



**Riparian Buffer Management Plan**  
**Rice Brook Adjacent to Sugarbush Lincoln Peak Phase II Redevelopment**  
**Prepared by Vanasse Hangen Brustlin, Inc.**  
**May 25, 2012**

**Background and Applicability**

This riparian buffer management plan (Plan) has been prepared on behalf of Sugarbush Resort (dba Summit Ventures NE, LLC.) at the request of the District 5 Environmental Commission, in close consultation with the Vermont Agency of Natural Resources (ANR). The Plan is applicable for the land area that lies within 50 feet of the south top of bank of the segment of Rice Brook adjacent to Phase II of the Lincoln Peak Base Area Redevelopment project site, from the United States Forest Service (USFS) boundary (approximate elevation 1,625 feet above mean sea level (AMSL)) to the Sugarbush Village Road (approximate elevation 1,490 feet AMSL), referred to herein, as the Plan area. Within the Plan area the permittee shall implement the phased riparian zone restoration elements, which has been determined by Sugarbush Resort to be feasible, following extensive consultation with ANR.

Significantly, this Plan requires no new encroachment to the riparian buffer adjacent to Rice Brook, and represents a substantial improvement to existing conditions with respect to the protection and restoration of riparian buffer functions within the Plan area.

**History**

The Plan area has been a component of the developed lands within the Lincoln Peak base area since the early 1960s, consisting predominantly of gravel surface parking areas and the associated driveway providing access to Sugarbush Village Road. Stormwater runoff and snowmelt from portions of the parking areas and from the driveway currently flows overland to the northeast, transporting washoff sediment from these surfaces into the Rice Brook riparian zone. As the riparian zone adjacent to the driveway is currently characterized by minimal grassy vegetation and relatively thin tree cover, this washoff sediment is able to discharge directly to Rice Brook.

At the outset of planning for Phase II of the Lincoln Peak Base Area Redevelopment Project, Sugarbush Resort focused on resolving two key issues surrounding the existing parking lots and driveway:

1. Ceasing the discharge of sediment-laden stormwater runoff to the Rice Brook riparian zone via a stormwater management plan and subsequently enhancing the riparian buffer; and
2. Resolution of a long-standing disagreement with Brook House and Village Edge (the representing property owners within the Sugarbush Village), regarding rights to the use of the existing parking areas that lie within the Plan area.

To assist with the design process for Phase II and with the development of the Plan described herein, VHB performed a natural resources assessment of the Plan area in October 2011. The results of this study are contained within the Natural Resources Assessment report prepared by VHB dated December 22, 2011 (see Exhibit 7). Included in this assessment is a field-based determination of the top of bank (TOB) location within the subject parcel, on the south side of Rice Brook. This final TOB line was adjusted through field review with ANR personnel during Fall 2011, and the currently depicted line as shown on Sheet LA-101, dated February 1, 2012 (see Attachment, Page 1), has been agreed upon by VHB and ANR. Additional baseline information utilized in the development of the Plan has been the detailed field mapping of the existing extent of impervious area (see Grenier Engineering Plan sheet S1, Exhibit 18p, dated February 1, 2012).



Through a combination of careful engineering design and proactive outreach with Sugarbush Village, Sugarbush Resort has resolved the two goals described above in the following manner:

1. Current plans have all stormwater generated from these surfaces being routed to stormwater treatment practices, effectively ceasing overland flow to Rice Brook. The Plan described herein outlines how the riparian buffer zone will be enhanced and expanded by the use of native plantings and land use and management restrictions.
2. In the context of Master Permit reviews by the Town of Warren and the District 5 Environmental Commission, a Memorandum of Agreement (MOA) has recently been signed between these parties establishing, among other points, a New Association which will own and be responsible for the future maintenance of the proposed reconfigured parking fields. The MOA sets forth a protocol to ensure that permit conditions, including the ongoing management by the New Association of the riparian buffer area described in this Plan, will be assured.

### **Plan Components**

The Plan consists of two components; a forested buffer restoration and a grassed area revegetation. These areas are depicted on the map entitled “Overall Riparian Buffer Restoration Plan,” dated May 18, 2012 and provided as Page 2 of the Attachment. The Plan area includes lands located between the Rice Brook TOB and a distance of 50 feet from the TOB, wherever feasible. During the construction of Phase IIA, Sugarbush Resort will take initial steps to restore the riparian buffer at select locations. Pending issuance of all necessary permits, it is anticipated that the Phase IIA partial restoration implementation will be completed prior to the end of 2013. These areas are identified on the “Phase IIA Partial Riparian Buffer Restoration Plan,” dated May 24, 2012 and provided as Page 3 of the Attachment. The remaining components will be implemented concurrent with the construction of “Building B Phase” (Phase IIB), as depicted on Plan Sheet LA-006, and described in the Preliminary Phasing Summary, dated February 6, 2012.

### **Forested Buffer Restoration**

All feasible areas within the Plan area where forested buffer restoration can be achieved in the context of the proposed development project have been identified. These areas are shown in medium green color on the overall and partial plan maps (see Attachment, Pages 2 and 3). Within these areas, topsoil placement will occur as necessary, and plantings consisting of native trees and shrubs compatible with the site location and conditions will be utilized. Density of plantings will be consistent with U.S. Army Corps of Engineers (USACE) mitigation site implementation criteria. Permanent monumentation including placement of signage, boulders, and/or other appropriate demarcation to designate these areas as protected riparian buffer zone will be provided. Prior to construction of Phase IIA, Sugarbush Resort will prepare a landscaping plan for the forested buffer restoration areas, for final review and approval by ANR. Following implementation, these areas shall be maintained as naturally vegetated, undisturbed terrain. To maximize the successfulness of the buffer restoration, the following actions have been or will be undertaken by Sugarbush Resort:

- The width of the forested buffer restoration area has been maximized, with areas of grassed vegetation being limited to those where pedestrian and skier connections must occur (described below).



- The Phase II stormwater management plan ensures that all runoff from impervious surfaces will be routed to stormwater treatment practices, as described in the pending NOI for authorization pursuant to DEC General Permit 3-9015.
- No vehicular, equipment, or skier traffic will occur within these areas (except as described below).
- No snow plowing or snow storage shall occur within these areas.
- Other than necessary vegetation management (e.g., removal of danger trees), no removal of vegetation within these restored areas will occur.
- Ongoing annual inspections will be carried out by Sugarbush Resort to verify the success of the revegetation efforts, and to monitor/control invasive species, which may become established.

#### Grassed Area Revegetation

The grassed area revegetation will occur within two areas adjacent to the existing/restored forested riparian buffer along Rice Brook. The first area consists of the ski-back trail to the north and northeast of the Rice Brook Residences building, which begins at the “Out to Lunch” trail and continues downhill to the existing Sugarbush Village pedestrian covered bridge over Rice Brook. This area is depicted in light green on the overall and partial plan maps (see Attachment, Pages 2 and 3). This area cannot feasibly be returned to full naturally vegetated undisturbed buffer, given the need to provide skier and pedestrian access to the Sugarbush Village, the Phase II project area, the amenities and snowfront at the base area, and adjacent areas. However, Sugarbush Resort has performed the following actions to maximize buffer protection:

- Minimization of the width of the ski back trail to the maximum degree feasible consistent with maintaining skier and pedestrian safety.
- As noted above, the Phase II stormwater management plan ensures that all runoff from impervious surfaces will be routed to stormwater treatment practices, as described in the pending NOI for authorization pursuant to DEC General Permit 3-9015.
- Establishment of water bars on the ski trails which meet the ANR Class A Ski Trail Guidelines, and outlet to areas of maximum buffer width.
- Implementation of a sensitive area revegetation protocol. This protocol will include the following components:
  - establishment of a topsoil layer within this area;
  - use of a special seed mix (see Page 4 of Attachment) which includes native perennial grasses and other appropriate herbaceous vegetation; and
  - mulching with weed free straw mulch.
- Implementation of a limited maintenance protocol, which will limit mowing activities to a once annually during the late summer months.
- Ongoing annual inspections by Sugarbush to verify the success of the revegetation efforts, and to monitor/control invasive species, which may become established.
- No snow plowing/storage shall occur within this area.

The second grassed area restoration will occur within the lands below the Sugarbush Village pedestrian covered bridge, consisting of a band generally ten feet wide, adjacent to the reconfigured walkways and Sugarbush Village parking fields. Again, although this area cannot feasibly be returned to full naturally



vegetated undisturbed areas, since the functionality and safety of the walks and parking would be severely compromised by close proximity of vegetation and potential danger trees. However, in order to maximize buffer protection, Sugarbush Resort has performed, or will perform, the actions provided above with the following additions/modifications:

- No snow plowing/storage shall occur within this area.
- Implementation of a limited maintenance protocol, which will be limited to a once-annual mowing during the late summer months. This will be with the exception of a width of no more than 3 feet immediately adjacent to walkways and parking which will be subject to more frequent mowing for aesthetic and safety reasons.

### **Evaluation of Buffer Functions and Values Associated with Riparian Buffer Management Plan**

With respect to riparian buffer functions and values, the Plan maximizes the restoration of the following:

- Protection of aquatic habitat: Through the elimination of existing discharges of untreated stormwater runoff from the existing unpaved Sugarbush Village parking fields, the plan provides for further reduction in washoff sediment load to Rice Brook. Based on prior implementation of stormwater treatment practices by Sugarbush Resort, such efforts have directly resulted in improved aquatic habitat conditions in Rice Brook.
- Protection of water quality: All elements of the plan improve the protection of water quality in Rice Brook, compared to existing conditions. These include the improved management of stormwater runoff, promoting streambank stabilization through reforestation, and grassed area restoration to provide runoff filtration and enable infiltration.
- Protection of terrestrial habitat: By eliminating existing encroachment to the Rice Brook buffer to the maximum extent feasible, a significant area of terrestrial habitat, both forested and grassland will be restored, thus improving terrestrial habitat conditions within this long-developed area.
- Protection of channel, lakeshore, and floodplain stability: Through the field agreement with ANR on a conservative assumption with respect to the Rice Brook TOB, the plan provides space for potential channel migration. Nonetheless, Rice Brook in the project area is a relatively steep and entrenched stream system, and lateral migration is not a dominant process for this stream type. By restoring the area in particular immediately upstream of the Sugarbush Village pedestrian covered bridge, bank stabilization is improved by the plan.
- Maintenance of wetlands: As a redevelopment project, no wetlands are proposed to be impacted by the Phase II project. Therefore, this function is protected.

### **Conclusions**

The riparian buffer management plan for the Plan area adjacent to Rice Brook will achieve considerable improvement with respect to the protection of riparian functions and values. Although it is infeasible in the context of this project to achieve a 50 foot undisturbed forested buffer throughout the Plan area, Sugarbush Resort has worked to maximize the forested buffer restoration and grassed area revegetation within this long-developed area, in close consultation with and support by ANR. The implementation of this Plan will further the long-term and successful efforts of Sugarbush Resort to improve water quality conditions in Rice Brook.

**ATTACHMENT**



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Sugarbush Lincoln Peak Base Area Development Phase II  
**Lincoln Peak Village**  
 Warren, VT



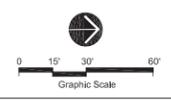
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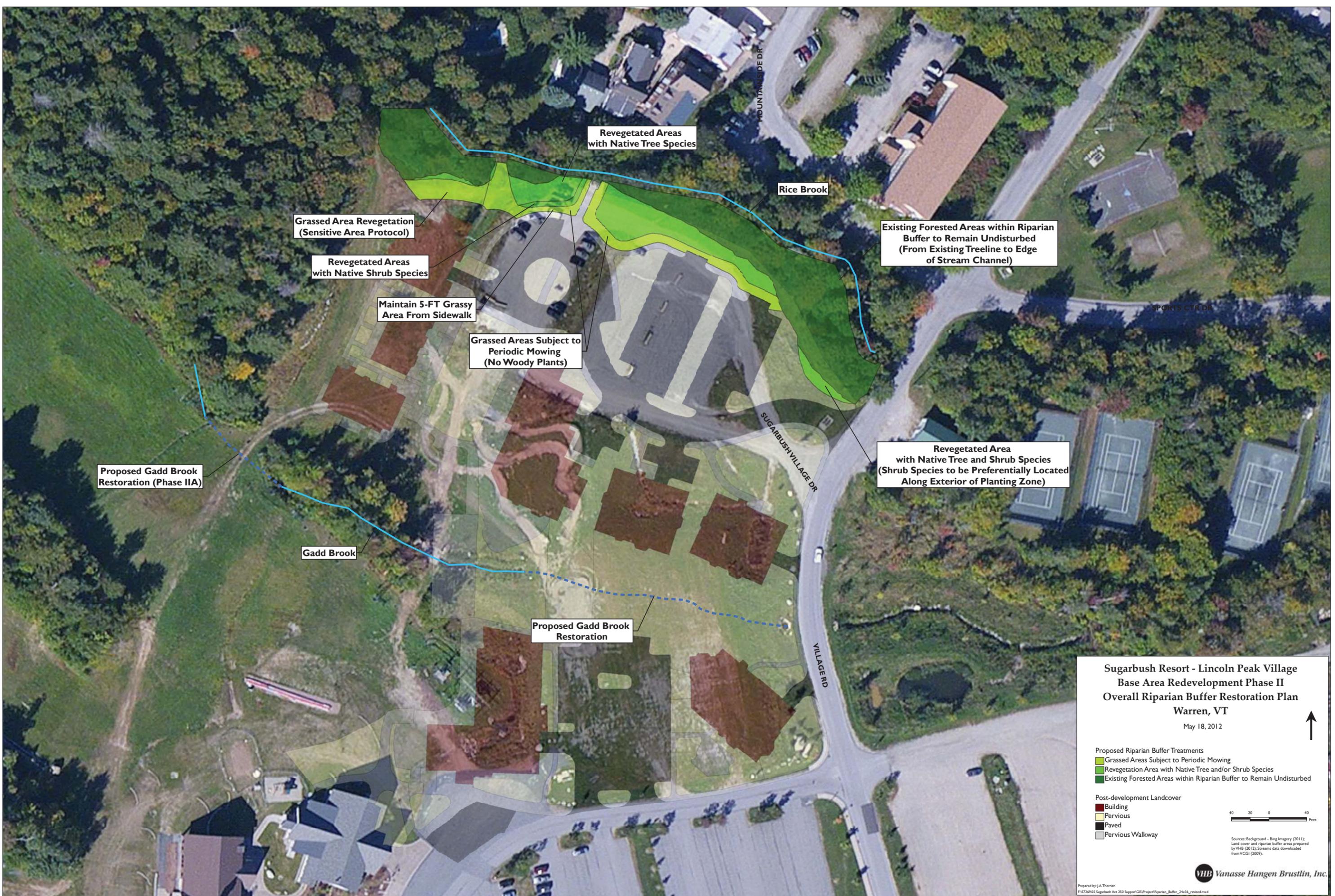
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**SITE PLAN  
 GARAGE  
 LEVEL**

**LA-101**



Not For Construction



**Sugarbush Resort - Lincoln Peak Village  
Base Area Redevelopment Phase II  
Overall Riparian Buffer Restoration Plan  
Warren, VT**

May 18, 2012

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**Proposed Riparian Buffer Treatments**

- Grassed Areas Subject to Periodic Mowing
- Revegetation Area with Native Tree and/or Shrub Species
- Existing Forested Areas within Riparian Buffer to Remain Undisturbed

**Post-development Landcover**

- Building
- Pervious
- Paved
- Pervious Walkway

40 20 0 40  
Feet

Sources: Background - Bing Imagery (2011);  
Land cover and riparian buffer areas prepared  
by VHB (2012); Streams data downloaded  
from VCGI (2009).

**VHB Vanasse Hangen Brustlin, Inc.**

Prepared by: JA, Thoren  
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Revegetated Areas with Native Tree and/or Shrub Species

Rice Brook

Grassed Area Revegetation (Sensitive Area Protocol)

Existing Forested Areas within Riparian Buffer to Remain Undisturbed (From Existing Treeline to Edge of Stream Channel)

Revegetated Areas with Native Tree and/or Shrub Species

Proposed Gadd Brook Restoration (Phase IIA)

Gadd Brook

Existing Gadd Brook Culvert

**Sugarbush Resort - Lincoln Peak Village  
Base Area Redevelopment Phase II  
Phase IIA Partial Riparian Buffer Restoration Plan  
Warren, VT**

May 24, 2012

- Proposed Riparian Buffer Treatments
- Grassed Area Revegetation
  - Revegetation Area with Native Tree and/or Shrub Species
  - Existing Forested Areas within Riparian Buffer to Remain Undisturbed

- Post Development Landcover
- Building
  - Paved
  - Pervious Walkway



Sources: Background - Bing Imagery (2011);  
Land cover and riparian buffer areas prepared  
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**May 2012**

**Proposed Seed Mix for Grassed Area Revegetation**

Common Name	Scientific Name	Percent Composition: All Locations	Percent Composition: Within 25' of Top of Bank
creeping red fescue	<i>Festuca rubra</i>	35	32
perennial ryegrass	<i>Lolium perenne</i>	26	23
redtop	<i>Agrostis gigantea</i>	8	8
alsike clover	<i>Trifolium hybridum</i>	8	8
birdsfoot trefoil	<i>Lotus corniculatus</i>	8	8
blue stem	<i>Schizacharium Scoparium</i>	10	10
common milkweed	<i>Asclepias Syriaca</i>	5	5
Joe-pye weed	<i>Eupatoriadelphus Maculatus</i>	N/A	3
boneset	<i>Eupatorium Perfoliatum</i>	N/A	3
TOTAL		100%	100%

Application Rate: 60 lbs/acre