VERMONT

AGENCY OF NATURAL RESOURCES

GUIDANCE FOR AGENCY ACT 250 AND SECTION 248 COMMENTS REGARDING RIPARIAN BUFFERS

DECEMBER 9, 2005

ADOPTED:

Thomas W. Torti

GUIDANCE FOR AGENCY ACT 250 AND SECTION 248 COMMENTS REGARDING RIPARIAN BUFFERS

TABLE OF CONTENTS

VERMONT AGENCY OF NATURAL RESOURCES
GUIDANCE FOR AGENCY ACT 250 AND SECTION 248 COMMENTS REGARDING RIPARIAN BUFFERS

Section I: Introduction and Summary

Riparian corridors, including streambanks and lakeshores, serve vital functions that have significant environmental, economic, and social value. A summary of technical information on the functions and values of riparian corridors is included as Appendix A and more detailed information is found in a series of technical papers developed and published separately by the Agency as *Riparian Buffers and Corridors Technical Papers*. The Agency seeks to sustain and enhance the functions and values of the State's waters and natural ecosystems by recommending maintenance and restoration of riparian buffer zones through its role in the Act 250 and Section 248 processes [10 V.S.A. § 6084 and 30 V.S.A. § 248(a)(4)(E)], as summarized in Appendix B.

The primary purpose of this Guidance is to direct Agency staff in developing buffer recommendations for Act 250 jurisdictional projects and other processes that use the applicable Act 250 criteria, including the Section 248 process before the Public Service Board. The companion *Technical Papers* are intended to assist others (private, municipal, regional, state, and federal entities) in understanding the functions and values of riparian buffers, the importance of sustaining and enhancing buffers, and in developing appropriate science-based guidelines or policies. This Guidance is not intended as a substitute for guidelines or policies that will meet a specific entity's individual needs.

As described in this Guidance, the minimum riparian buffer zone widths that the Agency will recommend in Act 250 and Section 248 applications are: 100 feet for lakes, and 50 or 100 feet for streams. Sections III.B.1 and III.B.2 summarize site attributes that influence the recommended width; these are discussed in more detail in Appendix C. In all cases, Agency recommendations will be based on the buffer width needed to maintain or enhance the functions and values of the riparian area at the project site. Section III.C of this Guidance describes low-impact activities that the Agency believes are acceptable in riparian buffer zones because the activities will not significantly impair the buffer's function.

A riparian management plan may be proposed by the applicant or requested by the Agency as an alternative to establishing recommended buffer widths using the qualitative assessment techniques described in Sections III.B.1 and III.B.2 of this Guidance. Riparian management plans are appropriate in: large and complex projects, including master plan applications for residential subdivisions and large-scale transportation corridor projects; in densely developed downtowns or town centers; and, in areas that have previously been developed along riparian areas. The objectives of riparian management plans may include preventing erosion; addressing special resources, such as threatened and endangered species; defining allowed activities during site disturbance and post-construction; restoring buffer vegetation; and documenting the boundaries of the buffer area.

This Guidance supercedes the ANR Riparian Buffer Guidance (adopted January 20. 2005).

Section II: Use of the Guidance

This Guidance will be used in the following:

1. Establishing Agency recommendations and testimony in the Act 250 process and in Section 248 proceedings;
2. Targeting consistency and predictability in intra-agency review and recommendations for Act 250/Section 248-regulated projects statewide; and
3. Assisting applicants in designing Act 250/Section 248-regulated projects that incorporate appropriate buffer zone widths for protecting riparian functions.

Under Act 250, the Act 250 District Environmental Commissions are responsible for making the final determination of the appropriate riparian buffer width that will be incorporated into the Act 250 permit. This decision is based on the Commissions' consideration of the project design, the resources involved, and when available, Agency recommendations. Act 250 Commissions often rely heavily on Agency recommendations for technical natural resources issues; the same is true for the Public Service Board in Section 248 proceedings.

For projects not under Act 250 or Section 248 jurisdiction, this Guidance does not replace existing practices and procedures. For example, this Guidance does not supersede any presumption of compliance created by the following: Accepted Agriculture Practices, adopted pursuant to 10 V.S.A. §1259(I); Acceptable Management Practices for Maintaining Water Quality on Logging Jobs in Vermont, adopted pursuant to 10 V.S.A. § 2622; or, the Vermont Wetland Rules. Also, this Guidance does not replace use of the ANR Floodway Procedure to support Act 250 decisions under Criterion 1(D).

Under the Vermont Wetland Rules, buffer widths of 100 feet and 50 feet are required for Class I and II wetlands, respectively. Where Class I and II wetlands are contiguous to a waterbody, buffer widths of greater than 100 feet and 50 feet may be recommended based on case-specific application of this Guidance. This Guidance will also be used to recommend buffers for Class III wetlands contiguous to waterbodies for projects under Act 250, as necessary to maintain the functions and values of the riparian area.

Section III: How to Apply the Guidance

A. Measuring Riparian Buffer Zone Widths

Buffers are measured horizontally from the mean water level for lakes and from top of bank or top of slope for streams, depending on site characteristics as described below, to the edge of allowed project activity. In areas where a wetland (Class I, II, or III) is contiguous to a waterbody, buffers are measured from the upland edge of the delineated wetland.

1. Lakes

Riparian buffer zones on lakes are measured inland perpendicular to the shoreline beginning at the mean water level. Records of mean water levels for many lakes are kept in the Water Quality Division's Lakes and Ponds Encroachment Program (802-241-3777). In cases where no mean water level is on record, Agency staff can conduct a site visit to determine the mean water level.

2. Streams
Riparian buffer zones on streams are measured inland perpendicular from either top of bank or top of slope, depending on the physical stream channel characteristics. The most common scenarios are:

- Channels where the break in bank slope represents the stage at which annual average high water (bankfull flow) accesses a relatively flat and wide floodplain; buffers are measured from the **top of bank** if no contiguous wetlands are present, or from the **upland edge of the wetland** if contiguous wetlands are present.
- Channels contained in a narrow V-shaped valley that has steep side slopes and little or no floodplain; buffers are measured from the **top of slope**.
- Channels that have an accessible floodplain on one side of the channel but run adjacent to the steep side slope of a valley or high terrace on the other; buffers are measured from the **top of slope** where the channel runs adjacent to the valley wall or high terrace and the **top of bank** where the channel has access to the floodplain.
- Channels that have recently abandoned their floodplain as a result of a lowering of the streambed, and are creating a new floodplain at a lower elevation; buffers are measured from the **top of slope**, defined as the edge of the most recently abandoned floodplain.

More information on determining the location of top of bank and top of slope is provided in Appendix C.

B. Buffer Zone Width Recommendations for Regulated Projects
Regulated projects or activities are those under review in the Act 250 process and in Section 248 proceedings. Although this Guidance may apply within any of the criteria on which the Agency comments in Act 250, the Agency will typically provide comments under criteria 1, 4, 8, and 9 when proposing buffers to protect riparian functions (see Appendix D). The process for establishing riparian buffer width recommendations is generally focused on ecological functions; in most cases, this approach will result in buffers sufficient to protect the social and economic values of the riparian area as well.

This section presents two equivalent alternatives for establishing recommended buffer widths: a default values approach involving a qualitative assessment of site attributes described in Sections III.B.1 and III.B.2; or, a site-specific approach involving Agency consultation and development of a riparian management plan, described in Section III.B.4. In all cases, the actual buffer width recommended by the Agency in its comments to the District Commission will be based on what will maintain or enhance the functions and values of the riparian area at the project site.

1. Lakes
In general, the buffer zone width recommended for regulated projects on lakes will be 100 feet, measured from mean water level. The Agency may recommend buffers greater than 100 feet at lakeshore sites with rare, threatened, endangered or sensitive species; sensitive significant natural communities; or necessary habitats. In addition, when site conditions warrant (e.g. significant risk of erosion and/or potential for overland flow of pollutants) the Agency may recommend that the buffer extend to top of slope even if this results in a buffer wider than 100 feet. Buffers narrower than 100 feet are generally not recommended due to the important role naturally

vegetated shores play in lake ecology, the sensitivity to pollution and the limited extent of remaining natural lakeshores in Vermont. However, buffers narrower than 100 feet are possible in limited circumstances, where permanent changes to the shoreline have eliminated the role vegetated shores play in overall lake ecology (see Appendix C).

2. Streams

The minimum buffer zone width recommended for regulated projects on streams is dependent on several site- and project-specific factors, including:

- Physical characteristics of the site and the watercourse and its banks and floodplain;
- Aquatic and terrestrial populations and communities dependent on the watercourse and riparian corridor; and,
- Nature and extent of the proposed development and existing encroachments, including the potential for erosion and overland flow of pollutants.

Detailed descriptions of these features and the associated functions of riparian buffers are included in Appendix C of this Guidance. Further, the Agency's *Riparian Buffers and Corridors Technical Papers* summarize and provide reference to the scientific studies that provide the foundation for recommendations contained in this Guidance.

While it is difficult to offer generalizations encompassing the wide range of stream conditions and resource needs found throughout Vermont, the Agency will generally make recommendations of either a 50-foot or 100-foot buffer for regulated project on streams based on evaluation of the site attributes summarized below.

Summary of Key Stream Riparian Buffer Functions and Typical Recommended Widths

Function	50-foot Buffer Recommendation	100-foot Buffer Recommendation
Protection of channel and floodplain stability	Small to moderate sized streams that are at low risk for lateral or vertical channel adjustment and have small floodplain requirements.	Small to moderate sized streams with the potential for significant lateral or vertical channel adjustment. Streams with large belt width and floodplain requirements (includes most large rivers).
Protection of aquatic and terrestrial wildlife habitats	Aquatic populations dependent upon stream habitat and/or water quality either directly associated with or in close proximity to the project site. Project sites without significant wildlife travel corridor and/or riparian dependent species and/or significant natural communities identified on or in close proximity to the project site.	Sites with significant wildlife travel corridor and/or identified riparian dependent species (e.g., riparian breeding birds), and/or significant natural communities either directly associated with or in close proximity to the project site.
Protection of water quality	Site soils and slope indicate low risk of erosion; proximity of project to receiving water and amount of resulting impervious cover indicate low potential for overland flow of pollutants.	Site characteristics indicate increased risk of erosion and/or potential for overland flow of pollutants.

3. Agency Recommendation for Wider or Narrower Buffers

As previously stated, recommended buffers for regulated projects will generally be 100 feet on lakes and either 50 feet or 100 feet on streams. There are some lake and stream sites, however, where recommended buffers may be wider than these minimums. These include areas where:

- Rare, threatened, endangered, or sensitive species, *sensitive* significant natural communities, and/or necessary habitats (as defined in Appendix C) are either directly associated with or in close proximity to the project site; and
- Actively adjusting channels are undergoing channel lengthening and floodplain development. In determining the floodway area needed to protect channel stability the Agency may also apply the *Procedure on ANR Floodway Determination in Act 250*.

Similarly, there are certain types of lake and stream sites where narrower buffers may be acceptable. These include areas where:

- Riparian functions and values will be adequately protected by a narrower buffer, such as sites adjacent to small, stable intermittent streams; or
- The location and extent of existing encroachments severely limits the ecological benefits that would be derived from a wider buffer.

4. Agency Consultation

Multi-faceted resource issues that involve numerous Agency programs are too complex to be summarized in a brief guidance such as this, and will be best served by Agency consultation, potentially involving staff from several technical areas. There are four project types where site-specific consultation with Agency staff should occur as part of the process for establishing recommended buffer widths. Consultations will occur for project sites where:

- Applicants are proposing large and complex development projects.
- Habitat and/or geomorphic features described in Section III.B.3, above, are present.
- Applicants are seeking an Agency recommendation for a buffer narrower than that recommended by this Guidance.
- The proposed project is adjacent to Class A(1) waters or a waterbody that provides exceptional value for public recreation and aesthetics, including waterbodies designated as Outstanding Resource Waters for natural, scenic, or recreational values.

Often, the end result of the Agency consultation process will be a riparian management plan that identifies buffer functions and values, establishes appropriate buffer widths, and details allowed uses in the buffer that are inconsistent with undisturbed, naturally-vegetated conditions. A riparian management plan may be proposed by the applicant or requested by the Agency and should document a systematic approach for describing site characteristics and assessing buffer functions and values, including measures to:

- Minimize the potential for hydrologic change within the subwatershed;
- Ensure the integrity of steep slopes;
- Assess the role of riparian Class III wetlands in maintaining the functions and values of the watercourse; and
- Limit to maximum extent practicable any encroachments into buffers.

The objectives of a riparian management plan may include preventing erosion; addressing special resources, such as threatened and endangered species; defining allowed activities during site disturbance and post-construction; restoring buffer vegetation; and documenting the boundaries of the buffer area. As appropriate, allowed or restricted activities and boundaries should be contained in covenants of subdivisions and land management agreements.

A riparian management plan also affords applicants an opportunity to propose non-standard buffer protection measures in order to accommodate unique features of a particular site. These could include:

- Identifying areas where enhanced plantings might be used to ensure buffer integrity.
- Identifying areas where conservation easements could be provided to ensure the long-term viability of the riparian area.

There are locations where it will be challenging to provide the buffer width recommended by this Guidance, most commonly in projects involving development, or redevelopment, in areas adjacent to existing encroachments. The Agency encourages applicants in areas with existing encroachments to apply the Guidance and give full consideration to the recommended buffers. In the end, if the applicant feels that buffer recommendation yielded by this Guidance is impractical, the Agency encourages the applicant to seek Agency consultation as would be expected for any project where the applicant wishes to propose a narrower buffer.

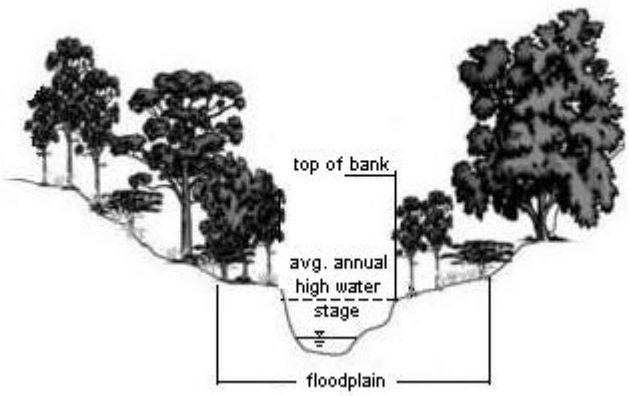
C. Acceptable Activities within Buffer Zone Areas

The definition of a *riparian buffer zone* as provided in this Guidance includes the description "undisturbed." Generally, "undisturbed" means no construction; no earth-moving activities; no storage of materials; no tree, shrub, or groundcover removal; and no mowing. The Agency recognizes that not every application begins with a site that is currently "undisturbed." Agency review will give due consideration to existing site conditions. Whenever the "undisturbed" condition is not consistent with a project plan, Agency staff will make a case-by-case evaluation of the proposed activities within the buffer, and, if necessary, consult with the applicant. Agency review will consider relevant riparian corridor functions and values, site features and type of project proposed in determining the activities that the Agency believes are compatible with buffer functions. As appropriate, allowed or restricted activities should be contained in covenants of subdivisions and land management agreements. In addition, when a parcel is subject to Act 250 and also has concurrent, unrelated forestry activities, the AMPs supersede this guidance, as described in Section II.

GUIDANCE DEFINITIONS

Average Annual High Water Stage: The stage or elevation at which the average annual high water begins to spill out of the active channel into the adjacent floodplains; also called the "channel-forming" or "bankfull" flow (see Figure 1).

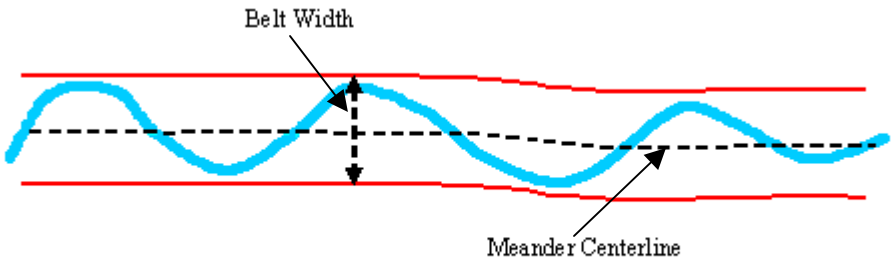
Figure 1: Schematic of a Generic Riparian Area



Adapted from: National Academies Press, 2002

Belt Width: The horizontal distance which extends laterally across the stream valley, from outside meander bend to outside meander bend, thereby encompassing the natural planform variability of the channel necessary to accommodate the slope requirements of the stream (see Figure 2).

Figure 2: Determining Belt Width for a Geomorphically Stable Stream



Contiguous Wetland: Wetlands that share a boundary with an adjacent waterbody, including situations where the water level of the wetland is directly influenced by the water level of the adjacent waterbody and where a man-made structure (e.g. roadway) divides a wetland, if surface water is able to flow over, under, or through that structure.

Floodplain: Land adjoining a waterbody that is covered by water during flows or water levels at or exceeding the average annual high water stage (see Figure 1).

Floodway: As defined by Act 250, the channel of a watercourse which is expected to flood an average of at least once every 100 years and the adjacent land areas which are required to carry and discharge the flood of the watercourse. Act 250 case law has established that the Act 250 Floodway includes land areas adjacent to the watercourse endangered by fluvial erosion hazards, as determined by the ANR Secretary.

Lake: A body of standing water, including bodies named lake, pond, and reservoir, that may have natural or artificial water level control. For the purpose of this guidance, off-stream reservoirs specifically constructed for the following purposes, are not considered lakes: snowmaking water storage; golf course irrigation; stormwater management; and, fire suppression. Exceptions include constructed reservoirs discharging to natural waterbodies where attendant thermal impacts are of concern.

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 under *Rules Determining Mean Water Levels* (November 14, 1972).

Regulated Project or Activity: Those projects or activities which fall under the jurisdiction of Act 250 or are part of a Section 248 proceeding.

Riparian Buffer Zone: The width of land adjacent to lakes or streams between the top of the bank or top of slope or mean water level and the edge of other land uses. Riparian buffer zones are typically undisturbed areas, consisting of trees, shrubs, groundcover plants, duff layer, and a naturally vegetated uneven ground surface, that protect the waterbody and the adjacent riparian corridor ecosystem from the impact of these land uses.

Riparian Corridor: The waterbody and the width of adjacent land that supports a distinct ecosystem with abundant and diverse plant and animal communities (as compared with upland communities). For streams, this includes the belt width required for channel stability.

Stream: The full length and width, including the bed and banks, of any watercourse, including, but not limited to, bodies named creek, brook, river, branch, and kill. A stream has a channel that periodically or continuously contains moving water, has a defined bed, and has banks that serve to confine water at low to moderate flows. Streams include intermittent streams that have a defined channel and evidence of sediment transport, even if such streams does not have surface water flow throughout the year and/or throughout the channel. For the purpose of this guidance, constructed drainageways including water bars, swales, and roadside ditches, are not considered streams.

Streambanks: Physiographic features that normally contain streams within a channel. The bank is distinct from the streambed, which is normally wetted and provides a substrate that supports aquatic organisms.

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 (see Figure 1).

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.

Waterbody: A lake or stream.

Wetlands: Lands that are inundated or saturated by surface water or groundwater with a frequency sufficient to support significant vegetation or aquatic life that depend on saturated or seasonally saturated soil conditions for growth and reproduction. Such areas include but are not limited to: marshes, swamps, sloughs, potholes, river and lake overflows, mud flats, fens, bogs, and ponds. References to wetlands in this Guidance are those adjacent to streams or lakes.

APPENDIX A. Functions and Values of Riparian Ecosystems

Riparian corridors provide both ecological functions and social and economic values. The specific characteristics of a particular riparian corridor are important in determining the width of the buffer zone necessary to protect these functions and values. This appendix summarizes the functions and values of riparian buffers. More detailed descriptions are provided in a series of technical papers developed by the Agency, entitled *Riparian Buffers and Corridors Technical Papers*.

1. Functions of Riparian Corridors and Buffer Zones

A. Protection of water quality

i. Water temperature and light control: Shading maintains cool summer water temperatures and moderates harsh winter temperatures; also, lower light levels inhibit algal growth. Both factors maximize dissolved oxygen content in the water.

ii. Filtration of sediments, nutrients, pathogens and toxics in runoff: Vegetated buffer zones slow overland runoff, allowing the buffer to filter out pollutants originating from upland areas.

iii. Infiltration and maintenance of streamflow: Vegetated buffer zones slow overland runoff allowing for infiltration of surface water that helps to maintain base flow in streams.

iv. Lakeshore, channel and floodplain stability: Vegetated buffer zones minimize lakeshore erosion, instream scour, bank erosion, and sedimentation associated with channel instability, reducing sediment loads to receiving waterbodies.

B. Protection of aquatic habitat

i. Water quality: The water quality functions described above are important in the protection of aquatic habitat and aquatic biota. Moderating water temperatures in both summer and winter and maintaining sufficient dissolved oxygen levels are essential to aquatic biota. Removal of pollutants from runoff helps to ensure clean water and oxygen for aquatic organisms, and maintaining stream flows ensures flowing water even during the driest months. Reducing the amount of sediment entering a waterbody protects the eggs and young of fish, amphibians, aquatic insects and other aquatic invertebrates from suffocation and helps maintain the interstitial spaces in stream substrates, which provide important habitat for aquatic biota.

ii. Food supply: Organic material (leaves, twigs, and other detritus) derived from riparian areas is the origin of the energy that drives aquatic food chains in most streams and lakes.

iii. Woody debris: Large woody debris (LWD) is recruited from the riparian corridor by trees falling into the stream channel or lake, or delivered to the waterbody via floodwaters. LWD provides velocity refuge and overhead cover for fish, substrate and food for aquatic invertebrates, and substrate for plants. LWD influences the formation of pools, backwaters, and shallow slack water, increasing the complexity of aquatic habitat and influencing the storage and transport of aquatic food sources. It also traps sediments and retards scouring of the channel bed and banks during high flows and reduces the effects of wave action on lakeshores, maintaining habitat for aquatic biota.

iv. Lakeshore, channel and floodplain stability: Dissipating floodwater is as important for aquatic biota as it is for the channel or lakeshore itself. Floodwaters that are not allowed

to dissipate horizontally over a floodplain build up energy within the channel, often causing excessive scour of the channel bed that can cause direct mortality of fish and amphibians due to mobilization of large substrates in the channel bed. Riparian vegetation stabilizes both streambanks and lakeshores preventing the collapse of undercut banks that provide cover and cool water refuge for fish, reptiles and amphibians.

C. Protection of terrestrial habitat

i. Natural communities: Streambanks, lakshores, and floodplain forests are ecologically associated with 26 of the 80 natural community types recognized in Vermont. Shorelines and floodplains provide very specialized ecological conditions for 18 natural community types that are considered rare and uncommon in the state.

ii. Habitat for wildlife and vegetation: A large part of the life cycles of amphibians and reptiles occur in riparian corridors. The same is true for many aquatic insects, which use riparian vegetation as reproductive swarming site, nymph emergence sites, and food. In addition, the majority of Vermont's birds and mammals are dependent on riparian areas for a portion of their life cycle. Many species of plants can survive only in areas near water.

iii. Maintenance of aquatic food webs as they relate to terrestrial food webs: Vegetation, such as fallen leaves and branches, are important in providing food and cover for aquatic insects and fish. These insects and small fish, in turn, provide food for many mammals and birds.

iv. Habitat for rare, threatened and endangered species: Many of Vermont's rare species of plants and animals are dependent on riparian areas for at least a part of their life cycle. Many species occur only in wet areas.

v. Preventing the spread of exotic or invasive species: Non-native invasive or exotic species can easily establish in disturbed riparian areas and then significantly disrupt natural communities. Maintaining and restoring riparian corridors is a key component in controlling the spread of these species.

vi. Travel corridors for migration and dispersal: Many wildlife species in Vermont are dependent on riparian corridors as connective habitat through otherwise uninhabitable regions during periods of food shortage, for seasonal or diurnal movements within their home ranges, and as dispersal routes for juveniles.

vii. Breeding habitat: Many wildlife species, especially waterfowl, shore birds, many songbirds and most amphibians and reptiles, require riparian habitat conditions for breeding and for raising their young.

viii. Genetic interchange: Vegetative buffer zones around waterbodies may provide important dispersal routes for juveniles and breeding adults of some wildlife species, thereby assisting in genetic interchange with other local populations.

D. Protection of channel, lakeshore, and floodplain stability

i. Flood attenuation: Buffer zones provide space for channel meanders and floodwaters to spread out horizontally, dissipating stream energy and protecting channel stability and lakeshores during floods.

ii. Reduced effects of storm events: Vegetated buffer zones can slow the speed and reduce the volume of surface runoff from upland areas, protecting lakeshores and stream channel beds and banks from "flashy" powerful flows that can scour and erode the channel.

iii. Ice damage control: Forested buffer zones trap ice slabs during spring break-up, reducing the potential of jamming at downstream constrictions. Jamming can result in backwater and flooding upstream, which can lead to channel instability. Vegetated lakeshore buffer zones are able to absorb the pressures of mid-winter ice push, protecting upland development from ice damage.

iv. Bank and shoreline stabilization: Vegetation binds soil increasing the strength of the soil matrix and thereby increasing streambank and lakeshore stability. Bank and shoreline stability are important for reducing soil and property loss from the bank or shore, reducing sediment input to the waterbody, and maintaining overall channel stability. Riparian vegetation also protects lakeshores from wave action.

v. Maintenance of sediment transport and channel morphology: Buffer zones help maintain channel width-to-depth ratios and meander geometry (belt width) resulting in a channel slope that ensures consistent movement of sediments and water through stream systems.

E. Maintenance of wetlands

Wetlands in riparian buffer zone areas provide many significant functions and values as part of riverine and lacustrine systems. Among these functions and values are:

- Surface and groundwater protection;
- Erosion control for streambank and shoreline stability;
- Wildlife habitat;
- Fisheries habitat;
- Rare, endangered and threatened species habitat;
- Significant natural communities;
- Water storage for flood water and storm runoff;
- Open space and aesthetics;
- Recreational and economic value; and
- Educational and research value.

2. Social and Economic Values of Riparian Corridors and Buffer Zones

A. Flood control that protects human land use and investments from hazards associated with stream dynamics and shore erosion;

B. Ice damage control that protects human land use and investments from ice damage on the near shore/bank and from effects of ice jamming and subsequent upstream flooding;

C. Maintenance of optimal water quality for drinking water and recreation, such as boating, swimming, fishing, and wildlife viewing;

D. Maintenance of wastewater assimilation capacity of streams for reducing wastewater treatment costs. Riparian buffer zones lower water temperature thereby increasing dissolved oxygen; this increases the waterbody's capacity to assimilate organic wastes, such as from wastewater treatment plants;

E. Aesthetics: Clear, clean waters and naturally vegetated riparian areas enhance the sensory and recreational qualities of the waterbody, the watershed, communities, and individual properties. Aesthetic values often have economic benefits and contribute to a sense of pride and well-being for communities and property owners; and

F. Intrinsic values such as the preservation of natural functioning ecosystems and biological diversity.

APPENDIX B. Agency's Legal Authority for Protecting Riparian Buffers

As noted in Section I, the Agency seeks to protect riparian buffers through various permitting and planning processes in which the Agency is a participant. The Agency's legal authority to make recommendations regarding riparian buffers is derived from a number of statutes including, but not limited to:

- 10 V.S.A. Chapter 151 (State Land Use and Development Plan) § 6084 - This provision provides the Agency with statutory party status in Act 250 proceedings. The Agency exercises its party status to comment on Act 250 criteria that relate to the protection of riparian corridors. These criteria include, but are not limited to, 10 V.S.A. § 6086(a)(1), 1(A), 1(B), 1(D), 1(E), 1(F), 1(G), 4, 8, 8(A), and 9(K).

- 30 V.S.A. § 248 (a)(4)(E) - The Agency is a party to proceedings held under § 248 and provides evidence and recommendations under subdivision (b)(5), which requires that a facility not have an undue adverse effect on esthetics, historic sites, air and water purity, the natural environment and the public health and safety, with due consideration having been given to the criteria specified in 10 V.S.A. § 1424a(d) and § 6086(a)(1) through (8) and (9)(K).

- 10 V.S.A. Chapter 37 (Water Resources Management) § 901 - This provision mandates the protection of the state's water resources. As noted herein, maintaining riparian corridors is essential to the protection of the water resources of the state.

- 10 V.S.A. Chapter 37 (Water Resources Management) § 905(b) - This provision mandates that the Department of Environmental Conservation protect and manage the water resources of the state. As noted herein, maintaining riparian corridors is essential to the management of water resources of the state for a variety of uses.

- 10 V.S.A. Chapter 41 (Regulation of Streamflow) – Through regulating stream alteration and dams, provide increased property and infrastructure protection and maintain or restore rivers' ecological functions and social and economic values.

- 10 V.S.A. Chapter 47 (Water Pollution Control) § 1250 (1) and (4) - These provisions make it the policy of the state to protect and enhance the quality, character, and usefulness of its surface waters and to assure the maintenance of water quality to sustain existing aquatic communities. As noted herein, maintaining riparian corridors is essential to fulfilling this policy.

- 10 V.S.A. Chapter 47 (Water Pollution Control) § 1272 - This provision authorizes the Agency to issue an order for the control of activities determined to be violating Title 10, Chapter 47. Requiring restoration and/or maintenance of riparian corridors is one method of controlling such activities.

- 10 V.S.A. Chapter 49 (Protection of Navigable Waters and Shorelands) § 1421 - Relative to the protection of navigable waters and shorelands, this provision authorizes the

Agency as trustee of its navigable waters and declares it to be in the public interest to establish procedures for the efficient use, conservation, development, and protection of the state's water resources.

- Section 401 of the Federal Clean Water Act (Water Quality Certification) – This section stipulates that any applicant for a Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters, shall provide the licensing or permitting agency a certification from the State in which the discharge originates or will originate, that any such discharge will comply with applicable effluent limits and not cause or contribute to a violation of water quality standards.

- The Vermont Water Quality Standards, currently effective version, adopted pursuant to 10 V.S.A. Chapter 37 (Water Resources Management) § 905 – Water quality standards are developed to be protective of the existing and designated uses in a particular waterbody, including but not limited to: aquatic biota, wildlife, and aquatic habitat; aesthetics; swimming and other primary contact recreation; boating, fishing, and other recreational uses.

APPENDIX C. Site-Specific Considerations in Determining Riparian Buffer Zone Width

In developing this Guidance the Agency consulted available literature to ensure that the recommendations for minimum buffer widths were based on sound science. This Appendix provides additional detail on site-specific considerations in determining buffer zone width, and includes citations for a number of key references. In addition, the series of technical papers developed by the Agency – *Riparian Buffers and Corridors Technical Papers* – includes a more extensive list of technical references.

Specifically, this Appendix includes a more detailed discussion on whether to measure stream buffers from top of bank or top of slope. It also discusses the sensitive nature of lake sites that necessitates a minimum buffer of 100-feet, and site functions that should be evaluated in making a qualitative assessment of the appropriate stream buffer width. For each site characteristic listed, an explanation of how the characteristic influences buffer function is provided with a summary of current research.

1. Measuring Stream Buffers from Top of Bank and Top of Slope

When establishing riparian buffers on streams it is important to consider the point from which buffers should be measured – from the **top of bank** or **top of slope,** depending on the physical channel characteristics.

Measuring from top of bank Figure C.1 represents a stream channel with a relatively flat and wide floodplain, which the stream accesses during flows at or exceeding the average annual high water stage. When these channel characteristics are present riparian buffers and corridors can be measured from the top of bank, perpendicular to the channel. When contiguous wetlands are present in the floodplain, however, the Agency recommends that buffer measurement begin at the upland edge of the wetland.

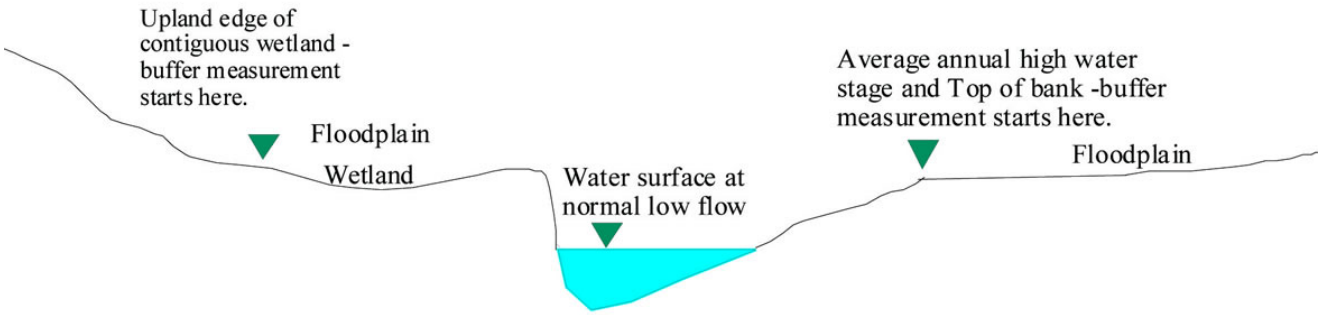


Figure C.1. Top of bank typical of streams with flat, wide floodplains that the stream accesses during flows exceeding average annual high water. Upland edge of wetland typical of continguous wetlands sometimes present in the floodplain.

<u>Measuring from top of slope</u> There are at least three scenarios when riparian buffers should be measured from the top of slope.

Scenario 1: When a channel is contained in a narrow V-shaped valley that has steep side slopes riparian buffer zone measurement should begin at the top of slope (Figure C.2). There is often little or no floodplain in this scenario, which increases the threat of slope toe erosion and slope failure, especially during storm and flood events.

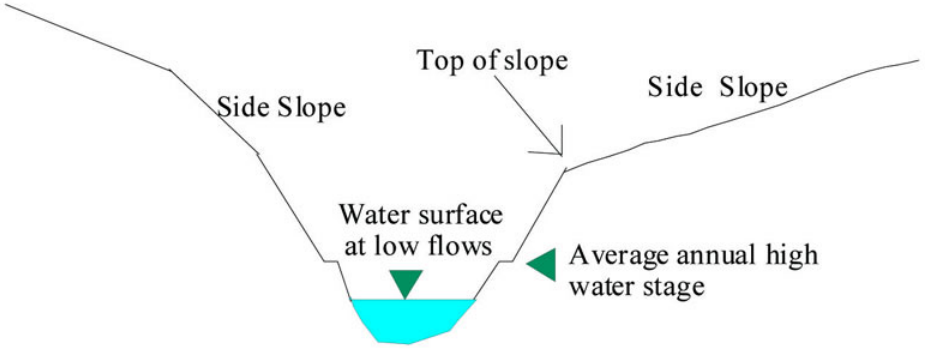


Figure C.2. Top of slope typical of steep streams in narrow V-shaped valleys with little or no floodplain.

Scenario 2: When a channel has adequate floodplain on one side but borders a steep valley side slope or high terrace on the other, riparian buffer zone measurement should begin at the top of slope on the valley wall or terrace side and the top of bank on the floodplain side (Figure C.3). The absence of a floodplain in areas where the channel runs adjacent to the steep valley side slope or high terrace increases the threat of slope toe erosion and slope failure.

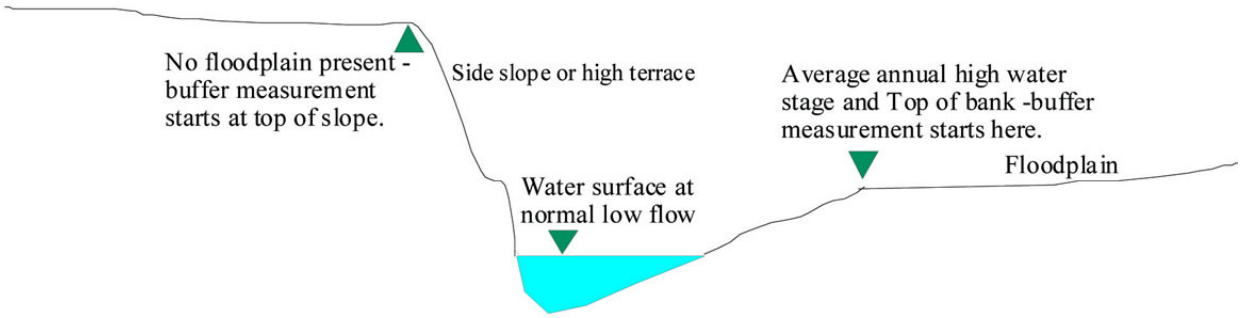


Figure C.3. Top of slope typical of streams that run adjacent to steep slopes or high terraces on one side of the valley but have adequate floodplain on the opposite side of the valley.

Scenario 3: Where streams that once had access to floodplains have since steepened and incised, the top of slope is found at the edge of the floodplain undergoing abandonment (Figure C.4). These streams are undergoing a channel evolution process, often taking decades to erode their banks and reestablish meanders, creating new floodplains at lower elevations. This often involves the cutting away of the toe of the steep slope, leading to slope failure. To ensure that streamside slopes are not compromised during this channel evolution process, riparian buffers should be established from the top of slope.

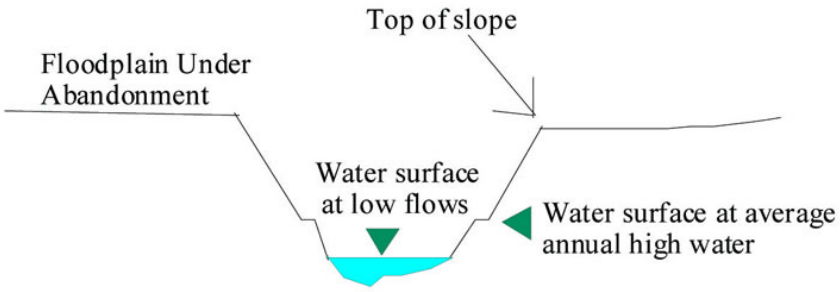
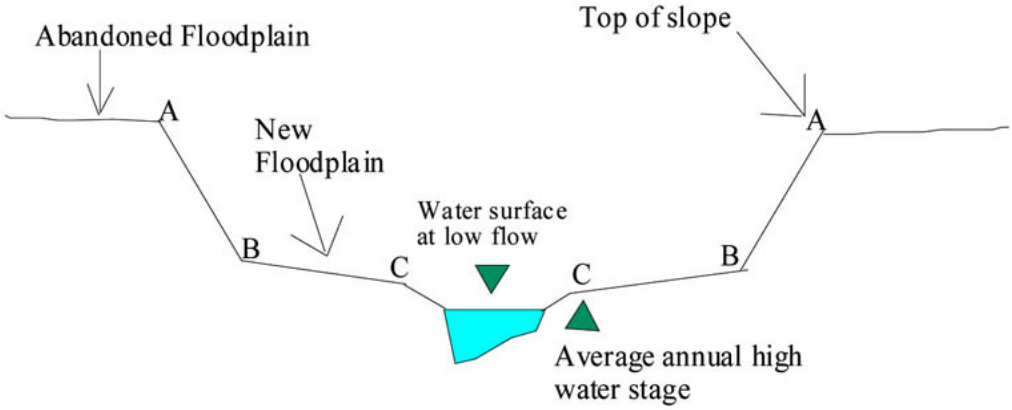


Figure C.4. Top of slope typical of incised streams that have little or no access to their floodplains and have yet to establish a new floodplain.

After a stream has incised and widened, it develops a new floodplain at a lower elevation. Often these floodplains are contained in narrow valleys and are flanked by steep slopes. In the case of narrow floodplains, where the slope and depth of the stream is maintained by the stream's ability to meander across the full width of the floodplain, riparian buffer zones should be established from top of slope to protect the stability of the stream as well as the stability of the adjacent slopes (Figures C.5 and C.6).



Fi gure C.5. Top of slope typical of streams that were once incised and have since reestablished a new floodplain at a lower elevation.

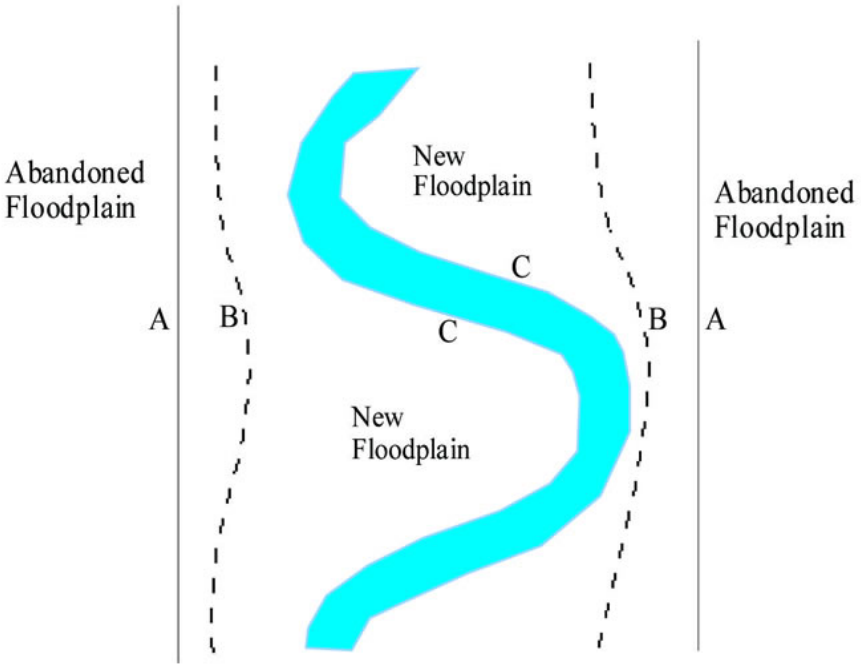


Figure C.6. Bird's eye view of stream in Figure C.5.
A=top of slope, B=outer edge of floodplain, C=top of bank.

2. Attributes of Lake Sites that Necessitate a 100-foot Buffer

Naturally-vegetated lakeshores are a critical element of overall lake ecology, providing the functions and values described in Appendix A. A large part of the life cycles of amphibians, reptiles, and many aquatic insects occurs in lakeshore areas. The majority of Vermont's birds and mammals are dependent on such areas for a portion of their life cycle, and many species of plants can survive only in areas near water. As Vermont's lakeshores have been developed, these plants and animals have become concentrated in the remaining natural areas on the shores. The very existence of these species as part of each lake's ecology is dependent on the protection of the remaining undisturbed lakeshore areas.

Lakeshores are a limited resource in Vermont and are under significant development pressure. An inventory of the undeveloped lakeshores of northern Vermont, conducted by the Northeastern Vermont Development Association from 1990-1992, found that less than half the lakeshore surrounding lakes greater than 20 acres in size in the study area (140 lakes) was in "undeveloped tracts." An undeveloped tract was defined as having a minimum of 1,000 feet of shore frontage and a depth of 250 horizontal feet with no human structures or 2-wheel drive roads. Most lakes that had undeveloped tracts had only one such tract on the lake.

Also, it is the nature of lakes to accumulate pollutants over time. A buffer width of 100 feet will in most cases provide adequate treatment of stormwater runoff from developed upland areas, preventing excessive accumulation of pollutants (specifically phosphorus and sediments) in the lake.

3. Site Functions to be Evaluated in Determining Stream Buffer Width

Protection of Channel and Floodplain Stability

A stream is considered geomorphically unstable when it is undergoing bed erosion (downcutting) or aggradation (buildup) due to an imbalance between watershed inputs (the quantity of flow and the efficient transport of the size and quantity of sediment produced in the watershed) and the channel's existing dimension, meander pattern, or slope (Lane 1955; Leopold 1994). Stream bed and bank erosion still occur in balanced, or stable, channels but at a lesser rate in comparison to unstable channels. A typical unstable channel scenario in Vermont is where the stream is straightened and has incised (down cut) to a depth where the average annual high water stage no longer has access to the floodplain. When floods occur in an incised channel, tremendous forces are constrained in the channel, and bank erosion and channel widening are accelerated. Channel widening and lengthening will continue until channel slope is moderated and there is sufficient aggradation of sediment in the channel to form a new floodplain. When the erosive force of a flood is spread out across the new belt width and floodplain and into the riparian area, the energy in the channel is reduced, resulting in a more stable stream system (Schumm 1984). Wooded riparian buffers are essential components of the channel boundary resistance and wider buffers are necessary where encroachments would limit the stream's ability to achieve equilibrium conditions.

A channel stability determination will be dependent on parameters such as rate of lateral migration or vertical profile adjustment, channel boundary resistance, and/or significant energy/channel slope imbalances. Indicators of significant rates of channel migration or vertical adjustment may be provided by the VT ANR Stream Geomorphic Assessment Database, comparison of channel location shown on successive aerial photo flights, in-field observation of headcuts, active bank erosion, substantial unvegetated depositional features, recently abandoned and/or incipient or developing flood plains, etc. More information is available on the DEC River Management Program web page: http://www.anr.state.vt.us/dec/waterq/rivers.htm

Protection of Aquatic and Terrestrial Wildlife Habitats

Aquatic Habitat and Species

The protection of aquatic habitat is dependent upon several riparian features and functions. Forested riparian areas are particularly important in providing floodplain area for attenuation and storage of floodwaters during high water events. This in turn protects channel stability and instream aquatic habitat. In general, larger rivers require large belt widths and floodplains to maintain channel stability and aquatic habitat functions, while smaller streams may have narrower belt width and floodplain requirements to maintain natural channel functions. Therefore, all other site factors being equal, larger buffers are typically recommended for large rivers in comparison to small streams. Forested riparian buffers also benefit aquatic habitat by improving the quality of nearby waters through shading, filtering pollutants from overland runoff, and providing leaf matter and woody debris to feed the aquatic food web and provide physical habitat structure.

Terrestrial Habitat and Species

The distinctive terrestrial habitat provided by riparian areas is home to a number of plant and animal species rarely found outside riparian areas (Verry 2000; CRJC 2000). Many species that are dependent on aquatic habitat, such as salamanders, frogs, turtles, mink, beaver, otter, and numerous species of birds also use terrestrial riparian habitats. For instance, wood turtles, which are considered a rare species in Vermont, are closely associated with riparian areas (Kaufman 1992; Parren 2005). These animals overwinter in rivers and streams and then move into the adjacent riparian areas in the spring and summer to forage, breed, and nest.

A variety of migratory songbirds also rely specifically on riparian areas for successful nesting, including Northern oriole and Yellow warbler. Often the diversity of bird species present in a riparian area is a function of the width of the vegetation along the river, stream, lake or pond. Larger areas provide a greater variety of habitat types and food sources. In a study of selected third-order streams in Vermont, a vegetated riparian area of 150-175 meters (roughly 490- 575 feet) from the high water mark was required to protect 95% of the bird species present (Spackman 1992). Some riparian dependent bird species, such as bald eagle, great blue heron, and wood duck, may require buffers 600 feet or greater in width to meet their nesting and roosting habitat needs (Roderick and Miller 1991).

Continuous stretches of riparian buffer may, in some instances, serve as wildlife travel corridors (Chase 1995; DeGraff and Rudis 1986). A Vermont study shows use of riparian corridors to be important for black bear movement, particularly in providing travel corridors at road crossings (Hammond 2002).

A review of scientific literature describing the range of buffer habitat needs for riparian-associated wildlife and information on species-specific riparian habitat requirements is included in the series of technical papers developed by the Agency, *Riparian Buffers and Corridors Technical Papers*.

> **Sensitive, Rare, Threatened and Endangered Species:** Sensitive species are those easily disturbed by human activities and include primarily wetland dependent species, such as wading birds. A rare species is one that has only a few populations in the state and that faces threats to its continued existence. The Vermont Fish and Wildlife Department uses a ranking system that describes the degree of rarity of a species in Vermont. Threatened and endangered species are defined by both state and federal law, and includes those species on both the state and federal threatened and endangered species lists. In general, the continued existence of these species is in immediate jeopardy.
>
> **Necessary Wildlife Habitat:** For the purposes of this Guidance, necessary wildlife habitat is as defined in Act 250 (10 V.S.A. Chapter 151 6001). These habitats are critical to the survival of the species that rely on them. The Vermont Department of Fish and Wildlife Department has developed and made available habitat guidelines for many species' necessary habitats, also termed significant habitats (e.g. deer winter habitat, significant wetlands, heron rookeries, bear feeding habitat).

Sensitive and Significant Natural Communities: A natural community is an interacting assemblage of plants and animals, their physical environment, and the natural processes that affect them. The same natural community type can be found repeating across the landscape wherever similar environmental conditions occur. These environmental conditions include climate, soil type, nutrient availability, the amount of water or the lack of water, and the type of natural disturbance (such as wind, fire, and flooding). It is possible to describe and classify natural community types since they repeat in similar environmental settings.

The Vermont Fish and Wildlife Department determines the state significance of a specific natural community by evaluating the quality of that particular community and the rarity of its community type. Some natural communities, in addition to being state significant, may also be sensitive, meaning they are easily disturbed by human activities. For example, calcareous riverside seeps rely on groundwater discharge surfacing over calcareous bedrock as well as frequent scour from flooding and ice. A change to any one of these environmental factors, such as redirecting groundwater discharge or reducing flood scour processes, could result in loss or degradation of the natural community. While most significant natural communities occurring in riparian areas will be protected by 100 foot wide buffers, sensitive communities may require buffers greater than 100 feet.

There are a wide variety of natural community types that occur along the shores of Vermont lakes and streams, including sparsely vegetated open shores (e.g. Cobble Beach), marshes (e.g. Wild Rice Marsh), shrub swamps (e.g. Alluvial Shrub Swamp), and floodplain forests (e.g. Silver Maple-Ostrich Fern Riverine Floodplain Forest). More information on Vermont's natural communities can be found in *Wetland, Woodland, Wildland: A Guide to the Natural Communities of Vermont* (Thompson and Sorenson 2000). Detailed information about the significance and sensitivity of a particular natural community can be obtained by consulting the Nongame and Natural Heritage Program of the Vermont Fish and Wildlife Department.

More information on aquatic and terrestrial wildlife habitats and natural communities is available on the Department of Fish and Wildlife website at http://www.vtfishandwildlife.com/

Protection of Water Quality

Riparian buffers filter stormwater runoff that flows through them as sheetflow. Buffer vegetation catches sediment and absorbs some of the nutrients and other pollutants contained in the runoff. Pollutant removal depends on the pollutant load and type, the composition and slope of the buffer, and the amount of runoff (Chase et al 1995). In general, to provide the same level of pollutant capture, buffers in steep slope areas will need to be wider as flows are typically faster moving and more concentrated.

The physical and chemical properties of the soil and surficial geologic materials, including particle size, structure, and cohesion determine the potential for erosion within the riparian area. Soil erodibility may be obtained from soils surveys and the Top 20 soils tables available through the Natural Resources Conservation Service (NRCS). One technique for quantifying soil

erodibility is the NRCS index (K) which quantifies the susceptibility of soil to water erosion. Areas with K-values > 0.24 are susceptible to erosion and may require additional protective measures (Baltimore County 2004). More information on K-values can found on-line at http://soils.usda.gov/ or http://www.vt.nrcs.usda.gov/soils/so_stat.html. The *Vermont ANR Stream Geomorphic Assessment Handbook* also provides information on the erodibility of surficial geologic materials.

It is important to keep in mind that riparian buffers alone are not enough to mitigate the effects of stormwater runoff from otherwise uncontrolled upland activities (Binford and Buchenau 1993). Appropriate on-site stormwater controls work in concert with riparian buffers to ensure that potential impacts on adjacent waterbodies from both construction and post-construction site activities are minimized.

References

Baltimore County, Environmental Protection and Resource Management Division. Buffer Management and Protection Ordinance. Retrieved December 2004. http://www.epa.gov/owow/nps/ordinance/documents/A2a-Baltimore.pdf

Binford, M.W. and M. Buchenau. 1993. Chapter 4: Riparian Corridors and Water Resources in D. Smith and P. Hellmund, (eds.), Ecology of Greenways. University of Minnesota Press.

Center for Watershed Protection (CWP). 1995. Site Planning for Urban Stream Protection. 188pp. Ellicott City, MD.

Chase, V., L. Demming, and F. Latawiec. 1995. Buffers for Wetlands and Surface Waters: A Guidebook for New Hampshire Municipalities. 80pp. Audubon Society of New Hampshire.

Connecticut River Joint Commission (CRJC). 2000. Riparian Buffers for the Connecticut River Water – No. 1, Introduction to Riparian Buffers. Chestertown, NH.

DeGraff R.M. and D.D. Rudis. 1986. New England Wildlife: Habitat, Natural History, and Distribution. U.S. Department of Agriculture. Forest Service. General Technical Report NE-108.

Hammond, F. M. 2002. "The Effects of Resort and Residential Development on Black Bears in Vermont." Final Report. Waterbury, VT: Fish and Wildlife Department, Vermont Agency of Natural Resources.

Kaufmann, J.K. 1992. "Habitat Use by Wood Turtles in Central Pennsylvania". Journal of Herpetology. Vol 26:315-321.

Lane, E.W. 1955. The Importance of Fluvial Morphology in Hydraulic Engineering. Proceedings of the American Society of Civil Engineers, Journal of the Hydraulics Division, vol. 81, paper no. 745.

Leopold, L.B. 1994. A View of the River. Harvard University Press. Cambridge, MA.

Parren, S. 2005. Personal communication.

Roderick, E. and R. Miller. 1991. Management recommendations for Washington's priority habitats and species. Washington Department of Wildlife.

Schumm, S.A. 1984. The Fluvial System. John Wiley and Sons, New York.

Spackman, S. 1992. Streamside buffers, where to draw the lines: Investigating the relationship between stream corridor width and species richness in Vermont. Masters Thesis UVM.

Thompson, E.H. and E.R. Sorensen. 2000. Wetland, Woodland, Wildland: A Guide to the Natural Communities of Vermont. The Nature Conservancy and Vermont Department of Fish and Wildlife. Distributed by University Press of New England.

Verry, E.S., J.W. Hornbeck, and C.A. Dolloff (eds). 2000. Riparian management in forests of the continental Eastern United States. Lewis Publishers, Boca Raton, FL. 402p.

APPENDIX D. Summary of Applicable Act 250 and Section 248 Criteria and Other Statutory References Relevant to Riparian Functions

Act 250 and Section 248 Criteria

(1) **Will not result in undue water or air pollution.**

(A) **Headwaters.** A permit will be granted whenever it is demonstrated by the applicant that, in addition to all other applicable criteria, the development or subdivision will meet any applicable health and environmental conservation department regulation regarding reduction of the quality of the ground or surface waters flowing through or upon lands which are not devoted to intensive development, and which lands are:

(i) headwaters of watersheds characterized by steep slopes and shallow soils; or

(ii) drainage areas of 20 square miles or less; or

(iii) above 1,500 feet elevation; or

(iv) watersheds of public water supplies designated by the Vermont department of health; or

(v) areas supplying significant amounts of recharge waters to aquifers

(B) **Waste disposal.** A permit will be granted whenever it is demonstrated by the applicant that, in addition to all other applicable criteria, the development or subdivision will meet any applicable health and environmental conservation department regulations regarding the disposal of wastes, and will not involve the injection of waste materials or any harmful or toxic substances into ground water or wells.

(D) **Floodways.** A permit will be granted whenever it is demonstrated by the applicant that, in addition to all other applicable criteria:

(i) the development or subdivision of lands within a floodway will not restrict or divert the flow of flood waters, and endanger the health, safety and welfare of the public or of riparian owners during flooding; and

(ii) the development or subdivision of lands within a floodway fringe will not significantly increase the peak discharge of the river or stream within or downstream from the area of development and endanger the health, safety, or welfare of the public or riparian owners during flooding.

(E) **Streams.** A permit will be granted whenever it is demonstrated by the applicant that, in addition to all other applicable criteria, the development or subdivision of lands on or adjacent to the banks of a stream will, whenever feasible, maintain the natural condition of the stream, and will not endanger the health, safety, or welfare of the public or of adjoining landowners.

(F) **Shorelines.** A permit will be granted whenever it is demonstrated by the applicant that, in addition to all other criteria, the development or subdivision of shorelines must of necessity be located on a shoreline in order to fulfill the purpose of the development or subdivision, and the development or subdivision will, insofar as possible and reasonable in light of its purpose:

(i) retain the shoreline and the waters in their natural condition,

(ii) allow continued access to the waters and the recreational opportunities provided by the waters,

(iii) retain or provide vegetation which will screen the development or subdivision from the waters, and

(iv) stabilize the bank from erosion, as necessary, with vegetation cover.

(G) **Wetlands.** A permit will be granted whenever it is demonstrated by the applicant, in addition to other criteria, that the development or subdivision will not violate the rules of the water resources board, as adopted under section 905(9) of this title, relating to significant wetlands.

(4) **Will not cause unreasonable soil erosion or reduction in the capacity of the land to hold water so that a dangerous or unhealthy condition may result.**

(8) **Will not have an undue adverse effect on the scenic or natural beauty of the area, aesthetics, historic sites or rare and irreplaceable natural areas.**

(A) **Necessary wildlife habitat and endangered species.** A permit will not be granted if it is demonstrated by any party opposing the applicant that a development or subdivision will destroy or significantly imperil necessary wildlife habitat or any endangered species, and

(i) the economic, social, cultural, recreational, or other benefit to the public from the development or subdivision will not outweigh the economic, environmental, or recreational loss to the public from the destruction or imperilment of the habitat or species, or

(ii) all feasible and reasonable means of preventing or lessening the destruction, diminution, or imperilment of the habitat or species have not been or will not continue to be applied, or

(iii) a reasonable acceptable alternative site is owned or controlled by the applicant which would allow the development or subdivision to fulfill its intended purpose.

(9) **Is in conformance with a duly adopted capability and development plan, and land use plan when adopted.**

(K) **Development affecting public investments.** A permit will be granted for the development or subdivision of lands adjacent to governmental and public utility facilities, services, and lands, including, but not limited to, highways, airports, waste disposal facilities, office and maintenance buildings, fire and police stations, universities, schools, hospitals, prisons, jails, electric generating and transmission facilities, oil and gas pipe lines, parks, hiking trails and forest and game lands, when it is demonstrated that, in addition to all other applicable criteria, the development or subdivision will not unnecessarily or unreasonably endanger the public or quasi-public investment in the facility, service, or lands, or materially jeopardize or interfere with the function, efficiency, or safety of, or the public's use or enjoyment of or access to the facility, service, or lands.

Other Statutory References

10 V.S.A. § 6088. Burden of proof.

(a) The burden shall be on the applicant with respect to subdivisions (1), (2), (3), (4), (9) and (10) of section 6086(a) of this title.

(b) The burden shall be on any party opposing the applicant with respect to subdivisions (5) through (8) of section 6086(a) of this title to show an unreasonable or adverse effect. --1969, No. 250 (Adj. Sess.), § 13, eff. April 4, 1970.

30 V.S.A. § 248(b)(5). Agency role in Section 248 process.

(b)(5) with respect to an in-state facility, will not have an undue adverse effect on esthetics, historic sites, air and water purity, the natural environment and the public health and safety, with due consideration having been given to the criteria specified in 10 V.S.A. § 1424a(d) and § 6086(a)(1) through (8) and (9)(K).