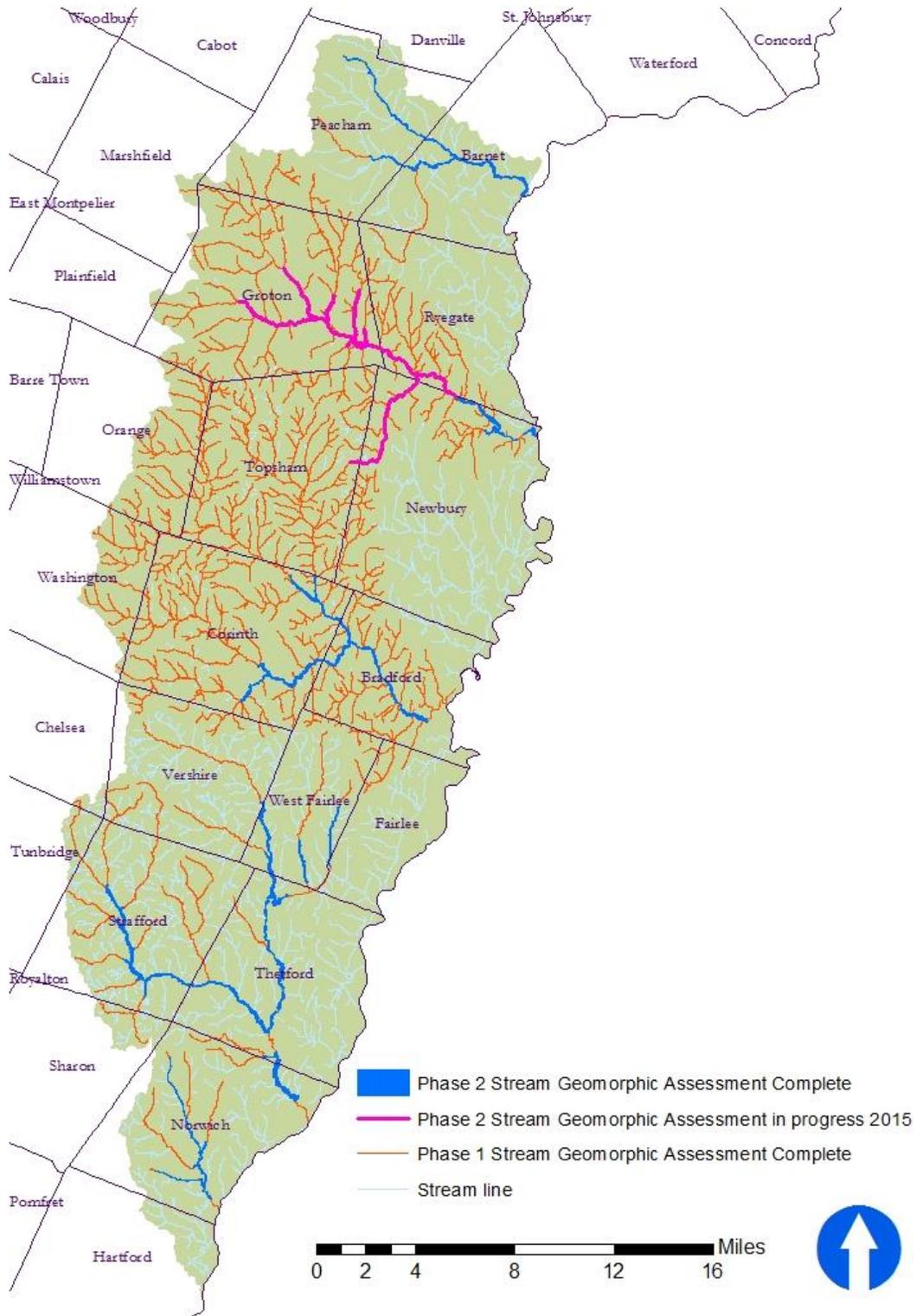
[http://www.vtwaterquality.org/wqd\\_mgtplan/swms\\_appA.htm](http://www.vtwaterquality.org/wqd_mgtplan/swms_appA.htm)

Non-regulatory programs may be accessed at:

[http://www.vtwaterquality.org/wqd\\_mgtplan/swms\\_appD.htm](http://www.vtwaterquality.org/wqd_mgtplan/swms_appD.htm)

# Appendix J – Basin 14 High Priority River Corridor Projects

Figure J.1 Basin 14 completed and on-going geomorphic assessments



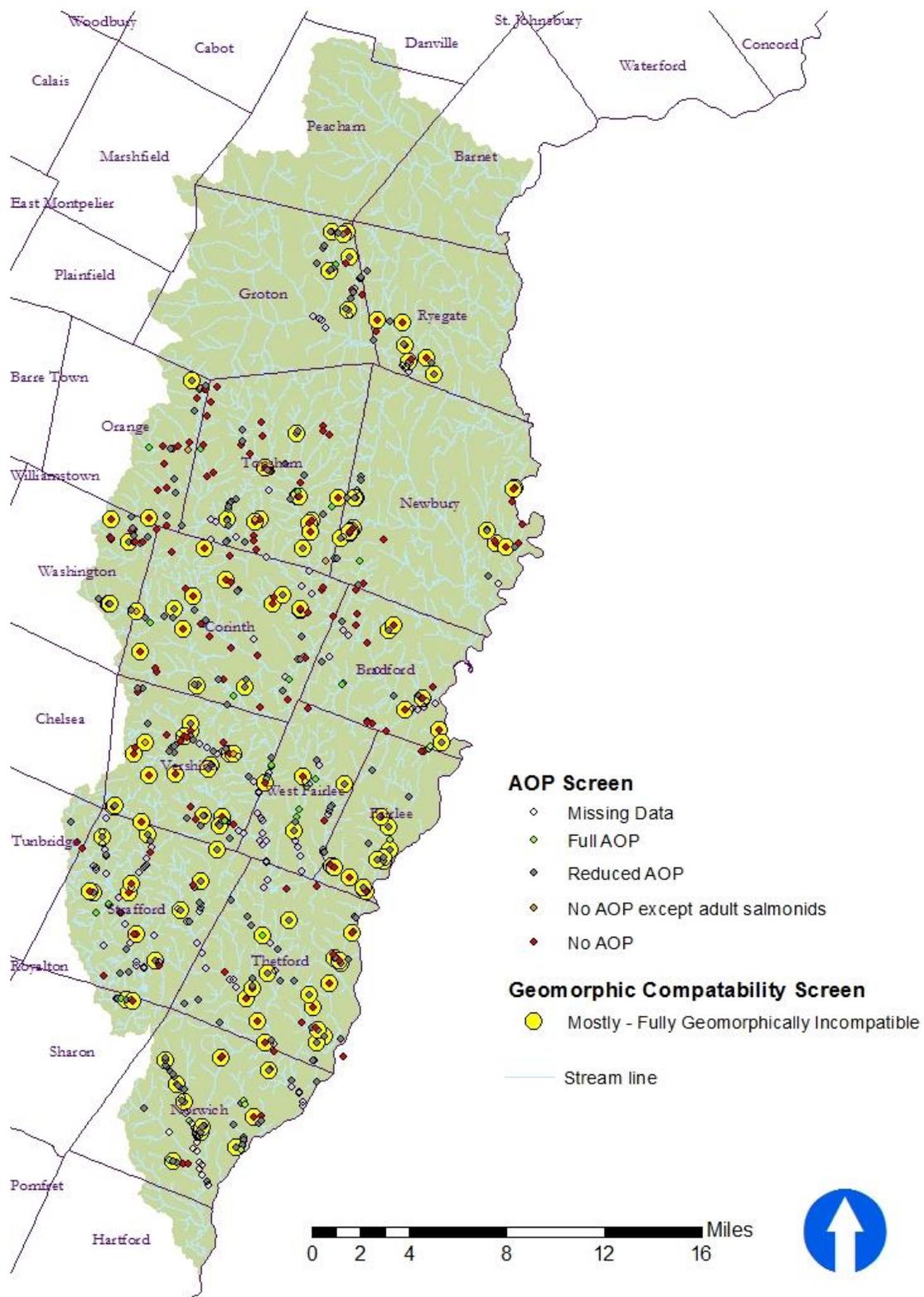


Figure J.2 Basin 14 Culvert Assessment results

Table J.3- high priority river corridor projects, from river corridor plans

Subwatershed/ Stream/ Reach	Riparian buffer planting/river corridor easement	Livestock exclusion	Floodplain restoration or encroachment removal or potential dam removal	Arrest headcut/gully stabilization	River clean- up
<b>Stevens River</b> M1.03	✓		✓		
<b>South Peacham Brook</b> T2.01	✓				
T2.02A	✓	✓			
T2.04A and B	✓	✓	✓		
<b>Peacham Hollow Brook</b> T1.01	✓				
T1.02	✓				
T1.03	✓				
T1.06				✓	
T1.07				✓	
<b>Wells River*</b> M09	✓				
<b>M8</b>	✓				
M07-A and B	✓				
M6-A and B	✓				
M4	✓				
M1	✓ (bank stabilization)				
<b>Waits River</b> M09A	✓		✓		
M07	✓				
M04B	✓				
<b>South Branch</b> T1.01	✓				
T1.02			✓		
T1.04	✓		✓		
T1.05	✓				
T1.09A, B, and C	✓				
<b>Cookville Brook</b> T1.06.S1A	✓	✓			
T1.06S1B	✓	✓			
<b>Tabor Branch</b> T2.01			✓		
T2.02A and C	✓				
<b>MeadowBrook</b> T1.09	✓				
<b>Ompompanoosuc - West Branch</b> M01	✓				
M10	✓				
M9B	✓		✓		

M6	✓		✓		
M5			✓		
Brook Road Brook T6.01	✓		✓		
Carpenter Hill Brook T4.01B		✓			
<b>East Branch R3</b>	✓				
R11 (impaired)					✓
R14 (impaired)					✓
R15 (impaired)	✓		✓		
R15B (impaired)			✓ (Montague Dam)		
R19A (impaired)	✓				
R19B (impaired)	✓		✓ (Geer Dam)		
R20B (impaired)	✓		✓		
<b>Brook Road Brook T6.01</b>	✓				
<b>Carpenter Hill Brook T4.01B</b>		✓			
<b>Mid- Connecticut Bloody Brook M09A</b>	✓			✓	
M4	✓				
M3			✓		
M1			✓		
<b>Bragg Brook M03T1.01A</b>	✓		✓		
M03T1.02B	✓				
<b>Charles Brown Brook M04T2.01A</b>	✓		✓		
M04T2.01B			✓	✓	
<b>New Boston Brook M05T3.01</b>			✓	✓	

\*Only the lower Wells River Corridor plans complete as of spring 2015.

### High Priority Stream Crossing Projects- for both AOP and Geomorphic Incompatibility

Table J.4- Stevens River Watershed- high priority stream crossing projects

Stream Name	Structure ID
Peacham Hollow Brook	700000000303093
Peacham Hollow Brook	100000000203091 700002010603093
South Peacham Brook	100000000803091 700006060303093

**Table J.5- Wells River watershed high priority stream crossing projects**

<b>Stream</b>	<b>Reach</b>
Wells River	M4B
Wells River	M1
Unnamed Tributary (near Blue Mt. Union)	M04S3.01

**Table J.6- Waits River Watershed high priority stream crossing projects**

<b>Stream</b>	<b>Structure ID</b>
Chase Brook	70001900760901x
Unnamed tributary to Waits	100037000009011
Unnamed tributary to Meadow Brook	70005103370905x
Unnamed tributary to Pike Hill Brook	70000401790905x
Pike Hill Brook	70000607440905x
Pike Hill Brook	70000607440905x
Cookville Brook	70000204560905x
Unnamed tributary to Cookville Brook	70004403790905x
Unnamed tributary to Hedgehog Brook	70004102510907x
Unnamed tributary to Hedgehog Brook	70004102550097
Unnamed tributary to Hedgehog Brook	70004303370907x
Unnamed tributary to East Orange Branch	100000000009081
Unnamed tributary to Tabor Branch	100032000009121
Unnamed tributary to Tabor Branch	70000201050912x
Unnamed tributary to Tabor Branch	70000104970912x
	700001008609123
Unnamed tributary to Tabor Branch	70000105050912x
Unnamed tributary to Waits River	70003804080912x
	700038037609123
Unnamed tributary to Waits River	70003603440912x
	700036034009123
Unnamed tributary to Waits River	70002602400905
Unnamed tributary to Waits River	70002602460905x
	700026044209053

**Table J.5- Ompompanoosuc Watershed high priority stream crossing projects**

<b>Stream</b>	<b>Structure Number/Reach</b>	<b>Road/Reach</b>	<b>Poor Condition</b>
Old City Brook	58	Van Dyke Road	
Old City Brook	50	Van Dyke Road	
Old City Brook	56	Van Dyke Road	

Old City Brook	19	Old City Falls Road	x
Old City Brook	21	Old City Falls Road	x
Alger Brook	31	Alger Brook Road	
Alger Brook	32	Alger Brook Road	
Ompompanoosuc	48	White Road	x
Ompompanoosuc	5	Justin Morrill HW	
Ompompanoosuc	26	Justin Morrill HW	
Brook Road Brook	-	T6.01	
Avery Brook	-	Main St./Ro6.s1.01-B	
Avery Brook	-	Route 132/R06.s1.02-B	
Blood Brook	R16T2.05C	Marsh Hill Road	
Blood Brook	R16T2.06C	Godfrey Road	

**Table J.6- Middle Connecticut River watershed high priority projects**

Stream	Road	Structure	Risk Category*
Needham	Upper Turnpike	40141001414111	I
Needham	Needham	4014111003614111	I

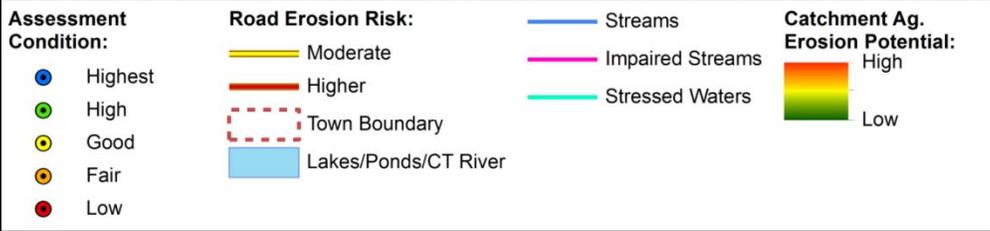
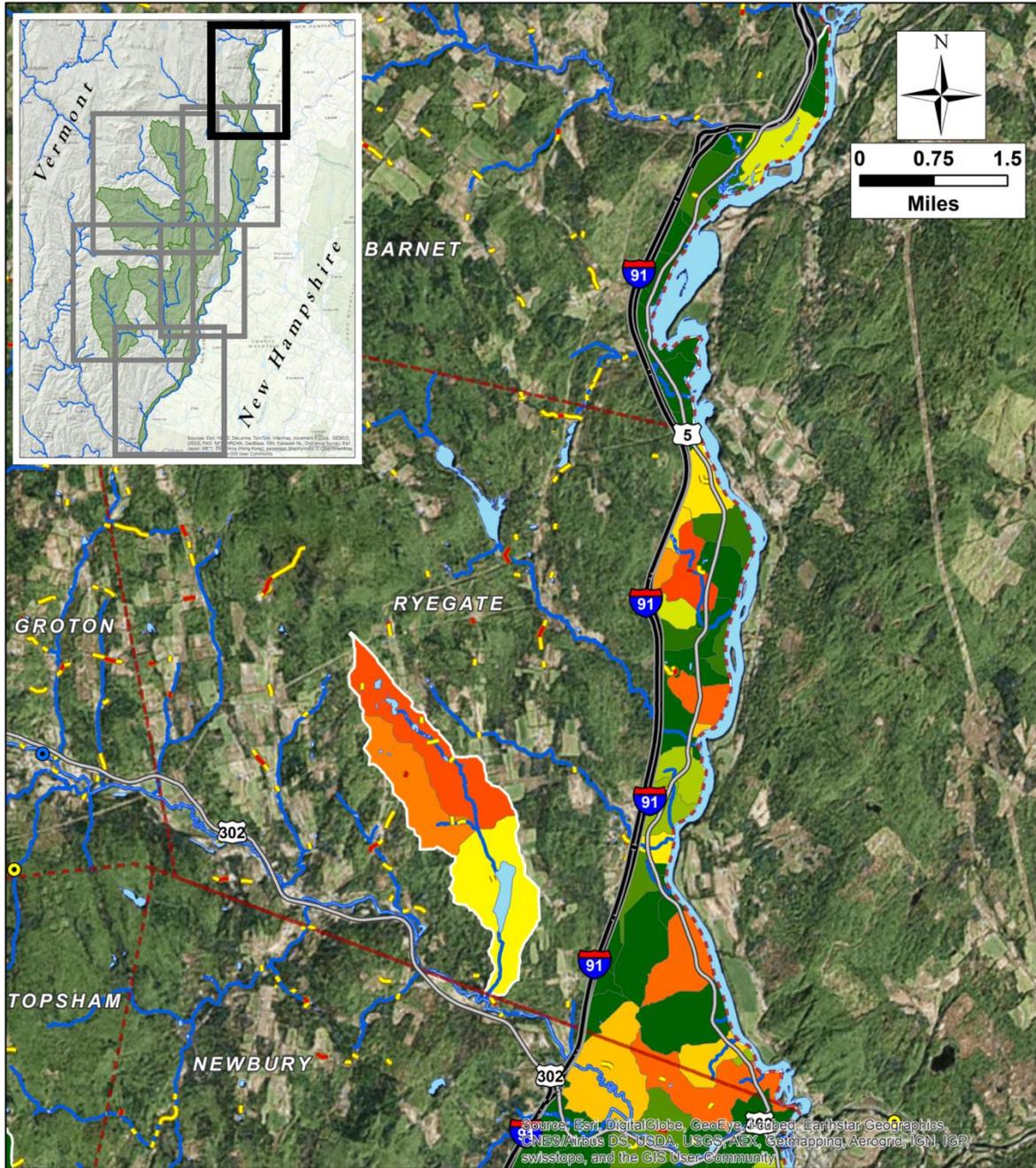
\*Risk Category from TRORC include structures less than 40% BFW, if Phase 2 BFWs are used this list of Category I's would include an additional 8 structures on Bragg and Bloody Brooks (*Phase 2 Geomorphic Assessment Blood(y) Brook Watershed Norwich*, prepared by VT Redstart Consultants for TRORC, 2007)

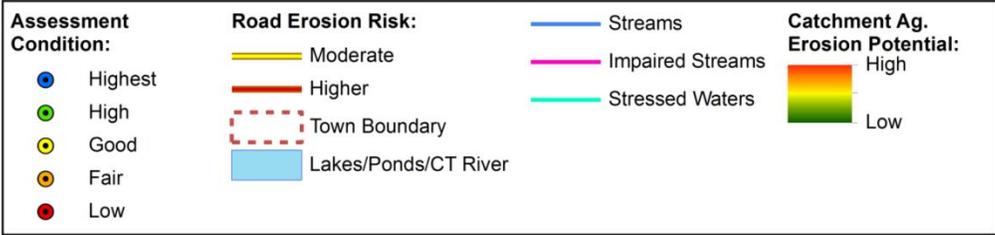
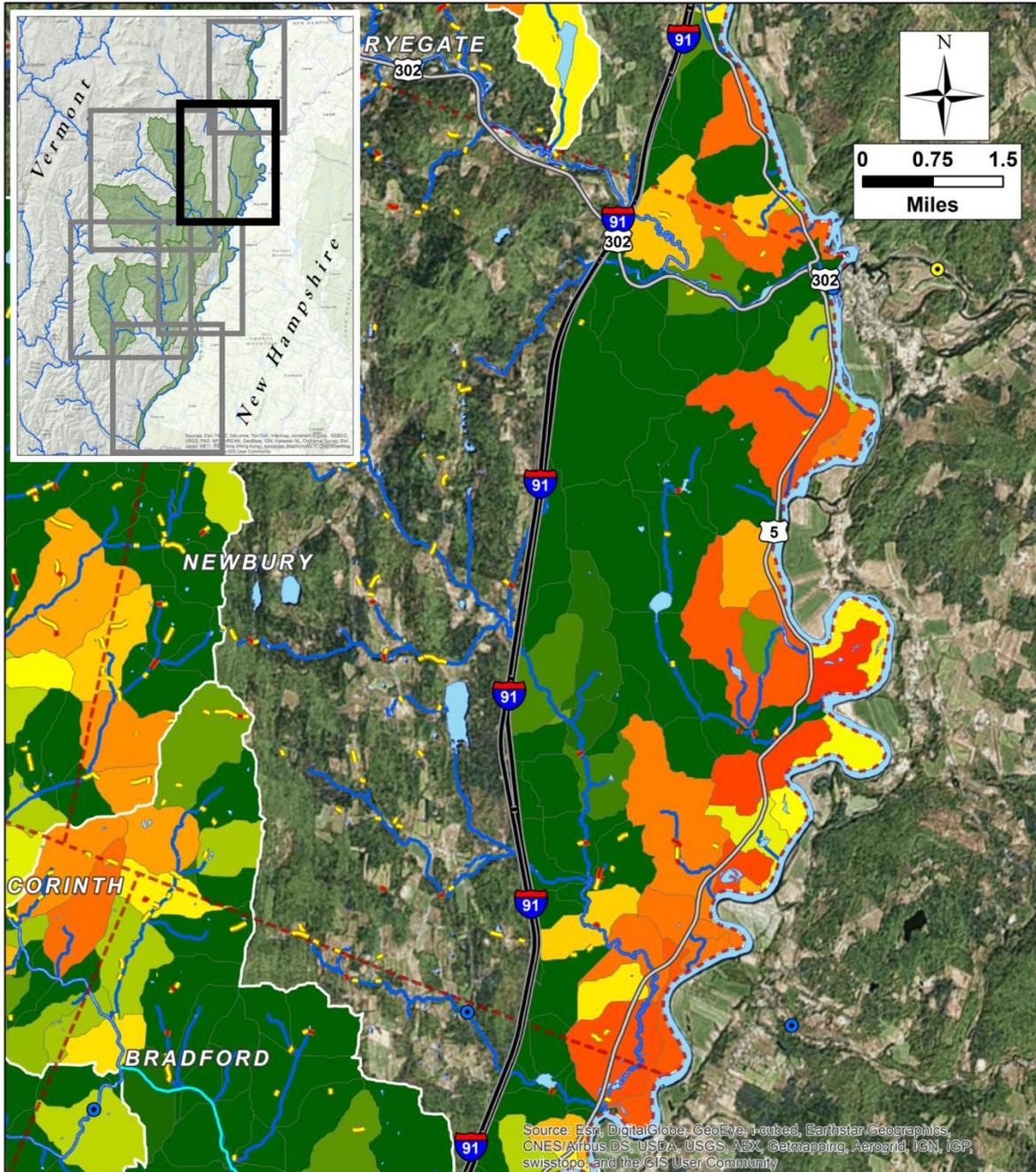
## Appendix K – Basin 14 Agricultural and Road Erosion Risk Maps

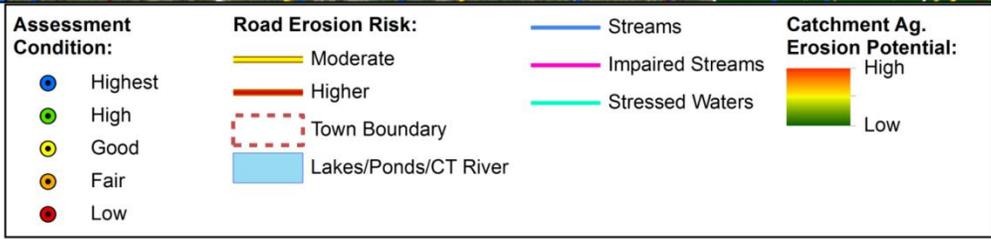
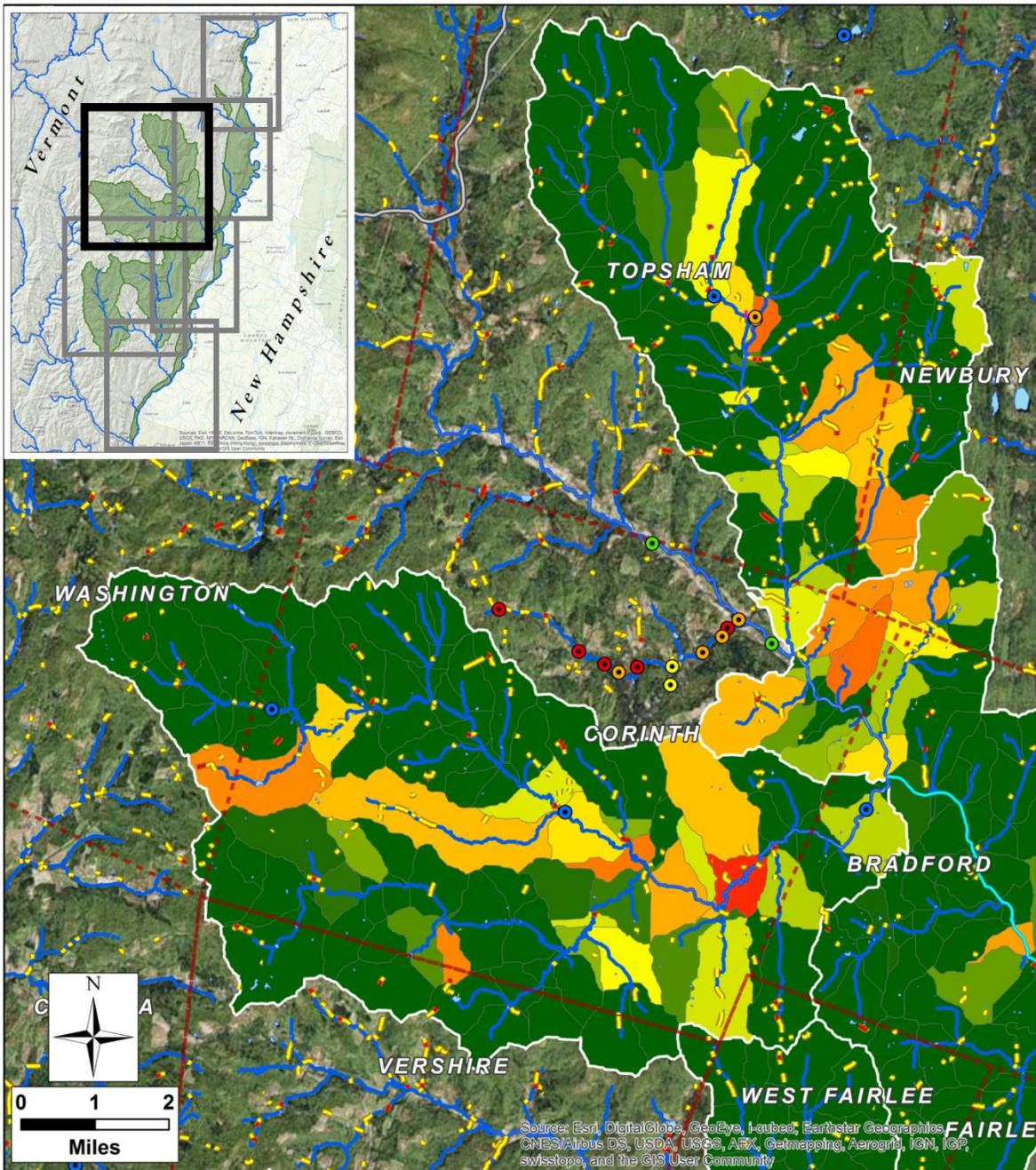
### Methodology

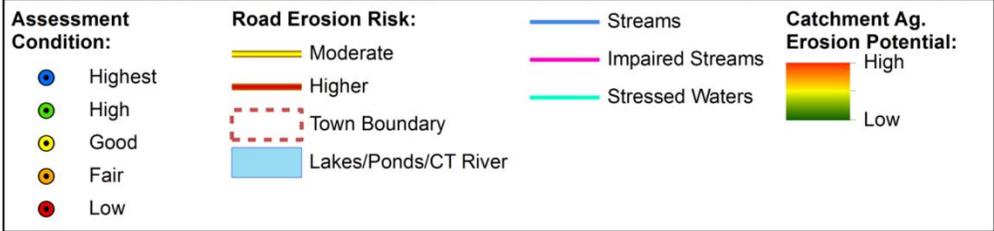
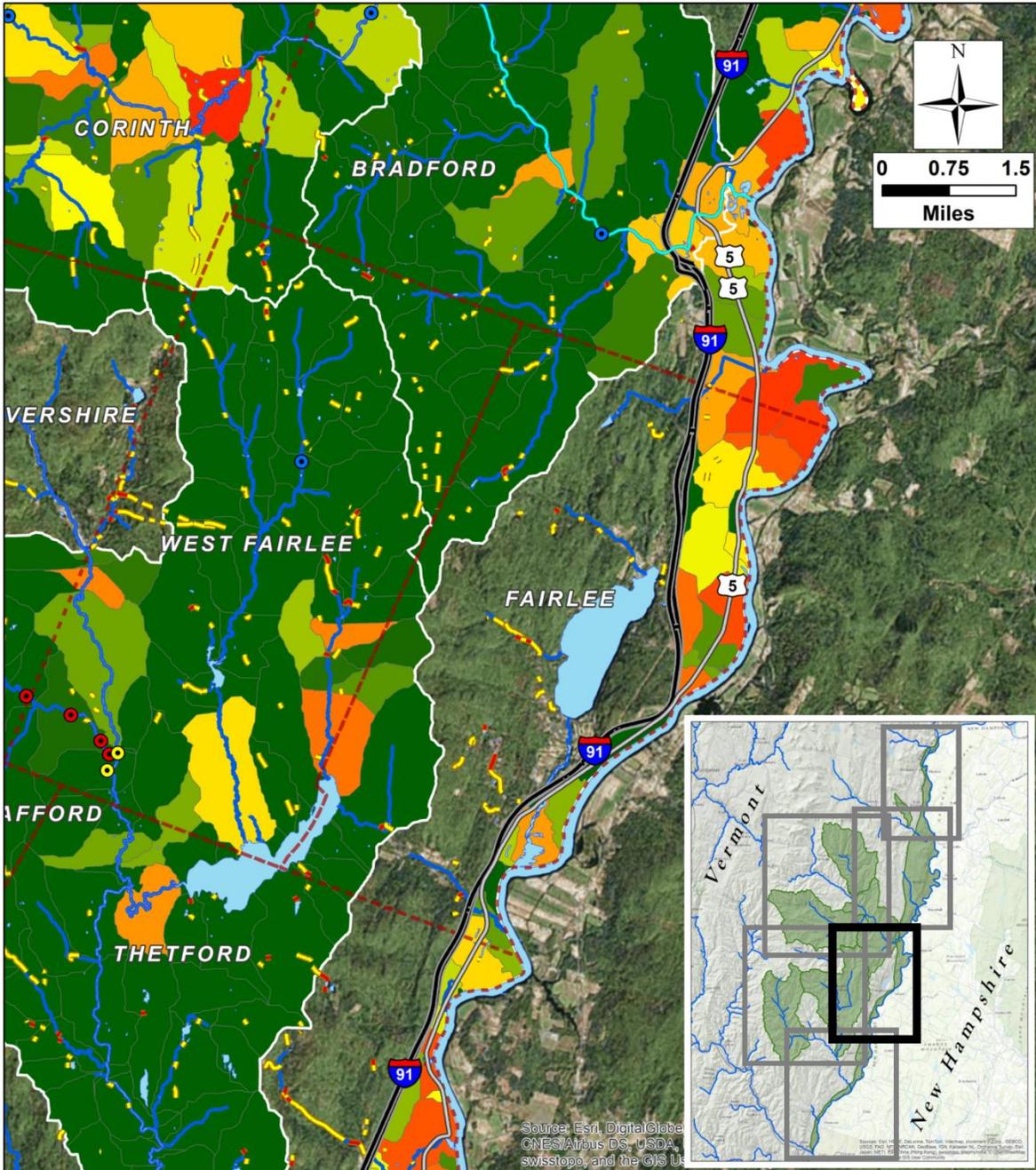
Catchments, ranging in size from less than 0.1 square miles to 1.5 square miles, were derived using the ArcHydro toolset with a hydrologically “enforced” 10m digital elevation model (DEM) provided by the Vermont Center for Geographic Information. The agricultural erosion potential layer is based on an analysis tool from Natural Resource Conservation Service (NRCS). This analysis scored erosion potential based on slope, flooding frequency, soil hydrologic group, and soil erodibility. These scores were then categorized and symbolized to convey a range of risk levels, from lower to higher. DEC partnered with Stone Environmental to develop a GIS layer that ranks road segments by their potential for erosion. The analysis specifically looked at unpaved class 2, 3, and 4 roads as well as driveways longer than 1,000 ft. This layer is similar to the NRCS Agricultural Erosion Potential analysis in that it is based on remotely sensed GIS data and also relies on land slope, soil erodibility and frequency of soil flooding as predictors of erosion risk. Proximity to waterbodies and the existence of undersize culverts were also factored in, as these conditions often exacerbate sediment delivery and in-stream erosion. The results of the analysis ranked and categorized segments into lower, moderate, and higher risk. These results are available in Appendix K, as well as statewide on the Vermont Natural Resources Atlas (<http://anrmaps.vermont.gov/websites/anra/>).

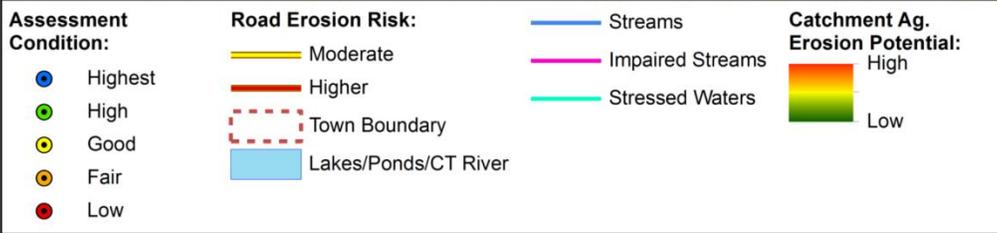
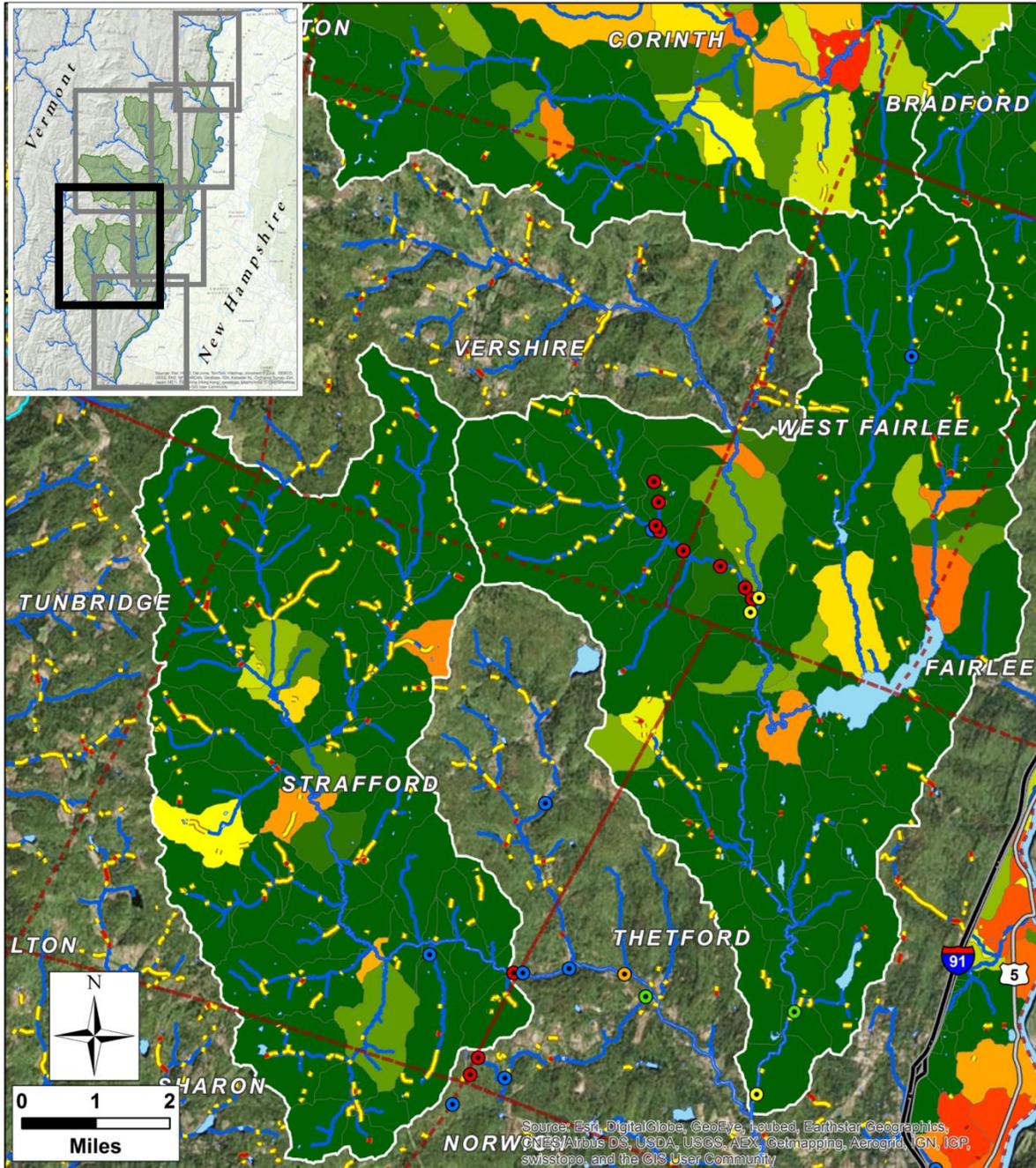
Biomonitoring assessment site status Overlaid on both the agricultural erosion potential and road erosion risk maps are the most recent assessment results at DEC biomonitoring sites (also available in Appendix A and on the Vermont Natural Resources Atlas). The point features are color coded to show status based on macroinvertebrate monitoring data that has been accepted and approved by DEC. Original assessment categories were assigned by DEC scientists as “poor”, “fair-poor”, “fair”, “fair-good”, “good”, “good-very good”, “very good”, “very good-excellent”, and no status where not enough data exists. These were then grouped and color coded on this map as “low”, “fair”, “good”, “high”, and “highest”. This data only communicates the results of the most recent assessment outcome.

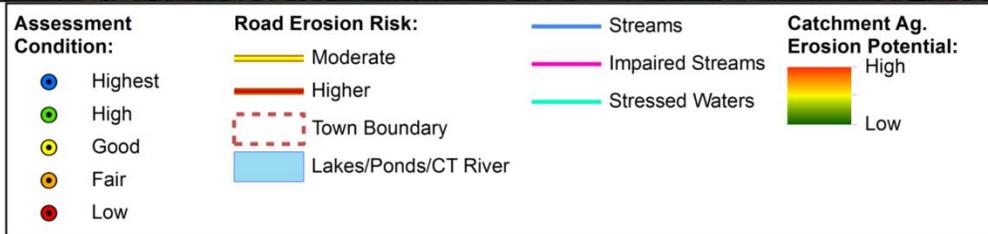
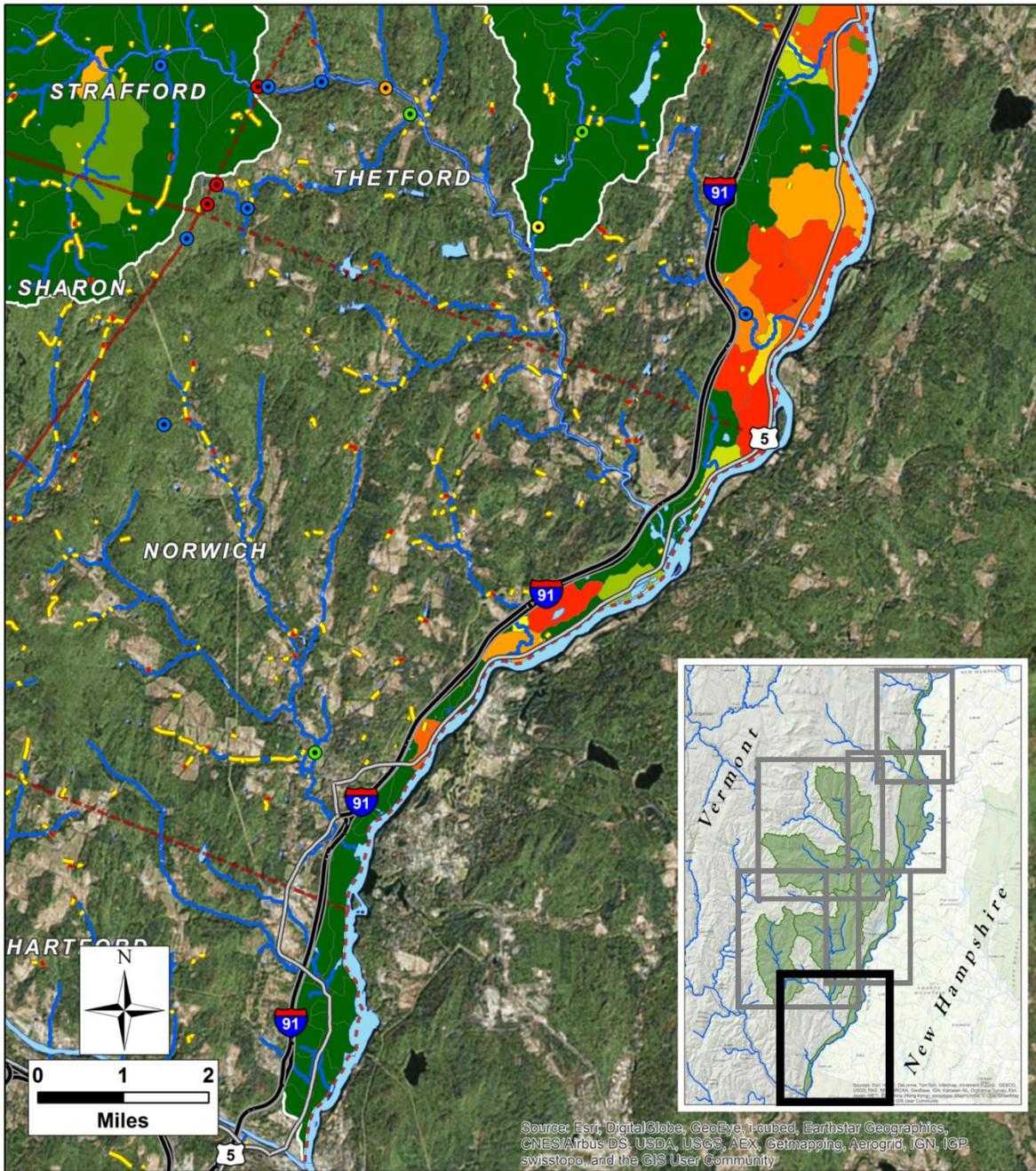












## Appendix L – Basin 14 Tactical Plan Public Comments and Responsiveness Summary

**Comment 1-** While reading the Ompompanoosuc fishery description found in the Tactical Plan and noticed it seemed to contradict the 2009 description in the Watershed Plan. In 2009 naturalized trout such as brown trout are found to exist. In the tactical plan it says "naturalized trout do not exist despite decades of stocking." Might DEC and VDFW have different present/absent data based on where they sample?

**ANR Response-** A salmon (stocked as part of the former Connecticut River Restoration program) could have been misidentified in a DEC survey at some point in time. Wild brown and rainbow trout have not been seen. The Connecticut River could be a source of an infrequent migrant.

**Comment 2-** There is the suggestion that Harvey's Lake is stocked with Lake Trout. It appears to be stocked with brown and rainbow trout based on stocking reports found.

**ANR Response-** That is correct, and that is the plan for the foreseeable future. When FWD sampled Harvey's Lake the last few years, there were no adult lake trout. A lack of deepwater oxygen limits available habitat for Lake Trout. We thought brown trout would have a better chance of surviving long enough to provide a big salmonid for ice fishermen.

**Comment 3-** There is a suggestion the Tabor Branch supports high numbers of trout throughout and yet in another area (can't remember if it was tactical or 2009 watershed plan). I believe it suggests lower a Tabor is too warm due to lack of buffers/shade.

**ANR Response-** Upstream Tabor Branch supports abundant brook trout. Lower reaches get wide and warm and exhibit less suitable habitat.

**Comment 4-** Stocking for the Stevens and Wells Rivers seem to contradict the current stocking reports. Stevens now seems to be stocked entirely with rainbow trout. The Wells seems to be stocked with browns, not rainbows.

**ANR Response-** There has been a state of flux since Tropical Storm Irene destroyed the Roxbury Hatchery. If FWD hatcheries were all at full capacity, we would be stocking brook and rainbow trout in the Stevens and rainbow trout in the Wells.

**Comment 5-** The Stevens branches are described as managed for wild trout, but they are not listed as "high quality waters for fishing. "

**ANR Response-** The ANR definition for High Quality Waters for Recreational Fishing is as follows:

*VT Department of Fish and Wildlife assesses wild trout populations and important nursery areas to document very high quality recreational fisheries, which are typically found in surface waters that exhibit clean and cool conditions. Abundant wild trout populations are defined as supporting multiple age classes of one or more species of wild trout (brook, brown, rainbow trout) at levels generally equal to or greater than 1,000 fish/mile and/or 20 pounds/acre. It should be recognized that wild trout populations vary widely from year to year and therefore an individual population may sometimes go below or greatly exceed these values in a given year. Other waters that have not been surveyed may also support similar wild trout densities and may be identified in the future. Certain noteworthy streams are also important to support spawning and nursery habitat.*

We have listed all waters in the basin that meet the above defined criteria in this document, recognizing that this number can vary from year to year and may change future listings.

**Comment 6-** Based on dam removals it would be interesting to know if the opinion of fisheries biologists is that the majority of the Wells is too warm to support trout in the summer. I fished this area a couple of weeks ago so I was interested in reading these reports.

**ANR Response-** The Wells is marginal for trout most of its length due to high temperatures, but it has wild trout in pockets, and it may serve as overwintering habitat and travel corridor for trout moving between tributaries.

**Comment 7-** TRORC fully supports the goal of restoring and maintaining the water quality in the region that is the basis for both natural and human health, as well as a healthy economy. The basin planning process at the agency continues to improve and provide more specificity and targeted actions, and the draft for Basin 14 represents another step forward in a long struggle to meet state and federal law.

In particular, we applaud the lists of undersized structures found the tables J.4-J.6 in the Appendices that are priorities for upgrades. These are exactly the type of actions tied to an issue that is needed. In fact, it would be easier for readers and might improve implementation if this list was actually in the body of the plan and not in the Appendices. Still of concern is how and whether these culverts and bridges will actually be upgraded. As the Vermont Water Quality Standards note, "Basin plans establish a strategy to improve or restore waters, and to ensure

full support of uses.” It could be argued that a strategy lacking in funding or a reasonable certainty that it will be done is not really a “strategy”, but more of a policy. Town and state efforts under the ERAF rule, structures grants, and other sources are making at least some physical improvement on these areas, but we would encourage greater funding to make these recommendations reality.

**ANR Response-** We have listed several specific high priority stream crossings in this document, and would support any partner efforts in moving these forward. Funding for stream crossing replacements is highly competitive and we felt that we should list all good potential stream crossing projects here, so that if an opportunity to replace a structure presents itself, this plan would be supportive of that effort. For consistency reasons, we prefer listing all specific projects in the Appendices, when they are too numerous to list in the Implementation Tables themselves. This applies to the AEM projects and Stormwater Infrastructure Mapping Report priorities.

**Comment 8-** On the stormwater side, the plan is more nebulous. The draft states that, “High priority stormwater management remediation projects are identified in the Tactical Plan Implementation Tables (Tables 18-23) in Chapter 4”. The relevant actions on stormwater are in Table 18, Action 3; Table 20, Actions 19 and 28; Table 21, Actions 36 and 41; Table 22, Actions 48 and 50; and Table 23, Action 59. These actions fall into two categories - implementing recommendations within separate “Stormwater Mapping Reports”, and preparing road erosion inventories and capital budgets targeting medium and high priority road segments using the *ANR Atlas Road Erosion Risk Analysis*.

As for Stormwater Mapping Reports, these are not actually called “Stormwater Mapping Reports”, but are rather “Stormwater Infrastructure Mapping Projects.” There is no link provided to these projects and they are not in the Appendices. These are excellent resources hiding at [http://www.watershedmanagement.vt.gov/erp/htm/SW\\_IDDE\\_program.htm](http://www.watershedmanagement.vt.gov/erp/htm/SW_IDDE_program.htm).

The text in the draft could at least be made to include a hyperlink to the projects, if they are not included in the Appendices. The target maps in these projects are very good, and if the entire project cannot be included, then we suggest that at least the target maps be included. Like culvert upgrades, we do not believe that the resource scale meets the need and encourage additional financial resources.

**ANR Response-** Thank you for pointing out Stormwater Infrastructure Mapping Projects, as the correct name of the so described reports, not Stormwater Mapping Reports. This terminology is not consistent in the plan. We will make that change in the plan.

Yes, adding a link to those documents would be helpful to the reader and those responsible for implementing the tactical plan. That link will be added.

**Comment 9-** As for the road erosion inventories and capital budgets, TRORC is beginning to work on this, and sees this as an excellent place where our capacity and relationships with towns positions us to undertake this kind of work. However, to move this from aspirational on anything but a pilot scale will require significant new funding to create the inventories and even more to implement. We encourage the agency to identify new sources of funding to bring this recommendation to full fruition.

**ANR Response-** ANR, and our watershed partners, look forward to working closely with TRORC and municipalities in completing road erosion inventories and capital budgets. ANR and VTrans have recognized the need for additional funding in order to make the actions in this plan, and throughout the state, a reality and are in the process of bringing enhanced funding and technical assistance to this very important area of watershed restoration and flood resiliency. Additionally, as a result of H.35, the Vermont Clean Water Act, a new DEC Municipal Roads Stormwater General Permit will be developed by December 2017. All towns in the state will be required to identify their highest priority road erosion sites and formulate a plan and implementation strategy to address those sites. The recommendations within the tactical plan have been formulated considering the forthcoming general permit.

**Comment 10-** The draft does a good job of describing the waters in the basin in both general, overall language, and then down to sections of particular rivers or streams, at points even listing waters that have very high quality. We urge the agency to take the next step. Even though the VWQS still require that basin plans “shall propose the appropriate Water Management Type or Types based on both the existing water quality and reasonably attainable and desired water quality management goals” the draft does not propose any WMTs. Given the work we did to pilot typing in the White River Basin, we believe typing is doable. However, in the absence of typing, there is still the potential to reclassify deserving waters as A1, and the draft lists some waters in Table 17 that might qualify. Given our work in the White, we believe that many more small upland streams would also meet A1 standards based on existing or reasonably attainable water quality. The agency should use the opportunity of the draft to go ahead and propose waters for A1 reclassification.

**ANR Response-** The Tactical Basin Plan in Chapter 3 lists those reaches, identified using monitoring and assessment data, that exhibit biological integrity consistent with Class A(1) criteria. Part of the implementation process for this and other tactical basin plans is to engage the public dialogue necessary to

determine whether the management objectives for Class A(1) are suited to the surface waters at hand, in the rulemaking process that would lead up to a reclassification action pursuant to 10VSA1253. In order to determine this suitability, the Agency would need to explain the management implications of Class A(1) designations, which among other preclusions limit the allowable size of indirect discharge wastewater systems, and preclude direct discharge of any waste that prior to treatment may have contained pathogenic organisms.

The Agency is at present carrying forth a dialogue with the US Forest Service to reclassify certain surface waters within USFS lands to Class A(1), in specific recognition of the management approaches applied to lands within the subject subwatersheds. While there are no USFS waters in this Tactical Basin Plan, the Agency is eager to complete this step, in order to pave the way for other reclassification efforts.

Further, the Agency is under requirement from Act 64 to promulgate by rule, before July 1, 2016, an antidegradation procedure. The intent of the Agency is to use this rule to clarify how permit conditions may be formulated to protect very high quality waters for which discharges are proposed, in such a way as to accomplish the intent of Water Management Types.

**Comment 11-** There is also the matter of existing uses. In section B in Chapter 3, the draft states that, "It is DEC's long-standing stipulation that all lakes and ponds in the basin have existing uses of swimming, boating and fishing." This is not backed up by evidence that all lakes and ponds actually have such uses. However, we agree with the agency's stance, but find the determination of existing uses in rivers and streams to be much more stringent. Here, it only happens where, "DEC has collected sufficient information to identify the existing uses." As the draft notes, though, "The list is not meant to be exhaustive. The public is encouraged to nominate other existing uses, which may be included in the basin plan or catalogued for a more thorough investigation when an application is submitted for an activity that might adversely affect the use." Given the nature of fisheries and fishing, that a youngster with a pole might, and should be able to, toss it in some mountain creek and expect a nibble, we recommend that all permanent third order streams and higher have fishing designated as an existing use.

**ANR Response-**Existing uses are listed as requirements of tactical basin plans within the Vermont Water Quality Standards. Notwithstanding the identification of an Existing Use in a tactical plan or otherwise, 10VSA1252 specifically designates the "Designated Uses" applicable to all surface waters within a given classification. Insofar as 1) good fish habitat is a designated use for all Class B or better waters [§1252(a)(2)], and 2) that all surface waters in Vermont are

designated to either Class B or Class A(1 or 2), then the most basic protections to existing uses of fishing are assured through implementation of the Water Quality Standards. In other words, the Agency cannot allow the elimination of a fishing use on any surface water, since all waters are already designated for good fish habitat.

Nonetheless, in recognition of this concern, this draft Tactical Basin Plan, along with all Tactical Plans issued by the Agency beginning 2015, contains specific text addressing fishing as an existing use. For this Tactical Plan, the text occurs in Appendix A (listing of Existing Uses), which reads: *“It is VDEC’s long-standing stipulation that all lakes and ponds in the basin have existing uses of swimming, boating and fishing. Likewise, we recognize that fishing activities in streams and rivers are widespread throughout the state and can be too numerous to document. The Vermont Water Quality Standards stipulate that existing uses may be documented in any surface water location where that use has occurred since November 28, 1975. Therefore information presented in Appendix A should be viewed as only a partial accounting of known fishing uses based upon limited criteria and does not change protection under the Clean Water Act or Vermont Water Quality Standards for waters not listed.”*

**Comment 12-**There are other three areas where the plan notes impacts, and we offer our services, if needed, in working with the affected communities. These are the ongoing issues with E. coli on the Ompompanoosuc in West Fairlee, old landfills on the Wells, and the town garage in East Topsham (Vershire’s town garage is also a problem site). While we are never glad to see water quality issues, where they exist, it is healthy to acknowledge them, and then determine the exact causes so that they can be addressed.

**ANR Response-** ANR, and our watershed partners, look forward to continuing to work with TRORC in implementing the Ompompanoosuc bacteria TMDL remediation plan. As indicated in the tactical plan, additional water quality monitoring, agricultural BMP implementation, and community awareness around septic issues projects are currently underway. ANR welcomes TRORC’s invitation for collaboration related to the landfill issues in the Wells River watershed and town garage water quality issues in East Topsham and Vershire. The latter site, will specifically be called out in the tactical plan.

**Comment 13-** I have some questions about the Wells River in Wells River Village. The banks of the Wells River in the village are falling in/ collapsing in a few spots, many other places need repairs. This process can be expensive, require state permits [may-be more?]. A daunting task for a home owner/business owner, enough to make them ignore the problem till--- bad thing happen! I would like to be Pro-Active not Re-

Active to this problem. Yes this is where you all come in. How can we help the village? Are there programs/ resources that would help the village study the river banks in the Village? Can/should there be an inventory [for lack of better words] done of the condition of the river bank in the village to see where to go, how bad the problem is, start to form a plan? How do we start? What help can we offer Wells River Village? I hope this starts a good conversation (Newbury Conservation Commission)

**ANR Response-** the Wells River Corridor Plan was completed by Redstart Consultants in 2009. The summary of the Well River Village reach indicates that over half the river corridor has been developed, 70% of the reach has been previously straightened, there is greater than 50% road encroachment on both sides and the entire reach has been armored. It also indicates that the reach is actively incising (cutting down its channel bed) and that there is little opportunity for floodplain restoration.

Unfortunately we see this all over the state, where historic villages were located within the river corridor and within the floodplain, with infrastructure from buildings and roads and the associated fill, acting as significant floodplain encroachments, pinching the river and eliminating or significantly reducing the river's ability to dissipate energy within the floodplain. This is further aggravated by efforts to then contain the river by straightening it, dredging it and armoring it. This human intervention prohibits the stream from going through the channel evolution process and naturally healing itself, by locking it in a dredged, armored and incised condition. Complicating matters more are the fact that this is an alluvial fan section of the Wells, where stream slope slows and it is highly depositional, the backwater effect of the CT river, the dam impoundment upstream and the rail crossing constriction downstream.

Proactive options are extremely limited due to the excessive river corridor development and loss of access to floodplain due to encroachments and incision and all of the additional complications that are mentioned here. In many of these village center areas built within the river corridor, it is essentially leaves "conflict resolution" and infrastructure protection options, meaning armoring to protect infrastructure.

ANR acknowledges the need to formulate a more proactive plan address river corridor conflict resolution in Wells River Village and will add a new Action to the tactical plan to undertake hydrologic and hydraulic assessments and modeling and prepare an

alternatives analysis there. The results of which, will better assist the Town of Newbury and Wells River Village in becoming more flood resilient.

**Comment 14-** Thank you for giving the CRJC Riverbend Subcommittee an opportunity to meet to discuss the draft plan for Basin 14. The Connecticut River Joint Commission Bylaws delegate to the Subcommittees the duty to advise ANR “on matters pertaining to the management of the river or segment and tributary drainage areas,” yet I do not believe they directly received notice of the availability of the draft and opportunity to comment.

Ben Copans had met with the Subcommittee at the outset of the project to learn about priority issues, concerns and trouble spots. The reactions to the draft plan were very positive. The consensus was that the priorities of the Subcommittee were included in the plan. The emphasis on specific projects was appreciated.

The one area where the Subcommittee felt the plan could benefit from strengthening is in regard to the issue of agricultural runoff. Manure pits continue to be permitted in the floodplain, and barnyards continue to expand near the river without proper stormwater management. This continues to be an area where the existing regulations are insufficient, local officials are not given an opportunity for oversight, and state resources are insufficient for adequate enforcement. It was suggested that a basin-wide objective and related actions be added to the plan to focus on improving education of landowners regarding the requirements, and of local officials regarding who to contact when a problem is observed.

**ANR Response-** ANR would like to acknowledge the important work of the CRJC in the Connecticut River watershed. The attendance of some of your sub-committee members at our Tactical Plan public meeting in Wells River was appreciated. In the ongoing implementation of this Tactical Basin Plan, and in the process to update the plan on a five year basis, the Agency will be timelier in our outreach to the relevant subcommittees.

We feel that agricultural runoff is an important watershed issue for basin 14. There have been some issues of manure pit locations in the floodplain that are currently being addressed by AAFM on a case-by-case basis. As a result of H.35, the Vermont Clean Water Act (VCWA), the Accepted Agricultural Practices will be strengthened for all farmers, as will agricultural water quality enforcement actions. Additionally, the VCWA will begin regulating small farms with a new small farm general permit. Small farms had previously been exempt from having to obtain a permit, as is the case with Medium and Large farms. There will be numerous other requirements as part of the

VCWA for farmers including nutrient management planning, livestock exclusion, and manure application training and additional setbacks.

The tactical plan specifically makes high priority recommendations in all of the basin sub-watersheds to continue the successful Agricultural Environmental Management (AEM) program in watershed. Farms with potential water quality issues are contacted by NRCD staff, their farm resources inventoried, technical assistance provided, and funding targeted to implement farm BMPs. DEC and NRCS have also created erosion risk maps for the agricultural portions of the basin. The plan references these maps, and specific waters that may be impacted by agriculture (Tabor Branch, Ompompanoosuc, and middle Connecticut River). These are specifically targeted for additional agricultural outreach efforts, BMP implementation through the standard State and NRCS programs and the new Rural Conservation Partnership Program, and where appropriate, enforcement of water quality violations.

**Comment 15-** Additional recommendations from DEC Lakes and Ponds Program to add the following Actions to the Implementation Tables:

- Continue to support volunteer water quality monitoring on lakes in the basin – Fosters, Groton, Halls, Harveys, Morey, Ticklenaked
- Recruit new volunteer lake monitor for Lake Fairlee
- Build local knowledge of shoreland best management practices among contractors, landscapers and other shoreland site workers by offering the Shoreline Erosion Control Certification Course annually
- Recruit homeowners, recreation area managers and state parks to develop demonstration sites showcasing shoreland best management practices
- Continue to support local Access Greeter programs on Lakes Fairlee, Harveys, and Morey
- Recruit residents to join the Vermont Invasive Patrollers. There are currently no VIPS in Basin 14.

**ANR Response-** These recommended Actions have been added to the Implementation Tables