TABLES

FIGURES

APPENDICES

SECTION 10. BUFFERS

Vegetated buffer strips are an important means for maintaining the water quality of surface waterbodies and also provide habitat and travel corridors for wildlife between habitats. Vegetated buffers are also effective, attractive ways to provide visual screening of development. Although the Northeast Reliability Interconnect (NRI) will be continuously vegetated with grass and shrubs, several methods will be used to maintain vegetated buffers along Bangor Hydro-Electric Company's (BHE) NRI. Buffers for the NRI will include (i) the typical right-of-way (ROW) buffer created during typical ROW clearing and follow-up vegetation maintenance; (ii) standard waterbody buffers at streams and other waterbody crossings created by selective ROW clearing during construction and reduced cutting of vegetation during maintenance and operation of the line; (iii) salmon stream buffers at nine designated salmon habitat stream crossings that combine strategic placement of structures, selective ROW clearing during construction and minimal cutting of vegetation during maintenance and operation of the line; and (iv) enhanced visual buffers at the ROW crossings of the Narraguagus, Machias and St. Croix Rivers. A variation of the salmon stream buffer will also apply to certain streams in the Narraguagus, Machias and East Machias River watersheds.

The desired objectives, characteristics and methods of development and maintenance of these buffers are described in this section. The vegetation cutting practices used to create and maintain buffers range from very limited, selective, hand cutting to normal mechanized clearing and selective use of herbicides. The specific methods to be utilized along the ROW have been developed by BHE, tailored to meet the desired buffer objectives in a manner that provides a clear, achievable set of standards for construction and maintenance personnel. BHE will maintain these buffers in accordance with the project-specific Northeast Reliability Interconnect Post-Construction Right-of-Way Vegetation Maintenance Plan (the NRI Vegetation Maintenance Plan), which is provided in Appendix 10-1 of this application.

The existing vegetation within the area to be modified at the Orrington Substation will be removed and covered with new substation structures or crushed stone and surrounded by a chain-

link fence. Two, short gravel access roads and modifications to an existing retention pond will be constructed outside the fence. Disturbed, previously vegetated areas outside the fence will be restored to original contours and stabilized with permanent grass cover following construction. The small change in stormwater runoff characteristics within the modified area will be managed in accordance with Maine stormwater regulations, as discussed in detail in Section 12, Stormwater Management. The addition of approximately 0.8 acre of new impervious surface to accommodate the new substation equipment required by the NRI project to the Orrington Substation is minor in contrast to the existing substation that covers approximately 7.3 acres. There will be no significant change in the visual impact or impacts to protected resources that will result from the modifications to the substation. Therefore, no visual buffers are proposed at the Orrington Substation.

Table 10-1, below, summarizes the five basic types of buffers proposed for the NRI project ROW and the clearing and maintenance practices that will be implemented to maintain each type of buffer. Additional details and variations are provided in the remainder of this section and in the NRI Vegetation Maintenance Plan.

TABLE 10-1. NRI BUFFER SUMMARY

Name	Location	Buffer Width	Clearing During Construction[1]	Cutting During Maintenance and Operation[1]	Pole Placement	Herbicide Use
Typical ROW	All areas not otherwise restricted	Not applicable	Cut at ground level all vegetation that is greater than 2 inches dbh[2]; remove or top all other vegetation that is 8-10 feet or taller	Cut at ground level all capable species that are 8-10 feet or taller; top all other vegetation that is greater than 8-10 feet or taller	Standard	Allowed
Standard Waterbody Buffers	Parallel to existing MEPCO[3] Row	25 feet on each side of waterbodies	Cut at ground level all capable species that are 8-10 feet or taller; no other vegetation is cut	Cut at ground level all capable species that are 8-10 feet or taller; no other vegetation is cut	Not Allowed	Not Allowed
	All other waterbodies not otherwise restricted	75 feet on each side of waterbodies	Cut at ground level all capable species that are 8-10 feet or taller; no other vegetation is cut	Cut at ground level all capable species that are 8-10 feet or taller; no other vegetation is cut	Standard	Not Allowed
Salmon	7 ASC[4]	75 feet on	Top[5] all capable	Top[5] all capable	Not	Not

TABLE 10-1. NRI BUFFER SUMMARY

Name	Location	Buffer Width	Clearing During Construction[1]	Cutting During Maintenance and Operation[1]	Pole Placement	Herbicide Use
Habitat Stream Buffers	Special Concern Salmon Habitat Streams	each side of streams	species that could grow to within 15 feet of a conductor in the next 3-4 years; no other vegetation is cut	species that could grow to within 15 feet of a conductor in the next 3-4 years; no other vegetation is cut	Allowed, but place as close as possible	Allowed
Modified Salmon Stream Buffers	All other streams in Narraguagus, Machias, East Machias River Watersheds	75 feet on each side of streams	Top[5] all capable species that could grow to within 15 feet of a conductor in the next 3-4 years; no other vegetation is cut	Top[5] all capable species that could grow to within 15 feet of a conductor in the next 3-4 years; no other vegetation is cut	Not Allowed	Not Allowed
Visual Buffers	Narraguagus, Machias, St. Croix Rivers	Varies 75-500 feet. See site-specific descriptions	Top[5] all capable species that could grow to within 15 feet of a conductor in the next 3-4 years; no other vegetation is cut	Top[5] all capable species that could grow to within 15 feet of a conductor in the next 3-4 years; no other vegetation is cut	Not Allowed	Not Allowed

[1] dead or danger tees are removed at any time
[2] dbh = diameter at breast height
[3] MEPCO = Maine Electric Power Company
[4] ASC = Atlantic Salmon Commission
5 Cut at ground level if topping the tree will not leave sufficient foliage to sustain the tree

10.A Importance of ROW Vegetation Maintenance

Routine vegetation maintenance of the NRI ROW is required to comply with the New England Power Pool (NEPOOL) ROW Vegetation Maintenance Standards (NEPOOL Vegetation Maintenance Standard)[1], to maintain the integrity and functionality of the line, to maintain access in case of emergency repairs and to facilitate safety inspections. Clearing and trimming of vegetation before it gets too close to electrical conductors is essential to ensuring the safe, reliable and uninterrupted availability of electrical power. For example, power outages may occur if trees or other vegetation either come into contact with or get too close to the

conductors.[2] Consistent with the NEPOOL operating procedures and to ensure safe, reliable operation of a 345 kilovolt (kV) transmission line, the vegetative maintenance plan must ensure there is a minimum distance of 15 feet between any object and the conductor during all phases of the maintenance cycles. Failure to do so may result in the line short circuiting and/or line outages.

Indeed, inadequate tree trimming near transmission lines was a major cause of the recent blackout that occurred in the United States and Canada on August 14, 2003, and previous large scale blackouts in North America. See U.S.-Canada Power System Outage Task Force Final Report on the August 14, 2003 Blackout in the United States and Canada: Causes and Recommendations, pp.17-21, 107, 154 (April, 2004) ("Task Force Report"). On August 14, 2003, large portions of the Midwest and Northeast United States and Ontario, Canada, experienced a power blackout with devastating consequences. An estimated 50 million people were without power, which in some areas took up to four days to restore. Estimates of the total costs of the blackout in the United States alone ranged from 4 billion dollars to 10 billion dollars. Id. at 1. A joint U.S.-Canada Power System Outage Task Force was established to investigate the causes of the blackout and concluded that during the afternoon of August 14, 2003, three separate 345 kV transmission lines failed as a result of contact between a conductor and tree that encroached into the required clearance height for those lines. Id. at 57-64. While not the sole cause, it was a major initiating event of the blackout. Not surprisingly, the Task Force included among its recommendations steps to ensure adequate maintenance of transmission line rights-of-way. See id. at pp. 154-55.

BHE's proposed buffer plan balances the need to maximize buffer width and vegetation height in those areas where doing so brings about significant environmental benefits, with the practical and operational limitations under which BHE operates and its mandate to provide reliable power.

---

[1] Reference: *NEPOOL Operating Procedure No. 3- Transmission Maintenance Scheduling for Facilities Operating at 115 KV and Above (OP 3), Appendix D*, approved by the NEPOOL Participants Committee on May 3, 2002.

[2] Outages can occur either by direct contact between the object and the conductor, or even absent direct contact if there is insufficient separation between the object and the conductor, which may cause an electric arc. Electric arcs can cause fires as well as short circuits. The arcing distance is a function of several factors including the voltage, load, and ambient wind and temperature conditions.

10.B Basis for BHE's Buffer Designs

Many factors were taken into consideration in the determination of the number, size, location and construction and maintenance restrictions associated with the various types of buffers proposed for the NRI project. BHE has drawn on its considerable past experience with construction and maintenance of electric transmission lines and blended that with more recent buffer proposals, Maine Department of Environmental Protection (DEP) regulatory authority, ROW maintenance guidelines, and its consultations with resource and regulatory agencies and boards. During development of the proposed buffers and associated vegetation maintenance for the NRI, seven types of concerns were identified as critical factors that must be incorporated. They are:

- BHE's responsibility to comply with the NEPOOL Vegetation Maintenance Standard and to provide sufficient, dependable electric power to its customers;
- The scientific objectives and other goals to protect and preserve natural resources and the natural environment;
- BHE's ability to successfully implement and ensure compliance with vegetation clearing and maintenance requirements;
- Existing ROW construction and maintenance practices conducted by BHE and throughout the industry;
- Recent proposals for other BHE projects; and
- Input received from resource agencies and regulatory bodies regarding the suitability of current practices versus the advisability of more complicated, far reaching proposals.

All of the above factors were taken into consideration to design buffers that balance the operational needs of the NRI with environmental benefits of riparian buffers. BHE believes these buffers combine the best features of successful, existing practices with new ideas and more focused resource concerns, while providing procedures and restrictions that are realistic to implement in the field. BHE believes that the buffers and vegetation maintenance plan proposed

for the NRI also respond to concerns previously expressed by the Board of Environmental Protection regarding the feasibility of and practical barriers to implementing complicated, continually varying vegetation.

10.C Typical ROW Buffer

BHE's typical ROW construction and maintenance procedures are designed to provide for a vigorous growth of low, scrub/shrub vegetation, while ensuring compliance with the NEPOOL Vegetation Maintenance Standard and the requirement to provide safe, reliable, uninterrupted electrical power. These procedures require the retention of low ground cover to the maximum extent practicable during construction, immediate restoration and stabilization of areas affected by construction and ongoing maintenance activities that promote the long-term growth of diverse, healthy, low vegetation. This results in a utility corridor that provides excellent cover for small animals and birds, significant browse habitat for larger mammals, and prevents soil erosion and the resultant sedimentation of water and wetland resources.

10.C.1 Typical ROW Clearing Procedures

Prior to construction, crews with whole-tree harvesting machines will first ground cut all vegetation that is two inches dbh and greater. The remaining vegetation greater than 8 to 10 feet above ground will then be removed or topped by hand clearing crews and/or mowing machines, except in waterbody and visual buffer zones. Significant branches that overhang the ROW and any dead or damaged trees outside the ROW that could contact the proposed power lines or cause an arc if they fall (danger trees) are also removed. All vegetation cut during initial clearing will be cleaned up and disposed of in accordance with the Maine Slash Law.

10.C.2 Typical ROW Maintenance Procedures

Routine vegetation maintenance of the NRI ROW is required to comply with the NEPOOL Vegetation Maintenance Standard, maintain access in case of emergency repairs and facilitate

safety inspections. The objective of BHE's ROW management will therefore be to control large woody vegetative growth to ensure the integrity and safe operation of the transmission line.

Once woody vegetative growth is under control, follow-up maintenance activities during operation of the line require only the selective removal of "capable species," dead or danger trees. Capable species are defined as those plant species that are capable of growing tall enough to reach within the required clearance between the conductors and vegetation established by the NEPOOL Vegetation Maintenance Standard. The NEPOOL Vegetation Maintenance Standard for the NRI transmission line requires a minimum of 15 feet of separation between vegetation and the conductors. Due to the sag in the height above ground of electric transmission lines between structures, which varies with the distance between structures, tension on the wire, electrical load, air temperature and other changing conditions, and to simplify the implementation of maintenance procedures and ensure compliance; the required NEPOOL clearance is typically achieved by maintaining ROW vegetation below 8 to 10 feet tall. It should be noted that, as a practical matter and to ensure that personnel safety and reliable system operation is maintained, vegetation heights are generally stated as height above ground. Nevertheless, the height above ground limit (in this case 8 to 10 feet) is based on the required NEPOOL clearance. Figure 10-1 illustrates typical vegetation clearing and maintenance practice to comply with the NEPOOL Vegetation Maintenance Standard.

During routine vegetation maintenance after construction, the mechanical means of maintaining the height of vegetation on the ROW consist primarily of hand cutting, with limited use of motorized equipment in areas that are directly accessible from public or private access roads. The procedure will be to cut all capable species and any danger trees at ground level and top other vegetation greater than 8 to 10 feet tall, except in waterbody or visual buffer zones. Cutting of vegetation is typically conducted on a four to five year cycle. Danger trees are removed as they are identified. All vegetation cut during routine maintenance is cleaned up or otherwise handled in accordance with the Maine Slash Law.

FIGURE 10-1: TYPICAL ROW VEGETATION CLEARING/MAINTENANCE

BHE will also use herbicides to control ROW vegetation. BHE's herbicide application program will be consistent with most New England utilities and is used in conjunction with the mechanical methods of vegetation maintenance. It consists of directional spraying, by hand, targeted species along the ROW with a low-volume foliar application. In addition, herbicides may be applied to cut stumps and surfaces of larger trees. The herbicides used control only the targeted woody vegetation, while leaving low-growing plant communities consisting of grasses, forbs and shrubs to thrive. Aerial application will not be used. Only herbicides with low toxicity to non-target plants and animals, and that are registered with and approved by the U.S. Environmental Protection Agency (EPA-approved) for utility maintenance will be used.

Typically, the ROW will receive herbicide treatment the year following construction and then again two to three years following that to gain control of vegetation growth. Once control is achieved, treatment occurs on the typical four or five year schedule, along with mechanical cutting. By utilizing selective herbicides, the ROW will eventually become mostly a low-growing plant community, which impedes woody vegetation from being established, hence there are fewer woody species to treat in future applications.

Herbicides are not used within waterbody buffers or within 25 feet of all wetlands that have water showing at the surface, within 50 feet of known rare plant species or identified unique natural communities, within 100 feet of any known well or spring, or within 100 feet of a home or other human dwelling. Additional details regarding herbicide use and other vegetation maintenance procedures are provided in the NRI Vegetation Maintenance Plan (Appendix 10-1).

Based on consultations with Maine Department of Inland Fisheries and Wildlife (MDIFW) biologists, typical clearing and vegetation maintenance practices will not result in significant adverse impacts to wildlife habitat in the project area, including Significant Wildlife Habitat crossed by the NRI project, provided that all construction and routine maintenance activities using motorized equipment within moderate and high value Waterfowl and Wading Bird Habitat areas are prohibited between April 15 and July 15 of any year (see meeting minutes, dated January 20, 2005, in Appendix 7-2).

10.D Standard Waterbody Buffers

10.D.1 Standard Waterbody Buffers Along MEPCO ROW

A minimum 25-foot buffer, as measured from the top of bank on each side, will be established for all streams or other waterbodies crossed by the NRI ROW where the proposed ROW is parallel to existing MEPCO ROW (approximately 12.2 miles or 14 percent of the NRI). A 25-foot waterbody buffer width in this area is proposed to maintain consistency in the buffer widths between adjacent electric transmission line ROWs. In addition, the water quality classification for all streams along this portion of the proposed ROW is B. Higher water quality streams predominate the remainder of the proposed NRI ROW.

To minimize soil disturbance adjacent to waterbodies, the project has been designed to avoid the placement of structures within waterbody buffers. Additional procedures and restrictions apply within the waterbody buffers during construction and follow-up vegetation maintenance to further protect waterbodies from sedimentation and otherwise minimize any adverse project impacts.

Waterbody or riparian buffers are typically designed to provide one or more of the following functions:

- Prevent soil erosion and the resultant sedimentation of surface waters;
- Slow the velocity, increase the infiltration and otherwise remove sediment and other contaminants in stormwater runoff before it enters surface waters;
- Reduce accessibility of all-terrain vehicle (ATV) users to streams;
- Provide shade to reduce the warming effect of sunlight (insolation) on water temperature;
- Provide cover for wildlife when accessing waterbodies and traveling across the ROW; and
- Provide visual screens between development and recreational users of a waterbody.

As described in the previous section and in more detail in Section 14, Erosion and Sedimentation Control and further still in the NRI Project Erosion and Sedimentation Control Plan (the NRI E&S Plan or Plan), provided in Appendix 14-1, nearly the entire ROW will remain vegetated with low scrub-shrub and other understory species during construction. Ground disturbance will occur only in localized structure locations or equipment travel lanes. All necessary erosion and sedimentation control measures will be installed and maintained throughout construction to prevent adverse impacts to waterbodies and other resources. During initial clearing and vegetation maintenance in these 25-foot waterbody buffers, the removal of vegetation will be done by hand cutting or by reaching into the buffer using mechanized harvesting equipment located outside the buffer. Mobile equipment will be prohibited from the buffers except in those site-specific situations where a temporary equipment crossing is necessary. The locations of temporary equipment crossings will be reviewed and approved by a three-tiered environmental inspection system (see Section 11.0 of the NRI E&S Plan) before equipment bridges are installed, and the type and location of associated erosion and sedimentation controls will be established at that time. All equipment crossings will span the waterbody. Following completion of construction in an area, any disturbed ground will be restored to original contours and stabilized with permanent vegetation. Follow-up vegetation maintenance practices will encourage the growth of dense, low ground cover and shrub species. The use of herbicides is prohibited within waterbody buffers and within 25 feet of any wetlands with water showing at the surface. In addition, no refueling or maintenance of equipment will be performed within waterbody buffer zones.

As a result, the potential for soil erosion and sedimentation of waterbodies is minimized, and a 25-foot buffer where removal of vegetation is further restricted, as described below, is entirely adequate to protect waterbodies crossed by the NRI ROW from adverse effects from sedimentation and contaminated runoff. Generally, the conversion of forest cover to a scrub-shrub or early successional cover type within a transmission line ROW will improve the ability of the land to absorb runoff due to the increased density of the root mass and near-ground leaf and stem material associated with the resultant vegetative cover. In addition, the proposed

buffers are consistent with MDIFW prior recommendations to protect waterbodies from sedimentation and surface runoff, as confirmed in emails received from MDIFW on February 4, 2005, and to minimize adverse effects on wildlife habitat (see agency correspondence and January 20, 2005 meeting minutes in Appendix 7-2).

It is also important to note that BHE is proposing that all waterbody buffers be a minimum of 25 feet wide on each bank. In some locations, the buffers may, in actuality, be wider due to the characteristics of the crossing which allow for a wider buffer without presenting undue difficulty for vegetation maintenance crews or the potential for increased environmental damage in order to maintain the buffer. In general, a buffer width of 25 feet works well in that removal of large trees within the buffer can be accomplished using a feller-buncher, or similar mobile harvesting equipment, that can reach into the area, cut and remove a tree without having to travel into the buffer and without dragging the harvested tree out of the area. This becomes more difficult as buffer widths increase beyond approximately 25 feet, unless access for mobilized tree clearing equipment is allowed. While hand cutting of large trees is an alternative, removing the tree without the increased potential for significant soil disturbance when the tree is pulled out of the area and for damage to other vegetation that remains is very difficult and requires considerably more time and expense when maintaining long ROWs. Therefore wider construction buffers do not necessarily minimize the potential for environmental impacts.

As referenced in Section 7 of this application, Wildlife and Fisheries, in 1993 A. M. Peterson reported in the North American Journal of Fish Management that the removal of tree canopy (on new ROWs) increases stream insolation during the short term, but within two years the areas are bordered by dense shrubs and emergent vegetation and water temperatures are not significantly greater when compared with upstream forested reaches. Nevertheless, Sections 10.D.4 and 10.D.5 describe the restrictions related to vegetation cutting and maintenance that BHE is proposing to allow for taller vegetation within riparian buffers. Taller vegetation will provide additional shading of streams and reduce the potential warming effect of direct sunlight. The taller vegetation will also provide additional cover for birds and animals for accessing streams

and crossing the ROW, and provide some visual screening. As a result the waterbody buffers will continue to function in a similar manner as before construction.

10.D.2 Standard Waterbody Buffers Beyond MEPCO ROW

In response to a request by DEP staff to consider wider buffers in all areas where appropriate, BHE is proposing that the standard waterbody buffer width for the remainder of the NRI ROW (approximately 72.1 miles or 86 percent) be increased to 75 feet on each side of a waterbody. All of the streams crossed by this portion of the NRI are Class AA or A, except the St. Croix River, and of those streams in which the fishery type is unknown, nearly all support coldwater fisheries. As a result, maintaining wider buffers in this area will provide a conservative, additional measure of protection to these high quality streams.

However, establishing 75-foot wide waterbody buffers will require access for mobilized equipment during initial clearing and follow-up maintenance, in order to be able to effectively and efficiently remove large trees and maintain the vegetation in the wider buffers. The nature and extent of this access is described in Sections 10.D.4, below.

10.D.3 Structure Placement

To maintain the integrity and maximize the environmental benefits of the riparian buffers there will not be any permanent structures located within at least 25 feet of any waterbody and the number of structures that had to be placed within 75 feet of a waterbody has been minimized to the maximum extent practicable.

10.D.4 Standard Waterbody Buffer Clearing Procedures

To ensure a greater amount of protection than would already be provided by typical cutting practices, cutting in riparian buffer zones will be limited. Prior to construction, only capable species greater than 8 to 10 feet tall will be removed. No other vegetation, other than dead or danger trees, will be removed. Within the 25-foot buffers, removal of capable species will be by

hand cutting or reaching into the buffer zone with tree harvesting equipment located outside the zone.

Due to the limited reach of mobilized tree harvesting equipment (feller-bunchers or mechanical harvesters), three access ways will be needed within the 75-foot buffers to enable cutting and removal of large trees across the entire ROW without the potential for additional ground disturbance and damage to remaining vegetation that can occur if the trees were hand cut and dragged out of the buffer with a cable. The access ways will be located in the approximate middle of the proposed ROW and approximately half way between the middle access and the outside edge of the ROW. The access ways will be 10-12 feet wide and only the trees that would prevent the harvesting equipment from efficiently performing its job, or other vegetation that would otherwise be seriously damaged by harvesting equipment traveling along the access way, will be removed. Existing low vegetation will remain. The access ways will not extend closer than 25 feet from the top of banks of any waterbody and will not require grading or any gravel, stone or other surface material.

Temporary erosion and sedimentation control measures will be implemented along the access ways, as described in the NRI E&S Plan. As will be the case along the entire NRI ROW, ground disturbance caused by the use of harvesting equipment will be repaired by returning the ground to its original contour, as needed, and seeding and mulching any bare ground. The two outer access ways will be restored at the completion of clearing activities in the area, and the central access restored at the completion of construction in the area. The vegetation in the two outer access ways will be allowed to revert to its original state, as allowed by ROW vegetation maintenance requirements. The vegetation in the middle access way will be maintained in long-term to allow for small vehicle access (such as pick up trucks or a small tracked vehicle with a “cherry picker”) during transmission line and ROW vegetation maintenance activities. The middle access way be will maintained in the same manner as the standard ROW and thus will remain vegetated, albeit with shorter vegetation to facilitate access down the ROW.

In addition, no refueling or maintenance of equipment, including chain saws, will be performed within waterbody buffer zones.

10.D.5 Standard Waterbody Buffer Maintenance Restrictions

Vegetation maintenance within stream buffers is typically conducted on a three or four year cycle, depending on growth and vegetation. As during clearing for construction, only capable species greater than 8-10 feet tall will be removed. Removal will be by hand cutting only, with limited use of motorized equipment in areas that are directly accessible from public or private access roads, or from the middle access way established during initial clearing. In addition, no herbicides will be used, stored, mixed or transferred between containers within the stream buffer areas and no refueling of chain saws or other equipment will be allowed.

Figure 10-1 illustrates vegetation clearing and maintenance practice within standard waterbody buffer zones. It is important to note that once the capable species (e.g., quaking aspen [*Populus tremuloides*.], balsam fir [*Abies balsamea*], white pine [*Pinus strobus*], red maple [*Acer rubrum*]) are removed, the "desirable species" that will persist and be maintained in the buffers will consist primarily of grasses and shrubs (e.g., arrowwood [*Viburnum dentatum*], highbush blueberry [*Vaccinium corymbosum*], alder [*Alnus incana*], winterberry [*Ilex verticillata*], white mulberry [*Morus alba*], etc.). The desirable species will be allowed to grow at their naturally occurring rate and height. The only enhancement of the density and vigor of this vegetation will be achieved through the removal of taller, competing species.

Additional restrictions on vegetation maintenance will provide still taller vegetation in designated salmon habitat stream buffers, as described in Section 10.E.1 through 10.E.3, and all other stream buffers in the Narraguagus, Machias, and East Machias River watersheds, as described in Section 10.E.4, to further enhance shading capacity. Enhanced visual buffering requirements at the Narraguagus, Machias and St. Croix Rivers are described in Section 10.F.

The waterbody crossing table, provided in Section 7, Appendix 7-4 of this application and as Table 1 in Section 3.0 of the Vegetation Maintenance Plan, includes the names and locations of all waterbodies crossed by the NRI ROW.

10.E Salmon Stream Buffers

Nine rivers or streams crossed by the NRI ROW have been identified as containing salmon habitat or potential salmon habitat. The nine "salmon habitat streams," or as identified by the ASC in a letter dated January 24, 2005 (located in Appendix 7-2), "waters of special environmental concern," are identified in Section 7 of this application and Section 4.0, Table 2 of the NRI Vegetation Maintenance Plan. BHE has identified additional construction design criteria and further vegetative maintenance restrictions that will provide additional shading of these waterbodies to the maximum extent allowed by the NEPOOL Vegetation Maintenance Standard.

10.E.1 Structure Placement

As described in Sections 10.A and 10.B, the maximum height of vegetation within the ROW is a function of conductor height. The conductors are at their highest closest to a structure, and they are at a low point midway between structures. Accordingly, except at the Machias and Narraguagus River crossings, structure locations were sited as close to the edge of the salmon habitat stream buffers as possible to create a conductor height that will allow for higher vegetation. In one instance, at a tributary to Fletcher Brook (project survey station 2913+02), structures could not be located near the edge of the buffers, so taller structures will be used. This will result in taller vegetation that provides maximum shading of the salmon habitat streams. The extra shading that results from adjusting pole locations or heights is proposed because these streams were identified during agency consultations as the most critical in terms of promoting potential habitat for the threatened Atlantic salmon. The additional vegetation height could also enhance shelter for wildlife, although this is not considered a primary objective for these predominantly small streams.

The combination of closer structures and maximum allowable vegetation height within 75 feet of each bank at the seven smaller salmon habitat streams will provide vegetation that ranges from approximately 20 to 30 feet tall, on average, over the course of a routine maintenance cycle. Five of these seven streams are 5 feet or less in width; one, Joe Brook (project survey station 3831+68), is approximately 10 feet wide; and the last, Huntley Brook (project survey station 3702+97), is approximately 20 feet wide. Maintaining vegetation within the range of heights indicated will minimize the potential for warming of water temperatures that might otherwise result from removal of existing vegetation. BHE consultations with fishery management agencies indicated concurrence with this mitigation proposal.

Structures will be located further back from the Machias and Narraguagus Rivers to minimize the visual impact for these high value recreational resources and designated outstanding river segments (see Section 10.F). Fisheries resource agencies were consulted and are in agreement that the trade-off between maximizing the visual buffer as opposed to achieving maximum shading is justified at these two crossings due to the presence of existing, adjacent open habitat. Maintaining the maximum allowable vegetation height at the NRI ROW crossings at these locations would do little to improve or maintain existing water temperatures.

10.E.2 Salmon Habitat Stream Buffer Clearing Procedures

During initial clearing activity prior to construction, only those trees capable of growing to a height within the minimum NEPOOL Vegetation Maintenance Standard of 15 feet from a conductor within the next 3 to 4 years will be topped or removed. Topping of trees is the preferred method of vegetation maintenance, unless the tree is dead or dying, or topping will leave insufficient vegetation to sustain the tree. No other vegetation, other than dead or danger trees, will be removed. Removal of capable species will be by hand cutting and with tree harvesting equipment working from outside the buffer or from the three access ways as described in Section 10.D.4. In addition, no refueling or maintenance of equipment, including chain saws, will be performed within the salmon stream buffer zones.

10.E.3 Salmon Habitat Stream Buffer Maintenance Restrictions

The vegetation maintenance procedures and restrictions within salmon stream buffers are the same as those that apply during initial clearing, except that only hand cutting will be allowed, with limited use of motorized equipment in areas that are directly accessible from public or private access roads or the middle access way as described in Section 10.D.5. Figures 10-2 and 10-3 illustrate vegetation clearing and maintenance practices within salmon stream buffer zones.

10.E.4 Modified Salmon Stream Buffers

As presented in Section 7.B., the Distinct Population Segment of Atlantic salmon associated with the Narraguagus, Machias and East Machias Rivers has been listed as threatened under the Endangered Species Act by the U.S. Fish and Wildlife Service and National Marine Fisheries Service. In accordance with the recommendation of the ASC (see ASC letter dated January 24, 2005 in Appendix 7-2), BHE will apply the salmon habitat stream buffer clearing and maintenance restrictions described in Sections 10.E.2 and 10.E.3 at all streams located in these three watersheds. Most of these additional streams are less than 10 feet wide. Accordingly, the potential for additional vegetation height along these steams should minimize potential warming that might otherwise result from removal of adjacent vegetation.

10.F Visual Buffers

As a result of the comprehensive planning and siting process completed by BHE, the proposed NRI project will not result in adverse affects on visual quality, as described in Section 6, Visual Quality and Scenic Character. Nevertheless, BHE is proposing enhanced vegetated screens at the Narraguagus, Machias and St.Croix River crossings to provide additional visual buffering

FIGURE 10-2: SALMON STREAM BUFFER VEGETATION CLEARING/MAINTENANCE PRIOR TO PERIODIC MAINTENANCE

FIGURE 10-3: SALMON STREAM BUFFER VEGETATION CLEARING/MAINTENANCE FOLLOWING PERIODIC MAINTENANCE

10.F.1 The Narraguagus and Machias River Visual Screens

Because the Narraguagus and Machias Rivers are high value recreational resources and designated Outstanding River Segments, the maximum, practicable vegetated visual screen will be maintained across the ROW at each side of these crossings. As mentioned previously, structures will be sited well away from the river banks during construction to minimize their visual impact. The proposed width of the visual buffer areas for these two high value resources was then based on the site-specific structure locations, topography and existing vegetation type to provide the most effective visual screening of the power line as possible, within the constraints of the NEPOOL Vegetation Maintenance Standard and reasonable construction and maintenance requirements. Since both rivers are designated salmon habitat streams and to provide maximum visual screening, the salmon stream buffer vegetation clearing and maintenance restrictions will be followed. No cutting of vegetation will be allowed in these visual buffer areas, except as required to comply with the NEPOOL Vegetation Maintenance Standard. The potential for higher vegetation along these rivers, due to the cutting restrictions that apply within salmon stream buffers, and the extended buffer width over which it will be applied will provide an effective visual screen. The determination of the width of these visual screens is provided in the following sections.

10.F.1.a Narraguagus River Visual Screen Width

As can be seen on project Plan and Profile drawing number 38 of 74, of this application, the Narraguagus River crossing (project survey station 2218+80) is in a broad, open flat area with large wetland areas bordering each side of the river. The structures on both sides of the crossing have been sited well-away from the river, outside of the adjacent wetlands in locations where the topography starts uphill. The nearest structure on the west side of the river is approximately 290 feet from the water's edge; on the east side it is approximately 500 feet from the water. Given the low wetland vegetation that exists and that will persist in the wetlands bordering this crossing, there is little opportunity to leave or create a vegetated buffer high enough to screen much of the structures other than the trees that exist in the upland areas just outside the wetlands.

This is especially true on the east side, where much of the adjacent wetland is inundated. As a result, BHE is proposing that the visual buffer area at the Narraguagus River extend all the way to the nearest structures on either side of the river. The restrictions on clearing and maintenance that apply in salmon stream buffers will be applied from the water's edge up to and including the trees in the upsloping areas in front of the structures. This will provide an effective, partial visual screen of these structures from the river. No cutting of vegetation will be allowed in this visual buffer area, except as required to comply with the NEPOOL Vegetation Maintenance Standard. The other restrictions that apply to ROW construction and maintenance, such as the use of herbicides or petroleum products near waterbodies and wetlands will also apply.

10.F.1.b Machias River Visual Screen Width

Project Plan and Profile number 51 of 74 shows that the Machias River crossing (project survey station 2963+21) is also in an open area with large wetlands bordering each side of the river, although it is not as broad or flat as at the Narraguagus crossing. The structures on both sides of the crossing have been sited well-away from the river and the adjacent wetlands, in locations beyond topographic high points that are closer to the river. As at the Narraguagus River, the opportunity to leave or create a vegetated buffer high enough to help screen the structures begins at the trees that exist in the upsloping areas outside the wetlands. The higher elevation of the land (and its tree cover) that exists between the proposed location of the nearest structures and the river will provide a very good partial screen. On the other hand, extending the visual buffer beyond the topographic high points will not improve the effectiveness of the screen because visibility is a function of line of sight. The high point on the west side of the river is approximately 210 feet from the water's edge; on the east side it is approximately 360 feet from the water. As a result, BHE is proposing that the visual buffer area at the Machias River extend to the topographic high points on either side of the river. Applying the salmon stream clearing and vegetation maintenance restrictions from the water's edge up to and including the trees in the upsloping areas in front of the structures will provide an effective, partial visual screen of the structures from the river. No cutting of vegetation will be allowed in this visual buffer area, except as required to comply with the NEPOOL Vegetation Maintenance Standard. The other

applicable restrictions, such as the use of herbicides or petroleum products near waterbodies and wetlands, will also apply.

10.F.2 The St. Croix River Visual Screen

Because the St. Croix River (project survey station 4452+14) is an important recreational resource, the modified salmon stream buffer requirements described in Section 10.E.4 apply. Specifically, the clearing and maintenance restrictions that apply to designated salmon habitat streams will be used here to maximize the height of adjacent vegetation and the visual benefits that result from higher vegetation.

10.G NRI Vegetation Maintenance Plan

As requested by the DEP at the NRI project pre-application meeting, BHE has prepared an NRI Vegetation Maintenance Plan to be a stand-alone document containing all post-construction vegetation maintenance requirements related to the project. The NRI Vegetation Maintenance Plan, provided in Appendix 10-1, contains detailed descriptions of the procedures and maintenance restrictions that apply to these buffers (as well as other protected areas) and the system that will be used to ensure that the specified buffers and other resources are properly identified in the field and protected accordingly. BHE will implement the NRI Vegetation Maintenance Plan prior to initial vegetation maintenance activity on the NRI transmission line ROW and for all subsequent vegetation maintenance actions.

APPENDIX 10-1

NRI POST-CONSTRUCTION RIGHT-OF-WAY VEGETATION MAINTENANCE PLAN