Testimony of Shayne Jaquith
Watershed Restoration Program Manager
The Nature Conservancy in Vermont
Before the House Natural Resources, Fish, and Wildlife Committee
On The Importance of River Corridor Protections
February 6, 2019

Thank you Chairwoman Sheldon and Members of the Committee for the opportunity to speak with you about the importance of river corridors and their protection. My name is Shayne Jaquith and I am the Watershed Restoration Program Manager for The Nature Conservancy. Before joining TNC a little less than three years ago I worked for 16 years with the VT DEC Rivers Program in the specific areas of river assessment and restoration, hydro-project certification, regulation of instream management projects, and training road and bridge engineers and construction workers in flood resilient design and maintenance of roads and bridges.

In my role with TNC I work to protect and restore rivers, floodplains and wetlands with the purpose of strengthening ecosystems and increasing the flood resiliency of human communities. Central to that work is the protection of river corridors. River corridors are critical to flood resiliency, water quality and fish and wildlife habitat.

I'd like now to walk through a science-based explanation of why river corridors are indeed so important.

- Intact rivers perform a suite of ecological services that benefit both nature and people. They provide a self-maintaining transport system for rain and snowmelt from our landscapes to our ponds, lakes and oceans. They provide fish and wildlife habitat. They provide recreational opportunities. They provide opportunities for spiritual rejuvenation and respite. And they provide safe drinking water.

- Intact rivers are those that are well connected to their floodplains, meaning they have low banks and spill flow onto the floodplain when flows get high; they meander, meaning they have curving paths; and they move side-to-side over time.

- The first important characteristic of an intact river is that it is connected to its floodplain. Connection to the floodplain is critical because the floodplain is a giant pressure relief valve. When stream flows rise becoming deep and fast they also become more erosive. A channel in its natural condition has low banks that allow high stream flows to spill onto the surrounding floodplain. The energy of the flow is spread across the broad floodplain surface and slowed by trees and shrubs, and the channel remains intact.

  A modified channel, say one that has been dredged deep to contain flows has high banks and cannot release deep fast flows onto the floodplain. As a result the channel is eroded becoming deeper and wider. Roads, homes and other buildings are damaged, eroded sediments and debris are mobilized leading to the clogging of bridges and culverts and further downstream erosion.

- The second important characteristic of an intact river is that it has a meandering course. Rivers meander because the flow within them moves downstream in a corkscrew fashion. As it spirals, it carves sediment from one bank and deposits it on the other, creating a curving path.

- By creating a curving, or meandering path, the river increases it length (a meandering path is a longer path) and thereby decreases its slope (a longer path is a flatter path); and, a flatter river generates less erosive energy than a steeper river. So just as the floodplain moderates depth and ultimately the erosive energy within the channel, meandering moderates channel slope and ultimately the erosive energy within the channel.

- The third characteristic of intact rivers is that they are free to move from side to side over time.

- Rivers move in response to changes in precipitation patterns (think climate change), and changes in the amount of sediment they have to move (think large landslides).

- Again, these changes alter the amount of energy in the river and in response the river increases or decreases its length by changing its course, which results in a change in slope and energy.

- When these changes are free to happen, changes in energy are moderated and the channel stays intact (i.e., there is no severe erosion). It's like a thermostat. If it gets cold you turn the thermostat up and it warms up. If it gets too hot, you turn the thermostat down and it cools down and you are happy and healthy. The active meandering process is the rivers thermostat that keeps it stable.

- The fourth important characteristic of an intact river is that the banks and immediately adjacent area on either side of it (the riparian zone) is well vegetated. Vegetation is important because below the ground the root networks of the vegetation reinforce the soil, holding it together much like fiberglass strands added to concreate help hold the concrete together, and in this way help it to resist the erosive forces of the streamflow. Above the soil, the vegetation creates an impediment to flow so that when the stream does spill water onto its floodplain, that water is slowed and its erosive forces are absorbed without damage. Vegetation above the soil is also important because of the role it plays in shading the river, keeping waters at temperatures that are survivable by brook trout and the other cold-water species that inhabit our rivers.

- Beginning with European settlement, humans have dramatically modified the rivers of North America. Rivers have been dredged, which has disconnected them from their floodplains. Rivers have been straightened, which has increased their slope. And rivers have been armored, which has prevented them from moving over time.

- In response to this historic management, our rivers have cut downward into their valley floors, think if a road gully that gets deeper and deeper every time it rains (stage 2). Eventually these rivers get so deep and their banks so high that they collapse into the channel (stage 3). As the flowing water works around the collapsed banks it erodes the banks even further creating a wider channel and bringing in more sediment (stage 4). Finally, the sediments gather and become vegetated to form a new floodplain and the new

channel and floodplain have the same stable configuration as the original channel and floodplain (stage 5). But, a tremendous amount of land and often investments have been lost, nutrients brought into the water system and habitat lost in this process.

- We haven't always understood this process that we call the channel evolution. In fact, it was about the time that I began working with DEC that the river management community came to appreciate this process, its ramifications and ultimately the importance of protecting river corridors. Since that time, the DEC Rivers Program has assessed approximately 5,000 miles of Vermont's rivers and has found that 75% of them are in stages 1 – 3 of the channel evolution process where there they are disconnected from their floodplains and severely unstable.

- The ramifications associated so many of our rivers being disconnected from their floodplains and unstable include heightened flood damages,

- increased sediment and nutrient delivery to our lakes and ponds, and degraded fish and wildlife habitat.

- The river management and restoration community is working to restore our rivers and mitigate the impacts of our their degraded condition. We are working to stabilize runoff and sediment delivery to rivers through improved stormwater management, we are working to restore river floodplain connectivity, we are working to revegetate riparian areas, and we are working to restore headwater rivers so that instream flows will be slowed before they get downstream and sediments trapped in those headwaters.

- However, these efforts are not feasible at the scale required to get us where we need to be, and further in many cases they aren't even possible if our rivers don't have broad undeveloped corridors within which they are free to flood, meander, and move over time. If we are to solve our water quality problems, increase our flood resiliency and foster robust fish and wildlife habitats we absolutely have to protect our river corridors.

Thank You.