

**APPENDIX D**  
**VEGETATION RESOURCES**



## D. VEGETATION RESOURCES

This appendix provides additional detail on existing conditions for vegetation in the Port MacKenzie Rail Extension study area. This information is based on Nowacki *et al.* (2001), Gallant *et al.* (1995), Viereck *et al.* (1992), and ANHP *et al.* (2008). The study area is defined as vegetation cover within 5 miles of the centerline (10 mile total width) of the proposed rail line segments (Table D-1). Within the study area is the 200-foot right-of-way (ROW) and footprint of the rail line segments. Clearing of vegetation within the 200-foot ROW would occur principally within the rail line footprint, so the footprint area is used as the basis for evaluation and comparison of the potential impacts on vegetation from the alternatives. OEA's quantification of vegetation and habitat types in the study area is based on the U.S. Geological Survey National Land Cover Database (Homer *et al.*, 2004). Table D-2 lists vegetation communities by landscape position and vegetation type. Table D-3 lists vegetation cover within the rail line footprint of the southern segment combinations, and Table D-4 lists vegetation cover within the rail line footprint of the northern segment combinations.

**Table D-1**  
**Vegetation Cover Classes within the Study Area of the Proposed Port MacKenzie Rail Extension<sup>a</sup>**

Class Name	Area (acres)	Percent of Area
Barren Land	4,448	Less than 1
Cultivated Crops	11,810	2
Deciduous Forest Closed	81,855	16
Deciduous Forest Open	9,312	2
Deciduous Forest Woodland	2,282	Less than 1
Developed, High Intensity	959	Less than 1
Developed, Low Intensity	7,393	1
Developed, Medium Intensity	1,814	Less than 1
Developed, Open Space	5,630	1
Emergent Herbaceous Wetlands	70,426	14
Evergreen Forest Closed	64,438	13
Evergreen Forest Open	1,298	Less than 1
Evergreen Forest Woodland	604	Less than 1
Mixed Forest Closed	90,911	18
Mixed Forest Open	4,545	Less than 1
Mixed Forest Woodland	1,868	Less than 1
Open Water	57,551	11
Pasture/Hay	382	Less than 1
Shrub/Scrub	13,580	3
Woody Wetlands	82,584	16
<b>Total</b>	<b>513,690</b>	

<sup>a</sup> Source: Homer *et al.*, 2004.

**Table D-2**  
**Vegetation Communities<sup>a</sup> associated with the National Land Cover Database Land Cover Classifications<sup>b</sup>**  
 (page 1 of 3)

Classification	Landscape Position	Vegetation Type	Common Plants
Evergreen Forest Closed (canopy 60 to 100 percent)	Well-drained hillsides or young river terraces	Closed white spruce forest	White spruce ( <i>Picea glauca</i> ), willows ( <i>Salix</i> spp.), prickly rose ( <i>Rosa acicularis</i> ), lowbush cranberry ( <i>Vaccinium vitis-idaea</i> ), bluebell ( <i>Mertensia paniculata</i> ), woodland horsetail ( <i>Equisetum sylvaticum</i> ), Canada dogwood ( <i>Cornus canadensis</i> ), feathermoss ( <i>Hylocomium splendens</i> )
	Poorly-drained silts on floodplain terraces or north-facing slopes	Closed black spruce forest	Black spruce ( <i>Picea mariana</i> ), green alder ( <i>Alnus crispa</i> ), Labrador tea ( <i>Rhododendron groenlandica</i> ), lowbush cranberry, polar grass ( <i>Arctagrostis latifolia</i> ), feathermoss
	Poorly-drained silts on floodplain terraces	Closed black spruce-white spruce forest	Black spruce, white spruce, green alder, Labrador tea, lowbush cranberry, feathermoss
Evergreen Forest Open (canopy 25 to 60 percent)	Well-drained hillsides or young river terraces	Open white spruce forest	White spruce, Bebb's willow ( <i>Salix bebbiana</i> ), Canada dogwood, highbush cranberry ( <i>Viburnum edule</i> ), prickly rose, twinflower ( <i>Linnaea borealis</i> ), feathermosses ( <i>Hylocomium splendens</i> , <i>Rhytidiadelphus loreus</i> , etc.), common horsetail ( <i>Equisetum arvense</i> )
	Poorly-drained silts on floodplain terraces or broad, flat areas within low-lying depressions	Open black spruce forest	Black spruce, prickly rose, willows ( <i>Salix</i> spp.), green alder, Labrador tea, lowbush cranberry, crowberry ( <i>Empetrum nigrum</i> ), grasses, feathermosses, Sphagnum mosses ( <i>Sphagnum</i> spp.), tundra dwarf birch ( <i>Betula glandulosa</i> )
Evergreen Forest Woodland (canopy 10 to 25 percent)	Well-drained sites with thin soils, most common near tree line	White spruce woodland	White spruce, tundra dwarf birch, lowbush cranberry, crowberry, feathermoss, fruticose lichens ( <i>Cladonia</i> spp.)
	Cold, wet, poorly-drained soils on floodplains and slopes	Black spruce woodland	Black spruce, green alder, tundra dwarf birch, various willows, lowbush cranberry, Labrador tea, bog blueberry ( <i>Vaccinium uliginosum</i> )
	Cold sites with poorly-developed, stony soils over bedrock	Black spruce-white spruce woodland	Black spruce, white spruce, tundra dwarf birch, green alder, bog blueberry, lowbush cranberry, crowberry, Labrador tea, bluejoint reedgrass ( <i>Calamagrostis canadensis</i> ), feathermosses, fruticose lichens
Deciduous Forest Closed (canopy 60 to 100 percent)	Floodplain terraces	Closed balsam poplar forest	Balsam poplar ( <i>Populus balsamifera</i> ), white spruce, prickly rose, bluejoint reedgrass, common horsetail
	Upland loess soils	Closed paper birch forest	Paper birch ( <i>Betula papyrifera</i> ), green alder, prickly rose, highbush cranberry, Canada dogwood, common horsetail, bluejoint reedgrass, Labrador tea, lowbush cranberry
	Well-drained slopes, upland slopes, south-facing	Closed quaking aspen forest	Quaking aspen ( <i>Populus tremuloides</i> ), prickly rose, twinflower, soapberry ( <i>Shepherdia canadensis</i> ), bearberry ( <i>Arctostaphylos uva-ursi</i> )

**Table D-2**

**Vegetation Communities<sup>a</sup> associated with the National Land Cover Database Land Cover Classifications<sup>b</sup>**  
(page 2 of 3)

Classification	Landscape Position	Vegetation Type	Common Plants
Deciduous Forest Closed (canopy 60 to 100 percent) (continued)	Well-drained slopes	Closed paper birch-quaking aspen forest	Paper birch, quaking aspen, white spruce, green alder, prickly rose, soapberry, lowbush cranberry, grasses, clubmosses ( <i>Lycopodium</i> spp.)
	Well-drained slopes, floodplain terraces	Closed quaking aspen-balsam poplar forest	Quaking aspen, balsam poplar, prickly rose
Deciduous Forest Open (canopy 25 to 60 percent)	Upland loess soils	Open paper birch forest	Paper birch, green alder, Labrador tea, bluejoint reedgrass, leaf litter
	Well-drained slopes, upland slopes, commonly south-facing	Open quaking aspen forest	Quaking aspen, willows, bearberry, fireweed ( <i>Epilobium</i> spp.), bluejoint reedgrass, lichens
	Floodplain terraces	Open balsam poplar forest	Balsam poplar, willows, alder, bluejoint reedgrass, horsetail ( <i>Equisetum</i> spp.)
Deciduous Forest Woodland (canopy 10 to 25 percent)	Floodplains and slopes near tree line	Balsam poplar woodland	Balsam poplar, green alder, various willows, prickly rose, high bush cranberry, bluejoint reedgrass
	Well-drained sites, with alluvium originated soils	Paper birch-balsam poplar woodland	Paper birch, balsam poplar
Mixed Forest Closed (canopy 60 to 100 percent)	Well-drained slopes, poorly-drained slopes, floodplain terraces	Closed spruce-paper birch forest	White spruce, paper birch, green alder, Bebb's willow, prickly rose, bluejoint reedgrass, common horsetail, lowbush cranberry, feathermosses
	Well-drained slopes, upland slopes	Closed quaking aspen-spruce forest	Quaking aspen, white spruce, Canada dogwood
	Floodplain terraces	Closed balsam poplar-white spruce	Balsam poplar, white spruce, thinleaf alder ( <i>Alnus tenuifolia</i> ), prickly rose, lowbush cranberry, common horsetail
Mixed Forest Open (canopy 25 to 60 percent)	Relatively wet, poorly-drained upland sites	Open spruce-paper birch forest	Paper birch, white or black spruce, green alder, various willow, bluejoint reedgrass, tundra dwarf birch, spiraea ( <i>Spiraea beauverdiana</i> ), bog blueberry, lowbush cranberry, narrow leaf Labrador tea ( <i>Rhododendron subarcticum Harmaja</i> ), feathermosses
	Creek bottoms	Open paper birch-balsam poplar-spruce forest	White spruce, paper birch, cotton wood, alder, willow, bog blueberry, lowbush cranberry, Canada dogwood, crowberry, spiraea, prickly rose, Labrador tea, bluejoint reedgrass, fireweed, bluebell
	Slopes at tree line	Open spruce-balsam poplar forest	White spruce, balsam poplar, alder, willow, highbush cranberry, prickly rose, devil's club ( <i>Oplapanax horridus</i> ), fireweed, Canada dogwood, bluebell, horsetail, various ferns
Mixed Forest Woodland (canopy 10 to 25 percent)	Creek bottoms	Spruce-paper birch woodland	Paper birch, black spruce, white spruce

**Table D-2**  
**Vegetation Communities<sup>a</sup> associated with the National Land Cover Database Land Cover Classifications<sup>b</sup>**  
 (page 3 of 3)

Classification	Landscape Position	Vegetation Type	Common Plants
Shrub/Scrub (less than 5 meters tall, canopy less than 20 percent)	Active and young floodplains, river bars, and after fires	Tall willow scrub	Alaska willow ( <i>Salix alaxensis</i> ), sandbar willow ( <i>Salix interior</i> ), grayleaf willow ( <i>Salix glauca</i> ), Bebb's willow, littletree willow ( <i>Salix arbusculoides</i> ), bluejoint, fireweed, horsetail
	Along rivers, after fires, upland drainageways, seepages	Tall alder scrub	Thinleaf alder, green alder, bluejoint reedgrass
	Active and young floodplains, river bars	Tall alder-willow scrub	Thinleaf alder, green alder, Alaska willow, Bebb's willow, common horsetail, in wet areas with water sedge ( <i>Carex aquatilis</i> ), bluejoint, marsh fivefinger ( <i>Potentilla palustris</i> ), swamp horsetail ( <i>Equisetum fluviatile</i> )
Woody Wetlands (canopy less than 20 percent under saturated conditions)	Non-patterned wetlands with thick organic mat	Low mixed shrub-sedge tussock bog	Resin birch ( <i>Betula glandulosa</i> ), willows, tussock forming cottongrasses ( <i>Eriophorum brachyantherum</i> or <i>Eriophorum vaginatum</i> ), bog blueberry, narrow leaf Labrador tea, Sphagnum mosses
		Shrub birch-ericaceous shrub bog	Resin birch ( <i>Betula glandulosa</i> ), dwarf ericaceous-like shrubs ( <i>Vaccinium uliginosum</i> , <i>Vaccinium vitis-idaea</i> or <i>Rubus chamaemorus</i> ), mosses ( <i>Sphagnum</i> spp.), bog-rosemary ( <i>Andromeda polifolia</i> ) Lapland rosebay ( <i>Rhododendron lapponicum</i> ), sedges ( <i>Carex</i> spp), sweet gale, ( <i>Myrica gale</i> ), bush cinquefoil ( <i>Potentilla fruticosa</i> ), black crowberry ( <i>Empetrum nigrum</i> ), dwarf Labrador tea ( <i>Ledum decumbens</i> ), feathermosses
		Ericaceous scrub bog	Leatherleaf ( <i>Chamaedaphne calyculata</i> ), willows, water sedge ( <i>Carex</i> spp.)
		Shrub birch-willow scrub	Resin birch, diamondleaf willow ( <i>Salix pulchra</i> ), grayleaf willow
		Low scrub	Labrador tea, bog blueberry, willows, feathermosses
Emergent Herbaceous Wetlands (perennial herbaceous vegetation is over 80 percent under saturated conditions)	Lake and pond margins, sloughs, silty or organic soils	Subarctic lowland sedge wet meadow	Water sedge, narrow-leaf cottongrass ( <i>Eriophorum angustifolium</i> ), marsh fivefinger, swamp horsetail
	Sloughs, oxbow lakes, lake margins, silty or organic soils, fens	Fresh herb marsh	Buckbean ( <i>Menyanthes trifoliata</i> ), swamp horsetail, water smartweed ( <i>Polygonum amphibium</i> )
	Poorly-drained silty lowlands to well-drained upland slopes	Bluejoint meadow	Bluejoint reedgrass ( <i>Calamagrostis canadensis</i> ), sedge ( <i>Carex rostrata</i> ), cinquefoil ( <i>Potentilla</i> spp.), fireweed
	Shallow lakes and ponds	Aquatic bed	Yellow pondlily ( <i>Nuphar polysepalum</i> ), pondweed ( <i>Potamogeton</i> spp.), water milfoil ( <i>Myriophyllum spicatum</i> )
Barren Land	River bars (dry to mesic)	Seral herbs	Yellow dryas ( <i>Dryas drummondii</i> ), river beauty ( <i>Epilobium latifolium</i> ), fireweed

<sup>a</sup> Sources: Viereck *et al.*, 1992; HDR, 2008.

<sup>b</sup> Source: Homer *et al.*, 2004.

**Table D-3**  
**Vegetation Cover within the Rail Line Footprint of the Southern Segments and Segment Combinations<sup>a</sup>**

Vegetation Class	Mac West-Connector 1		Mac West-Connector 2		Mac East-Connector 3		Mac East		Mac East Variant-Connector 2a		Mac East Variant-Connector 3 Variant	
	Area (acres) <sup>b,c</sup>	Footprint Area (percent) <sup>c</sup>	Area (acres) <sup>b,c</sup>	Footprint Area (percent) <sup>c</sup>	Area (acres) <sup>b,c</sup>	Footprint Area (percent) <sup>c</sup>	Area (acres) <sup>b,c</sup>	Footprint Area (percent) <sup>c</sup>	Area (acres) <sup>b,c</sup>	Footprint Area (percent) <sup>c</sup>	Area (acres) <sup>b,c</sup>	Footprint Area (percent) <sup>c</sup>
Barren Land	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Cultivated Crops	26	6.4	36	9.2	3	0.7	2	0.5	49	12.8	52	11.4
Deciduous Forest Closed	25	6.2	25	6.4	111	23.8	104	25.7	67	17.5	75	16.5
Deciduous Forest Open	2	0.5	2	0.5	9	2.0	9	2.3	9	2.3	9	1.9
Deciduous Forest Woodland	5	1.1	5	1.2	7	1.6	8	1.9	3	0.8	3	0.7
Developed, High Intensity	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Developed, Low Intensity	1	0.2	1	0.2	1	0.2	0	0.0	0	0.0	<1	<0.1
Developed, Medium Intensity	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Developed, Open Space	<1	0.1	<1	0.1	<1	0.0	<1	0.0	<1	0.1	<1	0.1
Emergent Herbaceous Wetlands	26	6.3	23	6.0	15	3.2	12	2.8	24	6.2	29	6.4
Evergreen Forest Closed	84	20.6	70	18.2	63	13.4	44	10.7	39	10.1	58	12.8
Evergreen Forest Open	1	0.1	<1	0.1	0	0.0	0	0.0	0	0.0	0	0.0
Evergreen Forest Woodland	1	0.3	1	0.2	1	0.2	1	0.2	1	0.2	1	0.2
Mixed Forest Closed	123	30.4	119	30.9	183	39.2	158	38.8	131	33.9	160	35.3
Mixed Forest Open	2	0.4	2	0.4	7	1.5	7	1.7	5	1.3	5	1.2
Mixed Forest Woodland	3	0.7	3	0.7	6	1.2	6	1.4	2	0.4	2	0.4
Open Water	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Pasture/Hay	0	0.0	0	0.0	1	0.2	1	0.2	1	0.2	1	0.2
Shrub/Scrub	6	1.5	6	1.5	24	5.2	23	5.6	25	6.5	27	5.9
Woody Wetlands	104	25.6	95	24.6	36	7.7	33	8.2	30	7.8	32	7.0
<b>Total Area</b>	<b>407</b>		<b>387</b>		<b>467</b>		<b>407</b>		<b>386</b>		<b>453</b>	

<sup>a</sup> Source: Homer *et al.*, 2004.

<sup>b</sup> < = less than.

<sup>c</sup> Totals might not equal sums of values due to rounding.

**Table D-4  
Vegetation Cover within the Rail Line Footprint of the Northern Segments and  
Segment Combinations<sup>a</sup>**

Vegetation Class	Willow		Big Lake		Houston-Houston North		Houston-Houston South	
	Area (acres) <sup>b,c</sup>	Footprint Area (percent) <sup>c</sup>	Area (acres) <sup>b,c</sup>	Footprint Area (percent) <sup>c</sup>	Area (acres) <sup>b,c</sup>	Footprint Area (percent) <sup>c</sup>	Area (acres) <sup>b,c</sup>	Footprint Area (percent) <sup>c</sup>
Barren Land	0	0.0	0	0.0	0	0.0	0	0.0
Cultivated Crops	1	0.3	<1	0.1	0	0.0	0	0.0
Deciduous Forest Closed	138	36.2	84	25.4	59	22.2	35	16.6
Deciduous Forest Open	12	3.1	11	3.2	9	3.3	2	0.7
Deciduous Forest Woodland	3	0.7	2	0.6	4	1.4	1	0.3
Developed, High Intensity	0	0.0	0	0.0	0	0.0	0	0.0
Developed, Low Intensity	<1	0.1	13	4.0	1	0.5	2	1.0
Developed, Medium Intensity	0	0.0	0	0.0	0	0.0	0	0.0
Developed, Open Space	15	4.0	18	5.3	<1	0.1	10	4.9
Emergent Herbaceous Wetlands	13	3.4	40	12.3	41	15.6	63	30.1
Evergreen Forest Closed	46	12.1	32	9.8	46	17.5	31	14.8
Evergreen Forest Open	<1	0.1	1	0.4	1	0.4	1	0.5
Evergreen Forest Woodland	<1	<0.1	<1	0.1	1	0.3	1	0.4
Mixed Forest Closed	147	38.7	79	24.1	42	15.7	24	11.4
Mixed Forest Open	4	0.9	3	0.9	4	1.5	2	0.7
Mixed Forest Woodland	3	0.7	2	0.5	1	0.4	<1	0.2
Open Water	<1	<0.1	<1	0.1	<1	<0.1	<1	0.1
Pasture/Hay	0	0.0	0	0.0	0	0.0	0	0.0
Shrub/Scrub	3	0.7	25	7.5	<1	0.1	14	6.9
Woody Wetlands	11	3.0	50	15.2	57	21.5	36	17.3
<b>Total Area</b>	<b>380</b>		<b>329</b>		<b>265</b>		<b>210</b>	

<sup>a</sup> Source: Homer *et al.*, 2004.

<sup>b</sup> < = less than.

<sup>c</sup> Totals might not equal sums of values due to rounding.

There are no known Federal- or state-protected threatened, endangered, or candidate plant species in the study area (Lipkin, 2008; HDR, 2008). Preliminary research by the Applicant (HDR, 2008) did not indicate the presence of rare plants, although 1 data sheet from wetland delineations conducted during the summer of 2008 shows a record for brownish sedge (*Carex brunnescens*), which is closely related to a rarer subspecies, Alaska brownish sedge (*Carex brunnescens ssp. Alaskana*). There is some possibility that this plant was misidentified, but this cannot be confirmed with existing data. Rare-plant surveys have not been completed for the entire study area, so existing data may not provide a comprehensive accounting of rare plants across all segments.

## D.1 Noxious Weeds

The U.S. Department of Agriculture, Animal and Plant Health Inspection Service, regulates designated noxious weeds, however, there are no known federally-designated noxious weeds in Alaska. Noxious weeds are generally introduced through contaminated seed sources, equipment, vehicles, materials, and supplies used in revegetation. They are typically spread by construction vehicles, water, and wind. Noxious weeds could also be introduced to the study area through spills of contaminated grain or animal feeds (hay, pellets) during proposed rail line operations. The growth of invasive plant populations is typically encouraged by natural or man-made disturbances.

The state regulates the spread of invasive weed species and has listed 14 species as prohibited noxious weeds and 9 species as restricted noxious weeds under Title 11 of Alaska state statute (Alaska Admin. Code 11 § 34.020). Prohibited noxious weeds are any species of plants which when established are or may become destructive and difficult to control by ordinary means of cultivation or other farm practices. Restricted noxious weeds are species of plants which are very objectionable in fields, lawns, and gardens, but which can be controlled by good cultural practices. Four prohibited weeds and 5 restricted weeds have been reported in the study area (ANHP *et al.*, 2008; Lipkin, 2008). Table 5.2-2 in Chapter 5 of this Final Environmental Impact Statement lists regulated weed species. There are a number of non-native invasive plants in Alaska<sup>1</sup> that are not regulated by the state. Table D-5 lists all invasive plant populations that have been documented in the study area. Comprehensive surveys for invasive plants have not been completed for all segments. The data provided are from surveys compiled by various Federal and state entities for transportation corridors and municipalities (ANHP *et al.*, 2008). The highest concentrations of invasive plants in the study area are found in the more highly disturbed areas adjacent to Parks Highway and Knik-Goose Bay Road and in agricultural areas near Port MacKenzie. Segments near these areas would be more likely to contribute to the spread of invasive plants.

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<sup>1</sup> The non-native invasive plant list in Alaska is compiled by the Alaska Exotic Plant Information Clearing, which is cooperative project among the U.S. Forest Service, National Park Service, Agricultural Research Service, U.S. Geological Survey, University of Alaska (Fairbanks and Anchorage), Alaska Natural Heritage Program, Cooperative Extension Service, Bureau of Land Management, and Alaska Division of Forestry.

**Table D-5  
Occurrence of Invasive Plant Species in the Proposed Port MacKenzie Rail Extension Study Area<sup>a</sup>  
(page 1 of 2)**

Common Name	Species	Occurrences (sites) in Study area	Status <sup>b</sup>
Common Yarrow	<i>Achillea millefolium</i>	76	AWS
Crested Wheatgrass	<i>Agropyron cristatum</i>	8	NR
Smooth Brome	<i>Bromus inermis</i>	21	NR
Cheatgrass	<i>Bromus tectorum</i>	1	NR
Shepherd's Purse	<i>Capsella bursa-pastoris</i>	23	NR
Sticky Chickweed	<i>Cerastium glomeratum</i>	6	NR
Lamb's Quarters	<i>Chenopodium album</i>	47	NR
Canada Thistle	<i>Cirsium arvense</i>	1	P
Annual Hawksbeard	<i>Crepis tectorum</i>	75	NR
Quackgrass	<i>Elymus repens</i>	51	P
Siberian Rye	<i>Elymus sibiricus</i>	10	NR
Wormseed Mustard	<i>Erysimum cheiranthoides</i>	1	NR
Splitlip Hempnettle	<i>Galeopsis bifida</i>	1	NR
Brittlestem Hempnettle	<i>Galeopsis tetrahit</i>	7	P
Common Sunflower	<i>Helianthus annuus</i>	2	AWS
Orange Hawkweed	<i>Hieracium aurantiacum</i>	1	NR
Narrow-leaf Hawkweed	<i>Hieracium umbellatum</i>	1	NR
Foxtail Barley	<i>Hordeum jubatum</i>	22	NR
Leporinum Barley	<i>Hordeum murinum</i>	53	NR
Ornamental Jewelweed	<i>Impatiens glandulifera</i>	2	NR
Fall Dandelion	<i>Leontodon autumnalis</i>	4	NR
Common Peppergrass	<i>Lepidium densiflorum</i>	1	NR
Oxeye Daisy	<i>Leucanthemum vulgare</i>	1	NR
Butter and Eggs	<i>Linaria vulgaris</i>	14	R
Large-leaf Lupine	<i>Lupinus polyphyllus</i>	40	AWS
Purple Loostripe	<i>Lythrum salicaria</i>	45	NR
Pineappleweed	<i>Matricaria discoidea</i>	1	NR
White Sweet Clover	<i>Melilotus alba</i>	90	NR
Yellow Sweet Clover	<i>Melilotus officinalis</i>	41	NR
Reed Canarygrass	<i>Phalaris arundinacea</i>	11	NR
Timothy	<i>Phleum pratense</i>	1	NR
Plantain	<i>Plantago major</i>	85	R
Annual Bluegrass	<i>Poa annua</i>	96	R
Knotweed	<i>Polygonum aviculare</i>	49	NR
Black Bindweed	<i>Polygonum convolvulus</i>	45	R
Willow Weed	<i>Polygonum lapathifolium</i>	1	NR
Bohemian Knotweed	<i>Polygonum x bohemicum</i>	10	NR
Norweigan Cinquefoil	<i>Potentilla norvegica</i>	1	NR

**Table D-5**  
**Occurrence of Invasive Plant Species in the Proposed Port MacKenzie Rail Extension Study Area<sup>a</sup>**  
 (page 2 of 2)

Common Name	Species	Occurrences in Study area	Status <sup>b</sup>
Sheep Sorrel	<i>Rumex acetosella</i>	70	NR
Curly Dock	<i>Rumex crispus</i>	27	NR
Garden Dock	<i>Rumex longifolius</i>	14	NR
Common Groundsel	<i>Senecio vulgaris</i>	1	NR
Tumble Mustard	<i>Sisymbrium altissimum</i>	7	NR
Perennial Sowthistle	<i>Sonchus arvensis</i>	2	P
Spurry	<i>Spergula arvensis</i>	19	NR
Common Chickweed	<i>Stellaria media</i>	24	NR
Common Tansy	<i>Tanacetum vulgare</i>	1	NR
Common Dandelion	<i>Taraxacum officinale</i>	102	AWS
Alsike Clover	<i>Trifolium hybridum</i>	89	NR
Red Clover	<i>Trifolium pratense</i>	21	NR
White Clover	<i>Trifolium repens</i>	67	NR
Scentless Mayweed	<i>Tripleurospermum perforata</i>	13	NR
Tufted Vetch	<i>Vicia cracca</i>	44	R

<sup>a</sup> Source: ANHP *et al.*, 2008.

<sup>b</sup> State of Alaska: R = restricted; P = prohibited; AWS = Agricultural Weed Seed; NR = not regulated.

## D.2 Alaska Railroad Corporation Vegetation Management

The Alaska Railroad Corporation (ARRC) manages vegetation on rail beds and facilities to:

- Eliminate plants and roots that impede drainage or obstruct or interfere with train movement
- Allow track inspectors to visually inspect ties, track, and fasteners
- Maintain sight lines at crossings and visibility of track flags, mile posts, and other signage
- Remove potential fuels that can cause wildland fires
- Maintain safe walking areas
- Control the spread of invasive and noxious weeds (ARRC, 2008)

ARRC has used mechanical and other nonchemical methods of vegetation management since 1983 (STB, 2008). ARRC has used alternative vegetation management techniques such as hand clearing by inmates, hydro-ax brush cutting, modified ballast regulator, reballasting, hot water/steam, weed burning, and infrared burning treatments, all of which have been largely ineffective at controlling vegetation within the track ballast section (Kemenosh, 1999). ARRC uses manual and mechanical vegetation control, including brush cutting along the right-of-way (ROW) and manual and mechanical ballast clearing (Burnham *et al.*, 2003). The Federal Railroad Administration has cited ARRC annually under the Railroad Safety Statutes (49 Code of Federal Regulations § 213.37) for failing to control vegetation (Kemenosh, 1999). In April 2010, the Alaska Department of Environmental Conservation approved ARRC's pesticide permit

application to apply the herbicide AquaMaster along with Agri-Dex, a non-ionic surfactant and spray oil, along the rail line ROW between Seward and Indian (ADEC, 2010).

Plants that tend to dominate the rail bed are common within the study area and are difficult to remove include tree saplings (balsam poplar, birch, aspen), shrubs (alder, willow, raspberry [*Rubus idaeus*]), herbaceous plants (fireweed, bluejoint reedgrass, horsetail, common yarrow [*Achillea millefolium*]), and introduced weeds (dandelion [*Taraxacum officinale*], white sweetclover [*Melilotus alba*], annual bluegrass [*Poa annua*], and alsike clover [*Trifolium hybridum*]) (Kemenosh, 1999; Lipkin, 2007).

Mechanical removal of vegetation results in ground disturbance, which promotes erosion. Use of heavy equipment for spot-control of vegetation could result in removal of more vegetation than necessary. Vegetation removed by hand clearing would result in some soil disturbance if weeds are pulled. Use of chain saws or other hand-held power tools would reduce soil disturbance but the chance of small fuel spills would be increased. Removing excess vegetation by burning would increase the risk of fire spreading beyond the vegetation management target area and potentially result in the unintentional destruction of forest resources (ARRC, 1984).

### D.3 Fire Management and Wildland Fire History

The proposed rail line alternatives would cross 3 levels of fire protection (modified, full, and critical) under the Alaska Fire Services 2008 fire management options (Table D-6 and Figure D-1).

**Table D-6**  
**Fire Protection Levels in the Rail Line Footprint of Proposed Port MacKenzie Rail Extension Segments (acres)<sup>a</sup>**

Segment	Critical	Full	Modified	Total <sup>b</sup>
Mac West	0	348	8	356
Mac East	0	407	0	407
Mac East Variant	0	384	0	384
Connector 1	0	35	17	52
Connector 2	0	26	5	32
Connector 3	0	62	0	62
Connector 2a	0	2	0	2
Connector 3 Variant	0	69	0	69
Big Lake	345	15	0	360
Houston	77	48	0	124
Houston North	143	0	0	143
Houston South	98	0	0	98
Willow	86	310	0	396
<b>Totals (percent of total)</b>	<b>748 (34)</b>	<b>1,440 (65)</b>	<b>30 (1)</b>	<b>2219 (100)</b>

<sup>a</sup> Source: BLM, 2008a.

<sup>b</sup> Totals might not equal sums of values due to rounding. Totals also only count the Mac East terminal reserve area once, which is included in both the Mac East and Mac East Variant totals.

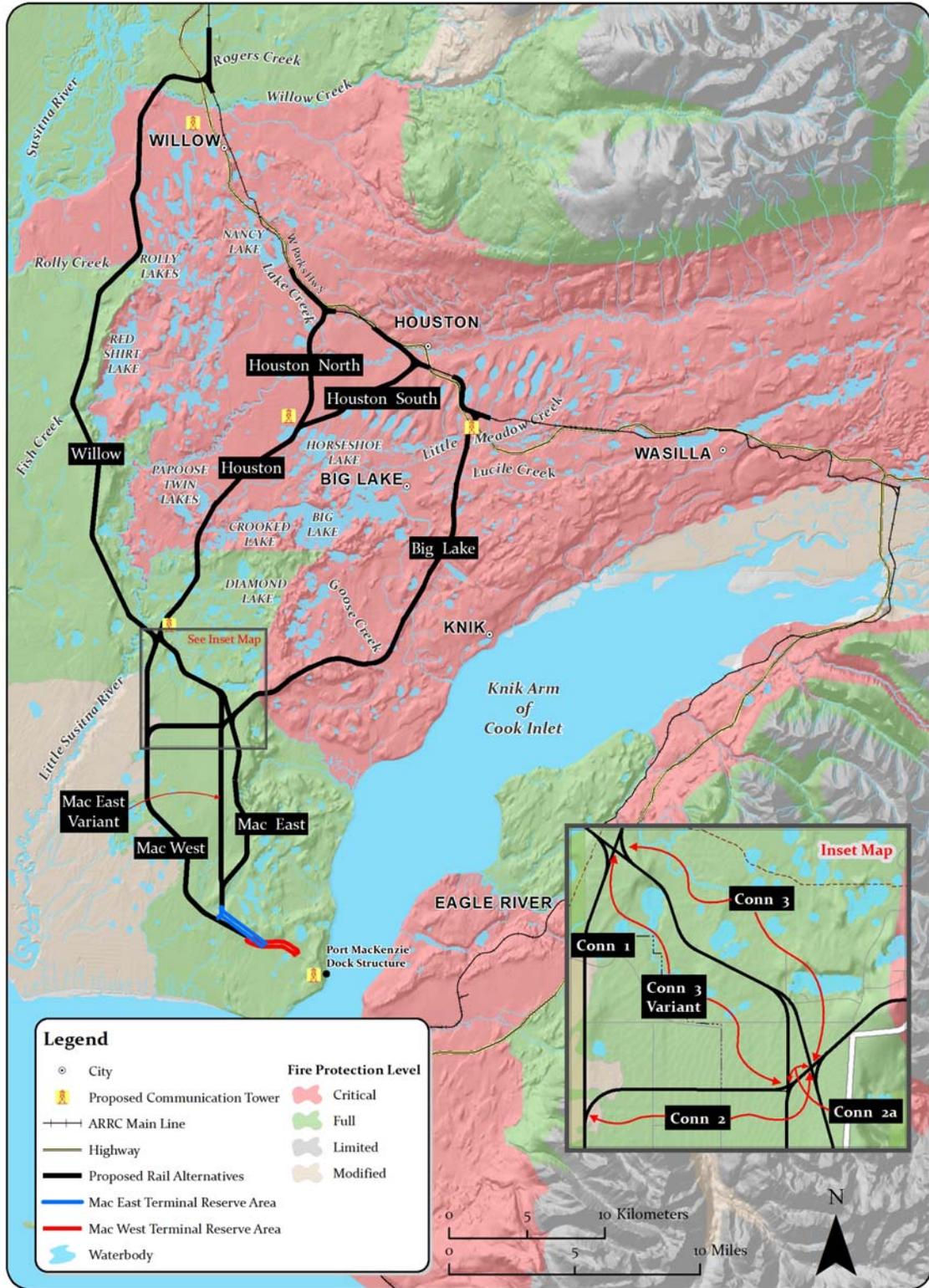


Figure D-1. Fire Protection Levels in the Proposed Port MacKenzie Rail Extension Study Area (BLM, 2008a)

The Bureau of Land Management Alaska Wildland Fire Management Plan (BLM, 2005) defines fire protection levels as follows:

- Critical – These areas are the highest priority for suppression actions and assignment of firefighting resources. This designation indicates human life, inhabited property, structural resources, or developed areas are at risk.
- Full – These areas are the second priority for fire suppression. This designation provides for protection of cultural and recreational resources, uninhabited structures, and high-value natural resources.
- Modified – The goal in these areas is to balance acres burned with suppression costs, and to use wildland fire where appropriate to accomplish land and resource management objectives. This designation is the most flexible fire management option.

Of the area the alternatives would cross, 65 percent falls within the full protection classification, followed by critical protection (34 percent) and modified protection (1 percent). Table D-7 summarizes the post-1950 fire history for each segment.

**Table D-7  
Post-1950 Fire History along Proposed Port MacKenzie Rail Extension Segments<sup>a</sup>**

<b>Segment</b>	<b>Miles of Track Proposed</b>	<b>Miles of Proposed Track Burned</b>	<b>Percent of Proposed Track Burned</b>	<b>Acres Burned in Proposed Rail Line Footprint</b>
Mac West	11.9	0.0	0.0	0.0
Mac East	10.9	0.0	0.0	0.0
Mac East Variant	9.9	0.0	0.0	0.0
Connector 1	4.8	0.0	0.0	0.0
Connector 2	3.7	0.0	0.0	0.0
Connector 3	5.3	0.0	0.0	0.0
Connector 2a	0.2	0.0	0.0	0.0
Connector 3a	5.5	0.0	0.0	0.0
Houston	10.4	0.8	8	7.1
Houston North	8.6	3.3	39	45.4
Houston South	9.4	7.8	83	81.8
Big Lake	21.1	5.3	25	76.9
Willow	29.7	0.0	0.0	0.0
<b>Totals<sup>c</sup></b>	<b>131.4</b>	<b>17.3</b>	<b>13</b>	<b>211.3</b>

<sup>a</sup> Source: BLM, 2008b.

<sup>b</sup> Totals might not equal sums of values due to rounding.

Of the approximately 131 miles of segments, wildland fires have burned approximately 17 miles, or approximately 13 percent (Table D-7 and Figure D-2). The most significant fire in the study area was the 1996 Millers Reach 2 fire, which burned 37,348 forested acres in the Big Lake area between Knik and Houston, including 211 acres in the proposed rail line footprint.

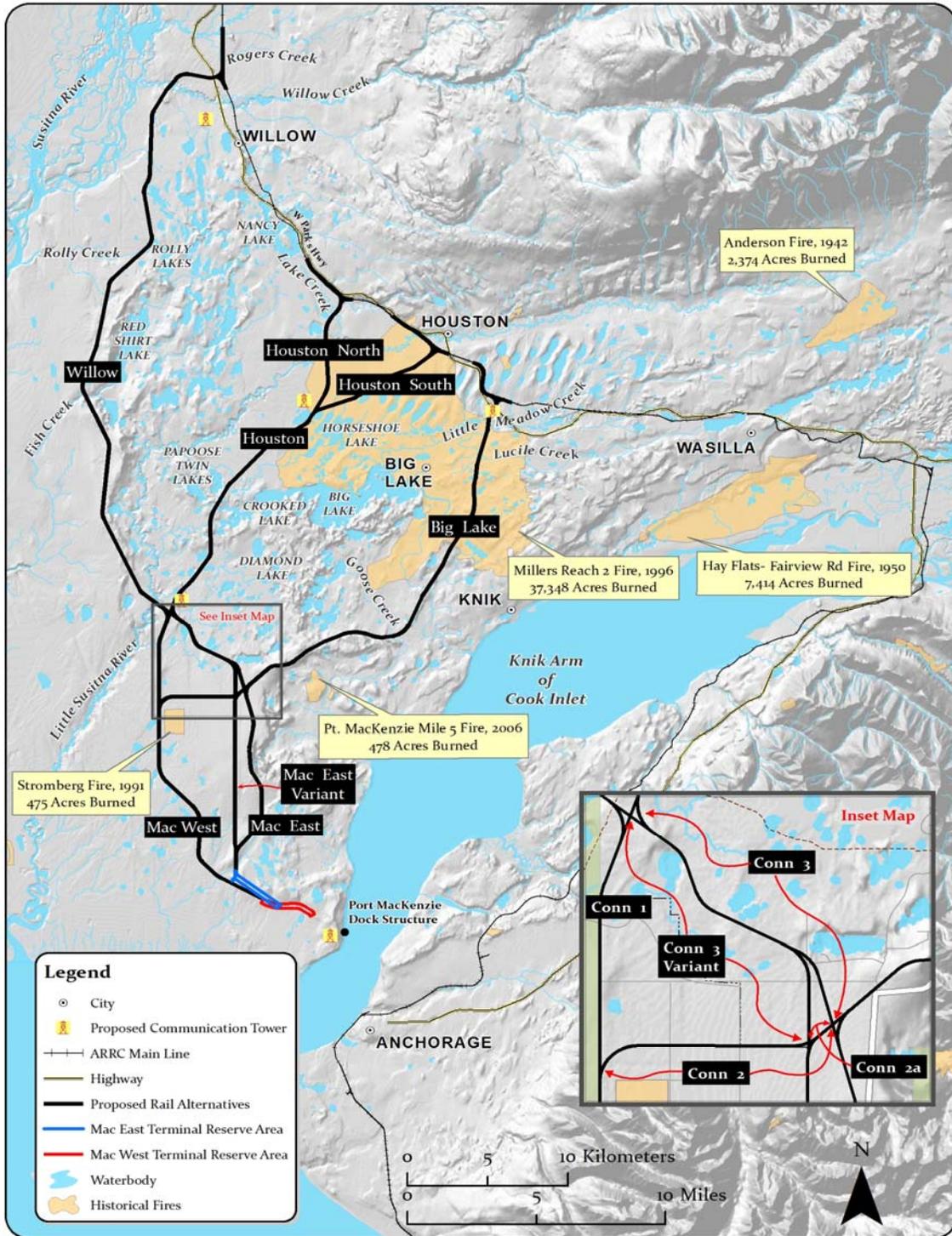


Figure D-2. Fire History in the Proposed Port MacKenzie Rail Extension Study Area (BLM, 2008b)

This human-caused fire destroyed 440 buildings and cost more than \$12 million to suppress (Stekel, 1996; AWFCG, 2006). Much of the study area can be considered “wildland-urban interface,” where structures and human development intermingle with natural vegetation. Wildland fires in or near these areas can pose significant threats to homes, other structures, and forested habitat. Fire season in Alaska begins as soon as the snow melts and is most active from June through August (BLM, 2005). Construction of the proposed rail line and access road, including clearing within the rail line footprint, would create a fuel break that could interrupt wildland fires and potentially contribute to increased fuel accumulations and an increased risk for intense wildland fire activity. In some areas, a fuel break might be beneficial in the protection of late-succession riparian forests and private property.

## D.4 References

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