



River Corridor Protection: Non- Regulatory Approaches

Communities that experience flood damage on a regular basis can reduce the volume and velocity of floodwaters threatening roads and settlements by preserving the natural capacity of the land along rivers to accept and store excess water and to dissipate the energy of the flood. Conserving functioning river corridors and the associated wetlands and floodplains is a cost-effective, preventative measure to preserve the natural disaster prevention systems in the landscape. Additional flood control capacity can be created by restoring floodplains blocked by berms or by fill, and through thoughtful, well-informed management of the way roads are repaired after damage to create more space for the rivers to move and flood.

Why it Matters

Enacting river corridor bylaws prevents future flood risks from worsening but regulations cannot improve existing conditions or reverse errors of the past. Furthermore, regulations are only as effective as those administering them. Non-regulatory measures provide an important compliment to river corridor regulations. Municipalities that are proactive in seeking opportunities to restore floodplains that have been cut off from the river by farming practices, roads and driveways, fill or to protect development, prevent future flood damage. Investment up-front in preserving and expanding lands that provide critical flood prevention services will help buffer the community against disruption and the high financial, economic and personal costs of damaging floods.

While berms and stream bank armoring are used to protect existing homes, businesses, transportation infrastructure and agricultural lands from flood damage, barriers typically transfer flood water, stream sediments, and erosive energy to another location, increasing flood elevations and velocities and triggering sudden channel adjustments and erosion that causes damage downstream.

How to Apply Non-Regulatory Approaches

River corridor protection works best when it starts with a firm understanding of the systems and streams that contribute to flood damage and identifying projects that can to prevent future flood disasters. Partnerships with state and federal agencies and non-profit organizations can provide the expertise that municipalities need and may provide some or all of the funding needed to get the work done.

River Corridor Planning

Start conservation and restoration efforts with a comprehensive assessment of the river corridor and the contributing watersheds to inform decisions about where to spend time and focus funding (see Chapter 2 of the

VERI Report). Vermont has well-established procedures for conducting technical river corridor assessments as detailed in the Agency of Natural Resources (ANR) [River Corridor Planning Guide](#). [ANR River Scientists](#) are available to assist communities with organizing an assessment project and [local conservation commissions](#), [watershed associations](#) and the [Natural Resources Conservation Districts](#) may be available to help move the project to completion. River corridor planning includes the following steps:

Phase 1 Geomorphic Assessment: analysis of the physical form of the river or stream takes place in an office and involves the collection and examination of existing studies, maps and other data.

Phase 2 Geomorphic Assessment: involves field work to collect data from measurements and observations taken along defined river segments or reaches.

Project Planning and Development: may involve further assessment and obtaining more detailed information about the feasibility of projects and the options for implementing improvements.

Alternatives Analyses & River Corridor Planning: consists of prioritizing projects, obtaining preliminary commitments from landowners, and developing and selecting alternative approaches.

ANR also produces [Tactical Basin Plans](#) to manage surface waters in the 17 basins in Vermont. Basin plans focus primarily on water quality but because river erosion is a major contributor to decreased water quality, the plans provide a context for river corridor plans as well as for the flood resilience element of municipal plans. By aligning the recommendations of all three plans, municipalities can increase the likelihood of obtaining funding and assistance for implementation.

Conserving Places where Rivers can Move and Flood

Communities can permanently protect river corridors through outright purchases of land conservation easements. Easements might be for a strip of land along a waterway, or on an entire parcel depending on the functions to be protected and landowner preferences. The land with an easement remains as private property but permanently protected from development and guaranteed to continue serving the intended flood prevention functions. Often a non-profit organization like the [Vermont Land Trust](#) or the [Vermont River Conservancy](#) will co-hold the easement on the land with the ANR, and together they take responsibility for stewardship, defending the terms of the easement against any future violation. They visit the site on a regular basis, to verify that the terms of the easement are being followed.

BENEFITS REPORTED BY LANDOWNERS WHO CONSERVE LAND

- ➔ Personal satisfaction and peace of mind comes from knowing that the things they value about their land will remain forever to benefit future generations.
- ➔ Landowners who donate conservation easements or give their land to a land trust or a similar non-profit entity, benefit from income and estate tax deductions. Conservation easement donations can offset capital gains taxes, reduce estate taxes, and help landowners achieve their philanthropic goals. See this [explanation from the Vermont Land Trust](#) for more about tax implications.
- ➔ For farmers or others who sell their development rights, conservation can help to reduce debt, enable the purchase of additional land, or facilitate the transfer of land or a farm to the next generation.



For conservation projects defined through a river corridor plan, easements may take the form of purchasing channel management rights, either as a first-time easement or by amending an existing easement, such as an easement protecting agricultural lands or wildlife habitat. By selling the channel management rights, landowners are restricted from intervening with erosion and channel adjustments within the river corridor. River corridor easements may be transacted as part of larger river restoration projects and in conjunction with the other conservation practices and programs. Agriculture and forestry is commonly permitted within river corridor easement areas.

Restoring Floodplains and River Corridors

Floodplains are cut off from the river for a variety of reasons such as to prevent floodwater from entering a farm field, to create a railroad grade, or to protect a flood-prone structure. Municipalities and their partners can work with landowners in these situations to remove or lower those obstructions.

- On land that is no longer farmed and where the landowner is willing to allow the land to be periodically flooded, existing agricultural berms can be removed. While flooding fields can be a problem if it isn't planned for, farmers can adopt management practices that tolerate or even benefit from flooding. Some farmers appreciate "poor man's fertilizer" that floodwaters bring in the form of nutrient-rich deposits.
- Where roads and railroad grades pass through river valleys, they can create dams, preventing rivers from overflowing into adjacent floodplains. In some cases, the grades can be lowered to allow flood waters to over-top them and still allow for light uses such as rail trails. Larger and more frequent culverts and bridges can also be installed under these "dams" to help facilitate the movement of floodwater into the floodplain.
- Floodplains can be restored even in settlements where homes and other structures have been removed due to flooding, and floodwaters can be allowed to enter parking lots, parks and other such places that can be flooded without damage.

CREATING NEW FLOOD CAPACITY AND A PARK IN WARREN

Before Irene, the Town of Warren took steps to prevent flood damage. Warren was devastated by flooding in 1998 when heavy rains fell on already saturated soils in late June, swelling the Mad River. Following the flooding, FEMA Hazard Mitigation funds were used to buy out three homes along the Mad River. A part later became the town-owned Riverside Park. Over the years, gifts and additional purchases helped the park expand. A 2008 plan for the park identified a primary goal of allowing the river channel to return to a balanced state. Over time, the river would top its banks, erode and deposit sediments along its channel and in the park, which it did in during the 2011 floods. According to Caitlin Maloney, formerly of Friends of the Mad River, Riverside Park area offers one of the first opportunities downstream from Warren Village, for "the river to blow off some steam" during high flow.



Training for Managing Roads to Reduce Flood Damage

Municipalities – especially road crews and selectboards – frequently make decisions about roads and streams that can, over time, profoundly improve the condition of streams and rivers and make them less destructive. The Vermont Agency of Natural Resources (ANR) together with the Vermont Agency of Transportation (VTrans) produces a comprehensive online and in-person [Rivers and Roads](#) training that explains the workings of rivers and how to design, construct and maintain roads and bridges to create greater river stability and more flood resilient roads. Both state and local road personnel who have participated in this program find the program useful and say they are able to directly apply the learning to their road work.

Anyone can access the [introductory online training](#) that provides a general awareness and understanding of river processes, aquatic habitat and how transportation infrastructure affects and is affected by dynamics of rivers. Announcements of classroom and field training opportunities and classroom materials are available on the ANR [Rivers Program](#) page.

Funding and Support Available

- [Vermont Clean Water Initiative Program \(VCWIP\)](#) offers an annual [grant program](#) and technical and educational assistance. Funding for river corridor plans to implement those plans through both conservation and restoration projects are available.
- [Hazard Mitigation Grant Program](#) offers funds to implement river corridor plans that are integrated into the local Hazard Mitigations Plan.
- For smaller projects, the [VT Watershed Grants](#) can be useful. Awards are made up to \$15,000.

JEFFERSONVILLE PLANS STRATEGIES TO REDUCE FLOODING IN THE VILLAGE



After the spring 2011 flooding, the Village of Jeffersonville launched an extensive hazard mitigation plan process and flood model to address recurring flooding in the historic village. A Mitigation Master Plan with multiple strategies for reducing flood impacts resulted and the flood resilience principles were integrated into the municipal plan. Strategies include restoring flood storage areas doubling as public green space, upsizing two bypass culverts under a state highway, and replacing a bridge to reduce flood constriction but retaining recreation functions. The Village applied for funding to implement priority projects and continues to work collaboratively with adjacent municipalities, the school, private businesses, and the Lamoille County Planning Commission to implement additional projects.