

# MUNICIPAL ASSISTANCE CENTER TECHNICAL PAPER #2

## Creating an Effective Riparian Buffer Ordinance APRIL, 2007



### INTRODUCTION

Statewide efforts to improve the water quality in Lake Champlain and other Vermont lakes, rivers and streams have recently drawn a lot of attention. With residential and other land development increasing in most areas, there is an urgent need to ensure that this development occurs with minimal impact on water quality. Poorly planned development along waterbodies can threaten water quality, aesthetics, wildlife habitat, municipal infrastructure and private property.

In Vermont, the impacts of most small scale or incremental development must be addressed locally. One tool that local officials have to help them keep waters healthy is the ability to adopt land use regulations that conserve vegetated riparian buffers in areas that have not yet been developed. They may also implement standards that require developers to maintain and restore vegetated riparian buffers before, during and after construction. This Paper and the VLCT Municipal Assistance Center's model riparian buffer ordinance offer guidance for municipal officials who are interested in adopting regulations that protect and conserve riparian buffers.

### WHY ADOPT A RIPARIAN BUFFER?

- 1. Local Economy.** It is in the best interest of every town to prevent water quality problems, as clean water is one of a town's most valuable assets. Allowing water bodies to become impaired can bring a local economy to a halt. (A river, stream or lake is impaired if its waters exceed state water quality standards, which set limits of pollution or change allowed by law.) State law prohibits development in areas where the project would create runoff into a waterbody already impaired by stormwater – unless the developer can implement a watershed-based, net-zero discharge system. This can be very expensive, time-consuming and contentious. A town that protects its local rivers, lakes and streams also protects its economic future.
- 2. Environmental Protection.** The health of Vermont's streams, rivers and lakes is strongly linked to surrounding land use and development. Riparian buffers store stormwater runoff and moderate stream flows, reduce the effects of flash floods, and help maintain base water levels during dry months. Riparian buffers also hold streambanks together, minimize erosion, remove contaminants and reduce sediment loads to surface waters. Healthy riparian buffers help maintain habitat for fish, amphibians, and terrestrial animals, and also improve aesthetics, thereby increasing property values.
- 3. Infrastructure Protection.** Allowing development too close to a waterway can lead to destruction of roads and buildings and threatens the scenic value and sense of place for a community. Sturdy vegetated riparian buffers, on the other hand, can offer protection from flash flooding and provide a flood and erosion "insurance policy" for towns.

### HOW MUCH LAND IS NECESSARY FOR AN EFFECTIVE BUFFER?

Your town's specific water quality and conservation goals will dictate how large an area to consider for riparian buffer protection. To determine the appropriate width for a vegetated riparian buffer, towns should take into account the width of the flood plain, channel stability, slope, adjacent wetlands, wildlife corridors, the amount of land draining into the waterbody, and existing land use and structures.

In general, a naturally vegetated 50-foot-wide riparian buffer on each side of a stream will control soil erosion, and a 100-foot-wide buffer will also protect many of the functions associated with healthy riparian habitat. For lakes,

State Act 250 guidelines generally call for a 100-foot vegetated riparian buffer. Towns may need to consider a wider riparian buffer for sites with significant wildlife travel corridors, or site characteristics that indicate increased risk of erosion and/or potential for overland flow of pollutants. To allow for local policy decisions, the VLCT model ordinance includes blank spaces for the buffer widths.

## WHICH WATER BODIES SHOULD HAVE PROTECTED RIPARIAN BUFFERS?

Towns have several policy options when it comes to determining which water bodies to include in their riparian buffer ordinance. A town can list specific streams and apply specific buffer widths to each waterbody or the ordinance can apply generally to all perennial and intermittent streams without specifically naming them – if they are portrayed on a map, such as the 7.5' U.S. Geological Survey quadrangle, surface water data map or fluvial erosion hazard map. Towns can also use a combination of specifically named streams and those generally identified on a map.

The same principal applies to lakes: towns can list them specifically or identify lakes portrayed on specific maps. In addition, a town can determine a lake's applicability by its size. For example, a buffer requirement could apply to all lakes within town boundaries that have more than 21,780 square feet (1/2 acre) of water surface. To allow for local policy decisions, the VLCT model ordinance includes blank spaces for the water bodies to be included.

Riparian buffer protection should apply to small streams as well as large rivers and lakes. Small streams are the most vulnerable because they respond most dramatically to changes in nearby land uses and tend to be located on the steepest sloping and erosion-prone lands. Small streams and tributaries also often have the highest quality aquatic and terrestrial habitats and thus warrant riparian buffer protection.

A riparian buffer ordinance is most effective in undeveloped and developing areas. In highly built-out areas water quality goals might best be achieved through site-specific land acquisition and conservation efforts.

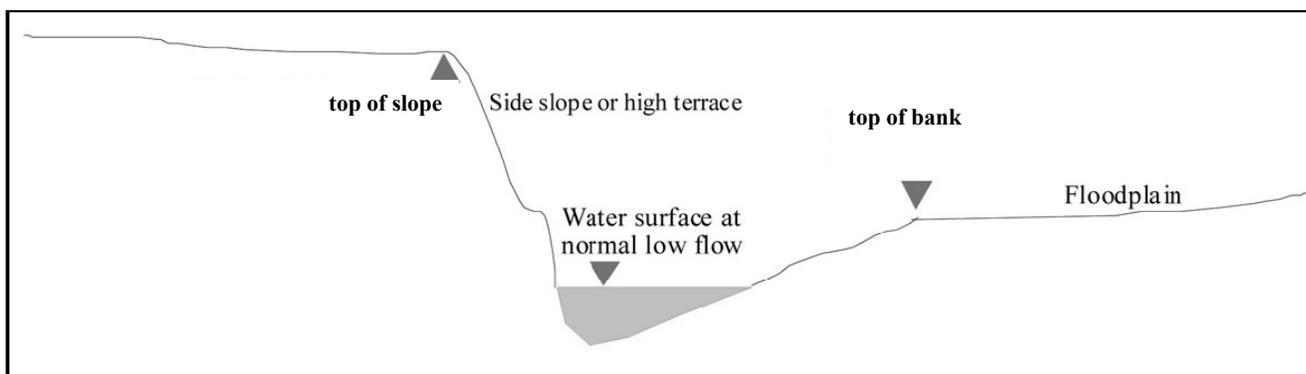
## HOW ARE RIPARIAN BUFFERS MEASURED?

When establishing riparian buffers, it is important to consider the point from which the buffers should be measured. In the VLCT model ordinance, we recommend that riparian buffers on streams be measured inland perpendicular from either the top of bank or the top of slope, depending on the stream channel characteristics.

Stream buffers measured from the top of bank are those with a flat, wide floodplain onto which the stream overflows during periods of high water flow. The top of bank begins at the streamside edge of the adjacent floodplain. If there is a wetland present adjacent to the floodplain, the top of bank begins at the upland edge of the contiguous wetland.

Stream buffers measured from the top of slope are those with steep valley side slopes or high terraces. Streams with steep banks have little or no floodplain for high flows to access, so the threat of slope erosion and slope failure is high, especially during storm and flood events. Therefore, it is important to establish riparian buffers at the top of the slope for steep streams with little or no floodplain.

Riparian buffers on lakes are measured inland perpendicular to the shoreline beginning at the mean water level. Towns can obtain mean water level records for specific lakes by contacting the Vermont Water Quality Division, Lakes and Ponds Encroachment Program, at 802/241-3777. If there is no mean water level on record, a town can request an on-site determination.



## IS PARTICIPATION IN THE NATIONAL FLOOD INSURANCE PROGRAM (NFIP) ENOUGH TO PROTECT OUR PROPERTY AND STREAMBANKS?

Municipalities that enroll in the NFIP in order to reduce flood insurance rates for members of the community use NFIP floodway maps to delineate where development can take place along a river corridor susceptible to flood damage. Although NFIP protection is important, a town's participation in the program does not address the water quality goals that riparian buffers can achieve. This is because the NFIP floodway maps and ordinances are based on elevation and can allow significant development in floodplains, as long as the structures are raised above the base flood elevation, with no consideration of riparian buffers.

In addition, many of the NFIP maps are out-of-date because they do not consider all of the development and changes in the years since the maps were first made. The NFIP floodway maps include only those streams susceptible to flooding by inundation (not erosion). Many streams in your town may not be covered under the NFIP, and if water quality is to be protected, towns will require another standard, such as a riparian buffer ordinance.

## HOW WOULD A RIPARIAN BUFFER ORDINANCE MESH WITH EFFORTS TO MAP FLUVIAL EROSION HAZARDS?

Incorporating riparian buffer protection into local land use regulations dovetails easily with the efforts of the Vermont River Management Program's fluvial erosion hazard mapping process, which is based on geomorphic assessment. Both initiatives limit development in areas immediately adjacent to streams. The two initiatives have different, but complementary goals.

The fluvial erosion mitigation strategy focuses on determining how much space is needed along a river corridor for an unstable stream or river to re-establish and maintain a stable slope and floodplain. This determination, based on a geomorphic assessment, considers channel movement and bank and streambed stability issues. The resulting recommended setbacks do not necessarily incorporate vegetated buffers.

On the other hand, the riparian buffer strategy focuses on protecting vegetated zones adjacent to streams in order to protect water quality and aquatic habitat by shading the waters, filtering surface runoff, minimizing erosion, and providing food and shelter to aquatic life. A riparian buffer can incorporate the setback needed for stream stability and also provide for these important functions. For example, if a recommended setback based on geomorphic assessment is deemed to be 100 feet, a town can establish that, at a minimum, one-half of this setback distance be maintained as a naturally vegetated buffer.

The VLCT model riparian buffer ordinance has the flexibility to include waterbodies and buffer widths based

### VALUES OF RIPARIAN BUFFERS

- Trap and remove sediment in runoff.
- Reduce stream bank erosion.
- Trap and remove phosphorus, nitrogen, and other nutrients that cause excessive algae blooms and damage to aquatic ecosystems.
- Trap and remove other contaminants, such as pesticides, heavy metals and pathogens
- Contribute leaves and other energy sources to the stream.
- Store flood waters, thereby decreasing damage to property.
- Maintain habitat for fish and other aquatic organisms by moderating water temperatures and providing woody debris.
- Provide habitat for amphibious and terrestrial organisms.
- Maintain base flow in stream channels.
- Maintain good water quality.
- Protect channel-forming processes and channel stability.
- Protect roads and bridges from erosion.
- Improve the aesthetic appearance of stream corridors.
- Offer recreational and educational opportunities to residents and tourists.

on geomorphic assessment and can combine with a town's effort to establish fluvial erosion hazard maps as the basis of variable buffer widths along a stream or river corridor.

The model riparian buffer ordinance can also employ fixed buffer widths, based on local policy decisions. Adopting and administering a riparian buffer ordinance that does not require a study to determine the buffer widths may be the best approach for towns to get protections in place sooner. Towns can adopt a riparian buffer ordinance while conducting a geomorphic assessment, and, as the problem areas are identified, they can adjust their ordinances accordingly.

## CONCLUSION

Local governments have clear legal authority under state statute (Chapter 117 of Title 24) to regulate riparian buffers. In Vermont, the impacts of most small or incremental development must be addressed locally. Adopting a riparian buffer ordinance is a straightforward way for towns to safeguard investments in roads and bridges, and to protect water quality.

The VLCT model riparian buffer ordinance is designed to offer towns a clear-cut framework that is simple to develop and administer. The riparian buffer model language can easily be incorporated into an existing land use regulation. For assistance in using and manipulating the model to fit specific town needs, contact Milly Archer, Water Quality Coordinator, at the VLCT Municipal Assistance Center, 800/649-7915, or [marcher@vlct.org](mailto:marcher@vlct.org). To access the on-line version of the VLCT model riparian buffer ordinance, please visit the Resource Library at [www.vlct.org](http://www.vlct.org).

## ABOUT THE VLCT MUNICIPAL ASSISTANCE CENTER

The Municipal Assistance Center (MAC) is comprised of six professionals with diverse backgrounds in municipal law, public management, municipal research and water quality protection. Our mission is to provide local officials with the education, training and professional assistance they need to fulfill their statutory duties. MAC is supported by membership dues, a state grant and fees that are charged for specific services.

With support from the Vermont Agency of Natural Resources, MAC now offers free on-site training and professional assistance for municipalities seeking to take greater steps to protect water quality. We can assist with projects such as recommended updates to land use regulations (zoning bylaws), on-site trainings on water quality regulation, examples of model and sample regulations, stormwater compliance and planning tools.