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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.

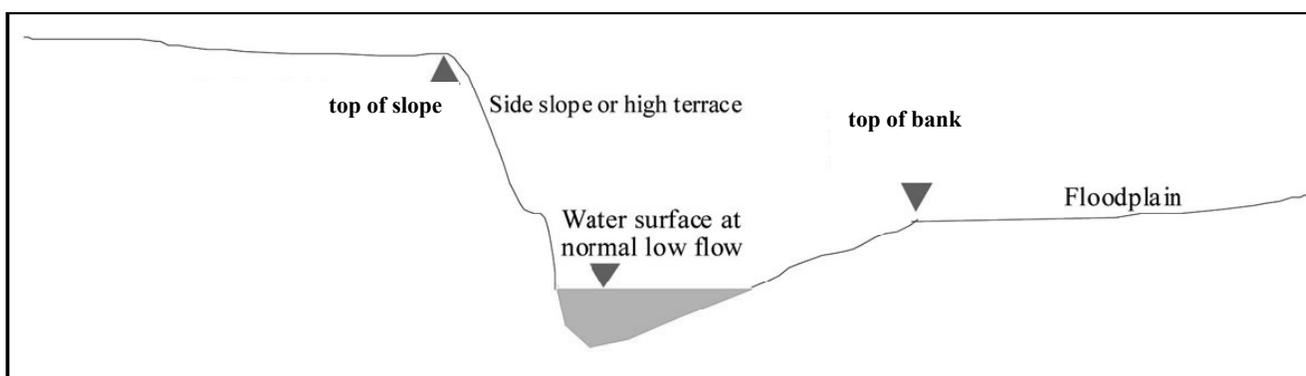
HOW ARE RIPARIAN BUFFERS MEASURED?

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. To access the on-line version of the VLCT model riparian buffer ordinance, please visit the Resource Library at 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.



89 Main Street, Suite 4
Montpelier, Vermont
05602-2948

Tel.: (802) 229-9111
Fax: (802) 229-2211

e-mail:
info@vlct.org

web:
www.vlct.org

MEMORANDUM

To: Selectboard Chairs, Municipal Managers and Administrators,
Zoning Administrators, Planning Commission Chairs, DRB Chairs

From: Milly Archer
Water Quality Coordinator

Date: April, 2007

RE: Model Riparian Buffer Ordinance

The Vermont League of Cities and Towns has produced the enclosed model riparian buffer ordinance for towns interested in protecting water quality. It is designed to offer a straightforward framework that is simple to develop and administer.

Local governments have clear legal authority under state statute (Chapter 117 of Title 24) to regulate riparian buffers. As you know, 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.

The model riparian buffer ordinance can easily be modified and incorporated into existing land use regulations. It can also dovetail with the objectives of the National Flood Insurance Program and fluvial erosion hazard mapping.

I would be very excited to come to your town and give a presentation and technical assistance in developing riparian buffer protection language that meets your specific needs. My job is funded through the Governor's Clean and Clear initiative, so my services are free of charge.

For assistance please contact Milly Archer, Water Quality Coordinator at the VLCT Municipal Assistance Center, (800) 649-7915 or marcher@vlct.org. I look forward to hearing from you!

Sponsor of:

VLCT Health Trust, Inc.

VLCT Municipal Assistance
Center

VLCT Property and Casualty
Intermunicipal Fund, Inc.

VLCT Unemployment
Insurance Trust, Inc.

MODEL RIPARIAN BUFFER ORDINANCE

SECTION 1. AUTHORITY.

This ordinance is adopted by the Town of _____ under authority of 24 V.S.A. § 4410.

SECTION 2. PURPOSE.

This ordinance is established for the provision and protection of riparian buffers along streams and lakes in the Town of _____. It is the objective of this ordinance to promote the establishment and protection of heavily vegetated areas of native vegetation and trees along the Town's waterbodies to reduce the impact of stormwater runoff, prevent soil erosion, protect wildlife and fish habitat, and maintain water quality.

SECTION 3. DEFINITIONS.

For purposes of this ordinance, the following terms shall apply:

Lake: A body of standing water, including ponds and reservoirs that may have natural or artificial water level control. For purposes of this regulation, off-stream reservoirs specifically constructed for the following purposes shall not be considered lakes: snowmaking water storage; golf course irrigation; stormwater management; and fire suppression.

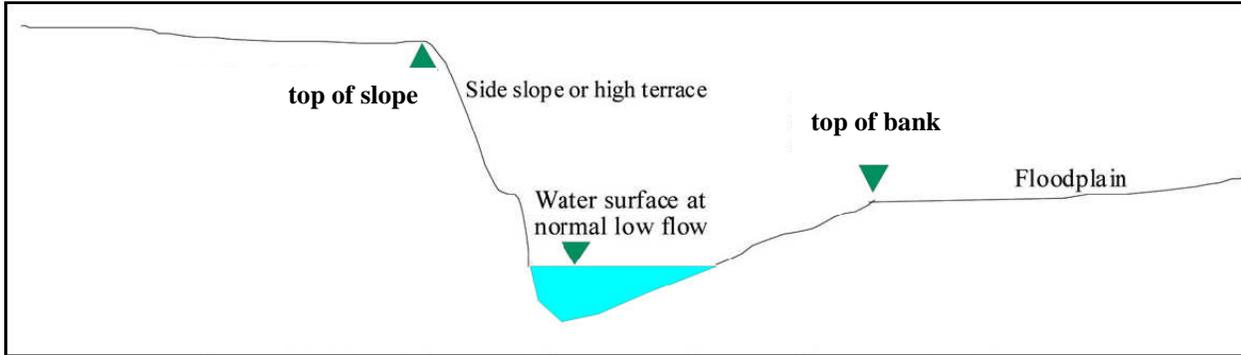
Mean Water Level: The normal summer (June 1 – September 15) water level, measured in feet above sea level, of lakes as determined by an average of water level readings available over time or as established by the Vermont Natural Resources Board.

Riparian Buffer: The width of land measured horizontally from the mean water level for lakes and from top of bank or top of slope for streams, to the edge of other land uses. Riparian buffers are typically undisturbed areas, consisting of trees, shrubs, groundcover plants, duff layer, and a naturally vegetated uneven ground surface.

Stream: The full length and width, including the bed and banks, of any watercourse, including rivers, creeks, brooks, and branches and intermittent watercourses that have a defined channel and evidence of water and sediment transport, even if such watercourses do not have surface water flow throughout the year or throughout the channel. For purposes of this regulation, constructed drainageways including water bars, swales, and roadside ditches, are not considered streams.

Top of bank: The point along a streambank where an abrupt change in slope is evident, and where the stream is generally able to overflow the banks and enter the adjacent floodplain during flows at or exceeding the average annual high water stage.

Top of slope: A break in slopes adjacent to steep-banked streams that have little or no floodplain; or a break in slope where the side slopes adjacent to an incised, or deeply cut channel meet floodplains that have been abandoned or are undergoing abandonment.



SECTION 4. APPLICABILITY.

The requirements of this ordinance shall apply to all riparian buffers in the Town of _____, described as follows:

1. All land within ___ feet horizontal distance measured from the top of slope, where the channel runs adjacent to a valley wall or high terrace, or top of bank, where the channel has access to its floodplain, for the following streams:

- a. _____
- b. _____
- c. _____

2. All land within ___ feet horizontal distance measured from the top of slope, where the channel runs adjacent to a valley wall or high terrace, or top of bank, where the channel has access to its floodplain, for all tributaries of the above named streams and all other minor streams identified on the 7.5' U.S. Geological Survey quadrangles (or 1:5000 VCGI surface water data map) covering the town, or on field survey maps prepared for the Town of _____.

3. All land within ___ feet horizontal distance measured from the mean water level of all lakes that have more than 21,780 square feet (1/2 acre) of water surface.

SECTION 5. GENERAL STANDARDS

(A) Except as provided in Subsection (B) below, all lands within a riparian buffer shall be left in an undisturbed, vegetated condition.

(B) Removal of dead trees or trees of immediate threat to human safety as well as reasonable pruning of existing trees is permitted.

(C) The creation of new lawn areas within riparian buffers is not permitted. Property owners already encroaching on the riparian buffer are encouraged to return mowed areas to their naturally vegetated state. Supplemental planting with appropriate native vegetation to restore and enhance the effective filtering and bank stabilization functions of a riparian buffer is encouraged.

(D) Any areas within a riparian buffer that are not vegetated or that are disturbed during construction shall be seeded with a naturalized mix of grasses rather than standard lawn grass.

SECTION 6. NEW USES AND ENCROACHMENTS WITHIN RIPARIAN BUFFERS.

(A) Permitted uses:

1. The control of non-native species of nuisance plants including Eurasian milfoil, water chestnut, purple loosestrife and reed grass (Phragmites), where such control is by hand pulling of plants or according to a written plan approved by the Vermont Agency of Natural Resources and under any applicable state law.
2. Buffer re-establishment projects which use “soft” techniques such as tree revetments and root wads.
3. Encroachments necessary to rectify a natural catastrophe for the protection of the public health, safety and welfare.

(B) Conditional uses:

The [planning commission/ development review board/zoning board of adjustment] may authorize the following as conditional uses within riparian buffers subject to the standards and conditions enumerated for each use:

1. Clearing of vegetation and filling or excavating of earth materials, only to the extent directly necessitated for the construction or safe operation of a conditional use on the same property and where the [planning commission/ development review board/zoning board of adjustment] finds that:
 - a. There is no practical alternative to the clearing, filling or excavating within the riparian buffer; and
 - b. The purposes of this ordinance will be protected through erosion controls, plantings, protection of existing vegetation, and/or other measures.

2. Encroachments necessary for providing for or improving public facilities where the [planning commission/ development review board/zoning board of adjustment] finds that:
 - a. There is no practical alternative to the clearing, filling or excavating within the riparian buffer; and
 - b. The purposes of this ordinance will be protected through erosion controls, plantings, protection of existing vegetation, and/or other measures.
3. Unpaved footpaths for the purpose of public recreation located at least ten (10) feet horizontal distance measured from the top of slope, where the channel runs adjacent to a valley wall or high terrace, or top of bank, where the channel has access to its floodplain.
4. Paved paths for the purpose of public recreation located at least fifty (50) feet horizontal distance measured from the top of slope, where the channel runs adjacent to a valley wall or high terrace, or top of bank, where the channel has access to its floodplain. Access points are allowed, but shall be limited to areas where the stream or river channel is already confined and/or permanently constrained.
5. Stormwater treatment facilities meeting the stormwater treatment practices and sizing criteria set forth in the *Vermont Stormwater Management Manuals Volumes I and II* as most recently amended, where [planning commission/ development review board/zoning board of adjustment] finds that:
 - a. There is no practical alternative to the clearing, filling or excavating within the riparian buffer;
 - b. The purposes of this ordinance will be protected through erosion controls, plantings, protection of existing vegetation, and/or other measures; and
 - c. Evidence of an approved permit from the Vermont Agency of Natural Resources or the Town of ____ for coverage under the applicable permitting requirements shall be required to meet this criterion for encroachment into a riparian buffer.
6. Roadways or access drives for purposes of crossing a riparian buffer to gain access to land on the opposite side of the buffer, or for purposes of providing safe access to an approved use, in cases where there is no feasible alternative for providing safe access. A roadway crossings or access drive shall occur at a right angle to the stream channel.
7. Utility lines, including telephone, cable, sewer and water, to the extent necessary to cross or encroach into the riparian buffer where there is no feasible alternative for providing or extending utility services.

8. Outdoor recreation and education facilities provided that any building or structure (including parking and driveways) associated with such use is located outside the riparian buffer.

9. Stream restoration projects, including dam removals, in accordance with a plan approved by the Vermont Agency of Natural Resources.

SECTION 7. EXPANSION OF NONCONFORMITIES WITHIN RIPARIAN BUFFERS.

Any building, structure, or land or use thereof, which is made nonconforming by reason of the adoption of this Ordinance, may be expanded or reconstructed, subject to the following provisions:

(A) The structure to be expanded or reconstructed was originally constructed on or before the effective date of these regulations.

(B) The nonconforming use shall not be changed to another non-conforming use.

(C) A nonconforming use that is discontinued for one year or abandoned shall not be resumed.

(D) A nonconforming use that is replaced by a conforming use may not revert to a non-conforming use.

(E) If a structure made nonconforming by reason of the adoption of this ordinance is damaged or destroyed over 75% of its market value by floodwater inundation or fluvial erosion, the structure shall not be rebuilt within the riparian buffer unless a variance is obtained in accordance with Section _____ of the Town of _____'s zoning regulations.

(F) Enlargement, repair or reconstruction of pre-existing structures within riparian buffers shall be permitted if the [planning commission/ development review board/zoning board of adjustment] determines that the development activity will not decrease the existing structure setback from the waterbody or increase the encroachment within the riparian buffer, and the total building footprint area of the expanded or reconstructed structure is no more that fifty percent (50%) larger than the footprint of the structure lawfully existing on or before the effective date of these regulations.

(G) New accessory structures appurtenant to a pre-existing structure within a riparian buffer shall only be permitted if it is determined that the accessory structures do not extend into the buffer any further than the existing structure and the total building footprint area of the new accessory structure is no more than fifty percent (50%) of the footprint of the pre-existing structure.

SECTION 8. OTHER LAWS.

This ordinance is in addition to all other ordinances of the Town of _____ and all applicable laws of the State of Vermont.

SECTION 9. SEVERABILITY.

If any section of this ordinance is held by a court of competent jurisdiction to be invalid, such finding shall not invalidate any other part of this ordinance.

SIGNATURES

DATE