

Senate Natural Resources & Energy
Rob Evans - Rivers Program
Testimony on Resilience Work
December 5, 2023

Good Afternoon Chair Bray and Committee Members,

I am Rob Evans, Rivers Program Manager within the ANR/DEC Watershed Management Division.

I am here to speak about the primary resilience work we do in with our program with an emphasis on our regulatory work and technical assistance with respect to instream work and land uses in floodplains and river corridors. My team works with landowners and communities to manage conflicts between existing human investments and river processes and to avoid or minimize conflicts with new investments in river bottom lands.

Background/Context

To understand where we are today, we need to sum up key findings and progress over the last 25 years. After the devastating floods of the 1990s, the General Assembly asked why we were experiencing damaging recurring floods if so many communities were enrolled in the federal flood insurance program and regulating development in floodplains. The post-mortem report – known as the Act 137 report of 1999 – essentially found that much of our flood damages in Vermont are due to flood related erosion. The National Flood Insurance Program maps and floodplain management regulations administered by most communities do not consider this type of hazard. A key finding in the Act 137 report was that “establishing long term river stability will provide both protection from flood damage and healthy riverine environments.”

Many of our rivers and streams are particularly unstable due to a legacy of channelization practices. Channelization in the form of straightening, dredging, berming, and armoring our rivers resulting in energized river systems making them more erosive during flood events. Channelized rivers erode vertically, or downward, and the stream channel becomes

disconnected from its floodplain. Instead of floodwaters spreading out and slowing down on the floodplain, larger and larger flows are contained within the deepened and widened channel and cause tremendous destruction to human investments.

Through the 2000s, with the aid of federal and state funding, detailed assessments were conducted to document the physical condition of thousands of miles of river and streams, and found that ~75% of the stream miles were in a channelized condition; straightened, deepened and disconnected from their floodplains. This information and better understanding of our flood risk resulted in changes to programs that exist today.

Stream Alteration Regulation

First is the Stream Alteration Permit program. For decades this had very limited jurisdiction and only regulated the larger rivers and streams, leaving the majority of stream miles unregulated by the state. Act 110 of 2010 changed the jurisdictional trigger to regulate all perennial streams and rivers, which are the majority.

Further refinements to the Stream Alteration Permitting program followed after Tropical Storm Irene. Act 138 of 2012 addressed a lack of authority regarding emergency work. Specifically, it codified in statute and ultimately rule the ability to regulate emergency work in rivers and streams to ensure the work is the minimum necessary to protect infrastructure and other human investments, without reverting back to the large scale channelization practices of the past that put rivers back to an energized and unstable condition.

Another significant change coming out of Irene was getting formal recognition of our standards in the Stream Alteration Rule related to the sizing of bridges and culverts. ANR, in partnership with VTrans and Vermont Emergency Management engaged in a years-long painstaking process to get approval of our standards to be recognized formally as “codes and standards” under FEMA’s Public Assistance Program. This means that when a bridge or culvert is destroyed due to flooding, FEMA will pay for the replacement structure to meet our sizing criteria. Unlike the

standard sizing practice of years past that looks at how much water a structure can pass, our standards require consideration of the size needed to pass sediment, rock, and woody material, resulting larger much more resilient stream crossing structures. As we witnessed in grand fashion this past summer, our high gradient watersheds contribute a lot of material during large floods.

Rivers and Roads

Another requirement coming out of Act 138 in 2012 was the requirement for ANR to stand up a training program focused on building resilient infrastructure and reducing impacts to Vermont's rivers during flood recovery. The Rivers and Roads multi-tiered training program was created in collaboration with VTrans and the Department of Fish and Wildlife with the goal of improving flood resilience when rebuilding devastated roads, culverts and bridges. Trainings are offered to a wide range of state, municipal and private sector transportation staff, consultants, construction contractors, consulting engineers, etc. working on roads in the flood recovery context. Since 2012, we have provided 48 training events to 860 individuals.

To close on stream alterations, we have made significant gains over the past decade. The post flood permitting authority we now have, coupled with broader understanding of flood recovery best practices provided by the Rivers and Roads training has made a difference. We have not seen large scale unauthorized over-working and channelization of our rivers after floods like we did after Irene and floods prior. This is important progress made on shifting the paradigm and practice away from the damaging practices of the past.

River Corridor and Floodplain Protection

Let's shift to the work of our River Corridor & Floodplain Protection section. Over the last 2 decades, there have been incremental gains dialing up standards related to land uses in floodplains and river corridors. These land uses are regulated under a patch work of municipal and state authorities.

[DEC Flood Hazard Area and River Corridor Rule](#)

The DEC Flood Hazard Area and River Corridor Rule, required by Act 138 in 2012 and effective in 2015 regulates development exempt from municipal regulation and was needed to ensure the state's compliance with the National Flood Insurance Program. The rule regulates a narrow set of activities that include State-owned buildings and facilities, Required Agricultural and Silvicultural Practices, and power generation/transmission facilities subject to the PUC Process. The rule is framed under a set of *No Adverse Impact* standards with the goal of not just protecting new development from flood hazards, but also ensuring that new development does not exacerbate flood hazards by increasing risk to pre-existing development and infrastructure.

Municipal Regulation

Most land uses in floodplains are still regulated at the local level. 90% of Vermont towns are enrolled in the National Flood Insurance Program and must regulate land uses in federally mapped flood hazard areas to at least federal minimum standards. The federal minimums do not result in resilient communities. In 2008, our program began offering municipal model flood hazard regulations that recommended higher standards including managing river corridor protection in consideration of riverine erosion hazards. The model regulations were significantly updated in 2017 to align with the No Adverse Impact framework employed in our state rule.

At last count, 97 communities have adopted some combination of higher standards that exceed the federal minimum criteria.

Act 250:

And the longstanding state jurisdiction is Act 250. Criterion 1D covers flood hazard areas and river corridors. Our program provides regulatory recommendations to District Commissions for developments proposed in flood hazard areas and river corridors. The Woodford Packers State Supreme Court decision in 2003 was significant as is affirmed ANR's ability to consider erosion hazards in addition to flood inundation hazards. The DEC procedure that guides our recommendations to District Commissions was updated significantly in 2015 to align with the No Adverse Impact framework employed in our rule and recommended in the model municipal regulations.

River Corridor Mapping:

In 2015, we published the first the statewide river corridor map layer which is publicly available on the ANR Natural Resources Atlas for over 14,000 miles of river and stream. The River Corridor map is an important planning and regulatory tool to inform the siting of new development. The federal inundation-based flood hazard maps only cover about 20% of rivers and streams in Vermont. The River Corridor map, on the other hand covers ~75% of stream miles.

Restoration and Conservation

Lastly, I would be remiss if I did not highlight the non-regulatory work of my team to restore floodplain functions and to conserve these functions in river corridors. We provide myriad partners river science technical assistance to support restoration and conservation projects, funded by both hazard mitigation and clean water funding. Our oft-repeated statement as it related to river stability and erosion hazards is “what is good for flood resilience is good water quality and vice-versa.”

Some of the best projects implemented in recent years were supported by a combination of hazard mitigation and clean water funds, to do buy-outs of flood-prone buildings, reconnect river channels to floodplains, plant riparian tress, and upsize stream crossing infrastructure. We created a novel River Corridor Easement program in 2008 to facilitate the passive restoration of river process and floodplain function. To-date, largely with state clean water funds, and with our land trust and conservation partners, we have executed 120 easements, conserving over 3000 acres of river corridor.

There is a lot of talk about nature-based solutions and the importance and effectiveness of restoring floodplain functions. The single most effective way to restore floodplain function at scale is to provide time and space for the river to restore itself. The restorative work done during floods far exceeds what we can achieve with yellow machines. Through the meandering process, rivers will reconnect to floodplains and reestablish a least erosive form. To achieve

this, we need to continue our work to limit new encroachments along largely undeveloped river corridors so we do not create new at risk development requiring the need to further channelize river reaches to protect new development from the meandering river.