











The Project has potential to impact sensitive environmental resources and, as a result, environmental protection measures have been developed to minimize potential impacts on these resources and will be applied, as applicable, to the Project.

## **2.0 FS GUIDANCE**

The FS developed a National Strategic Framework for Invasive Species Management in 2013 to guide the FS in responding to the invasive species problem in the United States. This guidance document identifies the most significant strategic actions that should be undertaken to reduce the threat of invasive species (FS 2013). The FS's national strategy encompasses four program elements:

- Prevention;
- Detection;
- Control and management; and
- Restoration and rehabilitation.

This Plan is based on the 2013 FS guidance document as well as the procedures and measures identified in the FERC's *Upland Erosion Control, Revegetation and Maintenance Plan* (FERC Plan) and was prepared with the support of the Wildlife Habitat Council (WHC).

## **3.0 POTENTIAL EXOTIC AND INVASIVE SPECIES ALONG THE PROJECT RIGHT-OF-WAY**

Table 3-1 lists the weeds that are known to occur or have the potential to occur along the pipeline route as identified through agency consultations. This table includes weed species along the entire 303-mile long Project route; however, only the multiflora rose, Japanese honeysuckle, garlic mustard, and mile-a-minute vine have been observed along the portion of the Project's survey corridor on the JNF. These weed species were observed scattered throughout the survey corridor through the JNF.

<b>Table 3-1</b>			
<b>Exotic and Invasive Species with the Potential to Occur Along the Project Right-of-Way</b>			
<b>Common Name</b>	<b>Scientific Name</b>	<b>Growth Form</b>	<b>Typical Habitat(s)</b>
Amur Honeysuckle	<i>Lonicera maackii</i>	Shrub	Pastures, fields, forest, forest edges, roadsides
Autumn Olive	<i>Elaeagnus umbellata</i>	Shrub	Pastures, fields, roadsides
Asian Bittersweet	<i>Celastrus orbiculata</i>	Vine	Fields, forest edges, roadsides, grasslands
Beefsteak Plant	<i>Perilla frutescens</i>	Herb	Roadsides
Bell's Honeysuckle	<i>Lonicera bella</i>	Shrub	Fields, pastures, forest edge, roadsides
Bishop's Goutweed	<i>Aegopodium podagraria</i>	Herb	Forests
Border Privet	<i>Ligustrum obtusifolium</i>	Shrub	Old fields, forest gaps
Bradford Pear	<i>Pyrus calleryana</i>	Tree	Full sun, orchards, parks, roadsides, yards, forest edge
Brittle Naiad	<i>Najas minor</i>	Herb	Ponds, streams, lakes, wetlands
Bull Thistle	<i>Cirsium vulgare</i>	Herb	Pastures, fields
Bush Honeysuckles	<i>Lonicera</i> spp.	Shrub	Pastures, fields, forest edges, roadsides
Butter-and-Eggs	<i>Linaria vulgaris</i>	Herb	Fields, pastures, roadsides, disturbed areas
Canada Bluegrass	<i>Poa compressa</i>	Grass	Fields, pastures, forest edge, wet sites, forest openings, waste areas
Canada Thistle	<i>Cirsium arvense</i>	Herb	Pastures, fields
Celandine	<i>Chelidonium majus</i> var. <i>majus</i>	Herb	Fields, roadsides, waste areas, dry to moist woodlands
Cheatgrass	<i>Bromus tectorum</i>	Grass	Pastures, fields
Chinese Bushclover	<i>Lespedeza cuneata</i>	Herb	Roadsides, rights-of-way, old fields, pasture, woodlands
Chinese Privet	<i>Ligustrum sinense</i>	Shrub	Pastures, fields, forest, forest edges, roadsides
Chinese Wisteria	<i>Wisteria sinensis</i>	Woody Vine	Forest, forest edges, roadsides, disturbed areas
Chinese Yam	<i>Dioscorea oppositifolia</i>	Vine	Streambanks, floodplain forests
Cinnamon Vine	<i>Dioscorea polystachya</i>	Vine	Forests, woodlands, thickets
Colonial Bent-grass	<i>Agrostis capillaris</i>	Grass	Pastures, fields
Common Buckthorn	<i>Rhamnus catharticus</i>	Shrub	Wetlands, old fields
Common Chickweed	<i>Stellaria media</i>	Herb	Fields, floodplain forests, disturbed areas, waste areas
Common Privet	<i>Ligustrum vulgare</i>	Shrub	Forests, fields, rights-of-way
Common Reed	<i>Phragmites australis</i>	Grass	Wetlands
Common Sheep Sorrel	<i>Rumex acetosella</i>	Herb	Fields, roadsides, disturbed areas, waste areas
Common Velvetgrass	<i>Holcus lanatus</i>	Grass	Meadows, wetlands, riparian areas

<b>Common Name</b>	<b>Scientific Name</b>	<b>Growth Form</b>	<b>Typical Habitat(s)</b>
Cork Tree	<i>Phellodendron japonicum</i>	Tree	Residential, parks, open woodlands, roadsides
Crown Vetch	<i>Coronilla varia</i>	Herb	Pastures, fields
Curled Thistle	<i>Carduus crispus</i>	Herb	Pastures, fields
Curlyleaf Pondweed	<i>Potamogeton crispus</i>	Herb	Wetlands, ponds, lakes
Cut-leaf Teasel	<i>Dipsacus laciniatus</i>	Herb	Fields, pastures, roadsides, waste areas
Dame's Rocket	<i>Hesperis matronalis</i>	Herb	Fields, forest edges
Drooping Star of Bethlehem	<i>Ornithogalum nutans</i>	Herb	Fields, floodplains, waste areas
English Ivy	<i>Hedera helix</i>	Vine	Forests, disturbed areas
Eurasian Water-milfoil	<i>Myriophyllum spicatum</i>	Herb	Aquatic ponds, ditches, wetlands
European Barberry	<i>Berberis vulgaris</i>	Shrub	Forests, wetlands, pastures
European Privet	<i>Ligustrum vulgare</i>	Shrub	Pastures, fields, forests, forest edges, roadsides, streams
European Stinging Nettle	<i>Urtica dioica</i>	Herb	Stream edges, marsh, meadows, moist woodlands
Field Hawkweed	<i>Hieracium caespitosum</i>	Herb	Fields, pastures, prairies, waste areas, disturbed areas
Fiveleaf Akebia	<i>Akebia quinata</i>	Vine	Forests
Fuller's Teasel	<i>Dipsacus fullonum</i>	Herb	Riparian areas, meadows, fields, forest openings, disturbed areas
Garden Yellow-rocket	<i>Barbarea vulgaris</i>	Herb	Pastures, fields, roadsides, moist meadows
Garlic Mustard	<i>Alliaria petiolata</i>	Herb	Forests
Giant Hogweed	<i>Heracleum mantegazzianum</i>	Herb	Right-of-ways, riverbanks, ditches
Glossy Buckthorn	<i>Frangula alnus</i>	Shrub	Wetlands, old fields
Goatsrue	<i>Galaga officinalis</i>	Herb	Pastures, streambanks
Goldern Bamboo	<i>Phyllostachys aurea</i>	Grass	Roadsides, disturbed areas, forest openings, forest edge
Great Mullein	<i>Verbascum thapsus</i>	Herb	Fields, meadows, forests, roadsides, disturbed areas
Ground Ivy	<i>Glechoma hederacea</i>	Herb	Open forests, disturbed areas, waste areas, lawn
Guelder Rose	<i>Viburnum opulus</i>	Shrub	Forests, wetlands, fields
Gypsy-flower	<i>Cynoglossum officinale</i>	Herb	Fields, pastures, forest edge, roadsides, disturbed areas
Hairy Cat's Ear	<i>Hypochaeris radicata</i>	Herb	Fields, pastures, grasslands, roadsides, disturbed areas
Hydrilla	<i>Hydrilla verticillata</i>	Herb	Wetlands, ponds



<b>Table 3-1</b>			
<b>Exotic and Invasive Species with the Potential to Occur Along the Project Right-of-Way</b>			
<b>Common Name</b>	<b>Scientific Name</b>	<b>Growth Form</b>	<b>Typical Habitat(s)</b>
Indian-strawberry	<i>Duchesnea indica</i>	Herb	Fields, prairies, open woodlands, disturbed areas
Ivy-leaved Speedwell	<i>Veronica hederifolia</i>	Herb	Fields, forest edge, roadsides, disturbed areas
Japanese Barberry	<i>Berberis thunbergii</i>	Shrub	Forests, wetlands, pastures
Japanese Bromegrass	<i>Bromus japonicus</i>	Grass	Pastures, fields
Japanese Honeysuckle	<i>Lonicera japonica</i>	Vine	Forests, wetlands, fields
Japanese Hops	<i>Humulus japonicus</i>	Vine	Roadsides, streambanks, drainage ditch, meadows, disturbed areas, waste areas
Japanese Knotweed	<i>Polygonum cuspidatum</i>	Shrubby herb	Wetlands, streambanks, roadsides
Japanese Spiraea	<i>Spiraea japonica</i>	Shrub	Fields, forest openings
Japanese Stilt Grass	<i>Microstegium vimineum</i>	Grass	Pastures, fields, forests, wetlands
Jetbead	<i>Rhodotypos scandens</i>	Shrub	Forests, forest edge, roadsides
Jimsonweed	<i>Datura stramonium</i>	Herb	Pastures, fields
Johnson Grass	<i>Sorghum halepense</i>	Grass	Fields, wetlands, open forests
Kentucky Bluegrass	<i>Poa pratensis ssp. pratensis</i>	Grass	Fields, grasslands, forest edge
Kudzu	<i>Pueraria lobata</i>	Vine	Forests
Lesser Burdock	<i>Arctium minus</i>	Herb	Fields, meadows, disturbed areas
Lesser Celandine	<i>Ranunculus ficaria var. bulbifera</i>	Herb	Forests
Lesser Periwinkle	<i>Vinca minor</i>	Vine	Fields, forest edge, forest openings
Linden Arrowwood	<i>Viburnum dilatatum</i>	Shrub	Forests, wetlands, disturbed areas
Long-bristled Smartweed	<i>Persicaria longisetata</i>	Herb	Lawns, roadsides, wet meadows, waste areas
Maiden Grass	<i>Miscanthus sinensis</i>	Grass	Pastures, fields
Marsh Dewflower	<i>Murdannia keisak</i>	Herb	Wetlands
Meadow Brome	<i>Bromus commutatus</i>	Grass	Pastures, fields
Meadow Fescue	<i>Schedonorus pratensis</i>	Grass	Pastures, fields
Mile-a-minute Vine	<i>Polygonum perfoliatum</i>	Vine	Fields, forest edges, roadsides, ditches
Mimosa	<i>Albizia julibrissin</i>	Tree	Forest edges, residential areas, roadsides
Moneywort	<i>Lysimachia nummularia</i>	Herb	Moist forests, streambanks, wet meadows, wetlands, roadsides, fields
Multiflora Rose	<i>Rosa multiflora</i>	Shrub	Pastures, fields, forest edges
Musk Thistle	<i>Carduus nutans</i>	Herb	Pastures, fields
Nodding Plumeless-thistle	<i>Carduus nutans ssp. marcollepis</i>	Herb	Disturbed sites, waste areas, roadsides

<b>Table 3-1</b>			
<b>Exotic and Invasive Species with the Potential to Occur Along the Project Right-of-Way</b>			
<b>Common Name</b>	<b>Scientific Name</b>	<b>Growth Form</b>	<b>Typical Habitat(s)</b>
Norway Maple	<i>Acer platanoides</i>	Tree	Forests
Oriental Bittersweet	<i>Celastrus orbiculatus</i>	Vine	Forest edges, old fields
Oriental Lady's Thumb	<i>Polygonum caespitosum var. longisetum</i>	Herb	Wetlands, floodplain forests, upland forests
Oxeye Daisy	<i>Leucanthemum vulgare</i>	Herb	Fields, pastures, grasslands, roadsides, disturbed areas
Parrot Feather	<i>Myriophyllum aquaticum</i>	Herb	Wetlands, ponds
Perennial Ryegrass	<i>Lolium perenne ssp. multiflorum</i>	Grass	Pastures, fields
Plumeless Thistle	<i>Carduus acanthoides</i>	Herb	Pastures, fields, roadsides
Poison-hemlock	<i>Conium maculatum</i>	Herb	Fields, pastures, roadsides, forest edge, degraded wetlands and prairies
Porcelain Berry	<i>Ampelopsis brevipedunculata</i>	Vine	Forests, stream banks, old fields
Poverty Brome	<i>Bromus sterilis</i>	Grass	Pastures, fields
Princess Tree	<i>Paulownia tomentosa</i>	Tree	Forests
Purple Crown-vetch	<i>Coronilla varia</i>	Herb	Pastures, fields, roadsides, utility right-of-ways
Purple Loosestrife	<i>Lythrum salicaria</i>	Herb	Aquatic ponds, ditches, wetlands
Reed Canary Grass	<i>Phalaris arundinacea</i>	Grass	Wetlands
Rough Bluegrass	<i>Poa trivialis</i>	Grass	Pastures, fields, roadsides,
Russian Olive	<i>Elaeagnus angustifolia</i>	Shrub	Pastures, fields, roadsides
Rye Brome	<i>Bromus secalinus</i>	Grass	Pastures, fields
Shattercane	<i>Sorghum bicolor</i>	Grass	Pastures, fields
Shrubby Bushclover	<i>Lespedeza bicolor</i>	Shrub	Forest edges, field edges, forest openings
Siberian Elm	<i>Ulmus pumila</i>	Tree	Forests
Small Carpgrass	<i>Arthraxon hispidus</i>	Grass	Wetlands, ponds, streams, river floodplains
Smooth Brome	<i>Bromus inermis ssp. inermis var. inermis</i>	Grass	Fields, Pastures
Spotted Knapweed	<i>Centaurea stoebe ssp. micranthos</i>	Herb	Pastures, fields, roadsides
Star of Bethlehem	<i>Ornithogallum umbellatum</i>	Herb	Forests, fields
Standish's Honeysuckle	<i>Lonicera standishii</i>	Shrub	Fields, pastures, forest edge, roadsides, disturbed areas
St. John's-Wort	<i>Hypericum perforatum</i>	Herb	Fields, pastures, disturbed areas
Stonecrop	<i>Sedum sarmentosum</i>	Herb	Forest, forest edge
Sweetclover	<i>Melilotus officinalis</i>	Herb	Fields, pastures, roadsides, waste areas
Sycamore Maple	<i>Acer Pseudoplatanus</i>	Tree	Forests

<b>Table 3-1</b>			
<b>Exotic and Invasive Species with the Potential to Occur Along the Project Right-of-Way</b>			
Common Name	Scientific Name	Growth Form	Typical Habitat(s)
Tall Fescue	<i>Schedonorus phoenix</i>	Grass	Pastures, fields
Tartarian Honeysuckle	<i>Lonicera tatarica</i>	Shrub	Pastures, fields, roadsides, utility right-of-ways, forest edge
Tree of Heaven	<i>Ailanthus altissima</i>	Tree	Forests
Viper's Bugloss	<i>Echium vulgare</i>	Herb	Pastures, fields, roadsides, waste areas
Water Chestnut	<i>Trapa natans</i>	Herb	Wetlands
Watercress	<i>Rorippa nasturtium-aquaticum</i>	Herb	Wetlands, streams, springs
Water Shield	<i>Brasenia schreberi</i>	Herb	Ponds, lakes
Wild Carrot	<i>Daucus carota</i>	Herb	Fields, pastures, roadsides, degraded prairie, forest edge
Wild Parsnip	<i>Pastinaca sativa</i>	Herb	Roadsides
Wine Berry	<i>Rubus phoenicolasius</i>	Shrub	Forests, fields
Winged Euonymus	<i>Euonymus alatus</i>	Shrub	Forests
Winter Creeper	<i>Euonymus fortunei</i>	Vine	Forests, fields
Wocheiner Knapweed	<i>Centaurea nigrescens</i>	Herb	Fields, pastures, grasslands, field edge, open forests
Yellow Flag	<i>Iris pseudocorus</i>	Herb	Wetlands
Sources: USDA 2015; VDCR-DNH 2015; WVDNR 2009, 2010			

## 4.0 STRATEGIES AND CONTROL MEASURES

### 4.1 Strategies

MVP has identified the following four principal strategies for exotic, noxious, and invasive plant species control:

1. The first strategy that will be implemented is to minimize the extent and scope of invasive plant infestations that will have to be managed during the construction of the Project. This will be accomplished by first identifying the exotic, noxious, and moderately to highly invasive plant species that occur along the Project's right-of-way through pre-construction surveys (see Section 3.0 and Table 3-1) and then working with the FS to identify the existing infestations that should be treated before construction begins. Only those infestations identified by the FS authorized representative would be treated prior to construction, while the remaining infestations would be treated during construction (as described below for the third strategy).
2. The second strategy that will be used is the avoidance of exotic and invasive species in materials brought on site during construction. For example, certified weed-free mulch and straw bales will be used to construct sediment control devices during construction, and equipment will be thoroughly cleaned prior to mobilization to the Project area (see section 4.2 for more details). In addition, MVP does not intend to use imported topsoil for agricultural or residential lands. All

additional topsoil for agricultural or residential lands will be locally sourced to prevent the introduction of foreign species.

3. The third strategy to be used involves the monitoring and selective spot treatment/eradication of any exotic or invasive species encountered during construction and post-construction. MVP will monitor and record the success of revegetation and any areas where exotic and invasive species have become an issue on FS-managed lands for up to five growing seasons or until the area is 80% revegetated. Inspection frequency will be determined by the FS Authorized Officer. MVP will submit a status report to the FS following each inspection. MVP will conduct selective spot eradications of invasive species infestations or outbreaks that are identified along the right-of-way. Eradication measures will include hand cutting and the use herbicides. An Herbicide Use Plan is included in the Plan of Development (POD) as Appendix T. All herbicides will be applied by applicators appropriately licensed or certified by the state in which the work is conducted. In addition, all label instructions from the manufacturer will be followed while using herbicides. Vehicles entering the FS for post-construction monitoring purposes will be required to remain on existing roadways and will need to be checked for non-native species.
4. The fourth strategy to be used in this plan involves MVP's commitment to using seed mixes during restoration that do not contain any invasive plant species and which have been approved by the FS for use on the JNF. Along with implementing restoration measures contained in the FERC Plan and *Wetland and Waterbody Construction and Mitigation Procedures* (FERC Procedures), MVP is partnering with the WHC, a nonprofit organization dedicated to assisting organizations and individuals with the restoration and enhancement of wildlife habitat. The WHC is working with MVP on its commitment toward native restoration of the pipeline right-of-way using seed mixes tailored to meet construction specifications, budgetary targets, and stakeholder desires while also providing local wildlife with native habitat. Working with the WHC, MVP will also incorporate principles of Integrated Vegetation Management into MVP's right-of-way maintenance. Integrated Vegetation Management incorporates seed-mix selection, vegetation maintenance scheduling, and selection of mechanical vegetation maintenance techniques to encourage a low ground cover of native species that flower for a long duration of the growing season. However, the successful stabilization of slopes and disturbed areas will be the primary goal of restoration efforts, and all seed mixed used on the JNF will be approved by the FS prior to their use.

## 4.2 Control Measures

In addition to the strategies described above, the following control measures will be used to further minimize introduction and/or spread of these species:

- The contractor will adhere to erosion control measures in the FERC Plan and Procedures and the Project-specific erosion and sedimentation control plans to ensure that sediment movement and the associated movement of non-native seeds into newly disturbed soils are minimized.
- Prior to mobilization to the Project area, contractors shall thoroughly clean all construction equipment with high-pressure washing equipment in order to limit the potential for the spread of noxious weeds, insects, or other soil-borne pests.
- Equipment cleaning stations will be established along the pipeline to ensure equipment is free of debris before being transported to a new construction spread. During construction, the environmental inspector will ensure all contractors clean the tracks, tires, and blades of equipment to remove any excess soil prior to movement of equipment out of known weed or soil-borne pest

infested areas, or utilize designated cleaning stations to remove vegetative materials using high-pressure washing equipment. No equipment will be allowed to enter the JNF until it has been inspected and approved by the FS Project Manager or an Authorized Officer.

- The contractor will use construction techniques along the pipeline route that minimize the time that bare soil is exposed and, therefore, minimize the opportunity for exotic species to become established.
- All disturbed areas will be reseeded promptly after final grading, weather and soil conditions permitting. Prompt reseeding will ensure that bare soil is not available for exotic or invasive species for an extended period of time. Reseeding will be done in compliance with FS Standards and Guidelines in the JNF Land and Resource Management Plan (e.g., FS Standards and Guidelines FW-86, FW-87, and FW-88).

As described in the FERC Plan, mulch will be applied if final grading and installation of permanent erosion control measures are not completed within 20 days after the trench is backfilled or seeding cannot be completed properly due to scheduling outside of recommended seeding dates.

### 4.3 Use of Pesticides

MVP has committed to not using pesticides during routine right-of-way maintenance along portions of the Project located outside of the JNF; however, the FS has requested that pesticides be incorporated into the management plan for maintenance of the right-of-way and treatment of invasive species on the JNF. Therefore, MVP will use pesticides for the control of non-native invasive plants and for the treatment of insect infestations along the right-of-way on the JNF. Pesticides would be applied in compliance with the FS Standards and Guidelines (e.g., FS Standards and Guidelines FW-89 through FW-110) and will comply with all label instructions as well as applicable state and federal regulations. The Project's *Herbicide Use Plan* (Appendix T of the POD) identifies how herbicide use to control noxious weed and invasive species will be implemented on the JNF.

## 5.0 REFERENCES

- USDA (United States Department of Agriculture). 2015. Natural Resources Conservation Service. Invasive and Noxious Weeds. Available online at: <http://plants.usda.gov/java/noxiousDriver>. Accessed October 6, 2015.
- FS (United States Forest Service). 2013. National Strategic Framework for Invasive Species Management. Available online at: [http://www.fs.fed.us/foresthealth/publications/Framework\\_for\\_Invasive\\_Species\\_FS-1017.pdf](http://www.fs.fed.us/foresthealth/publications/Framework_for_Invasive_Species_FS-1017.pdf). Accessed May 10, 2016.
- VDCR-DNH (Virginia Department of Conservation and Recreation, Division of Natural Heritage). 2015. Virginia Invasive Plant Species List. Available online at: [http://www.dcr.virginia.gov/natural\\_heritage/invspdflist.shtml](http://www.dcr.virginia.gov/natural_heritage/invspdflist.shtml). Accessed October 6, 2015.
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