



ALASKA DEPARTMENT OF TRANSPORTATION

Vegetation Study of Alaska's Richardson Highway: Identification of Plant Communities and Assessment of Control Strategies

Prepared by: Andrew Nolen, Agronomist
Donald Ross, Agronomist
Alaska Plant Materials Center
Division of Agriculture
Department of Natural Resources

November, 2006

Prepared for:
Alaska Department of Transportation
Statewide Research Office
3132 Channel Drive
Juneau, AK 99801-7898

FHWA-AK-RD-06-04

Alaska Department of Transportation & Public Facilities
Research & Technology Transfer

Notice

This document is disseminated under the sponsorship of the U.S. Department of Transportation in the interest of information exchange. The U.S. Government assumes no liability for the use of the information contained in this document.

The U.S. Government does not endorse products or manufacturers. Trademarks or manufacturers' names appear in this report only because they are considered essential to the objective of the document.

Quality Assurance Statement

The Federal Highway Administration (FHWA) provides high-quality information to serve Government, industry, and the public in a manner that promotes public understanding. Standards and policies are used to ensure and maximize the quality, objectivity, utility, and integrity of its information. FHWA periodically reviews quality issues and adjusts its programs and processes to ensure continuous quality improvement.

Author's Disclaimer

Opinions and conclusions expressed or implied in the report are those of the author. They are not necessarily those of the Alaska DOT&PF or funding agencies.

REPORT DOCUMENTATION PAGE

Form approved OMB No.

Public reporting for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestion for reducing this burden to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-1833), Washington, DC 20503

1. AGENCY USE ONLY (LEAVE BLANK) FHWA-AK-RD-06-04	2. REPORT DATE November 2006	3. REPORT TYPE AND DATES COVERED Final
--	---------------------------------	---

4. TITLE AND SUBTITLE Vegetation Study of Alaska's Richardson Highway: Identification of Plant Communities and Assessment of Control Strategies	5. FUNDING NUMBERS T2-05-03 RT-000S(541)
--	--

6. AUTHOR(S) Andrew Nolan, Agronomist Donald Ross, Agronomist

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Alaska Plant Materials Center Division of Agriculture Department of Natural Resources	8. PERFORMING ORGANIZATION REPORT NUMBER
---	--

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) State of Alaska, Alaska Dept. of Transportation and Public Facilities Research and Technology Transfer 2301 Peger Rd Fairbanks, AK 99709-5399	10. SPONSORING/MONITORING AGENCY REPORT NUMBER FHWA-AK-RD-06-04
---	--

11. SUPPLEMENTARY NOTES Performed in cooperation with the U.S. Department of Transportation, Federal Highway Administration. Research Project Title: "Evaluation of Single Lane Live Load Distribution Factor (DF) for the Alaska Style Decked Bulb-Tee Girder Bridge"
--

12a. DISTRIBUTION / AVAILABILITY STATEMENT No restrictions. This document is available to the public through the National Technical Information Service, Springfield, VA 22161	12b. DISTRIBUTION CODE
--	------------------------

13. ABSTRACT (Maximum 200 words) This vegetation survey of the Richardson Highway from Valdez to Delta Junction was completed in July 2006 by Alaska Plant Materials Center (PMC) agronomists as part of the effort by the Alaska Department of Transportation and Public Facilities (DOT&PF) to develop an Integrated Right-of-Way (ROW) Vegetation Management (IRVM) program. The survey classified natural vegetation outside the cleared zone based on <i>The Alaska Vegetation Classification</i> by Leslie A. Viereck et al. (1992). Undesirable woody species and non-native plant species were also identified. Vegetation management issues were the primary consideration during the survey. The data collected has been used to generate Geographic Information System (GIS) maps (Appendix A and C). It is possible to incorporate vegetation classification and no-native plant data into existing DOT&PF information management systems.

14. KEYWORDS : Vegetation Control, Native Plants, Invasive Plants, Environmental Design, Biological Control, Wetlands, Roadside Flora, Roadside Fauna, Roadside Improvement	15. NUMBER OF PAGES 140
	16. PRICE CODE N/A

17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT N/A
---	--	---	-----------------------------------

Executive Summary

This vegetation survey of the Richardson Highway from Valdez to Delta Junction was completed in July 2006 by Alaska Plant Materials Center (PMC) agronomists as part of the effort by the Alaska Department of Transportation and Public Facilities (DOT&PF) to develop an Integrated Right-of-Way (ROW) Vegetation Management (IRVM) program. The survey classified natural vegetation outside the cleared zone based on *The Alaska Vegetation Classification* by Leslie A. Viereck et al. (1992). Undesirable woody species and non-native plant species were also identified. Vegetation management issues were the primary consideration during the survey. The data collected has been used to generate Geographic Information System (GIS) maps (Appendix A and C). It is possible to incorporate vegetation classification and non-native plant data into existing DOT&PF information management systems.

Five major habitats are encountered in the drive from Valdez to Delta Junction:

- 1) Valdez/Coastal forest,
- 2) Chugach Range,
- 3) Copper River Basin,
- 4) Alaska Range, and
- 5) Delta Junction/Interior forest.

Undesirable ROW vegetation consists generally of woody plants that grow tall enough to reduce sighting distance along roadways. These include several species of willow as well as balsam poplar, aspen and alder. The most desired management conditions exist where thick stands of turf grasses are established, the hydrology of an area creates a wetland, or higher elevations limit plant growth. Native wildflowers contribute greatly to the desirable vegetation in the ROW for aesthetic purposes.

Information on the presence of non-native plants from this and other surveys has been compiled for the route. These non-native populations are likely present due to their inclusion in revegetation seed mixtures, possible intentional distribution, or escapement from agricultural or ornamental plantings. Many common garden weeds were also noted. Higher population densities of non-native plants were observed near population centers.

Data collection and mapping of non-native plant populations is a point of interest for many local and national land management agencies and organizations. Information on the location and scope of specific infestations is important if targeted control actions are to be performed. Also, documentation of treatments allows for evaluation of their effectiveness. Standards developed by the North American Weed Management Association (NAWMA) and implemented by the Alaska Exotic Plant Information Clearinghouse (AKEPIC) program are suitable for this use by DOT&PF if the data can be incorporated into existing data management systems.

DOT&PF vegetation control practices currently focus on mechanical methods targeting overall height which are expensive both in equipment and operational cost. These costs are recurring since control activities do not address the long-term reduction of undesirable plant populations. Also, non-native plants are not targeted by this method. An integrated approach begins during the design phase and considers long-term management goals and all potential control strategies (mechanical, chemical, biological, cultural and legal) as well as the growth characteristics of undesirable target species so that control efforts can be most effective. The goals of vegetation management, including target species and populations, vary regionally and within individual localities. Many states have adopted noxious weed laws that give jurisdiction over the control of

weeds to local agencies. It would be beneficial to cooperate with local groups to prioritize and implement control efforts.

Continuing research into the scope and distribution of native plant communities and non-native plant populations along the remainder of Alaskan ROWs would be beneficial. Also, new technologies and equipment are being developed for IRVM programs nationwide. Remaining current on these topics and testing new treatments for suitability in Alaska could aid in the development of best management practices for specific infestations and increasing the effectiveness and reducing the overall cost of vegetation management.

Table of Contents

Executive Summary	i
Table of Contents	iii
List of Figures and Photos	iv
1.0 Introduction	1
2.0 ROW Terminology	1
2.1 Roadside Vegetation Management Zones	1
2.2 Mile post vs. Milepoint	2
3.0 Classification of Native Vegetation in Zone 3	2
3.1 Vegetation Categories and Classifications	3
4.0 ROW Weeds	12
4.1 Invasive Species	12
4.2 Noxious Weeds	12
4.3 Undesirable Woody Vegetation	12
4.4 Non-Native Plants	13
4.4.1 Inventory and Data Management	13
4.4.2 Seed Mixes	14
4.4.3 Ornamental and Agricultural Crops	15
4.4.4 Common Garden Weeds	15
4.4.5 Prioritizing Control Actions	15
5.0 Desirable ROW Vegetation	15
5.1 Established Turf Grasses	16
5.2 Wetlands	16
5.3 High Elevations	16
5.4 Wildflowers	16
6.0 Vegetation Control	17
6.1 Mechanical Control	17
6.2 Chemical Control	18
6.3 Biological Control	18
6.4 Cultural Control	18
6.5 Legal Control	19
7.0 Conclusions and Suggested Research.	19
8.0 References	21
Appendix A. Vegetation Classification Maps	A-1
Appendix B. Vegetation Survey Data	B-1
Appendix C. Maps of Non-Native Plant Species Along the Richardson Highway	C-1
Appendix D. Non-Native Plants of Alaska from AKEPIC	D-1
Appendix E. Non-Native Species Observed on the Richardson Highway: Data from both the AKEPIC Database and this Survey	E-1
Appendix F. AKEPIC Field Data Sheet	F-1
Appendix G. AKEPIC Invasiveness Ranking	G-1
Appendix H. Best Management Practices for Willow	H-1
Appendix I. Best Management Practices for White Sweetclover	I-1

List of Figures and Photos

Figure 1.	Roadside Vegetation Management Zones	2
Table 1.	Table of Vegetation Classifications Encountered Along the Richardson Highway from Valdez to Delta Junction	4
Photo 1.	Open Black Spruce Forest	6
Photo 2.	Spruce Woodland	7
Photo 3.	Closed Quaking Aspen Forest with Closed Spruce Forest behind	8
Photo 4.	Closed Spruce-Birch-Poplar Forest	8
Photo 5.	Closed Quaking Aspen-White Spruce Forest	9
Photo 6.	Brome and clover in zone 2	14
Photo 7.	Established red fescue planting at scenic overlook near mile post 88	16
Photo 8.	Wetland area in zone 2 near mile post 92	16
Photo 9.	Reduced vegetation control demand observed at high elevations	16
Photo 10.	ROW wildflowers	17
Photo 11.	Desirable and undesirable vegetation intermixed in zones 1 and 2	17

1.0 Introduction

This survey of vegetation along sections of the Richardson Highway was completed by Alaska Plant Materials Center (PMC) agronomists in July 2006 for the Alaska Department of Transportation and Public Facilities (DOT&PF) as part of the process to develop an integrated roadside vegetation management (IRVM) plan. Detailed information on species composition and distribution along Alaska's right-of-way (ROW) corridors is essential for planning cost effective management techniques.

The survey was completed by driving the Richardson Highway from Valdez to Delta Junction and classifying the vegetation communities observed. The presence of non-native plants was noted as well as the composition of desirable and undesirable species in the ROW. Data collected was correlated to milepoints of existing features present in DOT&PF's geographic information system (GIS) for the route.

DOT&PF primarily performs mechanical vegetation control through mowing and hydro-axing. This method is expensive both in equipment and operational cost. These costs are recurring since control activities need to be completed at frequent intervals. Also, non-native plants are not specifically targeted by this method.

A literature review of current national ROW vegetation control goals and strategies was conducted to evaluate methodologies with potential for Alaska. Previous plant surveys of the Richardson Highway route were also reviewed.

2.0 ROW Terminology

2.1 *Roadside Vegetation Management Zones*

The Washington State Department of Transportation has explained that "to address the highway's functional needs, the roadside may be divided into as many as three major bands of area referred to as Zone 1– Vegetation Free, Zone 2– Operational, and Zone 3– Transition/Buffer. Roadside maintenance priorities within these zones are established beginning with activities relating to the safe highway operations and maintenance, and preservation of the highway roadway." (Washington State Department of Transportation, Maintenance and Operations, 2006). Figure 1 illustrates the three management zones.

- Zone 1 is the vegetation-free zone at the immediate pavement edge. This may be 0-2 feet wide. This section provides for surface drainage, sighting distance, and visibility and maintenance of roadside hardware.
- Zone 2 is the area from zone 1 to the edge of maintenance or the clearing limit. Its width varies depending on geographical features and design. This is the area where most vegetation control activities occur in order to maintain sight distance, vehicle recovery areas, hydraulic capacity of ditches and erosion control. Underground utilities are located in this zone.

- Zone 3 is the area beyond the maintenance edge. It is generally comprised of self sustaining native plant communities undisturbed by construction and maintenance activities. This area provides for wildlife habitat and aesthetics. Zone 3 vegetation classification is the primary objective of this survey.

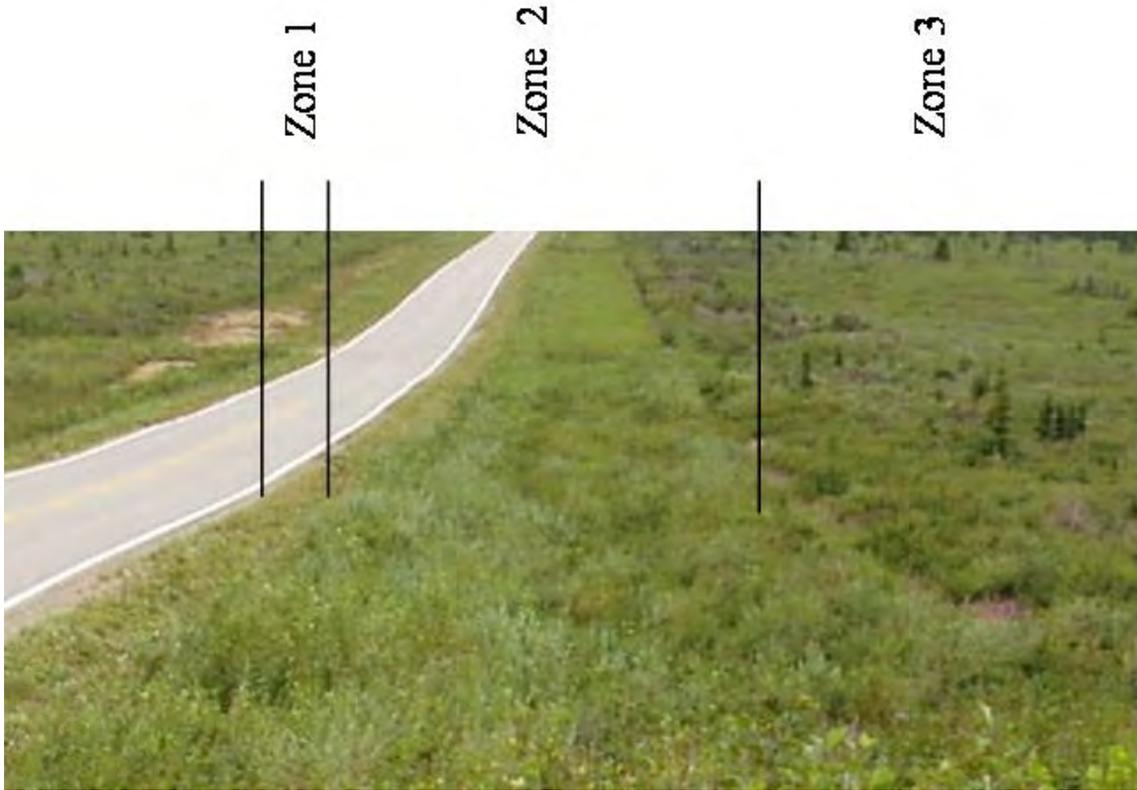


Figure 1. Roadside Vegetation Management Zones

2.2 Mile post vs. Milepoint

For the purposes of specifying locations on the route surveyed, both mile post and milepoint distinctions are made. Mile post refers the actual signage on the roadway where milepoint indicates a specific distance from the start of the route. Milepoint is the common indicator used by DOT&PF to identify individual features along the roadway. Mile post signage is often different than the actual milepoint of the feature.

3.0 Classification of Native Vegetation in Zone 3

The characterization of the natural vegetation encountered along the Richardson Highway corridor is based on the five-tiered system contained in *The Alaska Vegetation Classification* by Leslie A. Viereck et al. (1992). In describing the vegetation growing naturally in zone 3 of the ROW and beyond, we have carried the classification to level four of the five levels. The detailed examination of each plant community's species composition necessary to reach level five is beyond the scope of this survey.

Five major habitats are encountered in the drive from Valdez to Delta Junction: 1) **Coastal** forest yields quickly to shrubs and alpine tundra over Thompson Pass and the 2) **Chugach Range**. Dropping back down in elevation, the more Interior-like forest of the 3) **Copper River Basin** stretches for approximately 150 miles before the gradual ascent to Isabel Pass and the 4) **Alaska Range**, where again, treeless shrublands and tundra dominate the landscape below glaciated peaks. Continuing north, the descent from Isabel Pass toward Delta Junction yields more and larger trees, and the transition to 5) **Interior** forest is complete.

Following are brief descriptions of the 14 categories and 37 vegetation classifications as they apply to this study, and are listed in numerical/alphabetical sequence. Table 1 presents the vegetation classifications observed and ranks them by frequency of occurrence. The locations noted here apply only to the Richardson Highway corridor included in this survey. Refer to Viereck et al. (1992) for complete descriptions and statewide occurrences of each type. A few of the dominant species in each classification are listed. When correlating milepoint to vegetation type (see Appendix B), note that due to differences in soil type, drainage and aspect, vegetation can change rapidly and there may be two or more plant communities between milepoints. The data collected has been used to generate Geographic Information System (GIS) maps that may be incorporated into existing DOT&PF information management systems (Appendix A).

In correlating vegetation classifications with roadside vegetation management needs, a few generalizations may be made: 1) areas with shorter growing seasons such as alpine and Interior areas do not require management as intensive as that of longer growing season areas such as the coastal and Copper River Basin areas, 2) plant communities with high shrub or broadleaf tree components often require more intensive control measures, and 3) areas with a well established ground cover of grasses or low-growing forbs/semi-woody plants require less management input due to the suppression of taller aggressive woody species.

Table 1. Table of Vegetation Classifications^a Encountered Along the Richardson Highway from Valdez to Delta Junction

<u>Classification Code</u>	<u>Plant Community</u>	<u>Fourth Level Classification</u>	<u>Occurrence Ranking</u>
IA1a	Closed Needleleaf Forest	Sitka spruce	17
IA1j	Closed Needleleaf Forest	White spruce	9
IA1k	Closed Needleleaf Forest	Black spruce	14
IA1l	Closed Needleleaf Forest	White spruce / black spruce	5
IA2a	Open Needleleaf Forest	Sitka spruce	11
IA2e	Open Needleleaf Forest	White spruce	4
IA2f	Open Needleleaf Forest	Black spruce	2
IA2g	Open Needleleaf Forest	White spruce / black spruce	6
IA3c	Needleleaf Woodland	White spruce	8
IA3e	Needleleaf Woodland	White spruce / black spruce	13
IB1c	Closed Broadleaf Forest	Balsam poplar	10
IB1e	Closed Broadleaf Forest	Quaking aspen	7
IB2b	Open Broadleaf Forest	Quaking aspen	19
IB2c	Open Broadleaf Forest	Balsam poplar	7
IC1a	Closed Mixed Forest	White spruce / paper birch	16
IC1b	Closed Mixed Forest	White spruce / paper birch / balsam poplar – black cottonwood	19
IC1c	Closed Mixed Forest	Spruce / paper birch / quaking aspen	18
IC1d	Closed Mixed Forest	Quaking aspen / spruce	1
IC1e	Closed Mixed Forest	Balsam poplar / white spruce	5
IC2a	Open Mixed Forest	Spruce / paper birch	18
IC2b	Open Mixed Forest	Quaking aspen / spruce	10
IIB1a	Closed Tall Scrub	Willow	14
IIB1b	Closed Tall Scrub	Alder	15
IIB1c	Closed Tall Scrub	Shrub birch	16
IIB1d	Closed Tall Scrub	Alder / willow	3
IIB2a	Open Tall Scrub	Willow	16
IIB2b	Open Tall Scrub	Alder	17
IIB2d	Open Tall Scrub	Alder / willow	17
IIC1a	Closed Low Scrub	Shrub birch	10
IIC1b	Closed Low Scrub	Low willow	16
IIC2c	Open Low Scrub	Mesic shrub birch / ericaceous shrub	18
IIC2f	Open Low Scrub	Shrub birch / willow	19
IIC2g	Open Low Scrub	Willow	12
IID1a	Dryas Dwarf Scrub	Dryas tundra	19
IIIA1a	Dry Graminoid Herbaceous	Elymus	19
IIIA3c	Wet Graminoid Herbaceous	Wet sedge / herb meadow tundra	19
IIIA3h	Wet Graminoid Herbaceous	Halophytic grass wet meadow	17

^a See Viereck et al. (1992) *The Alaska Vegetation Classification*.

3.1 *Vegetation Categories and Classifications*

IA1 Closed Needleleaf Forest (60-100% tree canopy, over 75% by coniferous trees)

IA1a Closed Sitka Spruce Forest

Picea sitchensis/Alnus spp.-*Oplopanax horridus-Rubus spectabilis*

Dense stands of large Sitka spruce mix with more open stands and broadleaf forest surrounding Valdez. Where disturbed and shade is reduced, alder (*Alnus* spp.) is the dominant shrub layer. In this study, it is found only in the coastal Valdez-Lowe River area.

IA1j Closed White Spruce Forest

Picea glauca/Alnus spp.-*Salix* spp.-*Rosa acicularis-Shepherdia canadensis*

This community is found in the Copper River Basin, lower portions of the Alaska Range, and Delta. Considered a climax community, it is not common, either due to man-made or natural disturbances in the study area. Open white spruce forest or mixed stands of white spruce and other tree species are more commonly encountered.

IA1k Closed Black Spruce Forest

Picea mariana/Vaccinium spp.-*Ledum decumbens-Rosa acicularis*

Observed in the Copper River Basin, this community was encountered only occasionally. Open and mixed stands of black spruce are more common. This plant community is found mostly on cold and poorly drained soils and is also found north of the Alaska Range but was not observed there in this study. For management purposes, closed black spruce forest tends to produce fewer woody brush problems compared to the other communities in the closed forest category.

IA1l Closed White Spruce/Black Spruce Forest

Picea glauca-Picea mariana/Salix spp.-*Vaccinium* spp.-*Potentilla fruticosa*

Although this community is normally common in the Interior, we did not encounter it in the Delta Junction area. It is common in the Copper River Basin. Continuously changing soil moisture regimes can create a mosaic of white and black spruce, the white spruce favoring the more well-drained sites. Here woody brush is more common than in IA1k.

IA2 Open Needleleaf Forest (25-59% tree canopy, over 75% by conifers)

IA2a Open Sitka Spruce Forest

Picea sitchensis/Alnus spp./*Calamagrostis canadensis*

Like the closed Sitka spruce forest, this community is confined to the coastal area near Valdez. Alder is abundant in the more open areas, and this community quickly gives way to alder and willow shrub communities in the ascent to Thompson Pass.

IA2e Open White Spruce Forest

Picea glauca/Alnus spp.-*Salix* spp.-*Vaccinium* spp.

This community occupies the transition between uplands in the Chugach and Alaska Ranges and the lowlands of the Copper River Basin. In the south, alder is the dominant shrub layer while willow dominates in the north.

IA2f Open Black Spruce Forest

Picea mariana/Alnus spp.-Betula glandulosa-Salix spp./Vaccinium spp.-Ledum groenlandicum

Open black spruce forest is one of the most abundant plant communities in the Copper River Basin and the Interior/Delta Jct. area. Like closed black spruce forest, it grows on poorer soils than white spruce forest. Woody plants such as willow and dwarf birch may still need occasional control along the ROW but appear less problematic than the other open forest classifications.



Photo 1. Open Black Spruce Forest

IA2g Open White Spruce/Black Spruce Forest

Picea glauca-Picea mariana/Betula glandulosa-Alnus spp.-Vaccinium spp.-Ledum groenlandicum

This community commonly occupies upland sites of the Copper River Basin transitioning to the Alaska Range. Less common at lower elevations, it was found on soils with better drainage than that encountered in black spruce forest. Alder, willow, and dwarf birch are the dominant woody shrubs.

IA3 Needleleaf Woodland (10-24% tree canopy, over 75% by conifers)

IA3c White Spruce Woodland

Picea glauca/Salix spp.-Betula glandulosa-Alnus spp.-Vaccinium spp.

With only 10% - 24% cover, this community is found at treeline in the Alaska Range, both north and south of Isabel Pass. Slow growth due to cold harsh conditions will likely minimize the need for woody brush control in both needleleaf woodlands.

IA3e White Spruce/Black Spruce Woodland

Picea glauca/Picea mariana-Betula glandulosa-Alnus spp.

Similar to IA3c but with an approximately equal proportion of white and black spruce. Uncommon in this study, it is found on exposed ridges near Paxson Lake.



Photo 2. Spruce Woodland

IB1 Closed Broadleaf Forest (60-100% tree canopy, over 75% by broadleaf trees)

IB1c Closed Balsam Poplar Forest

Populus balsamifera/Alnus spp.-*Salix* spp.

While not abundant, it is found in four of the five major habitats contained in this study: Valdez/Coastal, Copper River Basin, Alaska Range, and Interior/Delta Junction. Open stands are more frequently encountered where there has been logging or other disturbance. Stream banks and valley bottoms often have stands of closed poplar forest. Young poplars establish easily on bare mineral soil and will likely need periodic control in some areas. Established ground covers can suppress the spread of cottonwood.

IB1e Closed Quaking Aspen Forest

Populus tremuloides/Salix spp.-*Viburnum edule*

Found in the Copper River Basin and the Delta Junction area, this community is usually associated with open mixed aspen-spruce stands. It may dominate old burned areas in the Interior for many years. Aspen stands are usually clonal and spread through a common root system. Periodic vegetation control may be necessary in ROWs bordering quaking aspen forest.



Photo 3. Closed Quaking Aspen Forest with Closed Spruce Forest behind

IB2 Open Broadleaf Forest (25-59% tree canopy, over 75% by broadleaves)

IB2b Open Quaking Aspen Forest

Populus tremuloides/Salix spp.

Encountered at only one site near Fort Greely. This is considered a transitional plant community bordering burned areas.

IB2c Open Balsam Poplar (Black Cottonwood) Forest

Populus balsamifera/Alnus spp.-*Salix* spp./*Oplopanax horridus*

Found in the Valdez area in association with Sitka spruce and alder, and in the southern portion of the Copper River Basin. It is similar to closed poplar forest in ROW management needs.

IC1 Closed Mixed Forest (60-100% tree canopy, 25-75% each by conifers & broadleaves)

IC1a Closed Spruce/Paper Birch Forest

Picea glauca-P. mariana-Betula papyrifera/Salix spp.-*Alnus* spp.

Not common in this study, this forest type is found at mile post 158 and in Delta Junction. Paper birch does not appear to be as abundant as aspen along the Richardson Highway corridor. Both closed and open mixed forest communities present the same woody brush management problems as noted above.



Photo 4. Closed Spruce-Birch-Poplar Forest

IC1b Closed White Spruce/Paper Birch/Balsam Poplar (Black Cottonwood) Forest

Picea glauca-Betula papyrifera-Populus balsamifera (P. trichocarpa)/Alnus spp.-*Salix* spp.

Found only near mile post 19, this association is described in “The Alaska Vegetation Classification” as a Susitna Valley community. Here it appears to be a transition between spruce forest and alder scrub.

IC1c Closed Spruce/Paper Birch/Quaking Aspen Forest

Picea mariana-Betula papyrifera-Populus tremuloides/Salix spp.-*Betula glandulosa*

Uncommon, this community is noted once in the Copper River Basin near Copper Center and again near the main entrance to Fort Greely.

IC1d Closed Quaking Aspen/Spruce Forest

Populus tremuloides-Picea glauca-P. mariana/Alnus spp.-*Salix* spp.

Found in the Copper River Basin and the Delta/Interior area, this is the most commonly encountered plant community. Alder, willow, and aspen sprouts in the ROW are the primary challenges in roadside maintenance here.



Photo 5. Closed Quaking Aspen-White Spruce Forest

IC1e Closed Balsam Poplar/White Spruce Forest

Populus balsamifera-Picea glauca(P. sitchensis)/Salix spp.-Alnus spp.-Viburnum edule-Rosa acicularis

This community was encountered often from the Valdez area to the north side of the Alaska Range. In the Valdez area, Sitka or Lutz spruce may substitute for white spruce. Willow, alder, and young cottonwoods are the problematic woody brush species for roadside maintenance.

IC2 Open Mixed Forest (25-59% tree canopy, 25-75% each by conifers and broadleaves)

IC2a Open Spruce/Paper Birch Forest

Picea glauca-P. mariana-Betula papyrifera/Salix spp.-Alnus spp.

An uncommon community found in the Copper River Basin by Willow Lake and in the Interior near Donnelly Dome. Willow, alder, and seedling birches can encroach on the ROW.

IC2b Open Quaking Aspen/Spruce Forest

Populus tremuloides-Picea glauca-P. mariana/Vaccinium spp.

Found occasionally in the Copper River Basin near Myers Lake and in the Interior between Donnelly Dome and Ft. Greely, this community is often seral in burned areas. The trees are mostly stunted and the growing season is short, lessening the need for frequent brush control.

IIB1 Closed Tall Scrub (75-100% cover by shrubs > 5 ft. high, trees <10% canopy)

IIB1a Closed Tall Willow Shrub

Salix spp./mosses-Calamagrostis canadensis-Festuca spp.

This community is found only in the Alaska Range north of Paxson and both north and south of Isabel Pass. Transitional between forest and alpine habitats, this community may still need periodic woody brush control.

IIB1b Closed Tall Alder Shrub

Alnus spp./grasses-mosses

Found sparsely in the Alaska Range on both sides of Isabel Pass. While not abundant, this community, like IIB1a, will likely also need occasional brush control.

IIB1c Closed Tall Shrub Birch Shrub

Betula glandulosa/Vaccinium spp.-Ledum spp.

Similar in structure to IIB1a and IIB1b, it is uncommon near treeline in the Alaska Range. This is a slow growing plant community lessening the need for ROW vegetation management.

IIB1d Closed Tall Alder-Willow Shrub

Alnus spp.-Salix spp.

This is the third most common plant community found in this study. In forested regions, it likely will be replaced by trees if left undisturbed. In the coastal Valdez area, it is found where trees have been cleared in the past. It is also found in the Chugach and Alaska Ranges where it is transitional between forest and tundra at mid elevations. Interestingly, it is not found in the Copper River Basin. With a ready supply of propagules, this community can easily encroach into zones 1 and 2 of the ROW.

IIB2 Open Tall Scrub (25-50% cover by shrubs > 5 ft. high, trees <10% canopy)

IIB2a Open Tall Willow Shrub

Salix spp./grasses-forbs

Found at two locations, this shrub community occupies four milepoints adjacent to the Gulkana Airport. It is believed that periodic clearing of tall vegetation maintains this community. It is also found at one location in the Alaska Range near Fielding Lake.

IIB2b Open Tall Alder Shrub

Alnus spp. /grasses-forbs

This community is found at four consecutive milepoints along the Fort Greely corridor that were subjected to the Donnelly Flats fire of 1999. This successional stage may require periodic brush control.

IIB2d Open Tall Alder-Willow Shrub

Alnus spp.-Salix spp./Vaccinium spp.-forbs-grasses

Viereck et al. describe this community from western and northern Alaska as well as the Interior. In this study, it is found only within a few miles of Thompson Pass on both the north and south sides. As elevation increases, this community transitions to low shrub and tundra. While not fast-growing, it may still necessitate an occasional ROW brush clearing.

IIC1 Closed Low Scrub (>75% cover by shrubs 8" to 5' tall; <10% tree cover, <25% tall shrub cover)

IIC1a Closed Low Shrub Birch Shrub

Betula glandulosa-B. nana/Vaccinium spp.

This community is found in the Alaska Range in the Isabel Pass area on well drained soils. It is slow growing and should require a minimal maintenance input.

IIC1b Closed Low Willow Shrub

Salix spp./grasses-forbs

In close proximity to IIC1a, this shrub community is found above tree line in the Isabel Pass area. ROW vegetation management needs here are likely low.

IIC2 Open Low Scrub (25-75% cover by shrubs 8' to 5' tall; <10% tree cover, <25% tall shrubs)

IIC2c Open Low Mesic Shrub Birch-Ericaceous Shrub

Betula nana-B. glandulosa-Salix spp./Vaccinium spp.-Empetrum nigrum-Arctostaphylos spp.

This alpine community is noted at two milepoints in the Chugach Range near the Thompson Pass DOT&PF maintenance station. Slow growing, this is likely a low maintenance community.

IIC2f Open Low Shrub Birch-Willow Shrub

Betula nana-B. glandulosa-Salix spp./Vaccinium spp.-Empetrum nigrum-Eriophorum spp.-Carex spp.

Another alpine community, this one is found at one location in the Alaska Range at Isabel Pass. Like most of the other alpine plant communities, ROW maintenance should be minimal.

IIC2g Open Low Willow Shrub

Salix spp./Vaccinium spp.-Arctostaphylos spp.

Found at the top of Thompson Pass in the Chugach Range and on the north side of Isabel Pass in the Alaska Range, this alpine plant community is more common than IIC2c and IIC2f.

IID Dwarf Scrub (25-100% cover by shrubs <8' tall; <10% tree cover, <25% cover by shrubs >8')

IID1a Dryas Dwarf Shrub Tundra

Dryas spp.-Vaccinium spp.-Salix spp./graminoids-forbs

This mostly alpine community is noted at one location in the Chugach Range near the Worthington Glacier Road junction. Limited in area, ROW maintenance is likely affected by the nature of surrounding plant communities.

IIIA1 Dry Graminoid Herbaceous (Grass-like plants dominate on well-drained soils; forbs ± present, <25% cover by shrubs)

IIIA1a Elymus

Elymus arenarius

This is the first plant community noted upon leaving Valdez. It grows near the bike path on stable flat ground close to the tidal flats. Occasional mowing may be necessary to maintain sight lines.

IIIA3 Wet Graminoid Herbaceous (Grass-like plants dominate on water-saturated soils; forbs ± present, <25% cover by shrubs)

IIIA3c Wet Sedge-Herb Meadow Tundra

Carex spp.-Eriophorum spp.-Potentilla palustris-Menyanthes trifoliata

Located at a single location near the top of Isabel Pass in the Alaska Range, this site likely requires little roadside vegetation control.

IIIA3h Halophytic Grass Wet Meadow

Triglochin maritimum-Plantago maritima-Elymus arenarius-Puccinellia nutkaensis

This community is encountered soon after leaving Valdez. It borders and is part of the tidal flats. It is subject to periodic tidal inundation. Confined to low areas, it does not contribute to the need for vegetation control.

4.0 ROW Weeds

The term “weed” is defined as “a plant out of place.” This is a precise definition but it does not categorize specific plant species; species considered to be weeds vary depending on the perception of the observer. For the purpose of ROW maintenance, willows, cottonwood, and alder occupying zones 1 and 2 are considered weeds. This being the case, more specific terms can be used to describe the character of individual plant species.

4.1 *Invasive Species*

Plants species that have an aggressive nature for moving into new areas are considered “invasive.” They are often observed invading a site following a disturbance. Invasive plant species can be either native or introduced to an area. For example, willow can be invasive in much the same manner as white sweet clover.

4.2 *Noxious Weeds*

Plant species that have been determined to be detrimental to intended land uses are often categorized as “noxious.” This is a legal definition used by governments and agencies to classify species that require control action. Alaska law currently defines selected species as noxious in Alaska State Statute Title 11, Chapter 34, Article 1, Seed Regulations. This regulation pertains to agricultural seed intended to be sold as seed in the state. The term “noxious” does not define a species as native or introduced.

4.3 *Undesirable Woody Vegetation*

ROW vegetation management in Alaska focuses primarily on controlling overall vegetation height. Undesirable vegetation consists mostly of woody species that grow tall enough to reduce sighting distance along roadways. Many of the problem species also attract wildlife to the ROW creating safety concerns.

The survey results indicate that zone 3 plant communities do not always have a direct effect on the species composition of zones 1 and 2. The construction processes implemented in designing and building roadways result in the creation of a distinct habitat on the fill slopes of the road bed. This habitat is similar to sand or gravel bars and alluvial outwashes that are common throughout Alaska. The primary woody species that occupy these coarse textured soil habitats are several species of willow as well as balsam poplar, aspen and alder. These species were found along nearly the entire length of the survey.

Willows belong to the genus *Salix*. *Salix* species observed varied slightly along the route. *Salix alaxensis* (feltnleaf willow) was the most abundant of the species noted, present in almost every circumstance. *Salix commutata* (undergreen willow) was observed in the coastal area from Valdez to Keystone Canyon. *Salix interior* (interior willow) and *Salix bebbiana* (Bebb’s willow) were observed in areas north of Glennallen. *Salix pulchra* was observed at higher elevations, particularly near Summit Lake.

Populus balsamifera (balsam poplar, cottonwood) was consistently observed along most of the route surveyed. It was not present at locations of higher elevations including Thompson Pass, Isabel Pass, and Summit Lake.

Populus tremuloides (quaking aspen) was observed during the survey in areas north of Thompson Pass excluding alpine areas. The presence of aspen in the ROW is often correlated to forested areas containing this species.

Alnus spp. (alder) was present in conjunction with willow and cottonwood in most circumstances. Common species inhabiting the regions covered in this survey include *Alnus viridis* and *Alnus incana*. Again, higher elevations tended to result in fewer sightings of alder.

Other less common woody plant species that may be considered undesirable in the ROW include *Eleagnus commutata* (silverberry), *Shepherdia canadensis* (soapberry), and *Betula nana* or *Betula glandulosa* (dwarf birch). Dwarf birch is found mainly at higher elevations and is fairly low growing in most instances. Silverberry also has a low growing nature and is uncommon in the ROW with the only instance surveyed being near the Gulkana River Bridge. Soapberry is common along the Gulkana River south of Summit Lake and generally does not cause roadside safety concerns.

4.4 Non-Native Plants

Plants that do not naturally occur in an area have been imported intentionally and unintentionally throughout history. They may have been brought in as potential landscape or crop plants or through contaminants in seed or feed. Also, many plants have been vectored by people through the movement of plant material coincidentally hitch-hiking on clothing, vehicles, and pets. These plants are referred to as “non-native,” “introduced” or “exotic.” Non-native plants can be highly invasive due to the lack of natural predators which keep native populations in check.

4.4.1 Inventory and Data Management

Data collection and mapping of non-native plant populations is a point of interest for many local and national land management agencies and organizations. Information on the location and scope of specific infestations is important if targeted control actions are to be performed. Also, documentation of treatments allows for evaluation of their effectiveness. Collaborative efforts that unify and standardize data collection and distribution exist. The North American Weed Management Association (NAWMA) and Alaska Exotic Plant Information Clearinghouse (AKEPIC) are examples.

“NAWMA is a network of public and private professional weed managers who are involved in implementing any phase of a county, municipal, district, state, provincial, or federal noxious weed law. There are active state weed and roadside vegetation associations and societies devoted to weed science organizations. Other organizations focus on federal legislation and others are comprised of federal and state middle level managers” (NAWMA, 2006). NAWMA has developed standardized data collection methods that have been adopted by the organization’s members. This allows for data sharing across many disciplines.

AKEPIC is “a cooperative project between the USFS State and Private Forestry, the National Park Service, the Alaska Natural Heritage Program, and the USGS Alaska Science Center in support of the Alaska Committee for Noxious and Invasive Plants Management (CNIPM) and the Strategic Plan for Noxious and Invasive Plants Management in Alaska” (Alaska Natural Heritage Program, 2005). AKEPIC provides data collection standards and database management for any interested party. The standards are virtually identical to those developed by NAWMA. The sole focus of the database is to provide inventory information on non-native plant infestation found in Alaska. The Alaska Natural Heritage Program administers the database and website for the project. (Alaska Natural Heritage Program, 2005) The program has developed a list of 197 non-native species known to be present in Alaska. See Appendix D.

The AKEPIC database has been utilized by agencies and individuals throughout the state for many years. Due to the nature of Alaska’s transportation systems, much of the data currently in the database has been collect from DOT&PF ROWs. This allows DOT&PF to take advantage of data collection efforts completed by others. AKEPIC data collection forms (Appendix E) record specific locations of infestations with GPS coordinates. These can be easily converted to milepoint locations on specific routes for inclusion in DOT&PF’s GIS.

If non-native plant data can not be easily added to DOT&PF’s existing data management systems, a database management system similar to The Nature Conservancy’s Weed Information Management System (WIMS) may be beneficial. “WIMS is a Microsoft Access database designed to document weed occurrences, assessments and treatments. It uses NAWMA standards for data collection. The database can be downloaded on a portable PC for field data collection, entry and evaluation. Shapefiles can be automatically produced for use in any standard GIS application program” (The Nature Conservancy, 2006).

Milepoint locations were used to document incidents of non-native plants in this survey. The data generated as well as data from the area included in the AKEPIC database have been used to generate GIS shapefiles by the diligent efforts of David Oliver and Kerry Kirkpatrick of DOT&PF’s statewide GIS mapping section. It is possible to incorporate this information with the rest of DOT&PF’s features along the route. Appendix E presents both sets of data. Maps generated are presented in appendix C. Of all the non-native species observed, several are likely present due to their inclusion in revegetation seed mixes. Others, generally found in more populated areas, are common ornamental or agricultural crop species. Many common agricultural and garden weeds were also observed.

4.4.2 Seed Mixes

Prior to the development of an Alaska native seed industry, introduced species were used throughout Alaska for revegetation purposes. Examples observed during this survey include the species *Bromus inermis* (smooth brome), *Phalaris arundinacea* (reed canary grass) *Poa pratensis*



Photo 6. Brome and clover in zone 2

(Kentucky bluegrass) and *Trifolium hybridum* (alsike clover). Clover and brome were spotted fairly consistently from Valdez to Glennallen.

4.4.3 Ornamental and Agricultural Crops

People have often introduced plants with the goals of improving the aesthetics or productivity of land. Unintended escapement of these is common. Some species intended for agricultural production in Alaska that have gone out of favor due to lack of productivity have found a niche along the ROW. The following species were observed during the survey: *Melilotus albus* (white sweet clover), *Melilotus officinalis* (yellow sweet clover), *Medicago falcata* (yellow alfalfa), *Leucanthemum vulgare* (ox-eye daisy), *Alopecurus pratensis* (meadow foxtail), and *Vicia cracca* (bird vetch). Smooth brome, reed canary grass and Kentucky bluegrass may also fit into this category.

4.4.4 Common Garden Weeds

Some non-native plant species are extremely common and are often found virtually anywhere there has been human activity. This survey sighted examples including: *Taraxacum sp.* (dandelion), *Plantago major* (plantain), *Matricaria discoidea* (pineapple weed), *Poa annua* (annual bluegrass), *Crepis tectorum* (narrow leafed hawkbeard), and *Hordeum jubatum* (foxtail barley).

4.4.5 Prioritizing Control Actions

The Alaska Natural Heritage Program has a weed ranking project as part of their “Non-Native Plants of Alaska” program. It ranks the invasiveness of non-native species found in Alaska. These rankings could help prioritize the need for control actions for specific infestations. Appendix G presents the ranking of species known to be present in Alaska as well as species of concern that have not yet been observed.

Determining which species or specific infestations require more intensive management than others is difficult. The ranking system developed by the Alaska Natural Heritage Program is a useful guide, though needs can vary regionally and with different land uses. Other states, including Washington and California, have enacted laws giving authority of noxious plant management to local groups. These weed districts or county weed boards develop priority lists based on local demands. Weed districts initiate control actions on target populations and work with property owners with infestations. They also provide a point of contact between regional ROW managers and local groups interested in weed control. Some of Alaska’s Soil and Water Conservation Districts have developed Cooperative Weed Management Areas. It may be beneficial to utilize groups like this in formulating management priorities for selected species and regions.

5.0 **Desirable ROW Vegetation**

Desirable vegetation conditions observed in the ROW exist in a variety of circumstances. Low overall vegetation height in zones 1 and 2 results when a thick stand of turf grass is established,

the hydrology of the area creates a wetland, or higher elevations slow plant growth. Native wildflowers contribute greatly to the desirable vegetation in the ROW for aesthetic purposes.

5.1 *Established Turf Grasses*

Festuca rubra (red fescue) is one of the most common grass species used for revegetation and turf plantings in Alaska, both historically and currently. The notable varieties include ‘Arctared’ and ‘Boreal’. Established red fescue plantings form a turf that resists invasion of other species. This condition exists at several locations in the survey area. One of the best examples is at the scenic overlook near mile post 88 (Photo 7).



Photo 7. Established red fescue planting at scenic overlook near mile post 88

5.2 *Wetlands*

Wetland conditions exist in zone 2 at many locations observed in the survey. The wetland plants identified in these locations consisted of primarily *Carex* spp. (sedges) and *Juncus* spp. (rushes). These species do not tend to reach an undesirable height. Also, high soil moisture is not conducive to the establishment of the undesirable woody species. Often these conditions are present in conjunction with closed black spruce forests in zone 3. Examples include areas near mile post 92 (Photo 8) and some stretches between Glennallen and the Gulkana River. It must be noted that even when these conditions exist, the fill slope of the road bed is still a well-drained gravel substrate suitable for the establishment of undesirable vegetation.



Photo 8. Wetland area in zone 2 near mile post 92

5.3 *High Elevations*

Plants that occupy alpine areas are generally short and slow growing. This was observed near the summit of Thompson Pass, the southern end of Summit Lake, Isabel Pass, and in the Donnelly Dome area. Several species of willow as well as dwarf birch are common woody species at higher elevations. Observations at these sites indicate a reduced vegetation control requirement. Photo 9 is an example.



Photo 9. Reduced vegetation control demand observed at high elevations

5.4 *Wildflowers*

Native wildflowers are highly desirable in the ROW for their aesthetics and generally short stature (Photo 10). Large populations of many species occupy zones 1 and 2 along the surveyed route. The common species

observed include: *Hedysarum alpinum*, *Oxytropis campestris*, *Oxytropis deflexa*, *Potentilla multifida*, *Dasiphora fruticosa*, *Solidago multiradiata*, *Solidago decumbens*, *Artemisia tilesii*, *Dryas drummondii*, *Lupinus nootkatensis*, *Lupinus arcticus*, *Chamerion latifolium*, *Chamerion angustifolium*, *Aster sibiricus*, *Astragalus robbinsii*, *Astragalus alpinus*, *Achillea millefolium*, *Shepherdia canadensis*, *Castilleja caudata*, *Aruncus dioicus*, *Delphinium glaucum*, *Aconitum delphinifolium*, *Heracleum lanatum*, and *Cnidium cnidiifolium*. Many of these species, especially those in the family *Fabaceae* (Legume), occur naturally on well-drained gravelly soils. They were often found intermixed with alder, cottonwood and willow in zones 1 and 2 of the ROW during this survey (Photo 11).



Photo 10. ROW wildflowers



Photo 11. Desirable and undesirable vegetation intermixed in zones 1 and 2

6.0 Vegetation Control

An IRVM plan should take into account all available vegetation control options which are determined by the long and short term goals of the management agency. Vegetation control tactics include mechanical, chemical, biological, cultural and legal techniques.

6.1 Mechanical Control

Mechanical control refers to the use of physical means to control vegetation. This includes mowing, burning, and cultivation. Mechanical means of vegetation control is the primary mode utilized in Alaska today, mostly through hydro-axing or mowing. Though these methods are effective in controlling vegetation height, they are not sustainable. Most of the undesirable vegetation is not mortally injured by the control effort, thus cyclical treatments must be made in order to maintain the desirable condition. Also, some undesirable species may be unintentionally spread or increased in population density by these activities.

Current mowing activities are not selective in targeting undesirable vegetation. Both wildflowers and non-native species are cut. The timing of mowing is based on the height of existing vegetation rather than when undesirable species are most susceptible to the treatment. Treatment of targeted species at their most vulnerable time is essential if populations are to be reduced in the long term.

Other mechanical means of control potentially suitable for an IRVM include burning and cultivation. Flaming can effectively kill the above ground portions of plants while cultivation disrupts plants roots. Some species may be more susceptible to these treatments than others.

6.2 *Chemical Control*

Chemical control methods involve the use of herbicides. Herbicides have been an integral component of vegetation management since they were invented in the late 1800s. Herbicides have reduced the demand for mechanical weed control in many instances. Active ingredients of herbicides have been developed for both broad-spectrum and selective vegetation control. Selective application methods are also used to target specific populations. “Recent research and development work by Purdue University has led to commercial production of an equipment system which can electronically identify individual weeds within its path and deliver a prescribed targeted application of herbicide in a single pass over the roadside.” (National Cooperative Highway Research Program. Berger, R.L., consultant, 2005).

Many chemicals are suitable for use in controlling woody vegetation. The following are active ingredients of herbicides that are labeled for shrub and tree control: amitrole; bromacil; 2,4-D; dicamba; 2,4-DP; fosamine; glyphosate; hexazinone; imazapyr; metsulfuron; picloram; tebuthiuron; and triclopyr (Howard, S. W. and R. Parker, 1995).

Selecting the proper herbicide is important in achieving the desired results. Narrowing the list to the actual brand and method of application most suitable for a specific circumstance involves the evaluation of many factors including: chemicals registered for use in a given area, the target pest, the timing of the treatment, application method, potential for drift, and proximity to susceptible non-target organisms.

6.3 *Biological Control*

Biological control techniques utilize the natural behavior of living organisms to achieve vegetation control. Examples of biological control techniques range from grazing animals that consume vegetative growth to insects or diseases that infest plants reducing their ability to proliferate. Introduced plant species often do not have natural predators in their new ranges. Introduction of insects or diseases that prey on these plants in their native regions may be suitable for selective control of specific species. This method has been successful with many infestations. Biological control agents suitable for introduced plant species will likely be very different from those appropriate for native vegetation.

6.4 *Cultural Control*

Cultural control employs methods of manipulating the environment to limit the introduction or productivity of undesirable vegetation. Implementing cultural control techniques on Alaska’s ROWs may prove to be effective in reducing the demand for mechanical or chemical treatments. Cultural control should begin in the design phase of transportation infrastructure improvements. Create ROW spaces that are conducive to projected management measures. The time needed to mechanically cut a rough, steep bank is more than what is need for a smooth level surface. Sight preparations utilizing quality top soil will promote establishment and persistence of turf grasses.

Selection of revegetation seed mixes that contain high percentages of varieties that promote the establishment of turf is also essential. Fertility management that optimizes productivity of the revegetation varieties planted should be done at the time of planting and on a regular maintenance schedule. Water management may also be a factor considered in the design criteria though it may be difficult and undesirable to maintain wetland conditions in zones 1 and 2.

Sanitation is a very important aspect of cultural control. Construction and maintenance equipment can transport plant propagules of undesirable species across broad areas. Protocols for cleaning equipment prior to transport are common in the industry for this reason. Materials sites can become infested with undesirable species which are then transported and spread across construction projects. Controlling infestations within gravel pits can stop infestations before they become established in the ROW. Select sources of seed and other organic materials, such as straw, used in construction projects that are free of undesirable weed seed or plant parts. Handle and dispose of contaminated materials properly so that they are not spread. Some plants can reproduce from very small plant parts or have seed that is highly mobile. Understanding the life processes of the targeted undesirable plants provides a scientific basis for establishing best management practices for individual species.

Weed barriers may be a useful cultural control method for certain circumstances. Barriers function by creating an impenetrable layer through which plants cannot grow. Many products are available for beneath guard rails and other roadside hardware.

6.5 *Legal Control*

Legal control methods include laws and regulations that aim to prevent the introduction and spread of noxious plant material. As discussed previously, many states have implemented noxious weed laws to address local and regional needs. Alaska Seed Regulations are part of a certification program designed to protect consumers of agricultural seed and limit the spread of undesirable plant material. They standardize noxious weed seed testing and labeling requirements. Other legal tactics that may be implemented include quarantines, containment, eradication and prohibition.

7.0 *Conclusions and Suggested Research*

Plant populations observed in this survey are highly diverse and vary due to geographic location, elevation, soil type, slope aspect, and proximity to population centers. Undesirable woody vegetation occupying zones 1 and 2 appears to be rather consistent along the route except where elevation, wetlands, or established turf grasses dictate species composition. Non-native plants are intermixed with native invasive species in these zones with higher concentrations observed near population centers.

Mechanical vegetation control is the primary method utilized in Alaska today with the emphasis on controlling vegetation height. An integrated program that incorporates multiple control strategies for target populations and scenarios that promote the long-term establishment of desirable vegetation should reduce maintenance demands over time.

Weed science is dynamic and adapts to changes in technology, target pests, desired outcome, and economics. Individuals and agencies involved in vegetation management need to be informed about current issues. Species of concern can change over time and advances in plant taxonomy can alter the nativity determination of some species. In the last few years a few species have been removed from non-native lists.

Goals of vegetation management, including target species and populations, vary regionally and within individual localities. Many states have adopted noxious weed laws that give jurisdiction over the control of weeds to local agencies. These weed districts work with property owners and land managers to develop and implement control efforts. Cooperative weed management areas developed by some of Alaska's Soil and Water Conservation Districts are currently attempting to prioritize and implement control efforts on a local level.

Pesticides registered for use in Alaska are available and are a key component to vegetation management nationally; however, other states are trying to decrease pesticide use in ROWs. In 1992, the California Department of Transportation "adopted an integrated vegetation management program and set goals for reduction of chemical use: a 50% reduction by 2000 and an 80% reduction by 2012" (California Department of Transportation, 1997). Much of this change is due to public concerns about environmental quality. This same concern is also present in Alaska; consequently, the incorporation of advances in cultural, biological, and mechanical control methods developed in other states would be beneficial. Alaska's highway ROWs, currently pesticide-free, may be a good testing ground for sustainable "organic" vegetation management practices.

Biological control agents may be able to reduce populations of non-native plant species; however, their introduction must be carefully evaluated. For example, in Ohio "the native sweet-clover weevil can help control white and yellow sweet-clover if the weevil is present in high concentrations. Unfortunately, this is not a reliable form of control" (Ohio Department of Natural Resources, Division of Natural Areas & Preserves, 2005). Research and testing of potential predatory agents should be undertaken to determine their suitability for Alaska.

Additional surveys of other ROW corridors in the state are essential for developing an understanding of the overall scope of vegetation management issues. It may be possible to classify vegetation or identify undesirable plant populations on a large scale through analysis of satellite or aerial imagery.

Maintenance personnel should be trained in identification of undesirable species and in the general practices that reduce their spread. A method of documenting occurrences and control actions should be implemented so that the effectiveness of treatments can be evaluated. It may be beneficial to contain infestations of targeted species within existing boundaries once these are known. Prohibiting an infestation from occurring is easier than removing it once it is established.

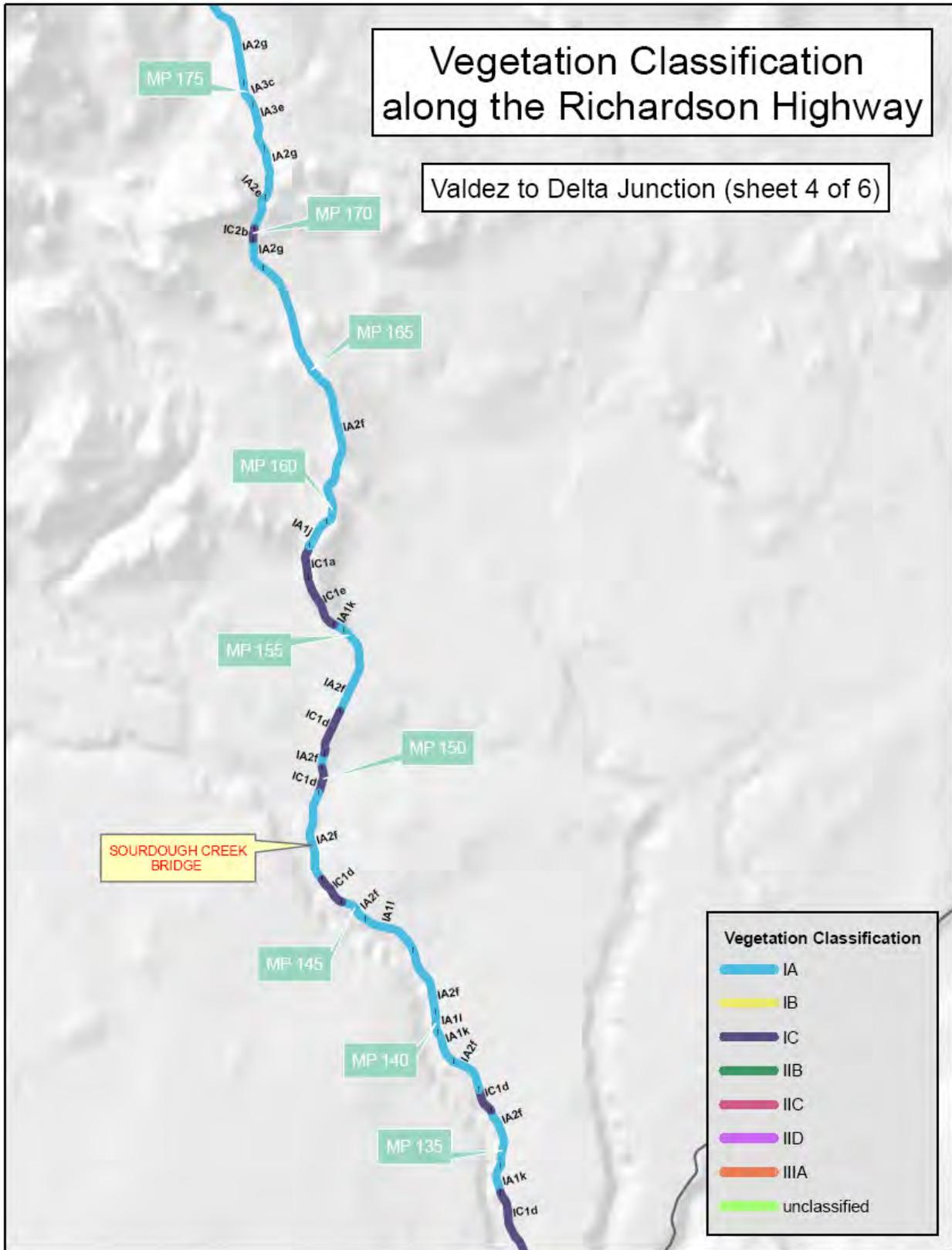
Best management practices for specific conditions and target species should be developed. Examples of best management practices for the common tall woody species and white sweet clover are presented in appendices H and I.

8.0 References

- Alaska Natural Heritage Program. 2005. *Non-Native Plants of Alaska*. Web page. <http://akweeds.uaa.alaska.edu/>
- California Department of Transportation. 1997. *California Roadsides – A New Perspective*. Web page. <http://www.dot.ca.gov/hq/maint/history.pdf>
- Heiligmann, R. B. and D. Krause. 2006. *Relative Effectiveness of Herbicides Commonly Used to Control Woody Vegetation in Forest Stands*. Ohio State University Extension Fact Sheet F-51-06. Ohio State Extension Web. <http://ohioline.osu.edu/for-fact/0051.html>
- Howard, S. W. and R. Parker. 1995. *Chemical Control for Woody Plants, Stumps, and Trees*. Washington State University Extension, EB1551. <http://cru.cahe.wsu.edu/CEPublications/eb1551/eb1551.html>
- National Cooperative Highway Research Program. Berger, R.L., consultant. 2005. *NCHRP Synthesis 341: Integrated Roadside Vegetation Management*. 62 p.
- Nature Conservancy, The. *TNC's Weed Information Management System (WIMS)*. Web page. <http://tncweeds.ucdavis.edu/products/wims/downloads/docs/overview.pdf>
- North American Weed Management Association. 2006. Web page. <http://www.nawma.org>
- Ohio Department of Natural Resources, Division of Natural Areas & Preserves. 2005. *White and Yellow Sweet-clover – Invasive Plants of Ohio Fact Sheet 16*. Web page. <http://www.dnr.state.oh.us/dnap/invasive/16clover.htm>
- U.S. Geological Survey, Northern Prairie Wildlife Research Center. 2006. *Species Abstracts of Highly Disruptive Exotic Plants at Scotts Bluff National Monument – Melilotus spp.* Web page. <http://www.npwrc.usgs.gov/resource/plants/exoticab/scotmeli.htm>
- Viereck, L.A.; Dyrness, C.T.; Batten, A.R.; Wenzlick, K.J. 1992. *The Alaska Vegetation Classification*. Gen. Tech. Rep. PNW-GTR-286. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 278 p. <http://www.treearch.fs.fed.us/pubs/6941>
- Washington State Department of Transportation, Maintenance and Operations. 2006. *Maintenance Manual M51-01*. 363p. <http://www.wsdot.wa.gov/fasc/EngineeringPublications/Manuals/MaintenanceManual.pdf>

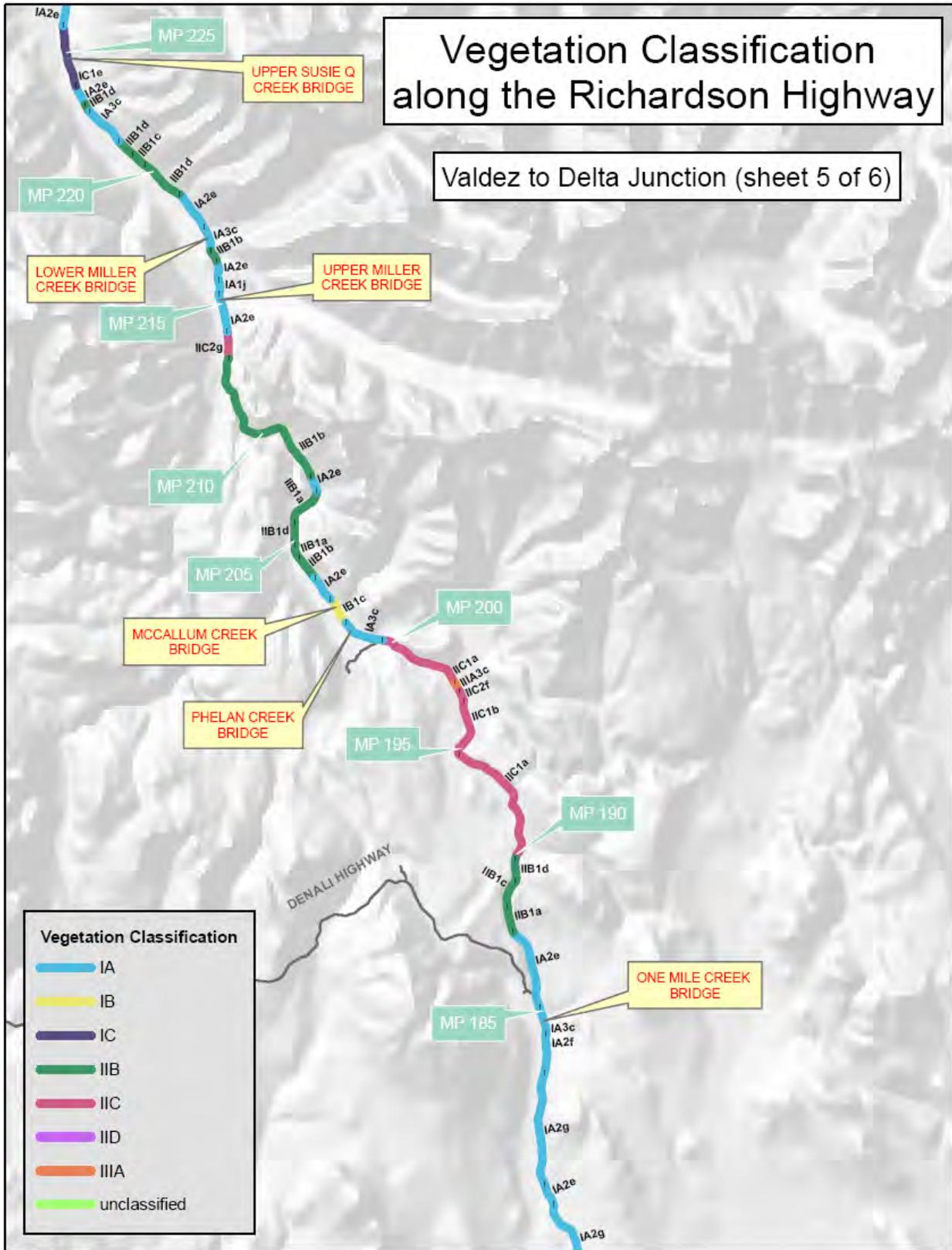
Vegetation Classification along the Richardson Highway

Valdez to Delta Junction (sheet 4 of 6)



Vegetation Classification along the Richardson Highway

Valdez to Delta Junction (sheet 5 of 6)



Vegetation Classification along the Richardson Highway

Valdez to Delta Junction (sheet 6 of 6)



Appendix B. Vegetation Survey Data

<u>Milepoint</u>	<u>Side</u>	<u>Description</u>	<u>Vegetation Classification</u>	<u>Non Native Plants Observed</u>	<u>Field Notes</u>
363.839	R	GAFFNEY ROAD (WAINWRIGHT MAIN GATE) FBK			
0	B	MEALS AVENUE * VALDEZ			
0.003	H	EGAN DRIVE * VALDEZ		TRHY	
0.003	B	***BEG SURFACE TYPE: PAVED ***		TRHY	
0.003	B	***BEG MEDIAN: NONE***		TRHY	
0.003	B	***BEG TRAFFIC:TWO- WAY***		TRHY	
0.003	B	***BEG NUMBER OF LANES:2***		TRHY	
0.097	R	TOTEM INN RESTAURANT		TRHY	
0.145	R	CHITINA AVENUE * VALDEZ		TRHY	
0.228	L	PIONEER DR		TRHY, LEVU	
0.228	R	BAYSIDE RV PARK		TRHY, LEVU	
0.331	R	ANIMAL SHELTER ENT		TRHY, LEVU	
0.527	L	VALDEZ DOT MAINT ENT		TRHY, LEVU	
0.636	L	BEG BIKE PATH	IIIA1a		
0.852	L	CROOKED CREEK TURNOUT BEG	IIIA3h		
0.938	L	CROOKED CREEK TURNOUT END	IIIA3h		East side=grass to ditch. Halophytic graminoid estuary beyond
1.919	R	TURN OUT	IIIA3h		
2.103	B	END TIDE FLATS	IIIA3h		Entering open cottonwood/alder forest. Roadsides mowed.
2.202	R	MINERAL CREEK	IB2c		

<u>Milepoint</u>	<u>Side</u>	<u>Description</u>	<u>Vegetation Classification</u>	<u>Non Native Plants Observed</u>	<u>Field Notes</u>
		LOOP * VALDEZ			
2.429	R	CHURCH OF THE NAZARENE	IB2c		
2.998	R	NO NAME RD	IB2c		
3.123	R	NO NAME RD	IB2c		
3.164	L	ALLEUTIAN TRAIL PARK	IB2c		
3.359	R	ACRES KWIK TRIP	IB2c		
3.421	L	MINERAL CREEK LOOP * VALDEZ	IB2c		
3.421	R	VALDEZ AIRPORT ROAD * VALDEZ	IB2c		
3.643	R	S. SAWMILL RD	IC1e		
3.97	R	OLD VALDEZ TOWN ENT	IC1e		
3.97	R	ALASKA AVENUE * VALDEZ	IC1e		
4.135	R	TEXACO BIG WHEEL ENT	IC1e		
4.526	L	LANDFILL HAUL ROAD * VALDEZ	IC1e		
4.805	A	VALDEZ GLACIER STREAM 0556	IB2c		Cottonwood dominant. Dense alder understory.
4.852	A	VALDEZ GLACER STREAM 0556	IB2c		
4.928	R	MILEPOST 1	IB2c		
5.343	L	TRAP SHOOTING CLUB ENT	IB2c		
5.539	R	EARLY VALDEZ CEMETERY RD	IC1e		
5.659	L	VALDEZ BAPTIST CHURCH	IC1e		
5.672	L	WOOD WAY	IC1e		
5.918	R	MILEPOST 2	IC1e		
6.157	L	DYLEN DRIVE * VALDEZ	IC1e		
6.257	L	TURN OUT	IA2a		
6.4	R	CEMETERY	IA2a		Large Sitka spruce w/ Heracleum, Salix & herbaceous

<u>Milepoint</u>	<u>Side</u>	<u>Description</u>	<u>Vegetation Classification</u>	<u>Non Native Plants Observed</u>	<u>Field Notes</u>
6.572	L	RIVER DR	IA2a		
6.729	R	DAYVILLE ROAD * VALDEZ	IA2a		
6.786	R	SCALE HOUSE ENT	IA2a		
6.838	R	SCALE HOUSE VALDEZ	IA2a		
6.887	R	SCALE HOUSE EXIT	IA2a		
6.917	R	MILEPOST 3	IA2a		
7.21	L	ROBE LAKE ROAD * VALDEZ	IA2a		
7.906	R	MILEPOST 4	IA2a		
7.996	R	TURN OUT	IA2a		
8.924	R	MILEPOST 5	IIB1d		
9.106	R	NO NAME RD	IIB1d		
9.855	R	MILEPOST 6	IIB1d	TRHY	Alsike clover-east side of road
9.855	L	NO NAME RD	IIB1d		
10.284	L	CORBIN LOOP DR	IIB1d		
10.484	R	NO NAME RD	IB1c		
10.854	R	MILEPOST 7	IB1c		Closed large cottonwood forest/alder
11.174	L	DEEP LAKE DR	IA2a		East=Lowe R.& alders by rd. West(cliff)= sitka spruce, alders, willow
12.654	R	MILEPOST 9	IA1a		West= dense closed Lutz or Sitka sp. East= more open.
13.274	L	FIRE STATION	IA1a		
13.446	R	WHISPERING SPRUCE DRIVE * VALDEZ	IA1a		
13.599	R	MILEPOST 10	IA1a		Continue dense spruce. Dense alder along roadside.
13.803	R	CHALET DRIVE * VALDEZ	IA2a		
13.915	R	NORDIC DRIVE * VALDEZ	IA2a		

<u>Milepoint</u>	<u>Side</u>	<u>Description</u>	<u>Vegetation Classification</u>	<u>Non Native Plants Observed</u>	<u>Field Notes</u>
14.119	L	GILPATRICKS GREENHOUSE	IA2a		
15.162	R	NO NAME RD	IA2a		MP11: spruce transitioning to cottonwood/alder forest
15.358	R	TURN OUT	IB2c		Initial id of common willow= Salix commutata
15.395	R	PIPELINE RD 4APL-1	IB2c		
15.628	L	NO NAME RD	IB2c		
15.843	R	MILEPOST 12	IB2c	BRINI	
16.338	L	NO NAME RD	IB2c		
16.759	A	ENTER KEYSTONE CANYON	IIB1d		
16.963	L	MILEPOST 13	IIB1d		Alder & cottonwood on cliffsides
17.446	L	HORSETAIL FALLS	IIB1d	BRINI, PLMA2	Few cottonwood, mostly alder/willow w/ Aruncus, Fescue, Plantago,
17.446	R	TURN OUT	IIB1d		Achillea, Calamagrostis, & much brome along rd.
17.75	L	TURN OUT	IIB1d		Oplopanax under alders. Roadsides not overgrown w/ willow/alder.
17.789	R	BRIDAL VEIL FALLS	IIB1d		
18.012	L	MILEPOST 14	IIB1d		
18.724	A	LOWER LOWE RIVER 0557	IIB1d		
18.811	A	LOWER LOWE RIVER 0557	IIB1d		
18.821	R	MILEPOST 15	IIB1d		More spruce on hillsides now.
19.186	R	HORSE & SLED TRAIL SCENIC	IIB1d		
19.216	A	LOWE RIV @ LOWER KEYSTONE 1383	IIB1d		

<u>Milepoint</u>	<u>Side</u>	<u>Description</u>	<u>Vegetation Classification</u>	<u>Non Native Plants Observed</u>	<u>Field Notes</u>
19.284	A	LOWE RIV @ UPPER KEYSTONE 1384	IIB1d		
19.89	R	MILEPOST 16	IIB1d		
20.208	A	LOWE RIVER UPPER CROSS 0558	IC1e		
20.3	A	LOWE RIVER UPPER 0558	IC1e		
20.424	R	KEYSTONE RAFT & KAYAK	IC1e		Closed cottonwood/spruce w/ alder/willow
20.76	R	NO NAME RD	IC1e		
20.895	R	MILEPOST 17	IC1e		
21.64	R	PIPELINE RD 5ACC-1	IC1e	TRHY	
21.834	B	TURN OUT	IB1c		Yellow composite (Arnica?) Plentiful in ditch.
22.042	R	GRAVEL PIT	IA2a		
22.431	A	SHEEP CREEK 0559	IA2a		
22.463	A	SHEEP CREEK 0559	IA2a		
22.543	B	***BEG NUMBER OF LANES 3***	IA2a		
22.652	R	PIPELINE RD 5APL/AMS-6	IC1b		
22.746	R	MILEPOST 19	IIB1d		
23.771	R	MILEPOST 20	IIB1d		
25.335	R	TURN OUT	IIB1d		Dense alder "hedge" along roadside & guardrails. A few Populus. Alsike clover. West= wetlands w/Eriophorum.
25.766	R	MILEPOST 22	IIB1d		
27.148	R	TURN OUT	IIB1d		
27.35	L	NO NAME RD	IIB1d		
27.563	R	TURN OUT	IIB2d		Guardrails encroached by

<u>Milepoint</u>	<u>Side</u>	<u>Description</u>	<u>Vegetation Classification</u>	<u>Non Native Plants Observed</u>	<u>Field Notes</u>
					alder & some willow
27.739	R	MILEPOST 24	IIB2d		
27.921	R	BLUEBERRY LAKE ROAD	IIC2g		Low scrub + some taller scrub - herbaceous between
28.785	R	MILEPOST 25	IIC2g	POPR	Almost alpine tundra - still some scattered alder & willow
29.261	L	TURN OUT	IIC2g		
29.487	L	TURN OUT	IIC2g		
29.848	A	ENTER THOMPSON PASS	IIC2g		
29.848	B	***BEG NUMBER OF LANES 2***	IIC2g		
29.848	L	PIPELINE RD GAPL-1D	IIC2c		
30.813	L	THOMPSON PASS MAINT STN	IIC2c		
31.619	R	TURN OUT	IIC2g		Willow scrub & tundra
32.075	R	MILEPOST 28	IIC2g		
33.111	L	WORTHINGTON GLACIER ROAD	IID1a		Slopes w/ tundra & low scrub w/ some tall scrub & cottonwood
33.481	R	MILEPOST 29	IIB1d		
33.886	L	PIPELINE RD GAPL-5	IIB1d		
34.431	R	MILEPOST 30	IIB1d		
34.584	L	TURN OUT	IIB2d		
36.328	R	MILEPOST 32	IIB2d	HOJU	
37.506	L	PIPELINE RD 7APL-2	IIB1d		
38.322	R	MILEPOST 34	IIB1d		Cottonwoods larger; few stunted spruces; scrub slopes, Dryas by road.
38.843	R	TSAINA LODGE ENT	IA2e		

<u>Milepoint</u>	<u>Side</u>	<u>Description</u>	<u>Vegetation Classification</u>	<u>Non Native Plants Observed</u>	<u>Field Notes</u>
38.91	R	TSAINA LODGE ENT	IA2e		
40.092	R	MILEPOST 36	IA2e	TRHY	
40.979	R	NO NAME PIPELINE RD	IA2e		
41.089	R	MILEPOST 37	IC1e		
41.356	B	TURN OUT	IC1e	CRTE3	
41.415	A	TSAINA RIVER 0564	IC1e		
41.454	A	TSAINA RIVER 0564	IC1e		
42.091	R	MILEPOST 38	IC1e	ALPR3	
43.089	R	MILEPOST 39	IC1e		
44.723	R	PIPELINE RD 8-APL-2	IB2c	PHAR3	Noted one plant of reed canarygrass
44.873	L	TURN OUT	IB2c		
45.308	R	MILEPOST 41	IB2c		
46.433	L	PIPELINE RD 9APL-2	IC1d		
46.956	R	MILEPOST 43	IC1e		
47.287	L	REST AREA BEGIN	IC1d		
47.641	L	NO NAME PIPELINE RD	IC1d		MP 44: Start of aspen
48.584	B	BEGIN DWELL	IC1d		
48.585	B	END DWELL	IC1d		
49.286	R	MILEPOST 45	IB1e		
49.777	A	STUART CREEK 0565	IB1e		
49.794	A	STUART CREEK 0565	IB1e		
49.93	L	CAPTAIN BILLY TAVERN & LODGE	IB1e		
50.189	R	MILEPOST 46	IB1e		
50.626	R	PIPELINE ROAD 9APL/AMS4	IB1e		More cottonwood & birch on east side. West: aspen
51.032	A	TIEKEL RIVER BRIDGE 1221	IC1e		

<u>Milepoint</u>	<u>Side</u>	<u>Description</u>	<u>Vegetation Classification</u>	<u>Non Native Plants Observed</u>	<u>Field Notes</u>
51.056	A	TIEKEL RIVER 1221	IC1e		West: tall cottonwood. East: cottonwood/white spruce/aspen
51.177	R	MILEPOST 47	IC1e		
51.915	R	NO NAME PIPELINE RD	IC1e		
51.986	R	BILLY MITCHELL MTN HISTOR	IC1e		Lodgepole pine planted at historical site.
52.188	R	MILEPOST 48	IB1c		IB2c alongside river
53.186	R	MILEPOST 49	IB1c		Tall cottonwood closed forest w/ birch & alder beside road
54.2	R	MILEPOST 50	IB1c	CRTE3, POPR	A few wh. spruce w/ birch & willow. Cottonwood regrowth in ROW.
54.861	A	TIEKEL RIVER BRIDGE 1222	IB1c		
54.922	A	TIEKEL RIVER 1222	IB1c		
55.22	R	MILEPOST 51	IB1e		Moving to closed aspen forest.
55.905	L	PIPELINE ROAD 10APL 3	IB1e		Aspen with a few cottonwood, spruce & birch.
56.186	R	MILEPOST 52	IB1e		
57.135	R	MILEPOST 53	IB1e		
58.12	R	MILEPOST 54	IB1c	MADI6	Closed cottonwood. Some aspen on upper slopes. Matricaria in ROW

<u>Milepoint</u>	<u>Side</u>	<u>Description</u>	<u>Vegetation Classification</u>	<u>Non Native Plants Observed</u>	<u>Field Notes</u>
58.301	L	PIPELINE ROAD 11APL-1	IB1c		
59.102	R	MILEPOST 55	IC1d		
59.205	R	TURN OUT	IC1d		
59.943	R	TIEKEL RIVER LODGE	IC1d	ALPR3	
60.087	R	MILEPOST 56	IC1d		
60.319	R	TURN OUT	IC1d		
61.07	R	MILEPOST 57	IB1c		
61.07	L		IB1c		
61.834	L	PIPELINE ROAD 12APL-1	IB1c		
62.059	R	MILEPOST 58	IC1e		
63.04	R	MILEPOST 59	IC1e		MP 59-60 East: rip-rap by river w/ willow & cottonwood
64.866	B	BEGIN DWELL	IC1d	CRTE3	
64.867	B	END DWELL	IC1d		
64.994	R	MILEPOST 61	IC1d		
65.774	R	GRAVEL PIT	IC1d		
65.992	R	MILEPOST 62	IC1d		
66.054	L	ERNESTINE DOT MAINT ENT	IC1d		
66.978	R	MILEPOST 63	IA1l		Castilleja in ROW. Alder scarcer. Still have willow & cottonwood.
67.986	R	MILEPOST 64	IA1l		West: beetle-killed spruce.
68.664	R	PUMP STATION #12	IA1k		
68.75	L	PIPELINE VIEW RD	IA1l		
68.95	R	MILEPOST 65	IA1l		
69.951	R	MILEPOST 66	IA1l		Mix of wh/blk spruce varies with soil type. Cottonwood & aspen present.
70.864	R	MILEPOST 67	IB2c		
70.864	L		IA1l		
71.966	R	MILEPOST 68	IB2c		

<u>Milepoint</u>	<u>Side</u>	<u>Description</u>	<u>Vegetation Classification</u>	<u>Non Native Plants Observed</u>	<u>Field Notes</u>
73.728	R	MILEPOST 70	IB1e		Closed aspen w/ spruce & cottonwood. Willow encroaching ROW.
74.713	R	MILEPOST 71	IC1d		Moving to blk. spruce w/ aspen, cottonwood & willow
75.537	L	BUREAU OF LAND MANAGEMENT TURNOUT	IC1d		
75.651	R	TURN OUT	IB1e		
76.621	R	MILEPOST 73	IA2f	BRINI, CRTE3	Hawksbeard in ROW prior to MP 73
76.833	R	GRAVEL PIT	IC1d		
77.529	R	MILEPOST 74	IC1d		
77.911	L	TURN OUT	IC1d		
78.092	L	TURN OUT	IC1d		
78.946	R	MILEPOST 75	IC1e		IA1l on west side. Riparian cottonwood/willow on east. Solidago in ROW.
79.946	R	MILEPOST 76	IC1d		
80.916	R	MILEPOST 77	IC1d		Open alder scrub in wet area by edge of clearing
81.816	R	MILEPOST 78	IC1d		
82.839	R	MILEPOST 79	IC1d		
82.919	R	TOSINA RIVER LODGE	IC1d		
83.06	A	TONSINA RIVER 0569	IC1d		
83.074	A	TONSINA RIVER 0569	IC1d		

<u>Milepoint</u>	<u>Side</u>	<u>Description</u>	<u>Vegetation Classification</u>	<u>Non Native Plants Observed</u>	<u>Field Notes</u>
83.353	L	SQUIRREL CREEK STORE	IC1d		Hillsides closed aspen forest. East: Riparian w/ willow, cottonwood
83.378	R	SQUIRREL CREEK CMPGRND EN	IC1d		Wh. spruce, aspen
83.412	A	SQUIRREL CREEK 0570	IC1d		
83.426	A	SQUIRREL CREEK 0570	IC1d	MEOF	
83.528	B	***BEG NUMBER OF LANES 3***	IC1d		
83.844	R	MILEPOST 80	IC1d		
84.857	B	***BEG NUMBER OF LANES 2***	IC1d		
84.9	L	TESORO	IA1I	CRTE3, BRINI, ALPR3, HOJU	
84.945	R	MILEPOST 81	IA1I	TRHY, MEOF	
84.983	L	ALASKAN HOUSE ENT	IA1I		
85.881	L	PIPELINE ROAD 16APL-1	IC2b		
85.881	R	MILEPOST 82	IC2b		
86.474	R	EDGERTON HWY/MCCARTHY RD	IA1I	LEVU	
87.391	L	PIPELINE ROAD 16APL-3	IA2f		
87.851	R	MILEPOST 84	IA2f		
88.276	L	ALASKA HOMEMADE KNIVES	IA2f		
88.859	R	MILEPOST 85	IA2f		
89.619	L	NO NAME PIPELINE RD	IA2f		
89.823	R	MILEPOST 86	IA2f		Vigorous red fescue in ROW.
89.961	L	PIPELINE ROAD	IA2f		

<u>Milepoint</u>	<u>Side</u>	<u>Description</u>	<u>Vegetation Classification</u>	<u>Non Native Plants Observed</u>	<u>Field Notes</u>
		17APL-3			
90.923	R	MILEPOST 87	IA2f	CRTE3	
91.56	R	SCENIC OVERLOOK ENT	IA2f	POPR	Red fescue well established in ROW
91.56	L		IC2a		
91.654	R	SCENIC OVERLOOK EXIT	IA2f		
92.464	L	PIPELINE ROAD	IC2b		
92.913	R	MILEPOST 89	IC2b	MEAL12, MESAF, BRINI, MADI6, HOJU	Brome in ROW w/ willow & cottonwood encroaching. Solidago.
93.916	R	MILEPOST 90	IC2b		
94.146	L	PIPELINE ROAD	IC2b		
94.868	R	MILEPOST 91	IC2b	MEAL12	
94.952	R	OLD EDGERTON LOOP ROAD	IA2g		
95.899	R	MILEPOST 92	IA2g	BRINI, MEAL12, ALPR3	
96.07	B	NO NAME PIPELINE RD	IA1i		
96.598	L	GRIZZLY PIZZA & GIFT SHOP	IC2b		
96.624	L	GRIZZLY PIZZA & GIFT SHOP	IC2b		
96.623	L	FILLING STATION	IC2b		
96.848	R	MILEPOST 93	IC2b	HOJU	Wht. spruce/aspen w/ willow
97.842	L	NO NAME RD	IC2b		
98.666	R	MILEPOST 95	IC2b		Wet areas w/ sedges ROW
99.945	R	MILEPOST 96	IC2b		Willows encroaching ROW
102.795	R	NO NAME RD	IA2f		
103	R	MILEPOST 99	IA1j		
103.563	L	TURN OUT	IA2f		

<u>Milepoint</u>	<u>Side</u>	<u>Description</u>	<u>Vegetation Classification</u>	<u>Non Native Plants Observed</u>	<u>Field Notes</u>
103.996	R	MILEPOST 100	IC1d		
104.227	R	OLD RICH @ COPPER CENTER	IC1d		
104.915	A	KLUTINA RIVER 1746	IC1d		
104.97	L	NO NAME PIPELINE RD	IC1d		
104.97	A	KLUTINA RIVER 1746	IC1d		
105.46	R	GRAVEL PIT	IC1d		
105.46	R	BRENNICK-CRAIG RD	IC1d		
105.46	L	COPPER RIVER PRINCESS LODGE	IC1d		
105.716	R	MILEPOST 102	IC1d		
106.578	R	MILEPOST 103	IC1d		
107.44	R	MILEPOST 104	IC1d		
108.345	L	NO NAME RD	IC1c		
108.466	R	NO NAME RD	IA2g		
109.16	R	MILEPOST 106	IA2g		
109.316	R	NO NAME RD	IA2g		
109.811	R	NO NAME RD	IA1I	HOJU	
110.993	R	MILEPOST 108	IA1j		
111.758	R	MILEPOST 109	IA1j	CRTE3	Aspen on edges of closed white spruce
112.754	L	NO NAME PIPELINE RD	IA2g		Patches of Elaeagnus in ROW w/ HOJU
112.754	R	55 LUEBECKE RD	IA2g		
113.168	L	TAZLINA RV PARK ENT	IA1I	CRTE3, BRINI, HOJU	
113.341	R	ROADSIDE REST AREA	IA1I		
113.442	A	TAZLINA RIVER 0573	IA1I		
113.532	A	TAZLINA RIVER 0573	IA1I		
113.657	R	SCHOOL ROAD * COPPER CENTER	IA1I		
113.749	R	MILEPOST 111	IA1I		

<u>Milepoint</u>	<u>Side</u>	<u>Description</u>	<u>Vegetation Classification</u>	<u>Non Native Plants Observed</u>	<u>Field Notes</u>
113.813	R	CHEVRON FILLING STATION	IA1I		
113.812	R	TAZLINA TRUE VALUE HARDWARE	IA1I		
113.924	R	CHEVRON ENT	IA1I		
114.09	R	TAZLINA TERRACE * COPPER CENTER	IA1I		
114.494	R	GRAVEL PIT	IA1I		
114.525	R	FIRESTATION	IA1I		
114.54	R	COPPERVILLE ROAD	IA1I		
114.786	R	MILEPOST 112	IA1j		
115.371	R	TRANS DEVELOP HIST MARKER	IA1j		MP 113: Encroaching willow in ROW w/ grasses & forbs.
116.762	R	MILEPOST 114	IA1I	MEAL12	
117.616	L	GLENN HIGHWAY	IA2g		
117.698	L	HUB OF ALASKA/TESORO	IA2g		
117.768	R	MILEPOST 115	IA2f	HOJU	Willows encroaching ROW
118.103	L	ACE HARDWARE	IA1I		
118.205	L	TRAILSIDE GRILL ENT	IA1I		
118.245	L	GLENNALLEN QUICK STOP ENT	IA1I		
118.782	R	MILEPOST 116	IA1I		
118.913	R	ARTWORKS ENT	IA2f		
119.403	R	BUSH BOTTLE INN	IA2f		
119.688	L	MBC AUTO	IA1I		
119.806	R	MILEPOST 117	IA1I		
120.796	L	DRY CREEK CAMPGROUND	IA1I	MEAL12	
120.816	R	MILEPOST 118	IA1I		
120.927	R	GULKANA AIRFIELD ROAD	IIB2a		
121.099	R	NO NAME RD	IIB2a		
121.279	R	HIGHWAY MAINTENANCE STATION	IIB2a	BRINI	Dominant willow = S. bebbiana
121.517	R	NO NAME RD	IIB2a		

<u>Milepoint</u>	<u>Side</u>	<u>Description</u>	<u>Vegetation Classification</u>	<u>Non Native Plants Observed</u>	<u>Field Notes</u>
121.67	L	PIPELINE ROAD 22APL-1	IA1I		
121.815	R	OMS 22-1 PIPELINE RD	IA1I		
121.857	R	MILEPOST 119	IA1I		
122.856	R	MILEPOST 120	IB1e		
123.86	R	MILEPOST 121	IC1d		
124.749	L	LANDFILL	IC1d		
124.901	R	MILEPOST 122	IC1d	MEAL12	
125.95	R	MILEPOST 123	IA1I		
126.967	R	MILEPOST 124	IA1k	MEAL12	
128.02	R	MILEPOST 125	IA1k	MEAL12	
128.976	L	TURN OUT ENTCE 1	IA1I	MEAL12	
129.038	R	MILEPOST 126	IA1I	MEAL12	
129.275	B	GRAVEL PIT	IA1I	MEAL12	
129.473	L	NO NAME PIPELINE RD	IA1I	MEAL12	
129.551	R	NO NAME RD	IA1I	MEAL12	
129.834	A	GULKANA RIVER 0574	IA1I	VICRC	
129.9	A	GULKANA RIVER 0574	IA1I	MEAL12	
129.989	R	SECOND STREET WEST * GULKANA	IA1I	MEAL12	
130.039	R	MILEPOST 127	IA2f	MEAL12	
130.287	B	GULKANA RIVER ACCESS RD	IA2f	MEAL12	
130.911	L	GULKANA RIVER RANCH	IA2f	MEAL12	
130.941	L	MOTASKA LOG CROSSING	IA2f	MEAL12	
131.033	R	MILEPOST 128	IA2f	MEAL12	
131.501	L	LINE CAMP TEXACO ENT	IA2f	MEAL12	
131.622	R	HISTORICAL TURNOUT	IA2f	MEAL12	
131.634	R	TOK CUTOFF HIGHWAY	IA2f	MEAL12	
131.994	R	MILEPOST 129	IA2f	CRTE3, TRHY	
132.372	B	RIVER ACCESS RD	IA2f		Heavy red fescue seeding along ROW

<u>Milepoint</u>	<u>Side</u>	<u>Description</u>	<u>Vegetation Classification</u>	<u>Non Native Plants Observed</u>	<u>Field Notes</u>
132.985	R	MILEPOST 130	IA2f		MP 130-150: Scattered pond & bogs w/ wetland grass/sedge
133.027	L	TURN OUT	IC1d		
133.959	R	MILEPOST 131	IC1d		
135.09	L	ROADSIDE REST AREA	IC1d		
135.107	L	ROADSIDE REST AREA	IC1d		
135.939	R	MILEPOST 133	IC1d		
136.104	R	ROAD TO COMM TOWER	IC1d		
136.889	R	MILEPOST 134	IA1k	CRTE3	
137.922	R	MILEPOST 135	IA2f	MEAL12	
138.726	R	SCENIC SITE	IA2f		
138.964	R	MILEPOST 136	IA2f		
138.964	L		IA1j		
139.715	L	GULKANA TRAIL HEAD	IC1d	CRTE3	
139.924	R	MILEPOST 137	IC1d		
140.35	L	NO NAME RD	IA2f		
140.923	R	MILEPOST 138	IA2f		
141.015	L	NO NAME RD	IA2f		
141.921	R	MILEPOST 139	IA1k		
142.296	L	TURN OUT	IA1k	TRHY	
142.9	R	MILEPOST 140	IA1l		
143.542	R	TURN OUT	IA2f	CRTE3	
143.542	L		IB1e		
143.915	R	MILEPOST 141	IA2f		
144.248	L	REST AREA ENT	IA2f		
144.345	L	REST AREA ENT	IA2f		
144.945	R	MILEPOST 142	IA2f	TRHY	
145.933	R	MILEPOST 143	IA1l		
146.873	R	MILEPOST 144	IA1l		
147.918	R	MILEPOST 145	IA2f	TRHY	
148.867	R	MILEPOST 146	IC1d		West: pond & wetland
149.895	R	MILEPOST 147	IA2f		
149.911	L	REST AREA ENT	IA2f		
149.986	L	REST AREA ENT	IA2f		
150.358	L	APL AMS 2	IA2f		

<u>Milepoint</u>	<u>Side</u>	<u>Description</u>	<u>Vegetation Classification</u>	<u>Non Native Plants Observed</u>	<u>Field Notes</u>
150.484	L	SOURDOUGH CAMPGROUND	IA2f	BRINI, TRHY	
150.574	A	SOURDOUGH CREEK 0575	IA2f		
150.591	A	SOURDOUGH CREEK 0575	IA2f		
150.645	L	SOURDOUGH ROADHOUSE ENT	IA2f		
150.888	R	MILEPOST 148	IA2f		West: large pond & wetland
151.136	L	PIPELINE RD APL-3	IA2f		
151.824	R	MILEPOST 149	IA2f		Willows encroaching ROW
152.819	R	MILEPOST 150	IC1d		
153.529	R	TURN OUT	IA2f	CRTE3, HOJU	
153.529	L		IC1d		
153.808	R	MILEPOST 151	IC1d		
154.67	R	MILEPOST 152	IC1d		
154.703	B	BEGIN DWELL	IC1d		
154.704	B	END DWELL	IC1d		
155.593	R	MILEPOST 153	IA2f		
156.875	R	MILEPOST 154	IA2f		
157.881	R	MILEPOST 155	IA2f		
157.957	L	ROAD TO 27 APL/AMR-3	IA2f		
158.133	R	PIPELINE RD 27 AMS 4	IA1k		
158.821	R	MILEPOST 156	IC1e		
159.817	R	MILEPOST 157	IC1e		
160.82	R	MILEPOST 158	IC1a	MEAL12, HOJU	
160.863	R	ROAD TO MS28-0	IC1a		
161.859	R	MILEPOST 159	IA1j		
162.815	R	MILEPOST 160	IA2f		
162.948	R	NO NAME PIPELINE ROAD	IA2f		
163.469	L	HAGGARD CREEK TRAILHEAD	IA2f		

<u>Milepoint</u>	<u>Side</u>	<u>Description</u>	<u>Vegetation Classification</u>	<u>Non Native Plants Observed</u>	<u>Field Notes</u>
163.761	R	HAGGARD CREEK	IA2f		Wetland w/ blk spruce
163.817	R	MILEPOST 161	IA2f	PLMA2	
164.224	R	NO NAME RD	IA2f		More shrub birch
164.818	R	MILEPOST 162	IA2f		
165.834	R	MILEPOST 163	IA2f		
165.976	R	ROAD TO 29-APL-1	IA2f		
166.815	R	MILEPOST 164	IA2f		
167.819	R	MILEPOST 165	IA2f		
168.818	R	MILEPOST 166	IA2f		
169.859	R	MILEPOST 167	IA2f		
170.819	R	MILEPOST 168	IA2f		
170.928	L	GILLESPIE CREEK TRAIL RD	IA2f		
172.252	L	GRAVEL PIT END AND ENT	IA2g		
172.27	L	MEIERS FORK TRAIL HEAD	IA2g		
172.562	L	NO NAME RD	IA2g		
172.738	R	ATWATERS MOTEL	IC2b		
172.841	R	MILEPOST 170	IC2b		
172.841	R	TESORO	IC2b		
172.841	L	MEYERS LAKE ROADHOUSE	IC2b		
173.128	L	MEYERS LAKE RD	IA2e		Getting close to treeline
173.824	R	MILEPOST 171	IA2e		
173.976	R	ROADSIDE REST AREA	IA2e		
174.007	R	ROADSIDE REST AREA	IA2e		
174.259	R	30 APL 1	IA2g		
174.423	L	ROADSIDE REST AREA	IA2g		
174.574	L	ROADSIDE REST AREA	IA2g		
174.822	R	MILEPOST 172	IA2g		
175.648	L	NO NAME PIPELINE RD	IA2g		
175.899	R	MILEPOST 173	IA3e		
176.823	R	MILEPOST 174	IA3e		

<u>Milepoint</u>	<u>Side</u>	<u>Description</u>	<u>Vegetation Classification</u>	<u>Non Native Plants Observed</u>	<u>Field Notes</u>
177.823	R	MILEPOST 175	IA3c		
177.855	L	PAXSON LAKE CAMPGROUND RD	IA3c		
177.855	L	PAXSON LAKE CAMPGROUND	IA3c		
178.339	R	PIPELINE ROAD 31APL1	IA2g		
178.85	R	MILEPOST 176	IA2g		
179.924	L	ROADSIDE REST AREA	IA2g		
179.924	R	MILEPOST 177	IA2g		
180.826	R	MILEPOST 178	IA2g		
181.823	R	MILEPOST 179	IA2e		
181.84	R	SUMMIT LAKE REST AREA	IA2e		
181.924	R	GRAVEL PIT	IA2e		
182.083	R	PIPELINE APL 3	IA2g		
182.275	L	PAXSON LAKE WAYSIDE	IA2g		
183.826	R	MILEPOST 181	IA2g		Open blk & wh spruce w/ dense willows & scrub birch
184.716	R	MILEPOST 182	IA2g		
186.837	R	MILEPOST 184	IA2f		
187.288	R	1 MILE PIT ROAD	IA3c		
187.538	A	ONE MILE CREEK 0577	IA3c		
187.55	A	ONE MILE CREEK 0577	IA3c		
187.837	R	MILEPOST 185	IA3c		
188.095	R	AT&T	IA2e		
188.333	L	DENALI HIGHWAY	IA2e		
188.632	L	PAXSON STATION DOT ENT	IA2e		
188.875	R	MILEPOST 186	IA2e		
189.95	R	MILEPOST 187	IA2e		
191.427	R	SUMMIT LAKE REST AREA	IIB1a		
191.692	R	SUMMIT LAKE REST AREA	IIB1c		
192.243	R	MILEPOST 189	IIB1c		
192.243	L		IIB1a		

<u>Milepoint</u>	<u>Side</u>	<u>Description</u>	<u>Vegetation Classification</u>	<u>Non Native Plants Observed</u>	<u>Field Notes</u>
192.655	L	REST AREA ENT	IIB1d		
192.833	L	REST AREA ENT	IIB1d		
193.097	L	TURN OUT	IIB1b		
193.356	R	MILEPOST 190	IIC1a		
193.392	R	ROAD TO 33-APL-3/33AMS-3B	IIC1a		
193.698	L	TURNOUT & HISTORICAL MARK	IIC1a		
194.287	R	33APL 4 33AMS 3B	IIC1a		
194.46	L	WATERS EDGE B&B ENT	IIC1a		
194.856	R	MILEPOST 192	IIC1a		
195.03	L	ROADSIDE REST AREA	IIC1a		
195.418	L	ROADSIDE REST AREA	IIC1a		
195.857	R	MILEPOST 193	IIC1a		
196.858	R	MILEPOST 194	IIC1a		
196.976	L	TURN OUT	IIC1a		
197.575	R	HINES SITE B&B ENT	IIC1a		
197.971	R	MILEPOST 195	IIC1b		
198.813	R	MILEPOST 196	IIC1b		
199.121	R	ROAD TO 34-APL-1A	IIC1b		
199.605	A	GUNN CREEK 0578	IIC1b		
199.62	A	GUN CREEK 0578	IIC1b		
199.823	R	MILEPOST 197	IIC2f		Birch/willow scrub along with wetlands (IIIA3c)
200.297	R	PIPELINE RD	IIIA3c		
200.502	R	RICHARDSON MONUMENT	IIC1a		
200.957	R	MILEPOST 198	IIC1a		
201.891	R	MILEPOST 199	IIC1a		
202.958	R	MILEPOST 200	IIC1a		
203.223	R	GRAVEL PIT	IIC1a		
203.363	L	FIELDING LAKE ROAD	IA3c		
203.943	R	MILEPOST 201	IA3c		
204.287	L	ROAD TO 35-APL-4	IA3c		
204.393	A	PHELAN CREEK 0579	IA3c		

<u>Milepoint</u>	<u>Side</u>	<u>Description</u>	<u>Vegetation Classification</u>	<u>Non Native Plants Observed</u>	<u>Field Notes</u>
204.408	A	PHELAN CREEK 0579	IA3c		
204.921	R	MILEPOST 202	IB1c		
205.312	A	MCCALLUM CREEK 0580	IB1c		Descent to north. More riparian.
205.319	A	MCCALLUM CREEK 0580	IB1c		
205.882	R	MILEPOST 203	IA2e		
206.135	L	PIPELINE ROAD 35APL 6	IA2e		
206.815	R	TURN OUT	IIB1b		
206.905	R	MILEPOST 204	IIB1b		East: ridge w/ alder, willow, scattered spruce
206.905	L		IIB2a		West: river plain w/ willow.
207.68	L	PIPELINE ROAD 36APL1A	IIB1a		
207.901	R	MILEPOST 205	IIB1d		East: dense willow by river
209.032	R	MILEPOST 206	IIB1a		
209.849	L	RAINBOW RIDGE SCENIC VIEW	IIB1a		
209.886	R	MILEPOST 207	IA2e		
210.92	R	MILEPOST 208	IIB1b		
211.03	L	TURN OUT	IIB1d		
211.368	L	TURN OUT	IIB1d		
211.838	R	MILEPOST 209	IIB1d		
212.398	R	TURN OUT	IIB1d		
212.872	R	MILEPOST 210	IIB1d		
214.061	R	MILEPOST 211	IIB1d		
214.52	L	PIPELINE ROAD 36APL	IIB1d		
214.918	R	MILEPOST 212	IIB1d		
215.621	L	PIPELINE ROAD 37APL 1	IIB1d		
215.891	R	MILEPOST 213	IIB1d		
216.133	L	TURN OUT	IIC2g		
216.515	R	GRAVEL PIT	IIC2g		

<u>Milepoint</u>	<u>Side</u>	<u>Description</u>	<u>Vegetation Classification</u>	<u>Non Native Plants Observed</u>	<u>Field Notes</u>
216.879	R	WILDLIFE/WILDFLWR VIEWING	IIC2g		
216.913	R	MILEPOST 214	IA2e		Valley bottom widening
216.968	R	WILDLIFE/WILDFLWR VIEWING	IA2e		
217.563	L	PIPELINE ROAD 37APL 2	IA2e		
217.826	R	MILEPOST 215	IA2e		
218.007	A	UPPER MILLER CREEK 0581	IA2e	HOJU	
218.042	A	UPPER MILLER CREEK 0581	IA2e		
218.315	B	***SURFACE TYPE:UNPAVED***	IA1j		
218.939	R	MILEPOST 216	IA2e		
219.633	A	LOWER MILLER CREEK 0582	IIB1b		
219.661	A	LOWER MILLER CREEK 0582	IA3c		
219.944	B	***SURFACE TYPE:PAVED ***	IA3c		
219.94	R	MILEPOST 217	IA3c		
220.075	A	CASTNER CREEK 0583	IA3c		
220.105	A	CASTNER CREEK 0583	IA3c		
220.824	R	MILEPOST 218	IA2e		
220.842	L	NO NAME ROAD	IA2e		
221.12	L	TRIMS DOT MAINT STATION	IA2e		
221.719	A	TRIMS CREEK 0584	IA2e		
221.719	A	TRIMS CREEK 0584	IA2e		
221.922	R	MILEPOST 219	IIB1d		
222.075	L	PUMP STATION 10	IIB1d		
222.771	A	MICHAEL CREEK 0585	IIB1d		

<u>Milepoint</u>	<u>Side</u>	<u>Description</u>	<u>Vegetation Classification</u>	<u>Non Native Plants Observed</u>	<u>Field Notes</u>
222.771	A	MICHAEL CREEK 0585	IIB1d		
222.964	R	MILEPOST 220	IIB1d		
223.026	L	38 APL 5	IIB1b		
223.655	L	TURN OUT	IIB1c		
223.772	A	FLOOD CREEK 0586	IIB1c		
223.783	A	FLOOD CREEK 0586	IIB1c		
223.952	R	MILEPOST 221	IIB1d		
224.016	L	PIPELINE ROAD 38APL 7	IIB1d		
224.977	R	MILEPOST 222	IA3c		
225.791	L	PIPELINE ROAD 38APL8	IA3c		
225.94	A	WHISTLER CREEK 0587	IIB1d	HOJU	
225.95	A	WHISTLER CREEK 0587	IIB1d		
225.967	R	MILEPOST 223	IIB1d		
226.331	R	PIPELINE 39 APL 1	IA2e		
226.711	A	BOULDER CREEK 0588	IA2e		
226.711	A	BOULDER CREEK 0588	IA2e		
226.919	L	PIPELINE ROAD 39APL 2	IC1e		
226.951	R	MILEPOST 224	IC1e		
227.441	A	LOWER SUSIE Q CREEK 0589	IC1e		
227.454	A	LOWER SUSIE Q CREEK 0589	IC1e		
227.8	R	UPPER SUSIE Q CREEK	IC1e		
227.8	A	UPPER SUSIE Q CREEK	IC1e		
227.965	R	MILEPOST 225	IC1e		
228.162	L	PIPELINE ACCESS RD MP 579.2	IC1e		
228.3	L	TURN OUT	IC1e		
228.365	L	TURN OUT	IC1e		

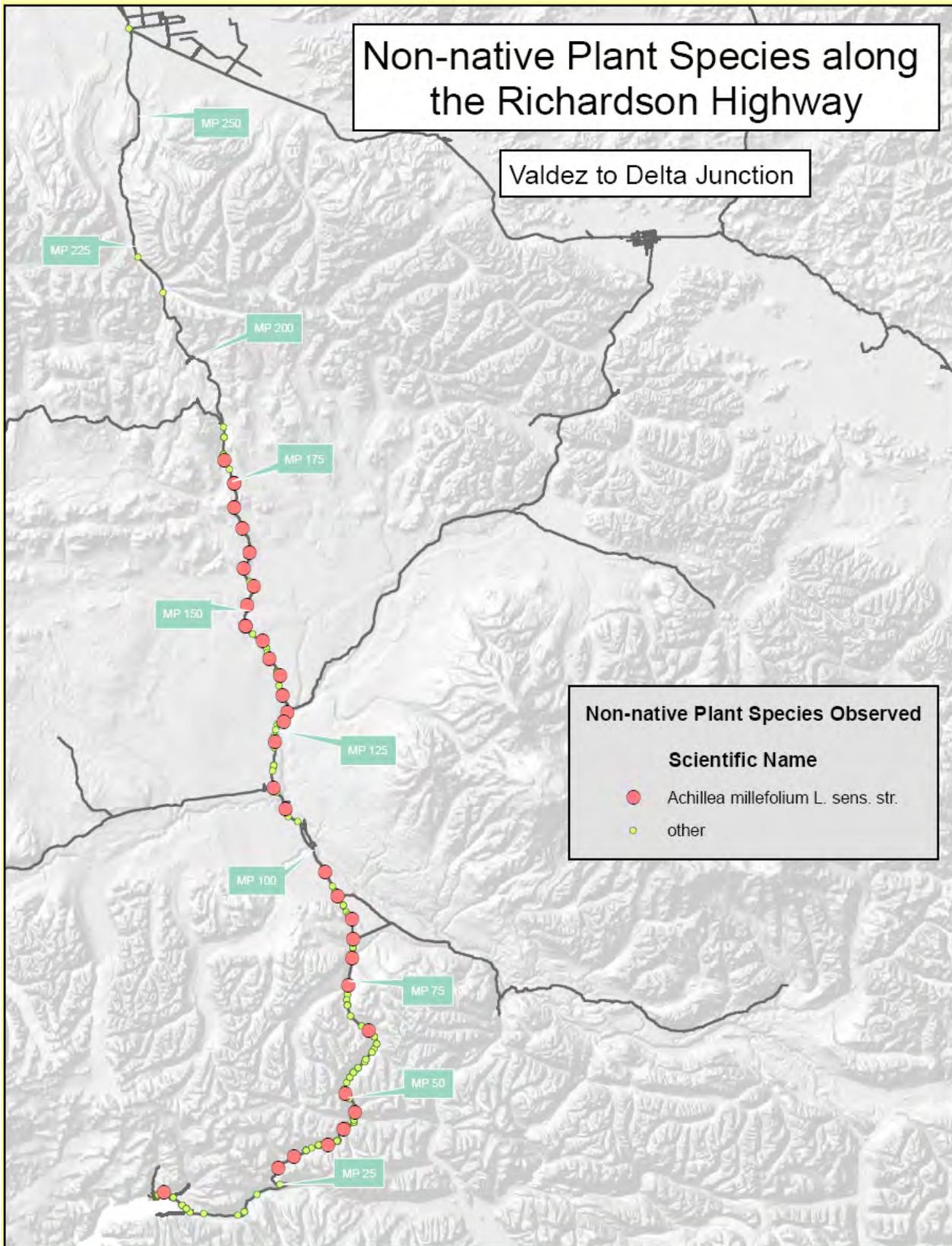
<u>Milepoint</u>	<u>Side</u>	<u>Description</u>	<u>Vegetation Classification</u>	<u>Non Native Plants Observed</u>	<u>Field Notes</u>
229.334	R	FALLS CREEK	IA2e		
229.347	A	FALLS CREEK	IA2e		
229.555	A	FALLS CREEK BRIDGE	IA2e		
229.555	R	FALLS CREEK BRIDGE	IA2e		
229.866	A	GUNNY SACK CREEK 0590	IA2e		
229.877	A	GUNNY SACK CREEK 0590	IA2e		
229.908	R	MILEPOST 227	IA2e		West: large gravel bar
230.222	R	MOTEL	IA2e		
230.807	R	PIPELINE ROAD 39APL 7	IA2e		
230.934	R	MILEPOST 228	IA2e		
231.312	A	ONE MILE CREEK 0591	IIB1a		
231.312	A	ONE MILE CREEK 0591	IIB1a		
231.387	L	GRAVEL PIT	IA1j		
231.971	R	MILEPOST 229	IA2e		
232.193	R	PIPELINE ROAD 40APL1	IA2e		
232.949	R	MILEPOST 230	IA2e		
233.952	A	DARLING CREEK 0592	IIB1d		
233.952	R	MILEPOST 231	IIB1d		
233.969	A	DARLING CREEK 0592	IA2e		
234.949	R	MILEPOST 232	IA2e		
234.949	L		IB2c		
235.07	L	TURN OUT	IB2c		
235.994	R	MILEPOST 233	IA1j		Now gaining elevation
236.19	L	TURN OUT	IA1j		
236.26	A	BEAR CREEK 0593	IA1j		
236.271	A	BEAR CREEK 0593	IA1j		

<u>Milepoint</u>	<u>Side</u>	<u>Description</u>	<u>Vegetation Classification</u>	<u>Non Native Plants Observed</u>	<u>Field Notes</u>
236.967	R	MILEPOST 234	IA1j		
237.137	R	REST AREA	IA1j		
237.229	R	REST AREA	IA1j		
237.458	L	TURN OUT	IA1j		
237.725	A	RUBY CREEK 0594	IA1j		
237.746	A	RUBY CREEK 0594	IA2e		
238.919	R	MILEPOST 236	IC1e		
239.006	R	PIPELINE ROAD 41APL1	IC1e		
239.91	R	MILEPOST 237	IC1e		
240.792	L	DONNELLY CREEK ENT	IA2e		
240.86	R	MILEPOST 238	IA2e		
241.816	R	MILEPOST 239	IA2e		
241.982	R	TURN OUT	IA2e		
242.99	R	MILEPOST 240	IA2e		
244	R	MILEPOST 241	IC2a		
244.284	L	TURN OUT BEGIN	IA2f		
244.352	L	TURN OUT END	IA2f		
245.025	R	MILEPOST 242	IA2f		
245.12	R	COAL MINE ROAD	IA2f		
246.031	R	MILEPOST 243	IA2f		
247.038	R	REST AREA	IA2f		
247.115	R	REST AREA	IC2b		
247.236	R	MILEPOST 244	IC1d		
248.009	R	MILEPOST 245	IC1d		
249.119	R	MILEPOST 246	IC1d		
249.847	L	TURN OUT	IIC2c		Begin alpine low scrub w/ shrub birch, alder, willow w/stunted aspen & spruce
250.183	R	MILEPOST 247	IIC2c		
251.129	R	MILEPOST 248	IC2b		Dwarfed aspen w/ open wht spruce
252.191	R	MILEPOST 249	IC2b		
252.398	R	SATELLITE TRACKING STN	IC2b		
253.172	R	MILEPOST 250	IA2g		

<u>Milepoint</u>	<u>Side</u>	<u>Description</u>	<u>Vegetation Classification</u>	<u>Non Native Plants Observed</u>	<u>Field Notes</u>
254.168	R	MILEPOST 251	IA2f		
255.138	R	MILEPOST 252	IC1d		
255.875	L	CAMPGROUND ENT	IC1d		
255.929	L	CAMPGROUND ENT	IC1d		
256.101	R	MILEPOST 253	IB2b		
257.103	R	MILEPOST 254	IIB2b		Burned area. Alder establishing.
258.055	R	MILEPOST 255	IIB2b		
259.086	R	MILEPOST 256	IIB2b		
259.115	B	ROAD & TANK CROSSING	IIB2b		
260.033	R	MILEPOST 257	IC1c		
260.433	L	COLD TEST CENTER ENT	IC1d		
260.651	R	NO NAME PIPELINE RD	IB1e		
260.651	L	FT GREELEY GATE ENT	IB1e		
261.076	R	MILEPOST 258	IB1e		
261.387	R	PUMP STATION NO 9 ENT	IB1e		
261.843	B	FORT GREELY MAINGATE ENT	IB1e		
262.08	R	MILEPOST 259	IB1e		
262.31	R	PIPELINE RD44 APL 5	IC1d		
263.087	R	MILEPOST 260	IC1d		
263.68	R	FLUR INC ENT	IC1d		
264.059	R	MILEPOST 261	IC1d		
264.212	R	FORT GREELY ACCESS ROAD * DELTA JUNCTION	IC1d		
265.082	R	MILEPOST 262	IC1d		
265.574	L	TURN OUT	IB1e		
265.657	L	TURN OUT	IB1e		
265.787	R	BIG DELTA FAA AIRPORT BEG	IB1e		
266.122	R	MILEPOST 263	IC1d		
267.126	R	MILEPOST 264	IB1e		
267.92	A	JARVIS CREEK 0595	IB1c		

<u>Milepoint</u>	<u>Side</u>	<u>Description</u>	<u>Vegetation Classification</u>	<u>Non Native Plants Observed</u>	<u>Field Notes</u>
267.955	A	JARVIS CREEK 0595	IB1c		
267.983	R	NO NAME RD	IA1j		
268.41	R	SIXTH STREET * DELTA JCT CITY	IC1a		
268.574	B	FOURTH STREET * DELTA JCT CITY	IC1a		
268.696	R	DELTA FIRE DEPT	IC1a		

Appendix C. Maps of Non-native Plant Species along the Richardson Highway



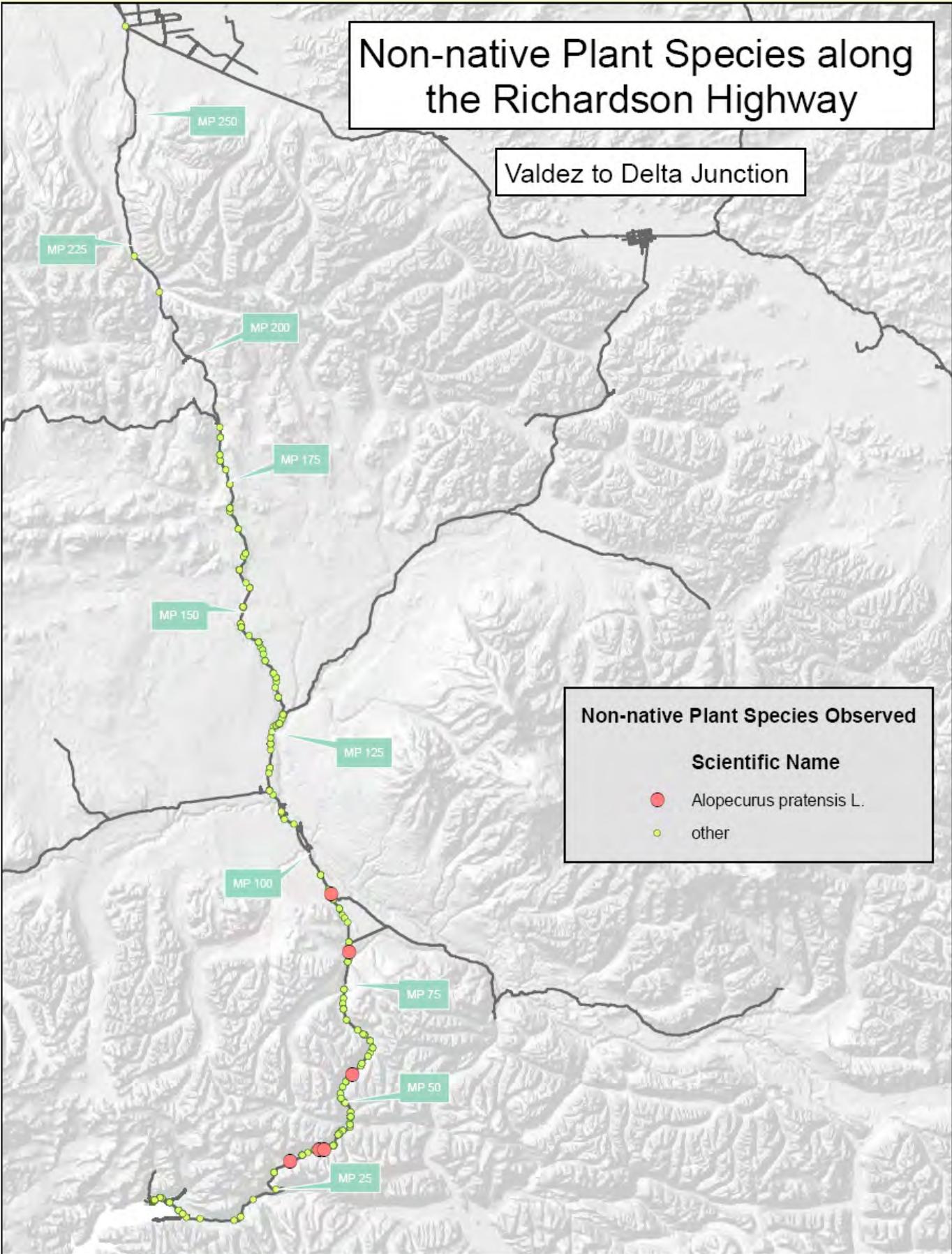
Non-native Plant Species along the Richardson Highway

Valdez to Delta Junction

Non-native Plant Species Observed

Scientific Name

- Alopecurus pratensis L.
- other



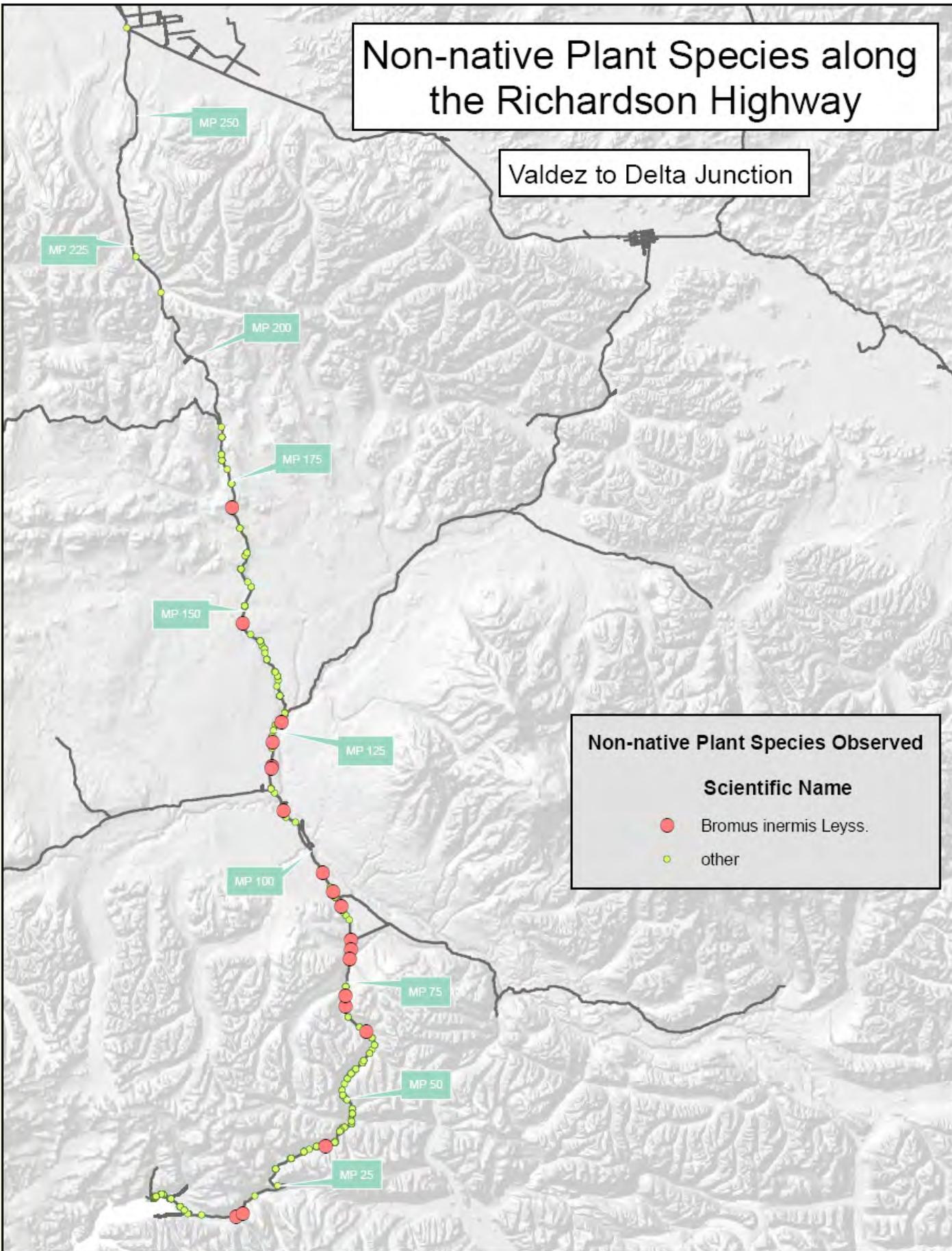
Non-native Plant Species along the Richardson Highway

Valdez to Delta Junction

Non-native Plant Species Observed

Scientific Name

- Bromus inermis Leys.
- other



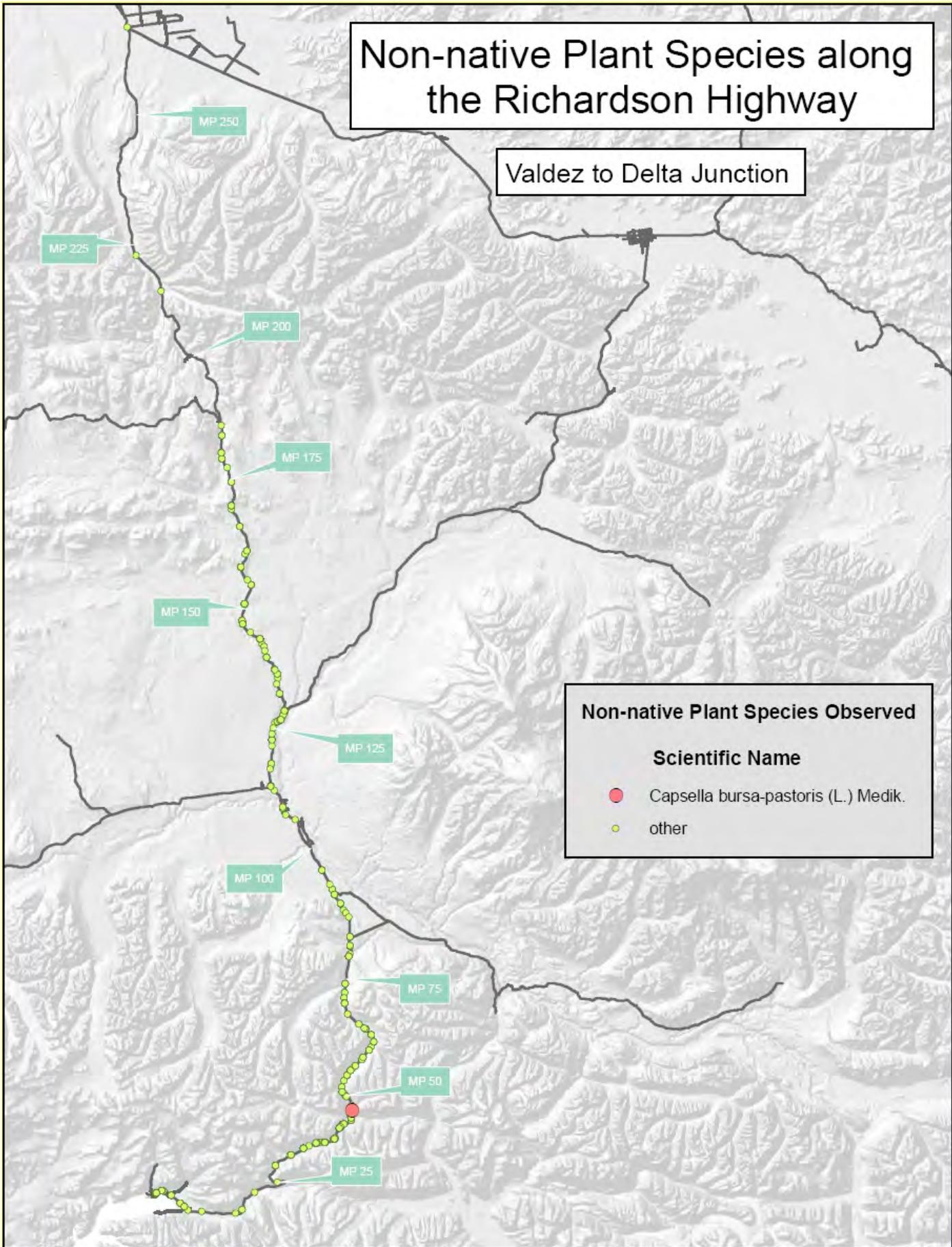
Non-native Plant Species along the Richardson Highway

Valdez to Delta Junction

Non-native Plant Species Observed

Scientific Name

- *Capsella bursa-pastoris* (L.) Medik.
- other



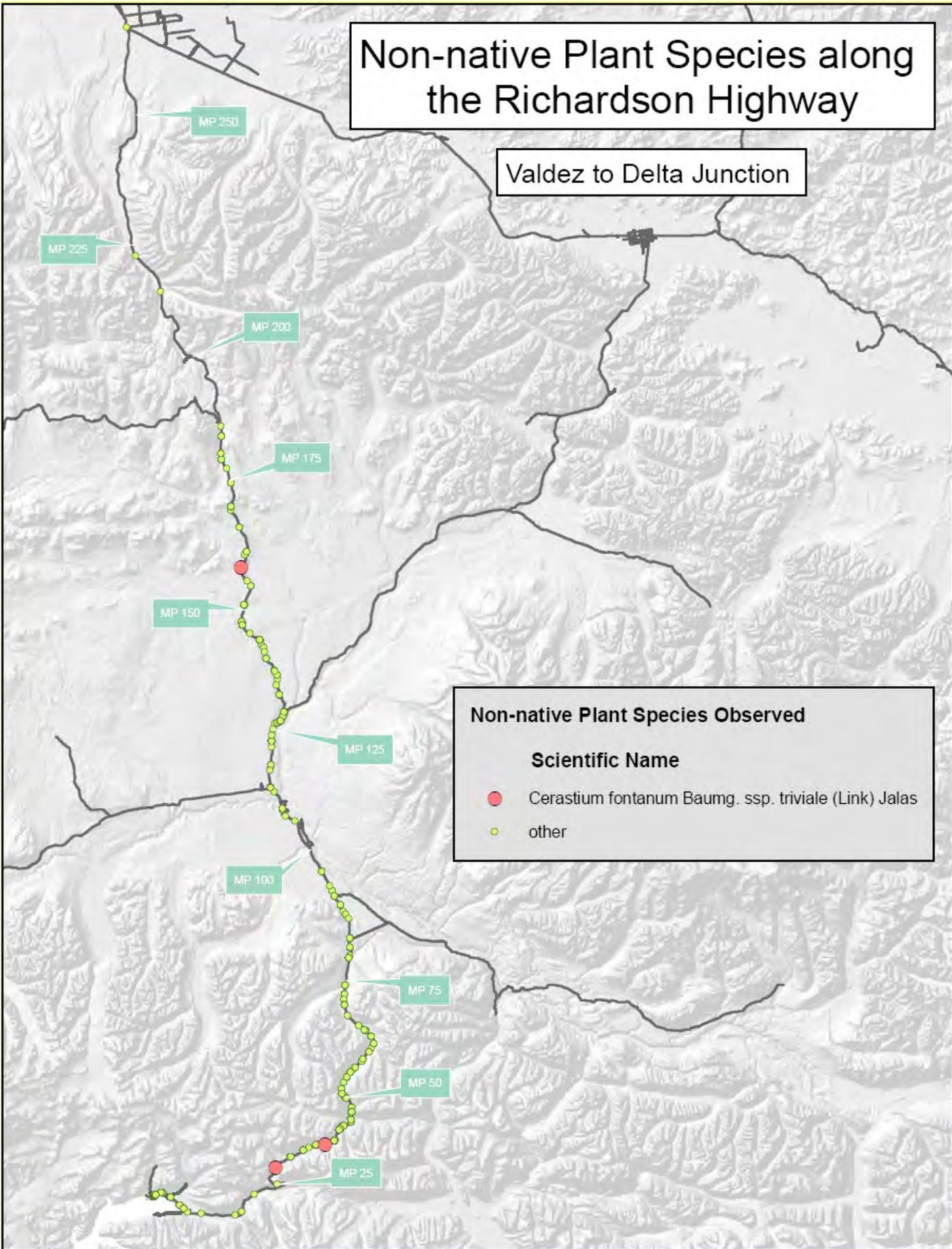
Non-native Plant Species along the Richardson Highway

Valdez to Delta Junction

Non-native Plant Species Observed

Scientific Name

- *Cerastium fontanum* Baumg. ssp. *triviale* (Link) Jalas
- other



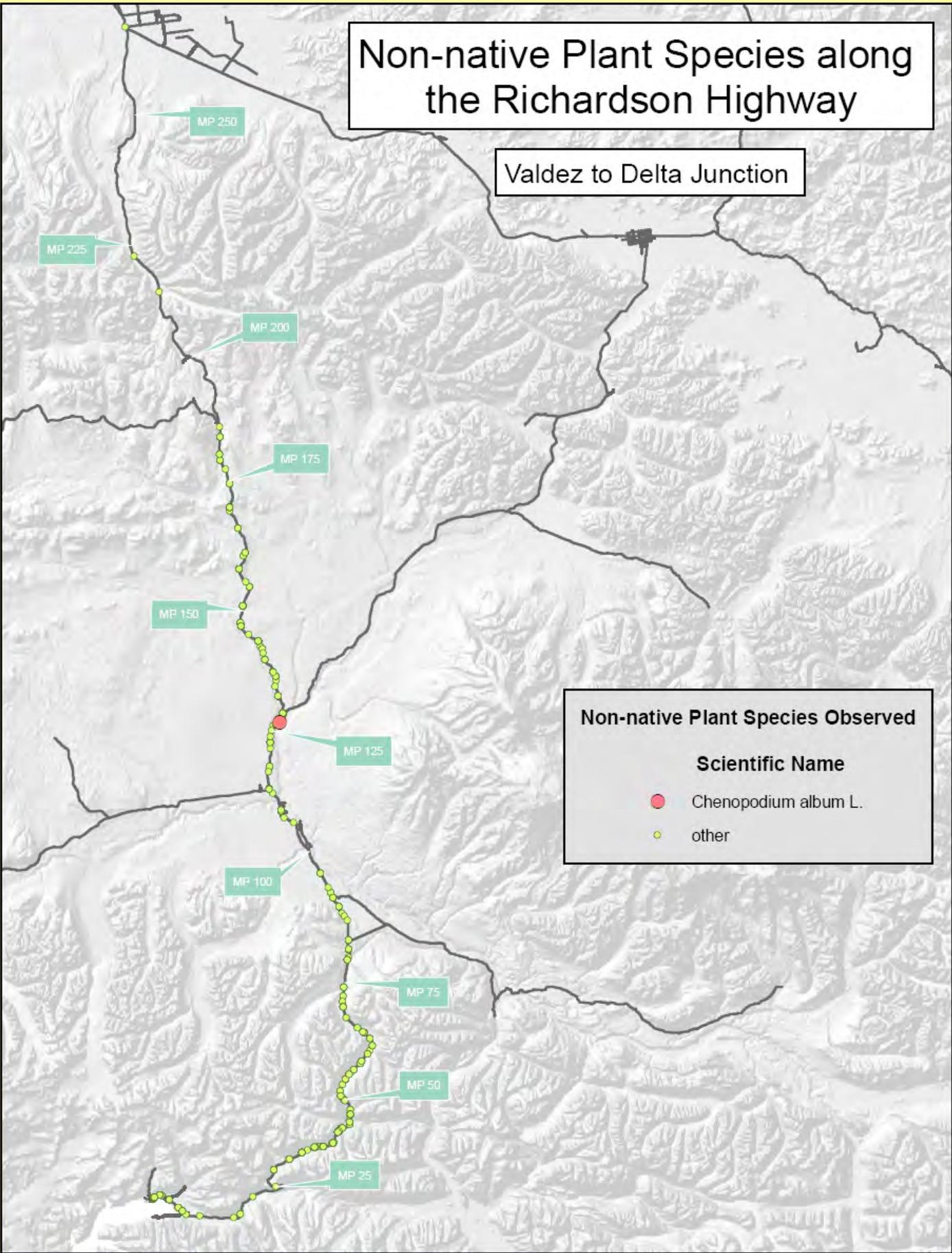
Non-native Plant Species along the Richardson Highway

Valdez to Delta Junction

Non-native Plant Species Observed

Scientific Name

- *Chenopodium album* L.
- other



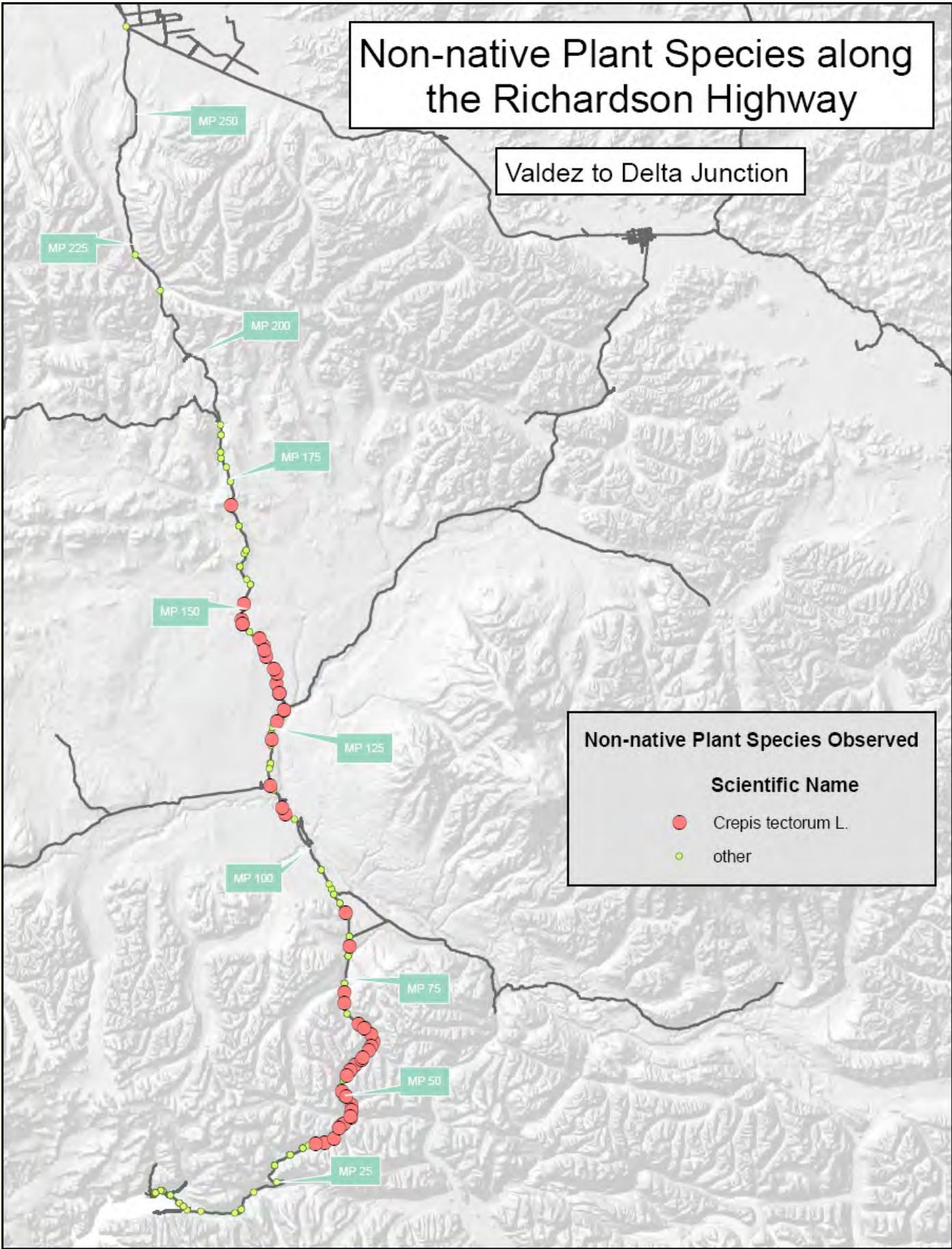
Non-native Plant Species along the Richardson Highway

Valdez to Delta Junction

Non-native Plant Species Observed

Scientific Name

- *Crepis tectorum* L.
- other



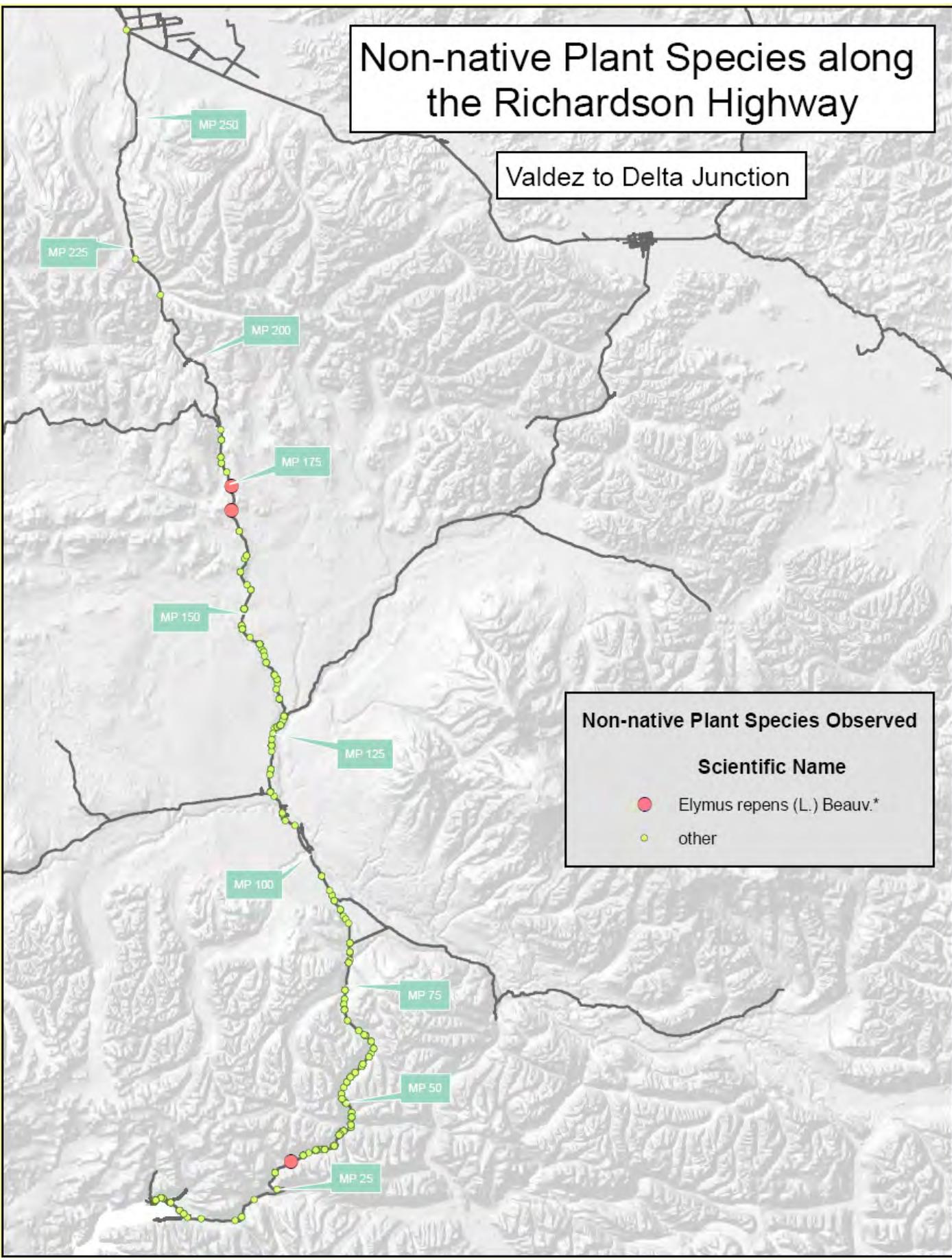
Non-native Plant Species along the Richardson Highway

Valdez to Delta Junction

Non-native Plant Species Observed

Scientific Name

- *Elymus repens* (L.) Beauv.*
- other



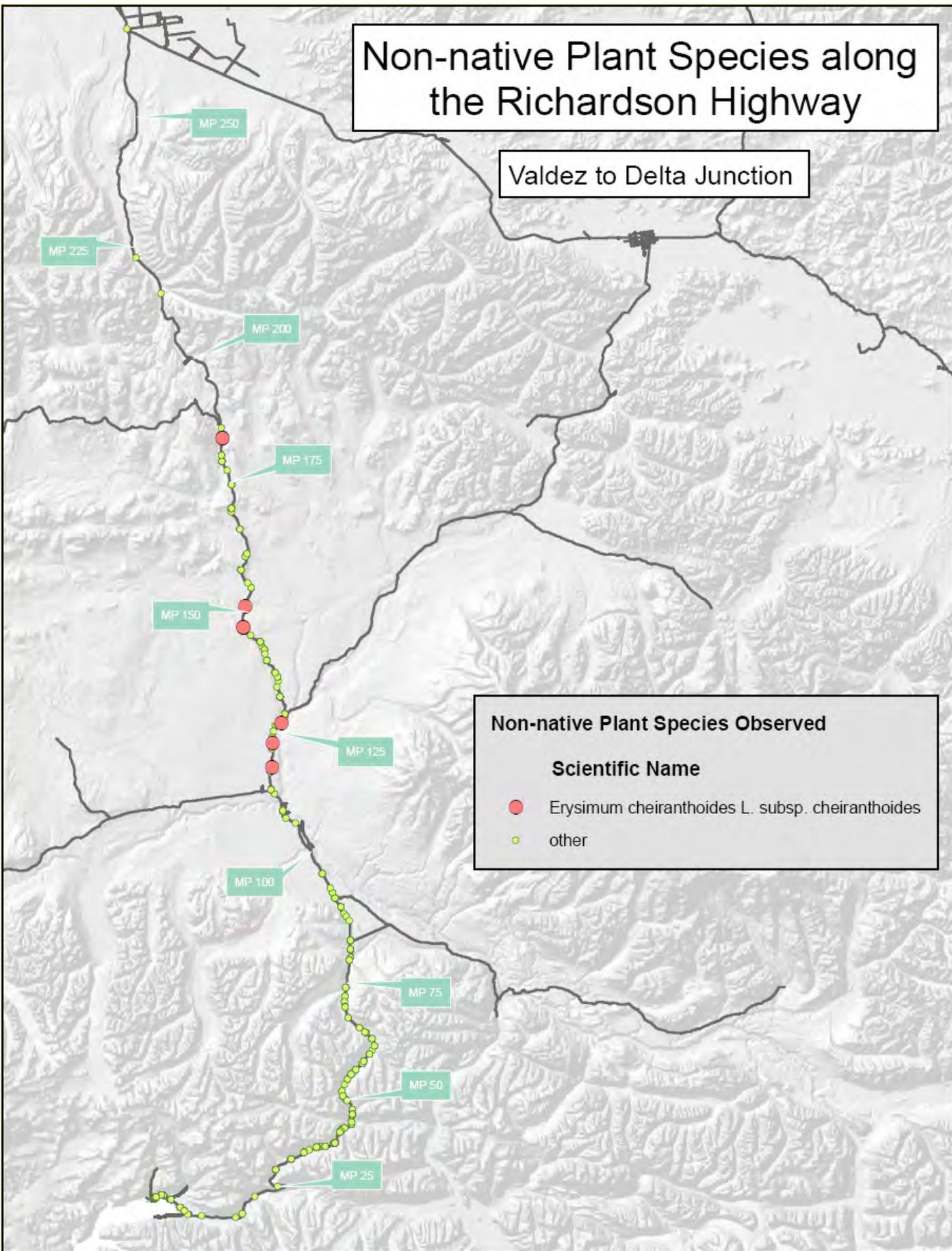
Non-native Plant Species along the Richardson Highway

Valdez to Delta Junction

Non-native Plant Species Observed

Scientific Name

- *Erysimum cheiranthoides* L. subsp. *cheiranthoides*
- other



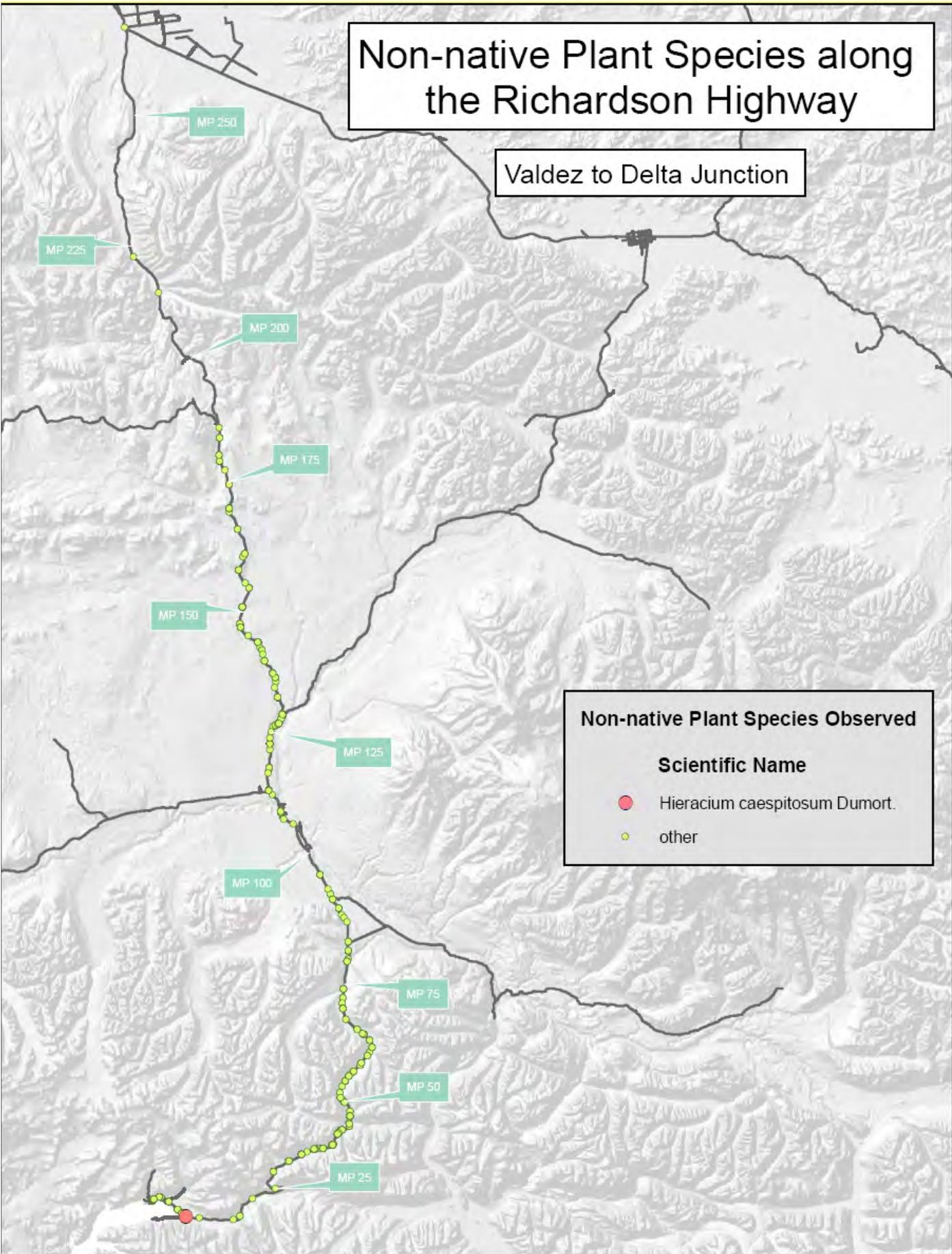
Non-native Plant Species along the Richardson Highway

Valdez to Delta Junction

Non-native Plant Species Observed

Scientific Name

- *Hieracium caespitosum* Dumort.
- other



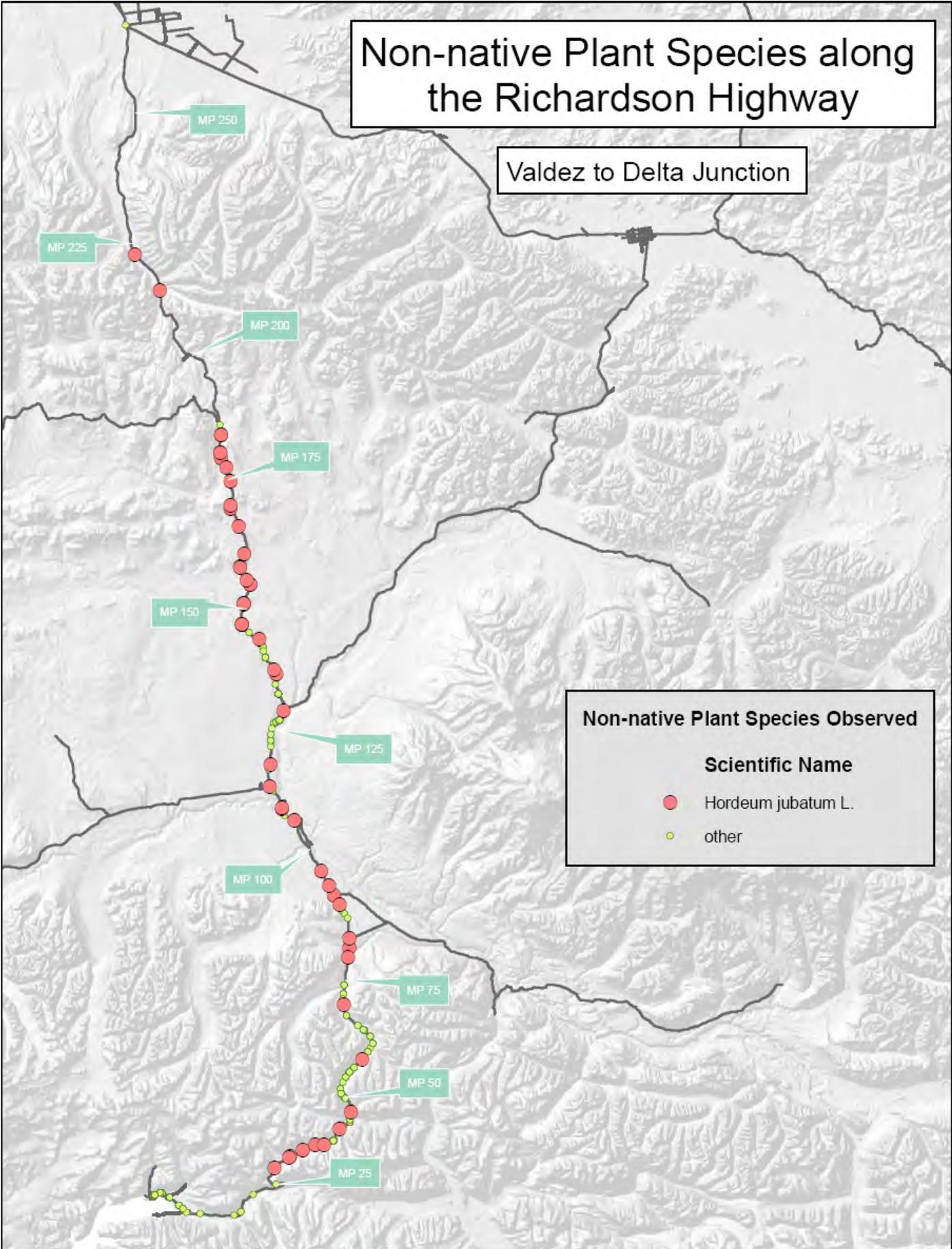
Non-native Plant Species along the Richardson Highway

Valdez to Delta Junction

Non-native Plant Species Observed

Scientific Name

- *Hordeum jubatum* L.
- other

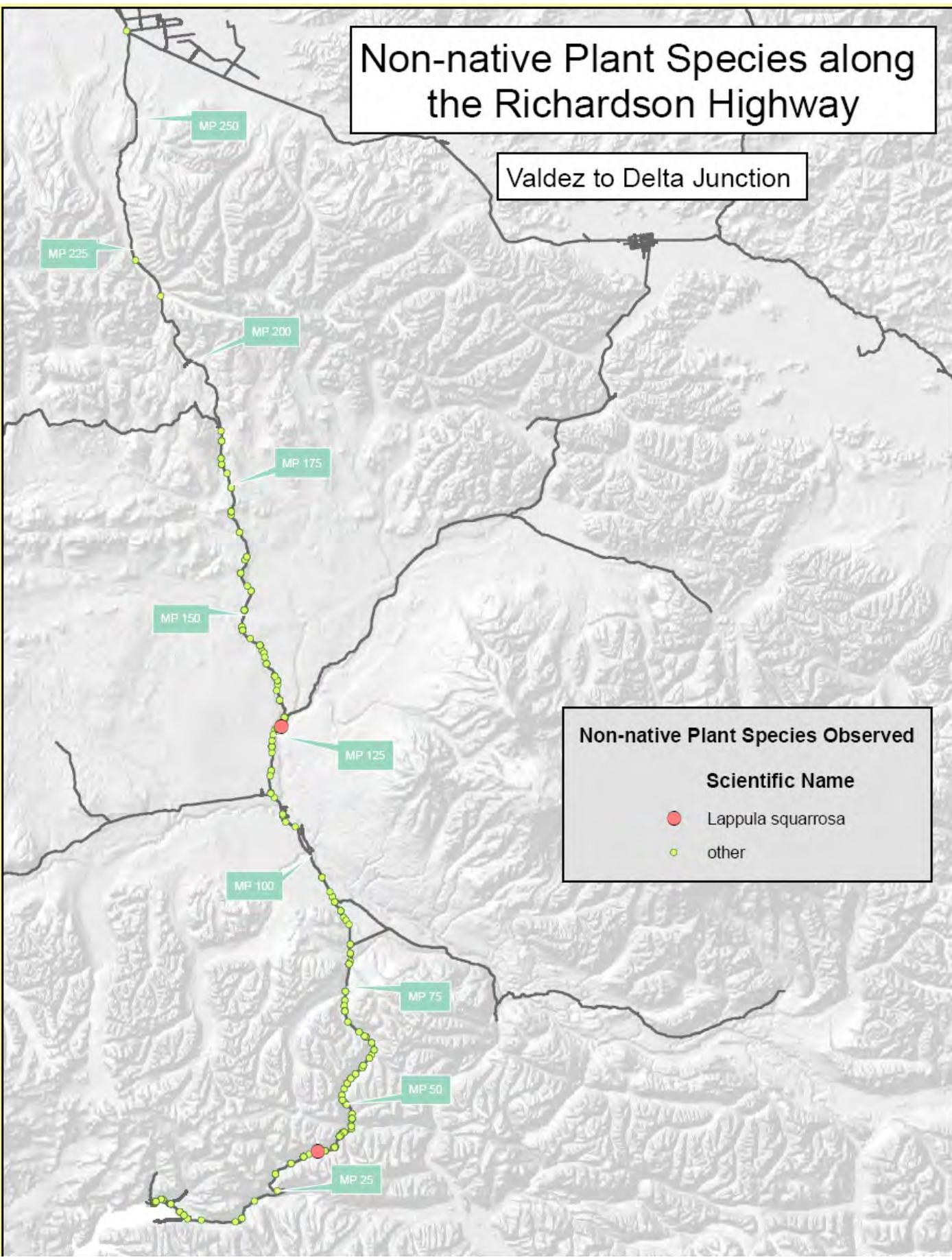


Non-native Plant Species along the Richardson Highway

Valdez to Delta Junction

Non-native Plant Species Observed

Scientific Name	
●	<i>Lappula squarrosa</i>
●	other



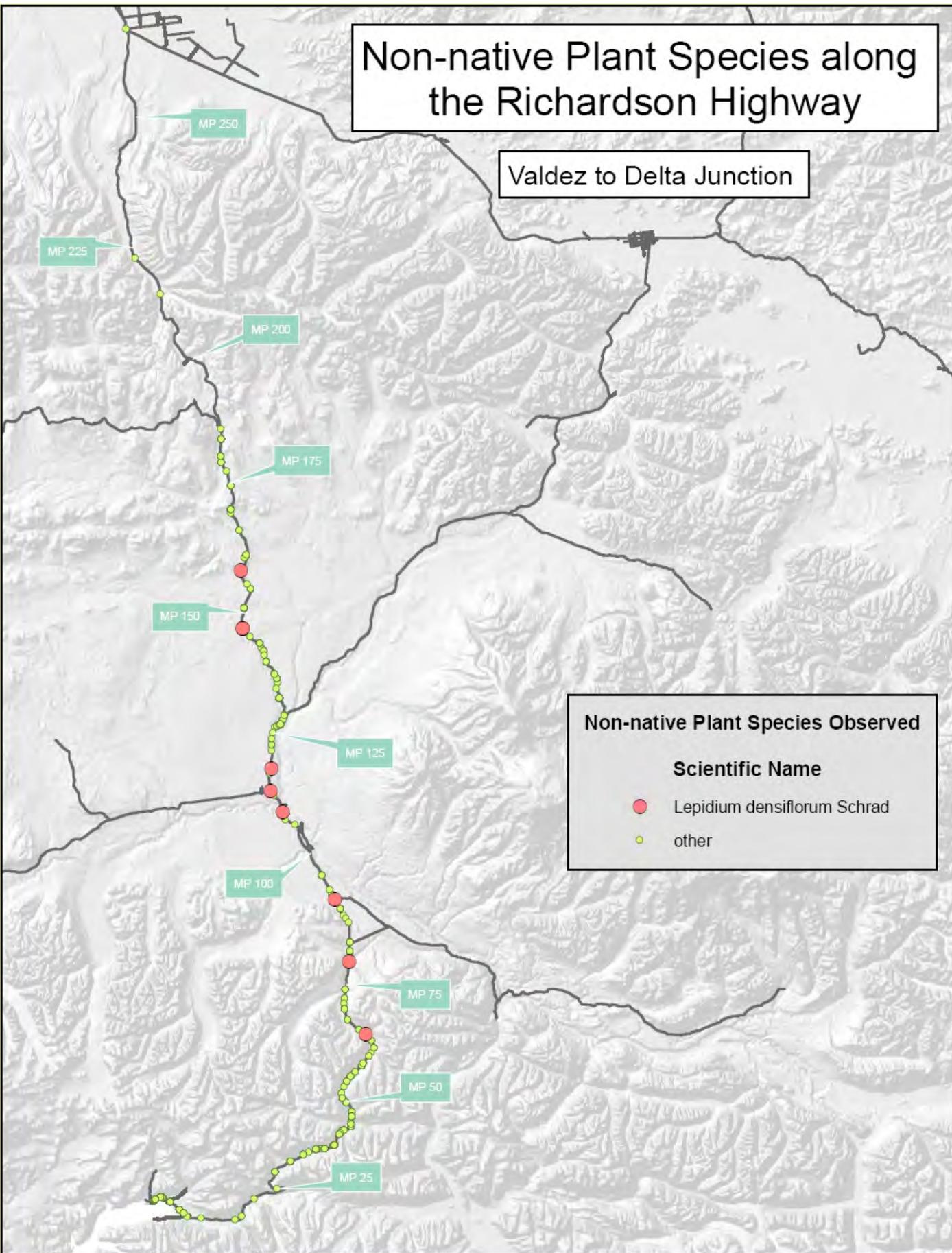
Non-native Plant Species along the Richardson Highway

Valdez to Delta Junction

Non-native Plant Species Observed

Scientific Name

- *Lepidium densiflorum* Schrad
- other



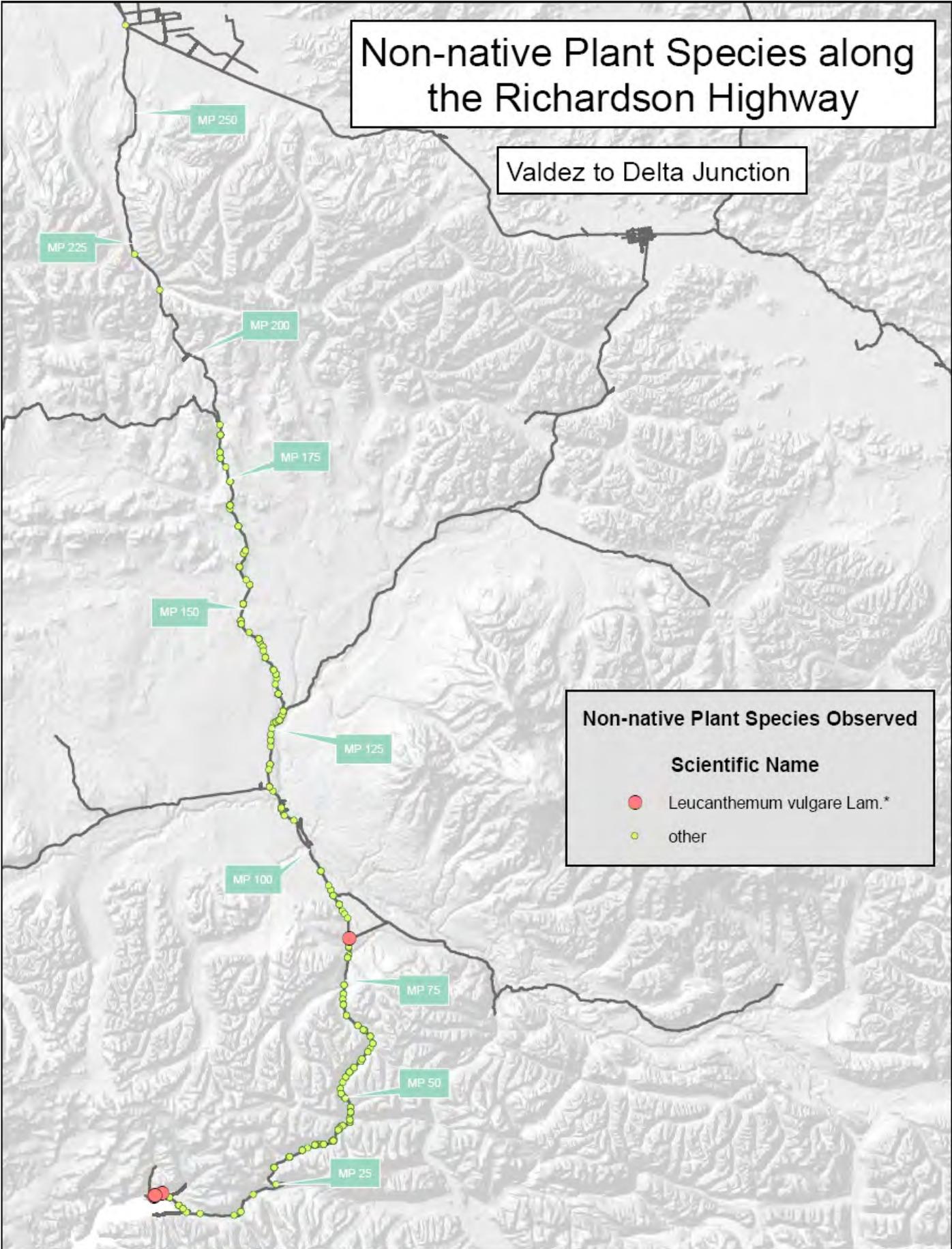
Non-native Plant Species along the Richardson Highway

Valdez to Delta Junction

Non-native Plant Species Observed

Scientific Name

- *Leucanthemum vulgare* Lam.*
- other



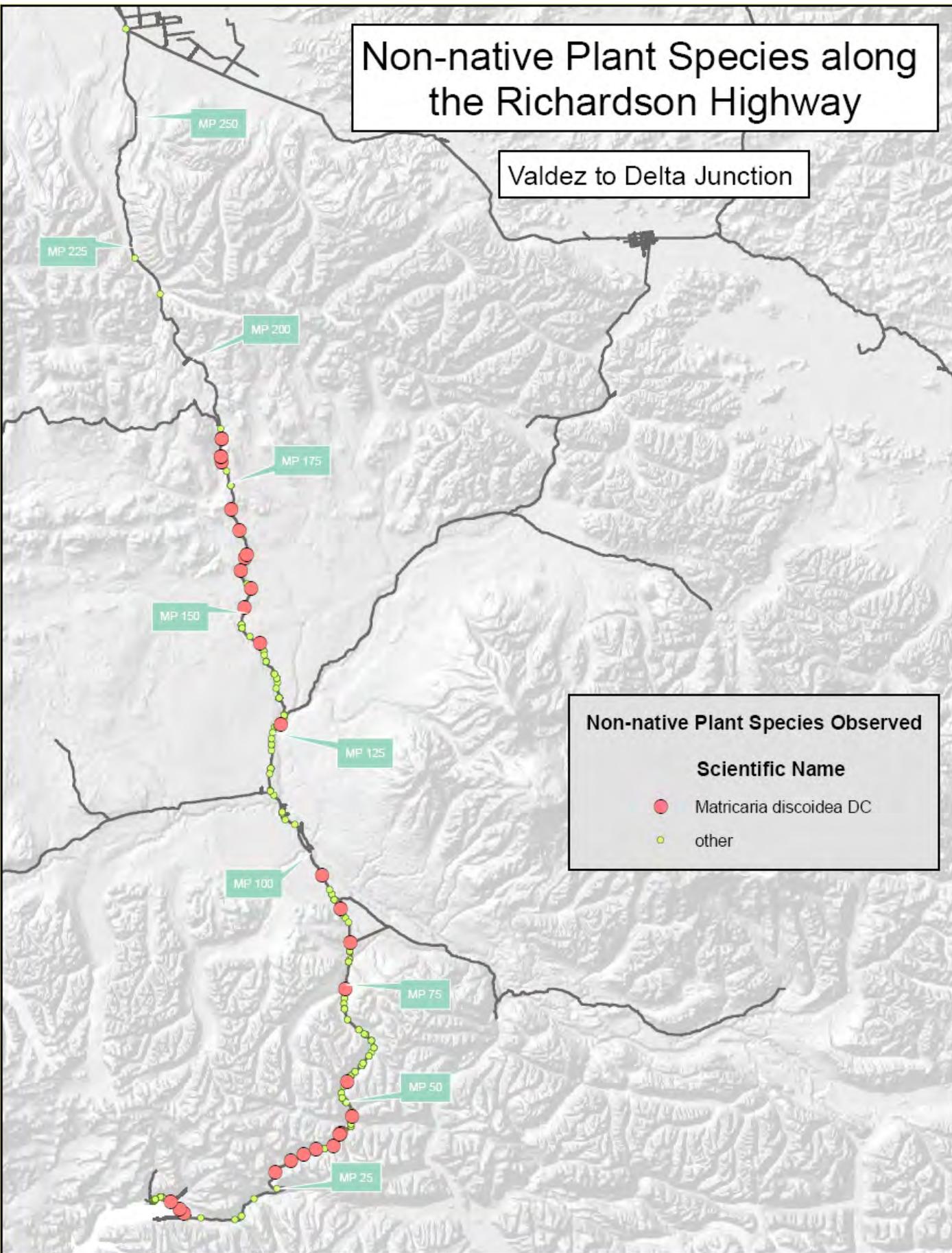
Non-native Plant Species along the Richardson Highway

Valdez to Delta Junction

Non-native Plant Species Observed

Scientific Name

- *Matricaria discoidea* DC
- other



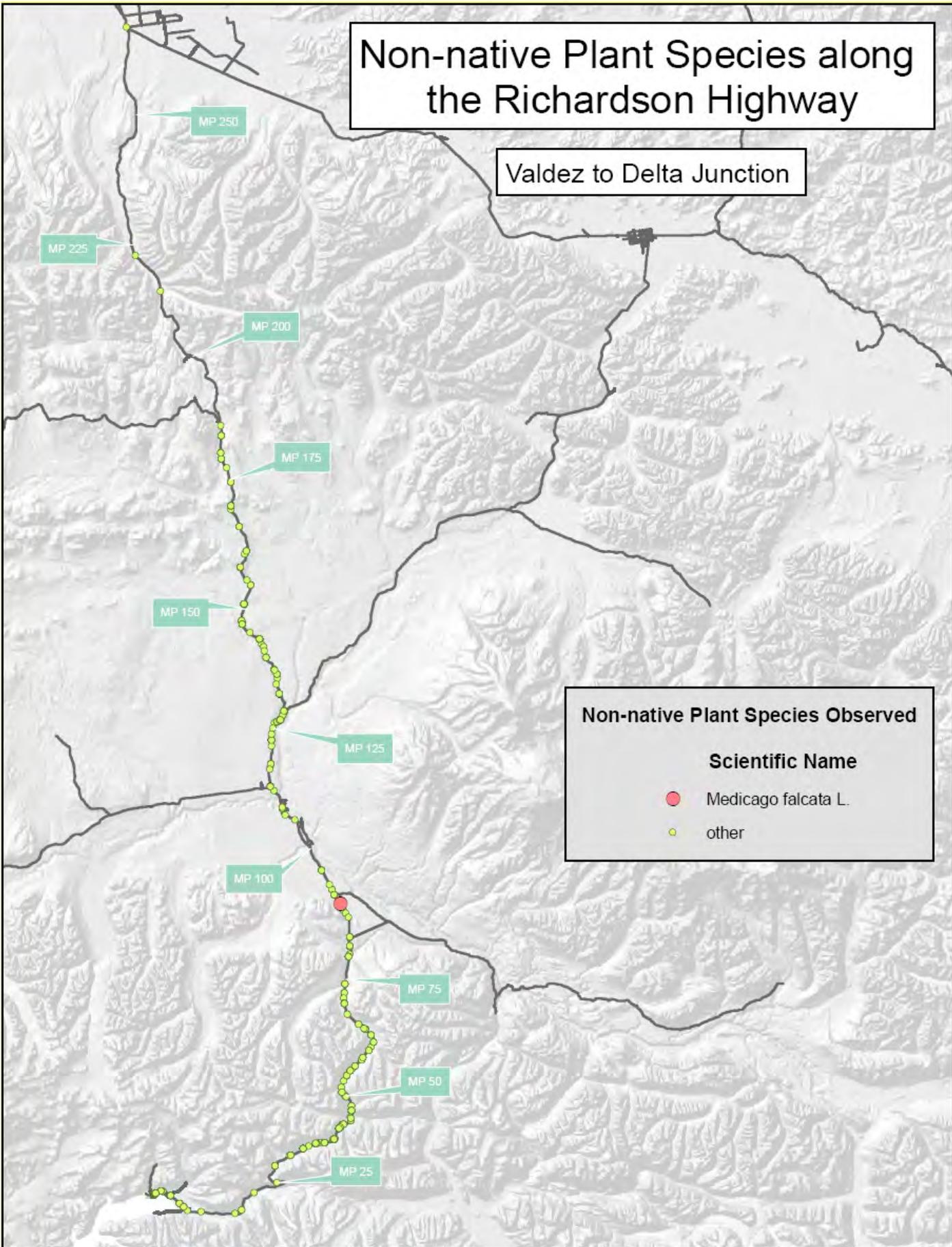
Non-native Plant Species along the Richardson Highway

Valdez to Delta Junction

Non-native Plant Species Observed

Scientific Name

- *Medicago falcata* L.
- other



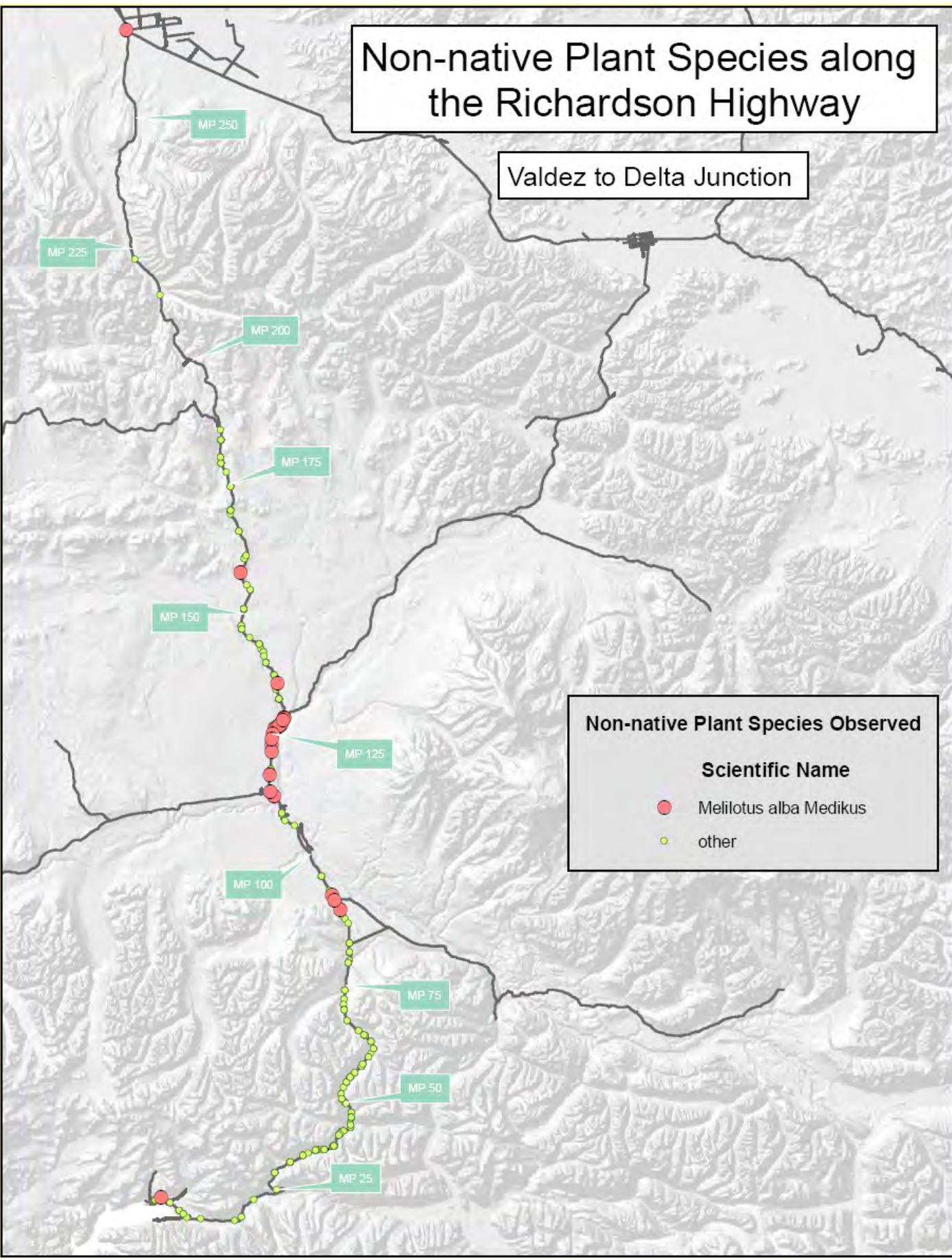
Non-native Plant Species along the Richardson Highway

Valdez to Delta Junction

Non-native Plant Species Observed

Scientific Name

- *Melilotus alba* Medikus
- other



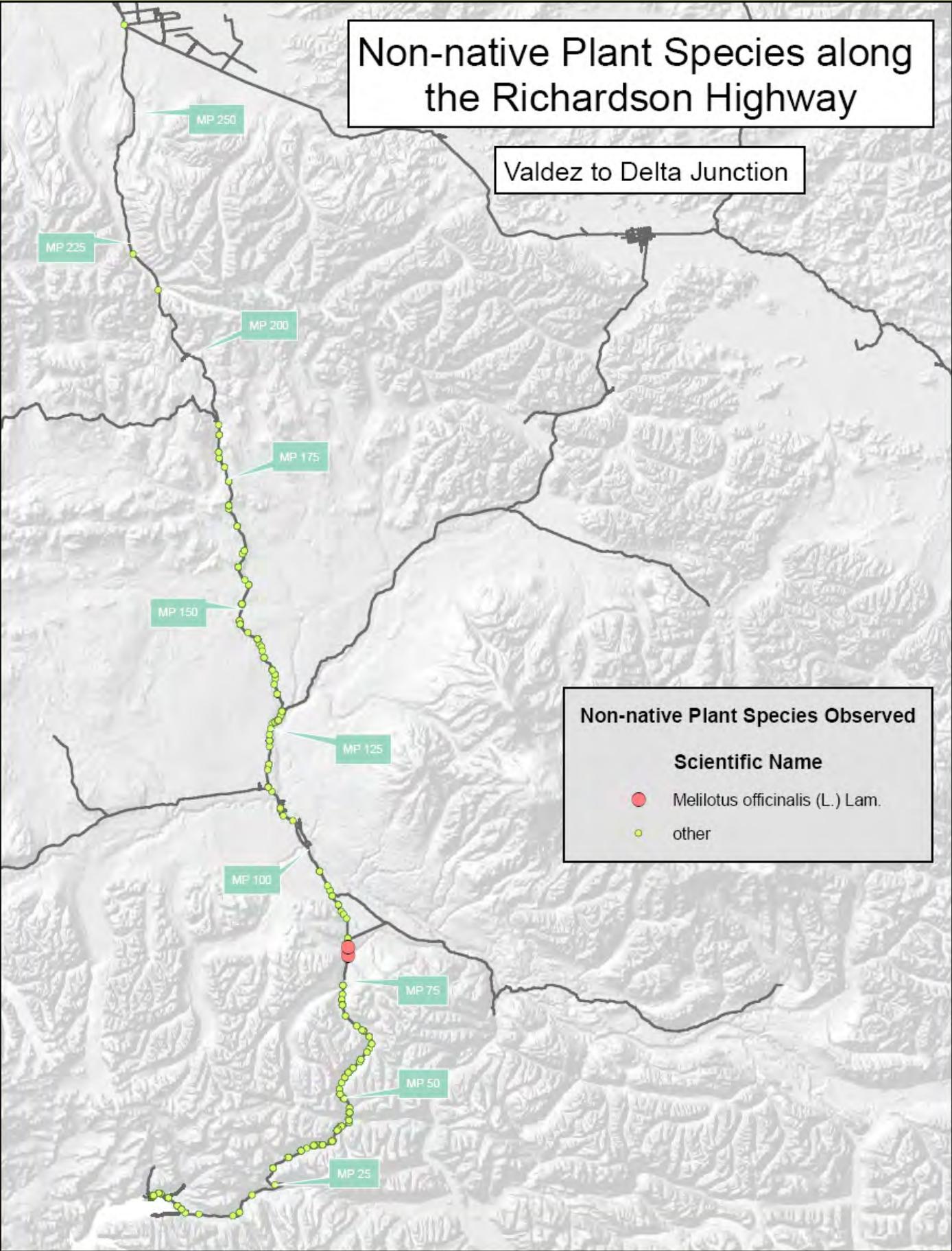
Non-native Plant Species along the Richardson Highway

Valdez to Delta Junction

Non-native Plant Species Observed

Scientific Name

- Melilotus officinalis (L.) Lam.
- other



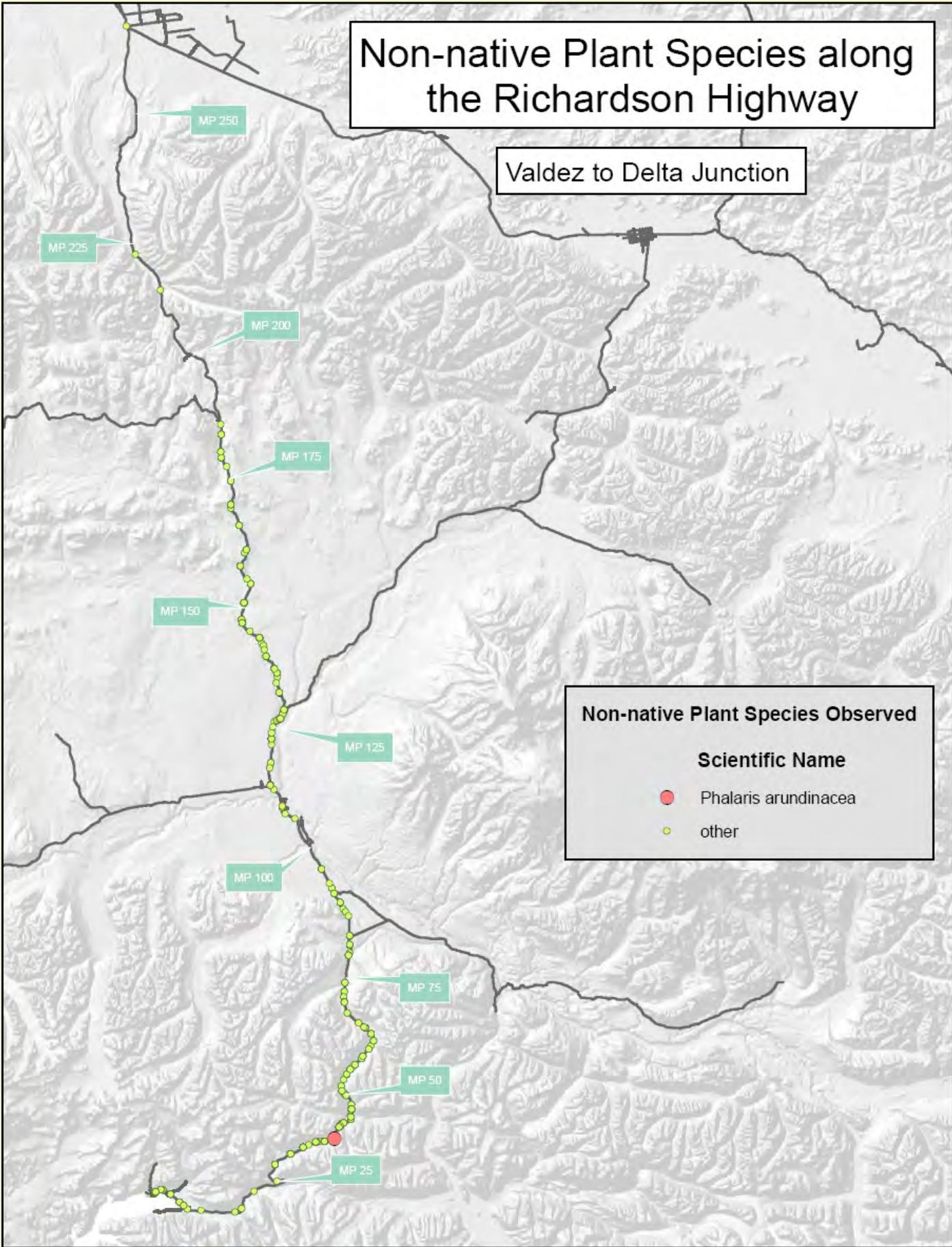
Non-native Plant Species along the Richardson Highway

Valdez to Delta Junction

Non-native Plant Species Observed

Scientific Name

- *Phalaris arundinacea*
- other



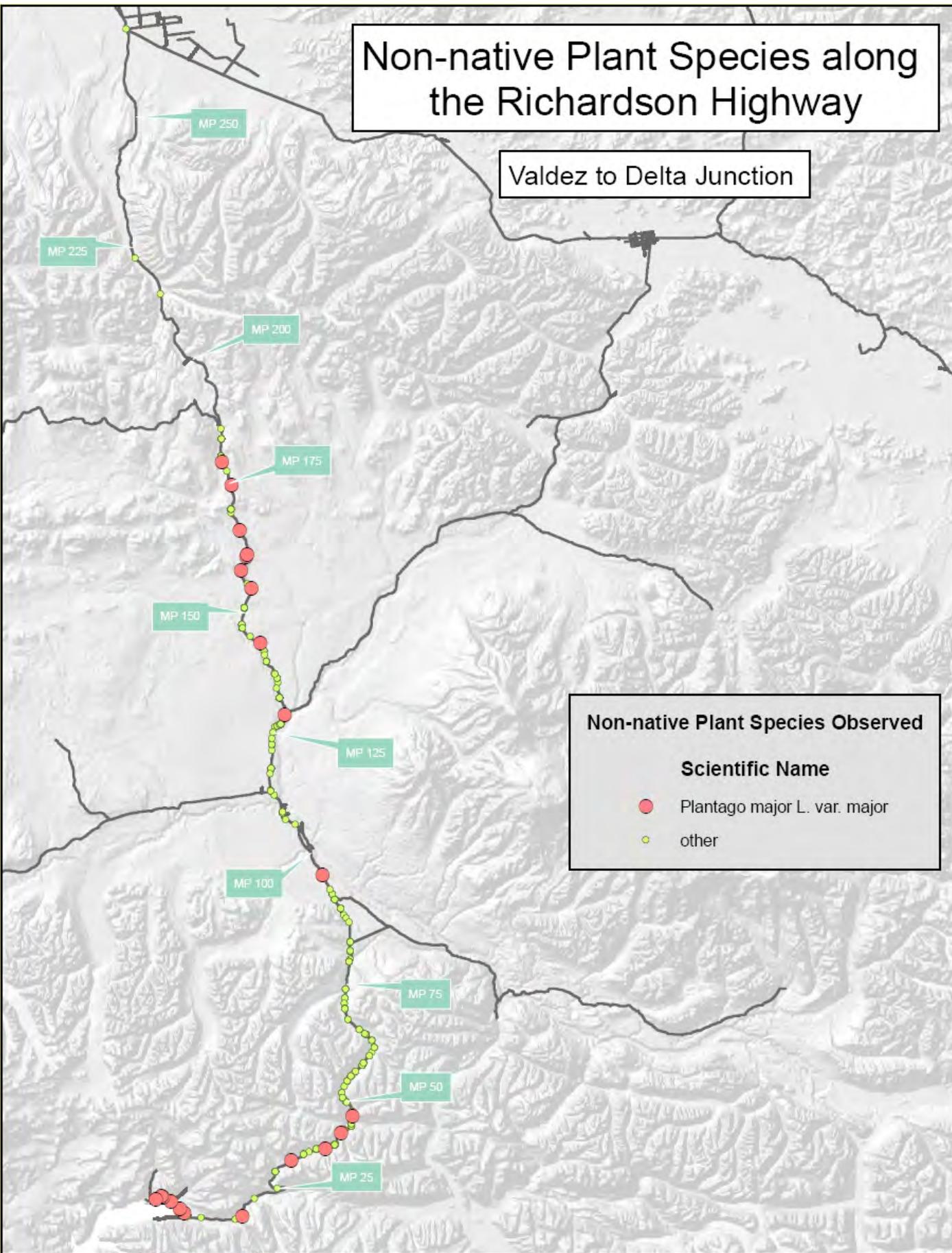
Non-native Plant Species along the Richardson Highway

Valdez to Delta Junction

Non-native Plant Species Observed

Scientific Name

- *Plantago major* L. var. *major*
- other



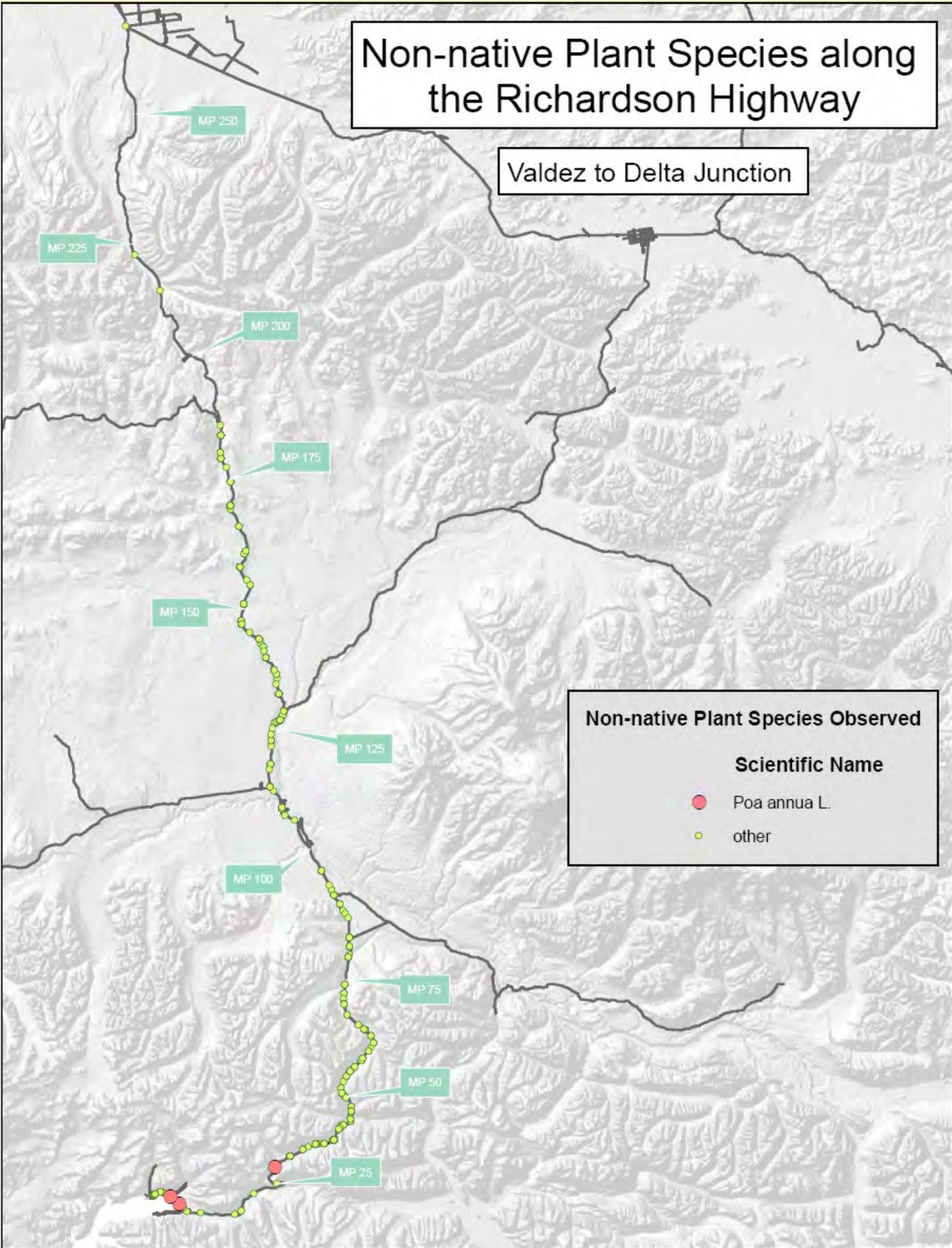
Non-native Plant Species along the Richardson Highway

Valdez to Delta Junction

Non-native Plant Species Observed

Scientific Name

- *Poa annua* L.
- other



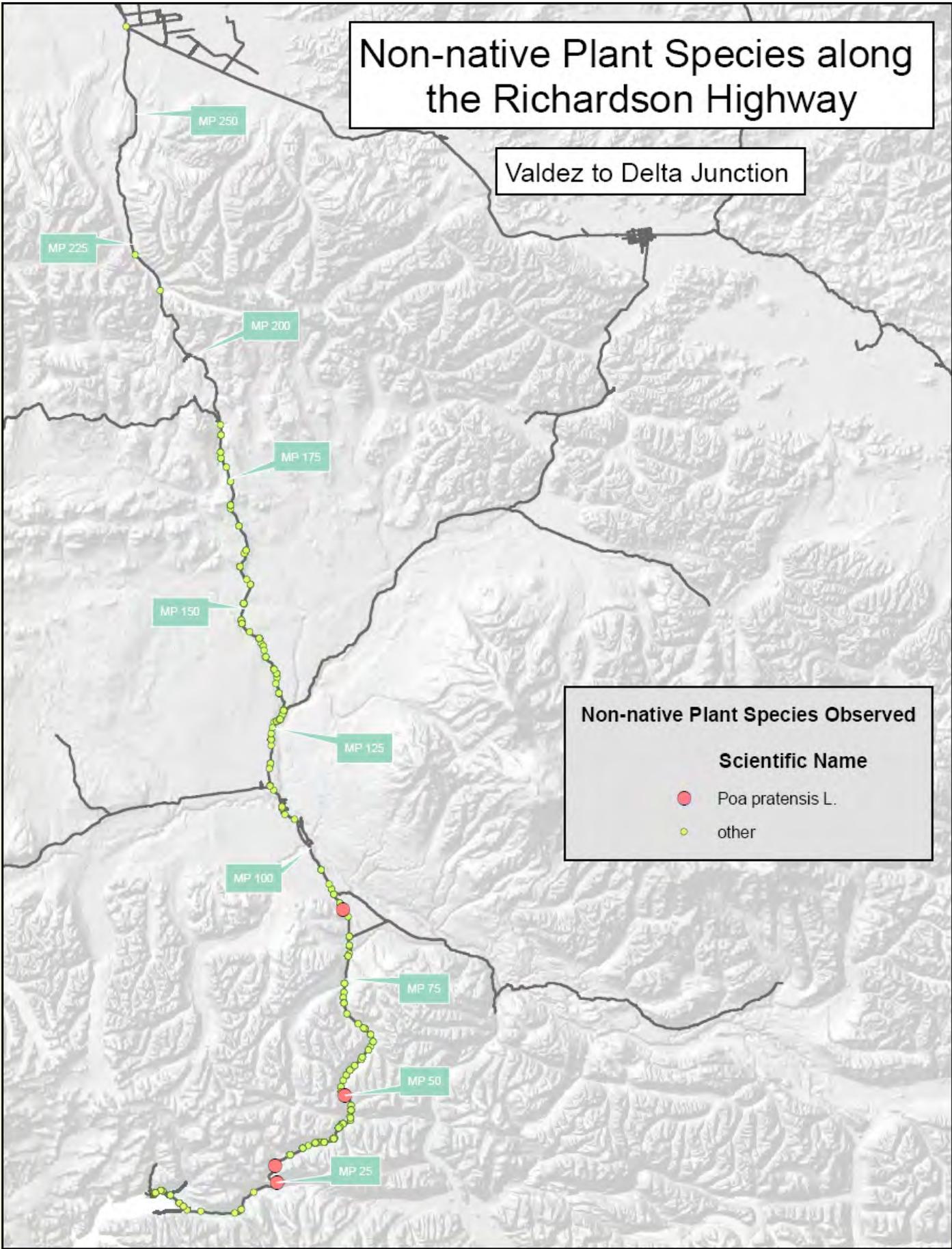
Non-native Plant Species along the Richardson Highway

Valdez to Delta Junction

Non-native Plant Species Observed

Scientific Name

- *Poa pratensis* L.
- other

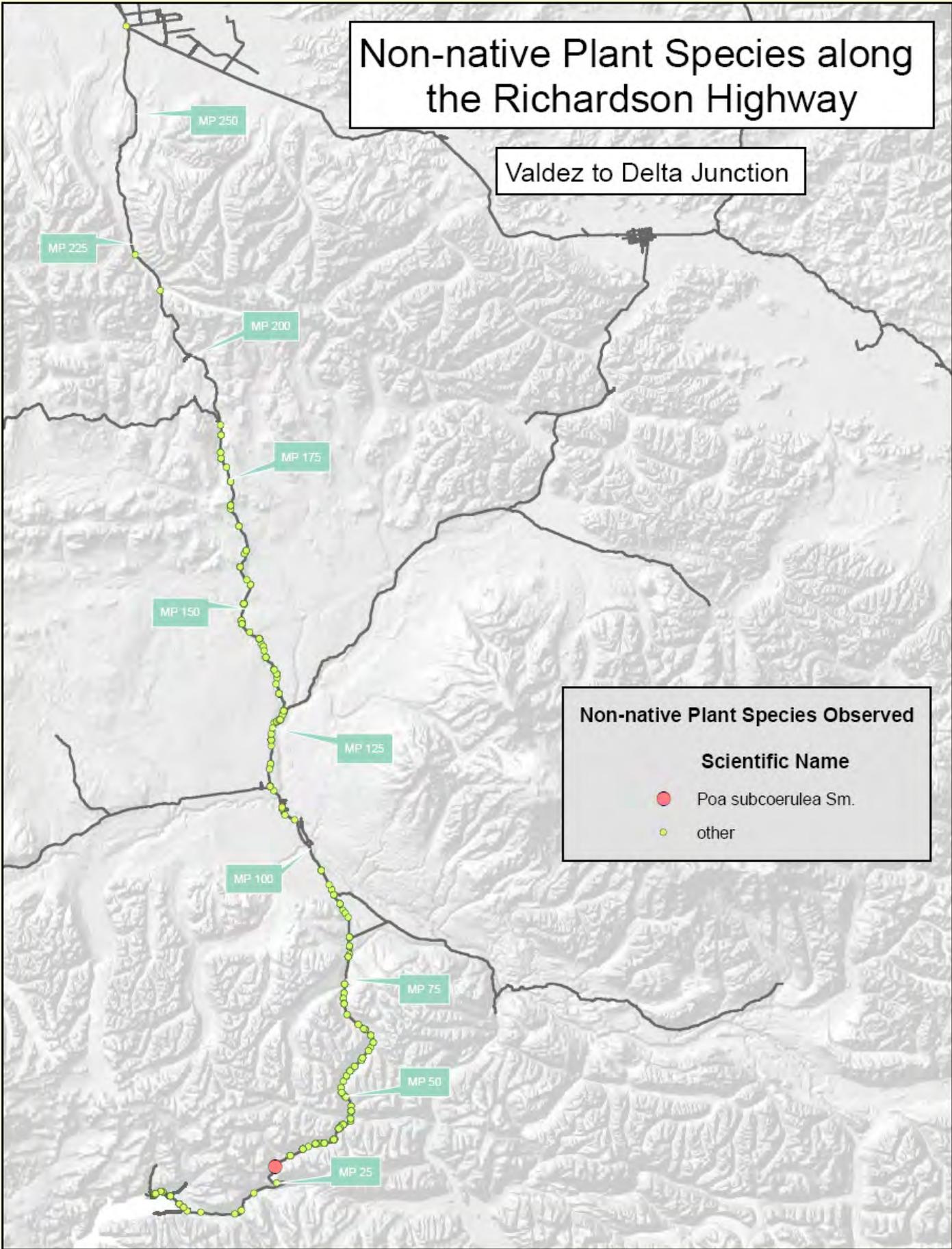


Non-native Plant Species along the Richardson Highway

Valdez to Delta Junction

Non-native Plant Species Observed

Scientific Name	
●	<i>Poa subcoerulea</i> Sm.
●	other



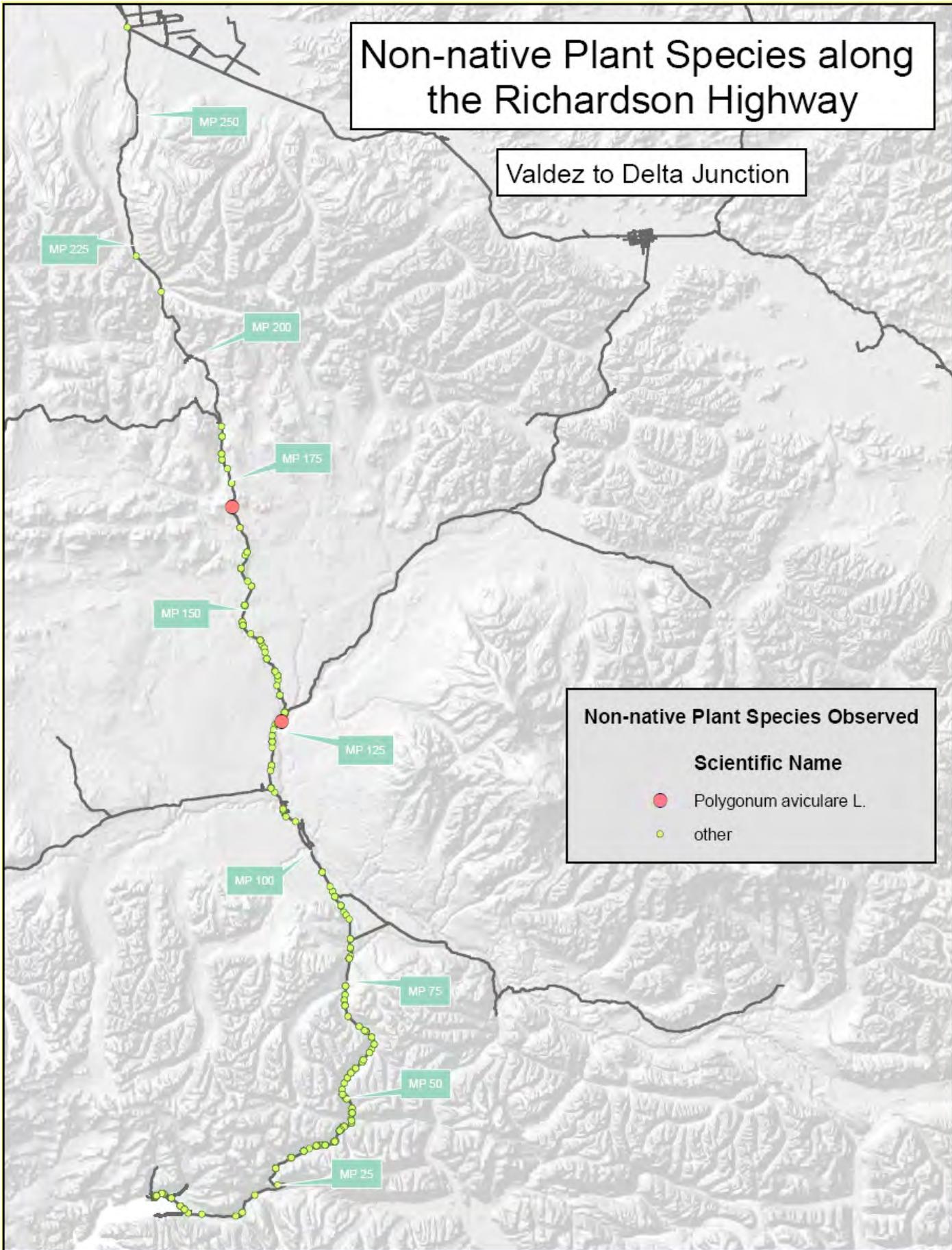
Non-native Plant Species along the Richardson Highway

Valdez to Delta Junction

Non-native Plant Species Observed

Scientific Name

- *Polygonum aviculare* L.
- other



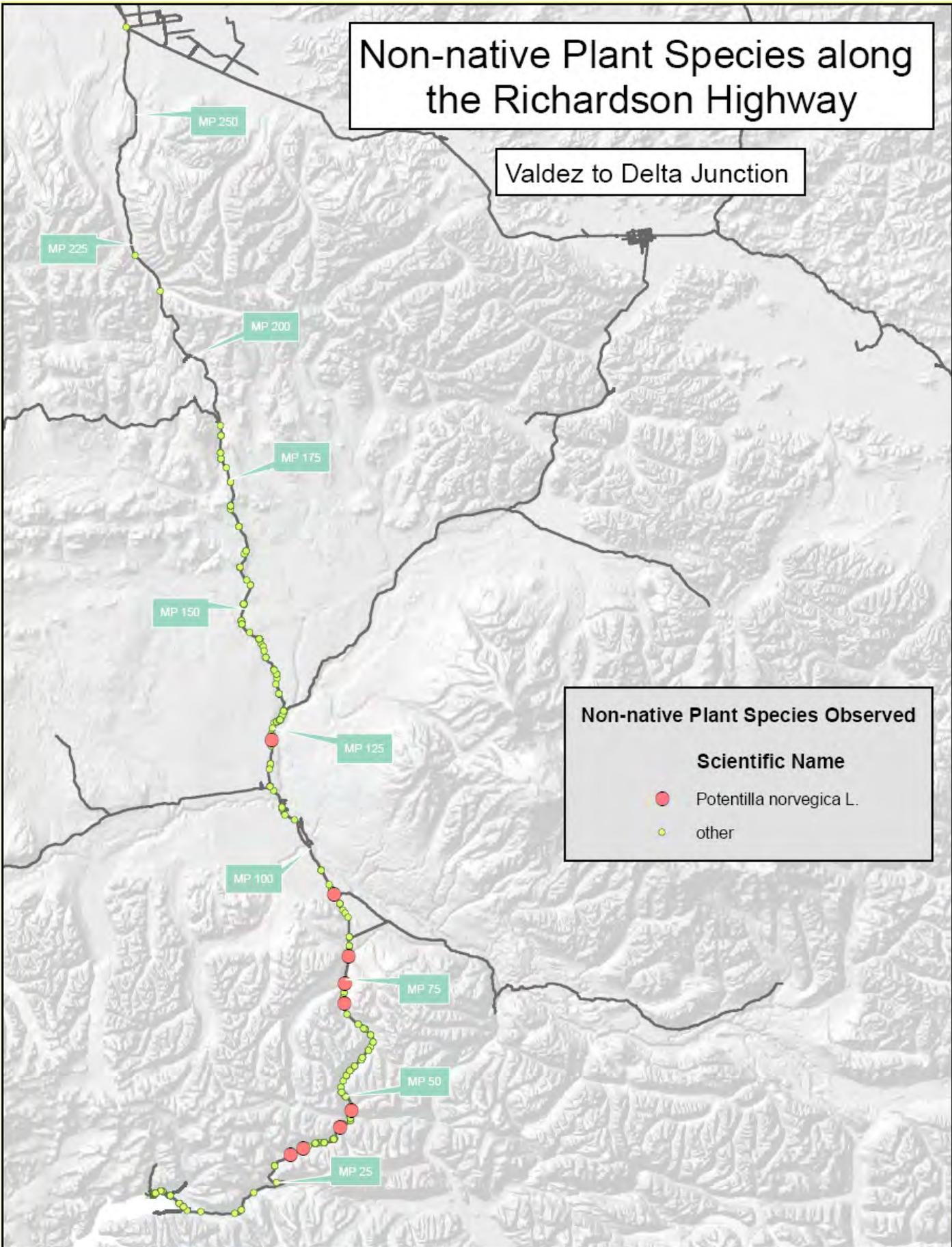
Non-native Plant Species along the Richardson Highway

Valdez to Delta Junction

Non-native Plant Species Observed

Scientific Name

- *Potentilla norvegica* L.
- other



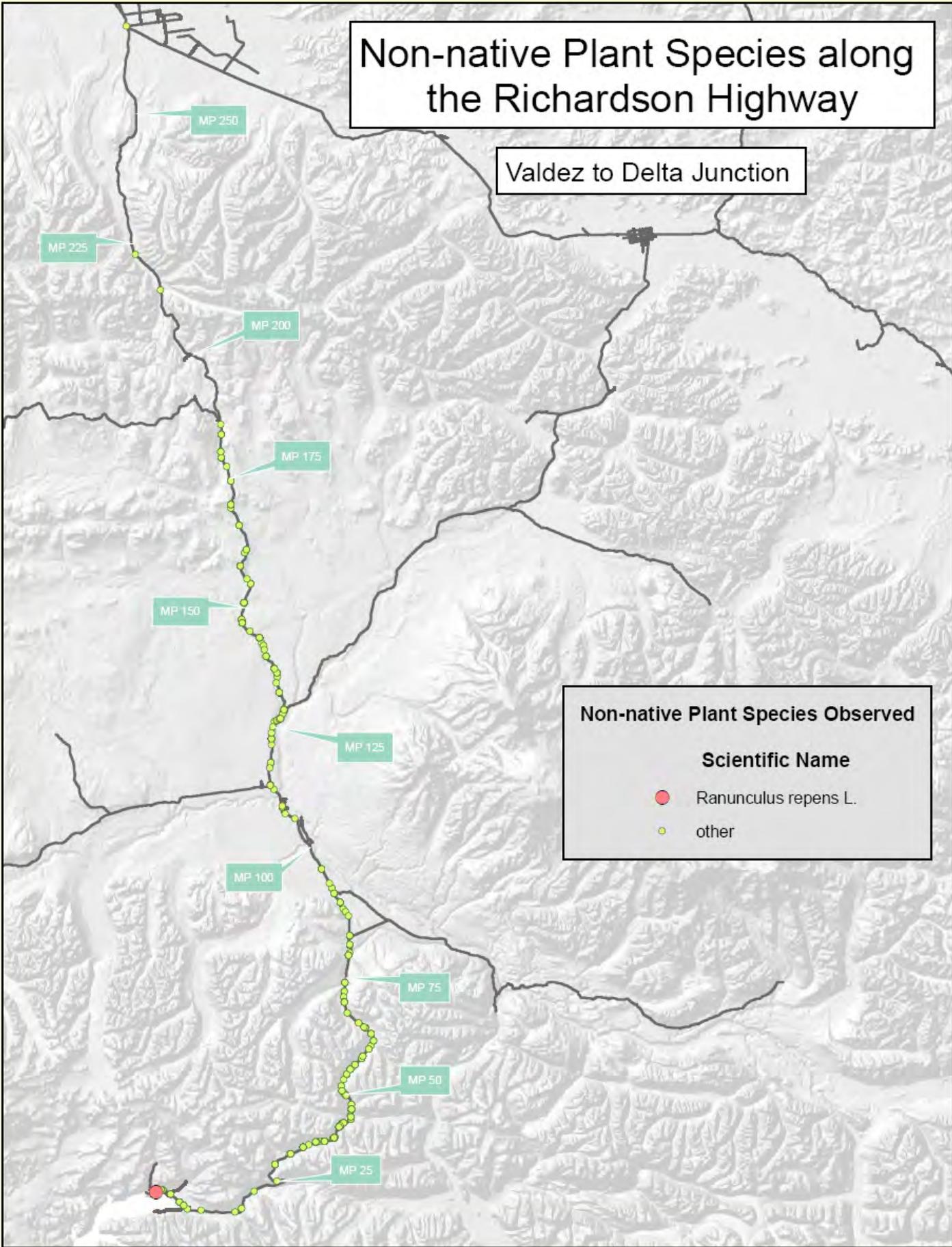
Non-native Plant Species along the Richardson Highway

Valdez to Delta Junction

Non-native Plant Species Observed

Scientific Name

- *Ranunculus repens* L.
- other

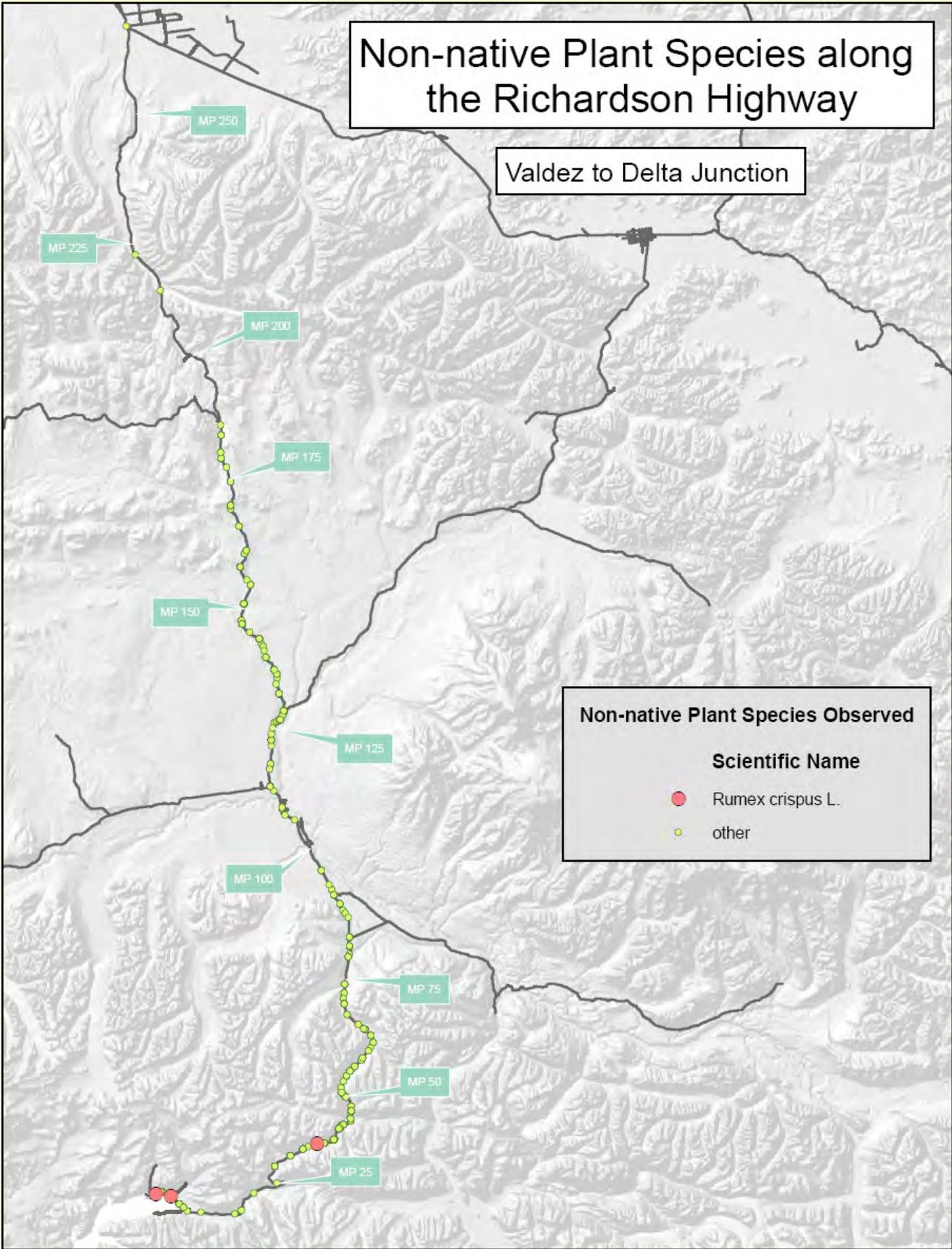


Non-native Plant Species along the Richardson Highway

Valdez to Delta Junction

Non-native Plant Species Observed

Scientific Name	
	<i>Rumex crispus</i> L.
	other



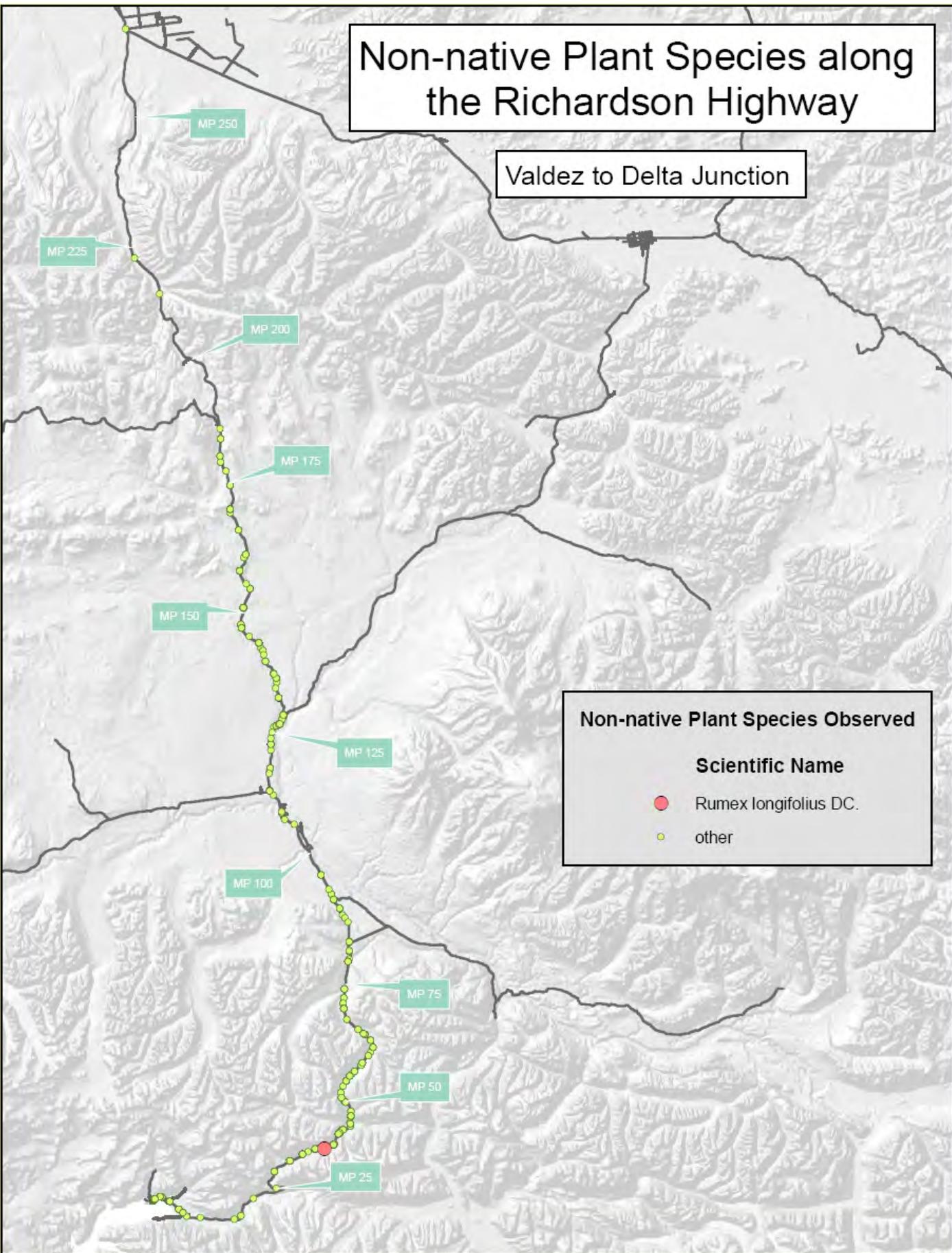
Non-native Plant Species along the Richardson Highway

Valdez to Delta Junction

Non-native Plant Species Observed

Scientific Name

- *Rumex longifolius* DC.
- other



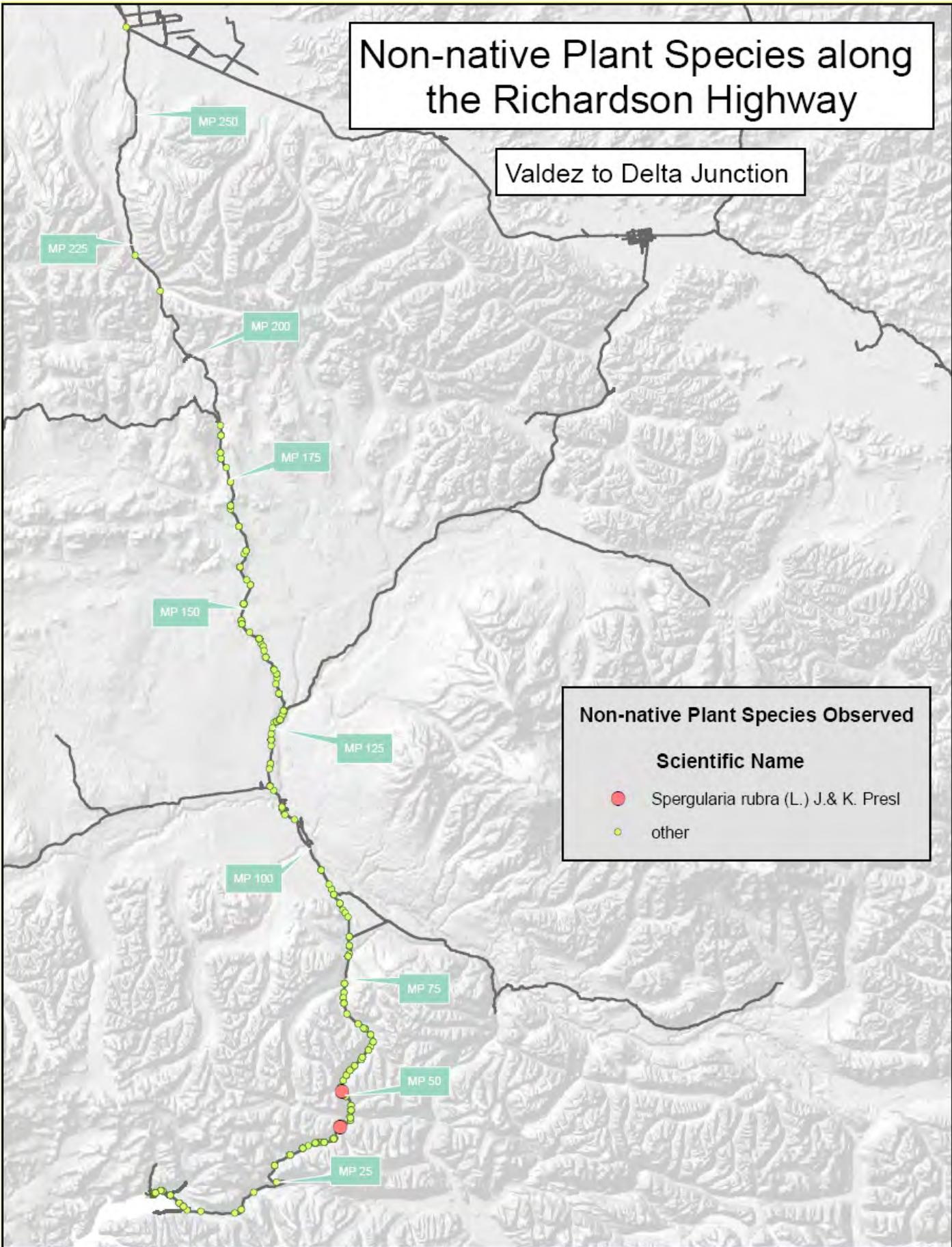
Non-native Plant Species along the Richardson Highway

Valdez to Delta Junction

Non-native Plant Species Observed

Scientific Name

- *Spergularia rubra* (L.) J. & K. Presl
- other



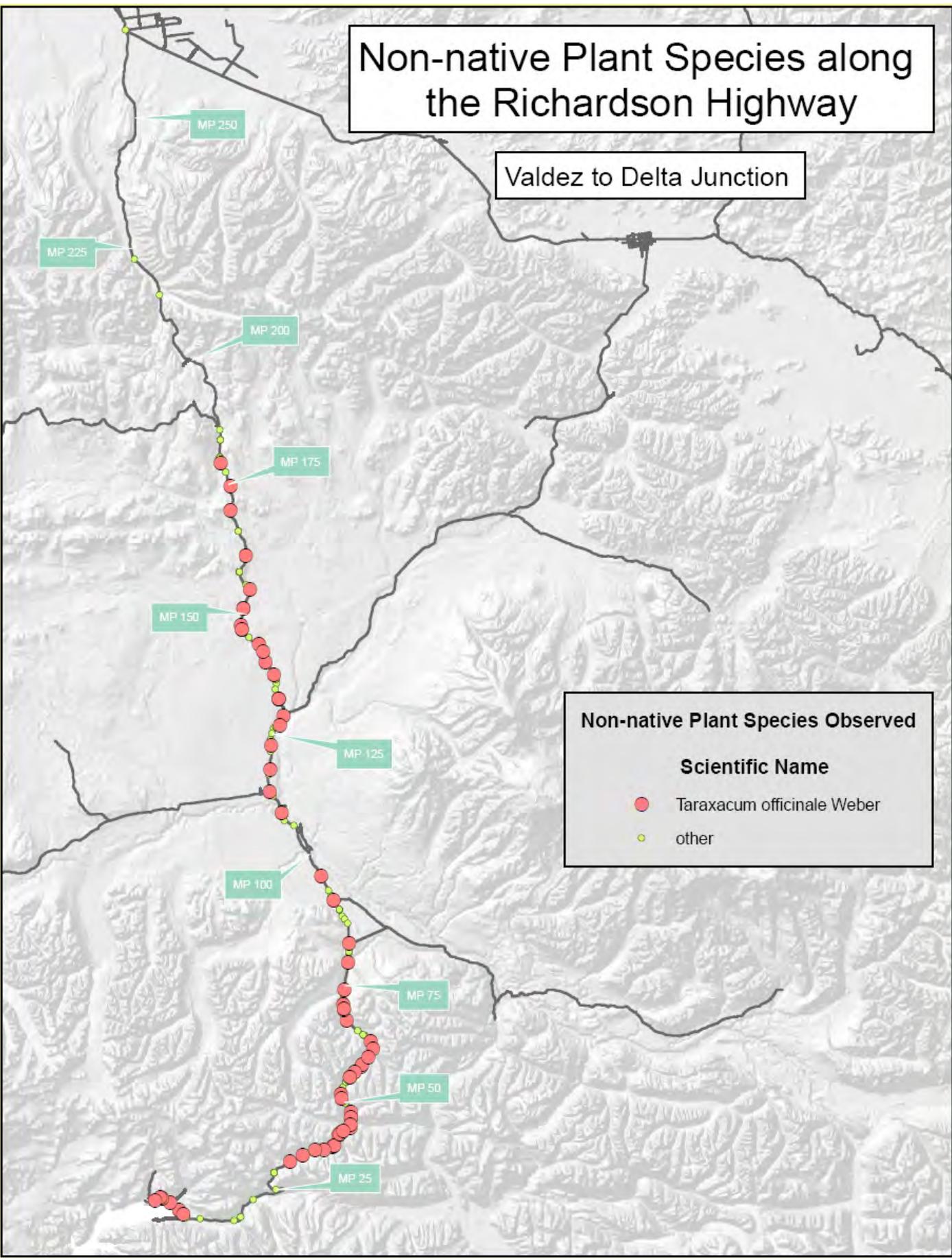
Non-native Plant Species along the Richardson Highway

Valdez to Delta Junction

Non-native Plant Species Observed

Scientific Name

- *Taraxacum officinale* Weber
- other



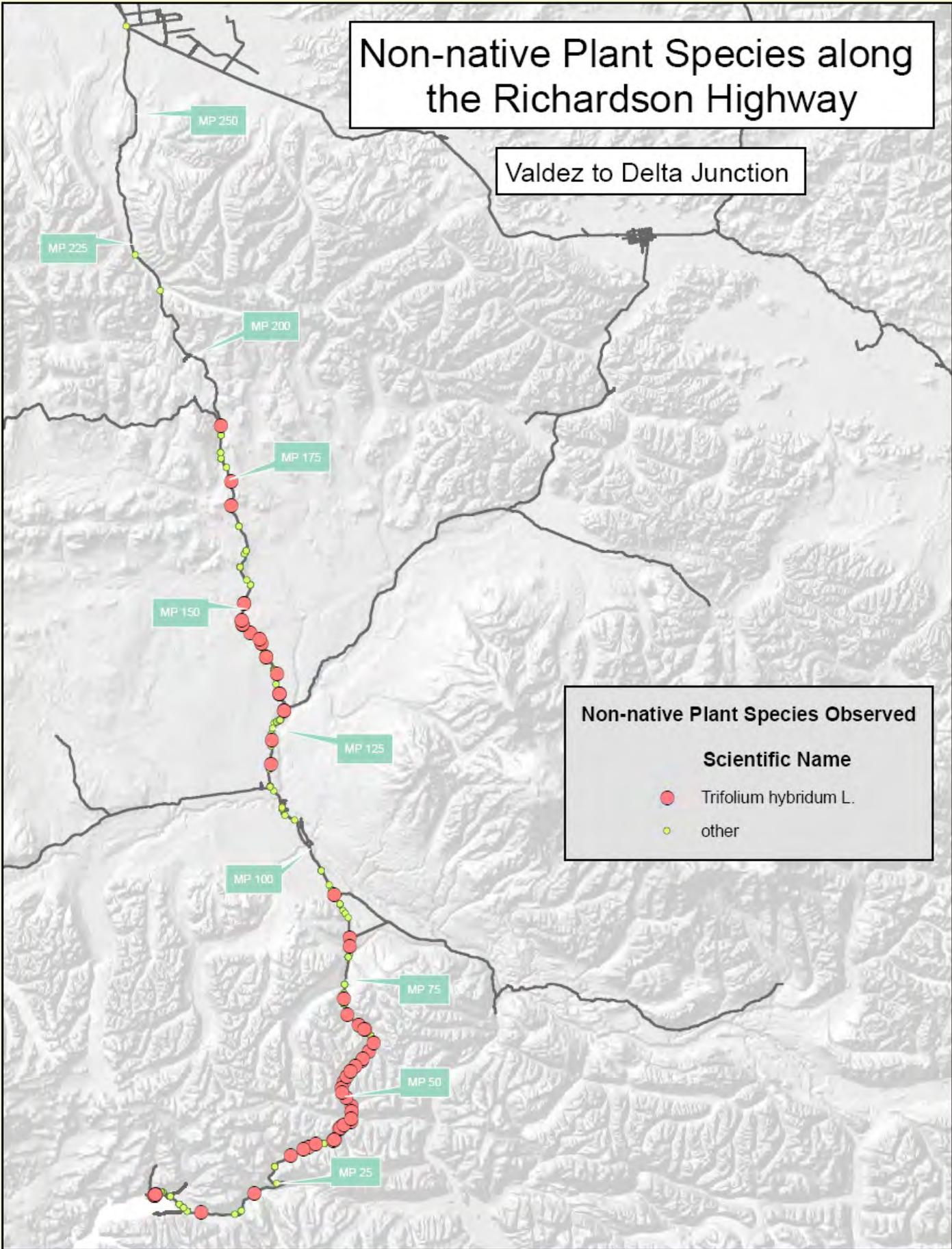
Non-native Plant Species along the Richardson Highway

Valdez to Delta Junction

Non-native Plant Species Observed

Scientific Name

- *Trifolium hybridum* L.
- other



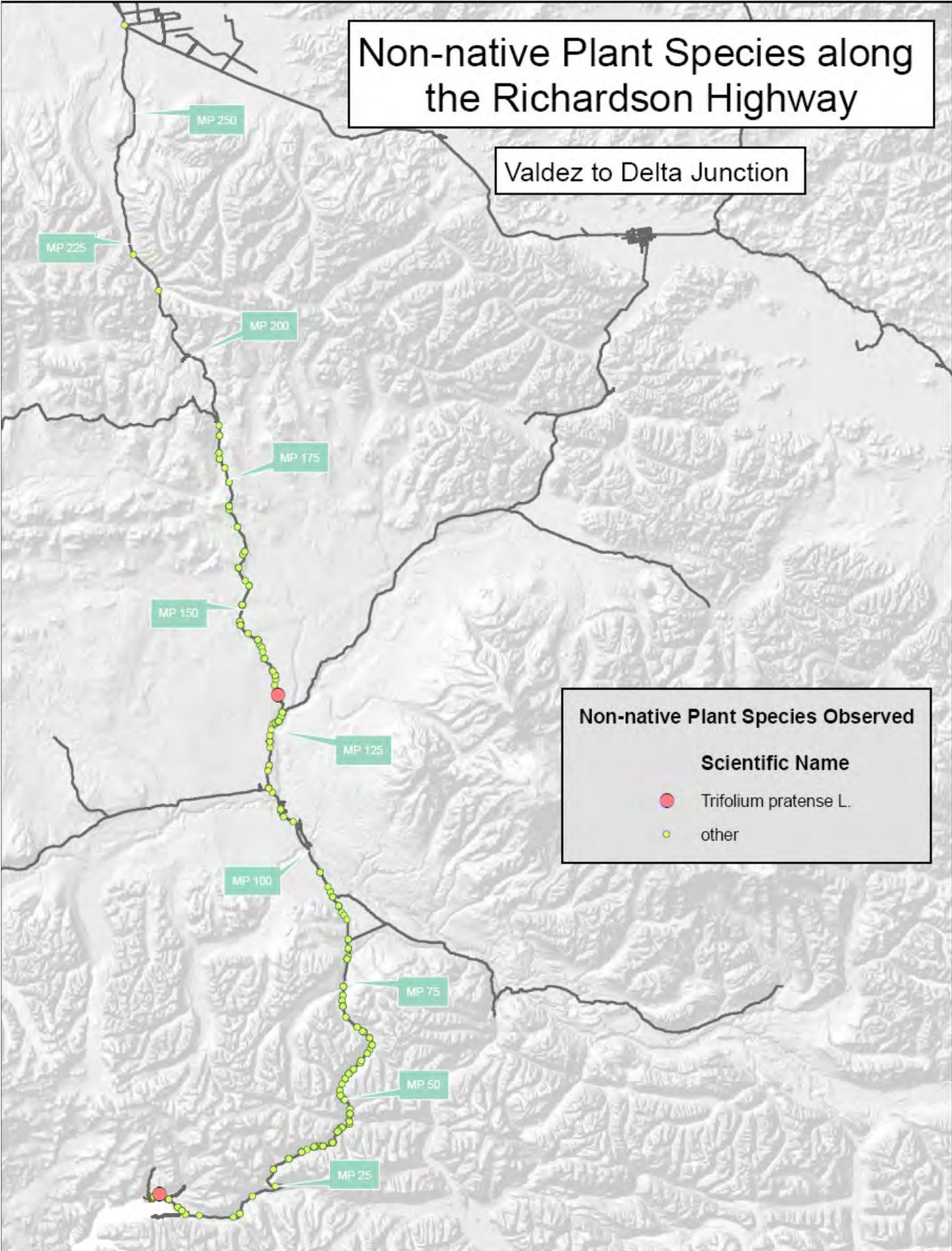
Non-native Plant Species along the Richardson Highway

Valdez to Delta Junction

Non-native Plant Species Observed

Scientific Name

- *Trifolium pratense* L.
- other



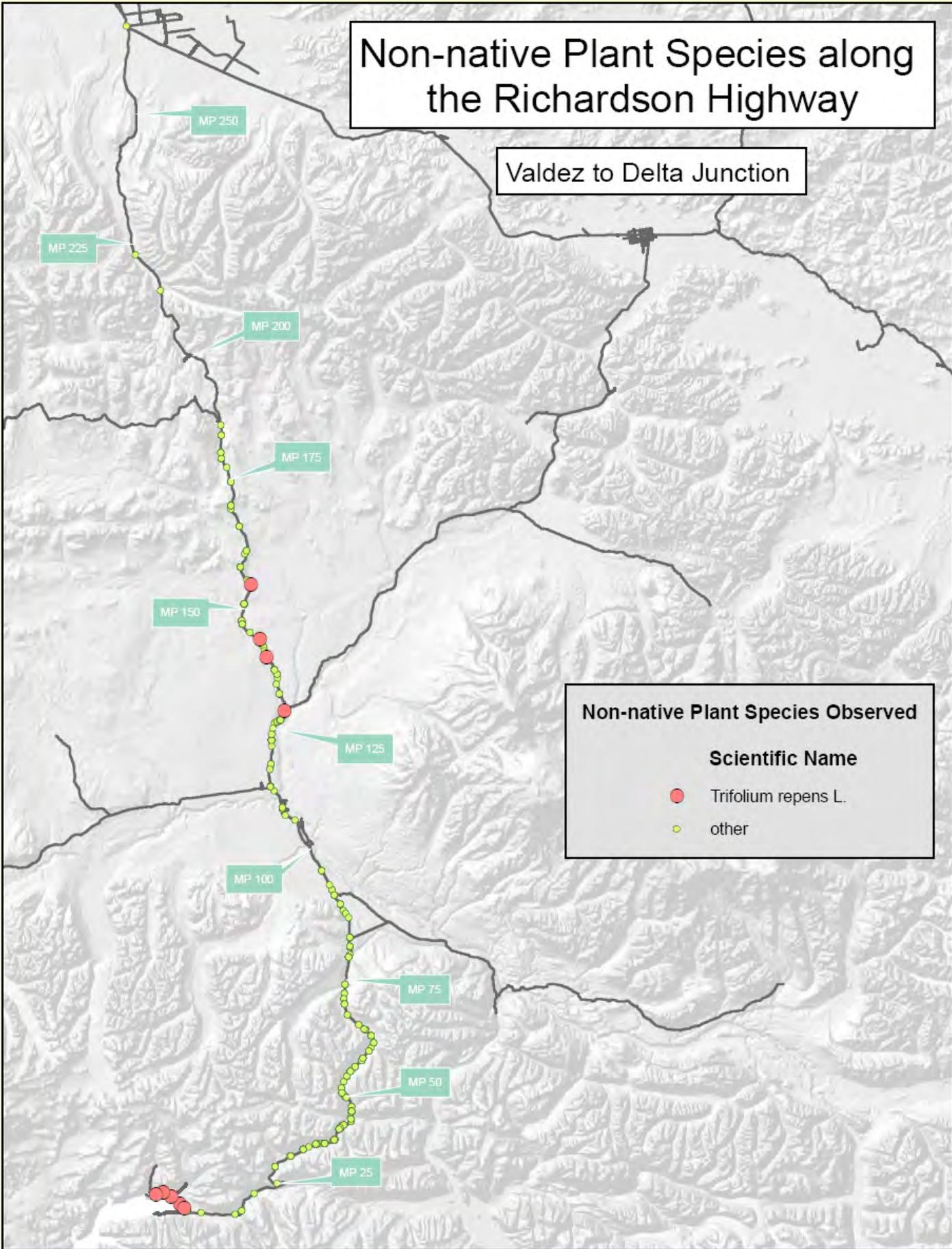
Non-native Plant Species along the Richardson Highway

Valdez to Delta Junction

Non-native Plant Species Observed

Scientific Name

- *Trifolium repens* L.
- other



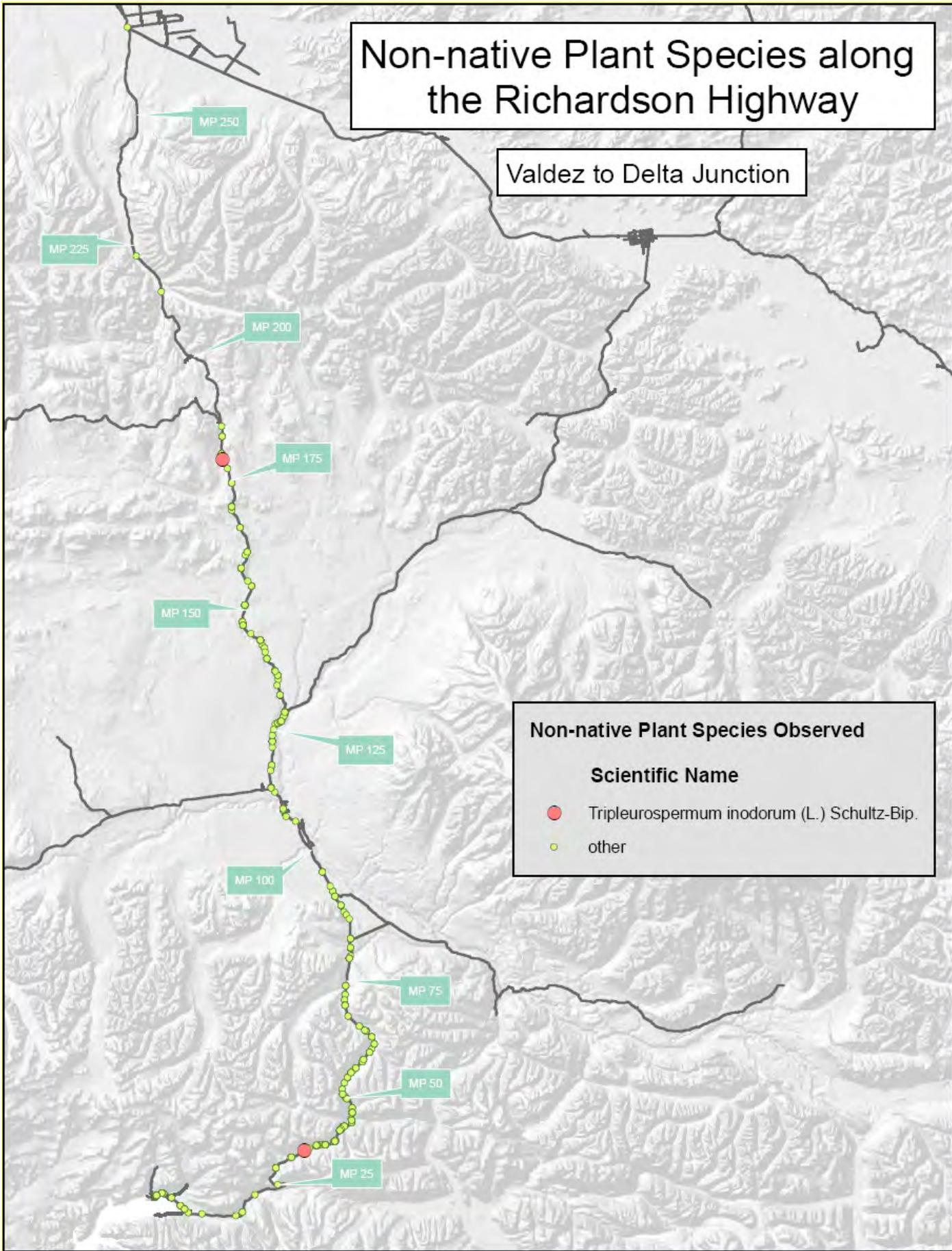
Non-native Plant Species along the Richardson Highway

Valdez to Delta Junction

Non-native Plant Species Observed

Scientific Name

- *Tripleurospermum inodorum* (L.) Schultz-Bip.
- other

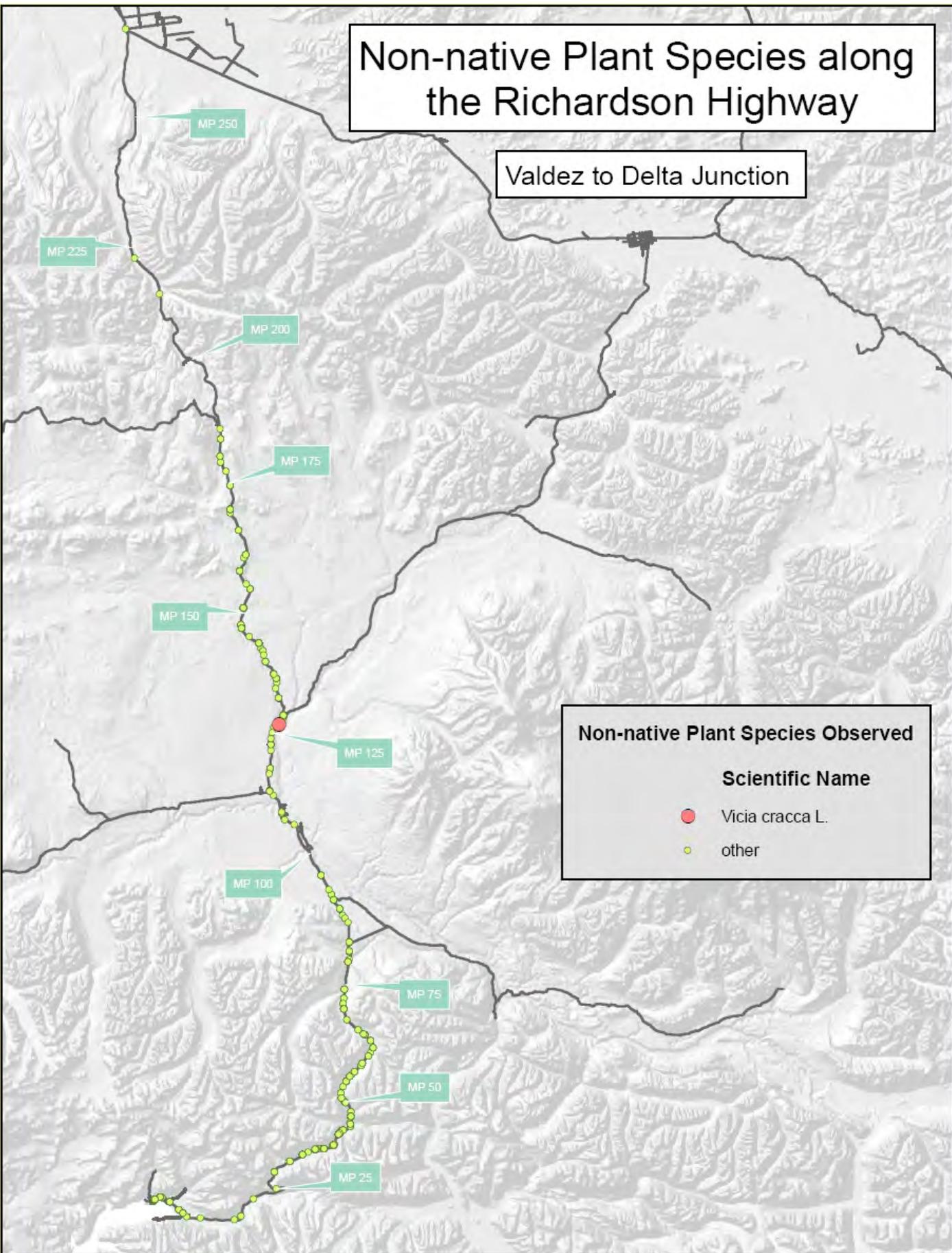


Non-native Plant Species along the Richardson Highway

Valdez to Delta Junction

Non-native Plant Species Observed

Scientific Name	
●	<i>Vicia cracca</i> L.
●	other



Appendix D. Non-Native Plants of Alaska from AKEPIC

CODE	Scientific name (Hultén 1968; or Kartesz *)	Common name	Family
ACFI	<i>Achillea filipendulina</i> Lam.	fernleaf yarrow	Asteraceae
ACMIM2	<i>Achillea millefolium</i> L. sens. str.	common yarrow	Asteraceae
ACPT	<i>Achillea ptarmica</i> L.	sneezeweed	Asteraceae
AGCR	<i>Agropyron cristatum</i> L. Gaertn.	crested wheatgrass	Poaceae
PASM	<i>Agropyron smithii</i> Rydb.	western wheatgrass	Poaceae
AGGI2	<i>Agrostis gigantea</i> Roth	creeping bentgrass, red top	Poaceae
AGST2	<i>Agrostis stolonifera</i> L.	creeping bentgrass, red top	Poaceae
AGCA5	<i>Agrostis tenuis</i> Sibth.	colonial bentgrass	Poaceae
ALPE4	<i>Alliaria petiolata</i> (Bieb.) Cavara & Grande	garlic mustard	Brassicaceae
ALGE2	<i>Alopecurus geniculatus</i> L.	water foxtail	Poaceae
ALPR3	<i>Alopecurus pratensis</i> L.	meadow foxtail	Poaceae
AMRE	<i>Amaranthus retroflexus</i> L.	redroot pigweed	Amaranthaceae
ANMA	<i>Anaphalis margaritacea</i> (L.) Benth.	western pearly everlasting	Asteraceae
ANCO2	<i>Anthemis cotula</i> L.	mayweed, stinking chamomile	Asteraceae
ANTI	<i>Anthemis tinctoria</i> L.	yellow chamomile	Asteraceae
MIOR	<i>Antirrhinum orontium</i> L.	snapdragon	Scrophulariaceae
ARGL	<i>Arabis glabra</i> L. Bernh.	tower rockcress	Brassicaceae
ARDR4	<i>Artemisia dracunculus</i> L.	tarragon	Asteraceae
ASPR	<i>Asperugo procumbens</i> L.	catchweed, mudwort	Boraginaceae
ASPR	<i>Asperugo procumbens</i> L.	German-madwort	Boraginaceae
ASCI4	<i>Astragalus cicer</i> L.??*	chickpea milkvetch, cicer milkvetch	Fabaceae
AVFA	<i>Avena fatua</i> L.	wildoats	Poaceae
BEIN2	<i>Berteroa incana</i>	hoary false madwort	Brassicaceae
BEPE3	<i>Betula pendula</i>	European white birch	Betulaceae
BICE	<i>Bidens cernua</i> L.	bur-marigold, nodding beggar-ticks	Asteraceae
BRJU	<i>Brassica juncea</i> (L.) Czern.	indian mustard	Brassicaceae
BRNA	<i>Brassica napus</i> L.	rape	Brassicaceae
BRRR	<i>Brassica rapa</i> L.	field mustard	Brassicaceae
BRRAR	<i>Brassica rapa</i> L. var. <i>rapa</i>	purple-topped turnip	Brassicaceae
BRHO2	<i>Bromus hordeaceus</i> L.	soft brome	Poaceae
BRINI	<i>Bromus inermis</i> Leyss.	smooth brome	Poaceae
BRSE	<i>Bromus secalinus</i>	rye brome, cheat	Poaceae
BRTE	<i>Bromus tectorum</i> L.	cheatgrass, downy brome	Poaceae
CASES	<i>Calystegia sepium</i> (L.) R. Br. ssp. <i>sepium</i>	hedge false bindweed	Convolvulaceae
CABU2	<i>Capsella bursa-pastoris</i> (L.) Medik.	shepherd's purse	Brassicaceae
CABU2	<i>Capsella rubella</i> Reut.	shepherd's purse	Brassicaceae
CAAR18	<i>Caragana arborescens</i> Lam.	Siberian peashrub	Fabaceae
CADE9	<i>Carex deweyana</i> Schwein.	Dewey sedge	Cyperaceae
CEBI2	<i>Centaurea biebersteinii</i>	Spotted knapweed	Asteraceae
CEMO	<i>Centaurea montana</i>	perennial cornflower	Asteraceae
CEFO2	<i>Cerastium fontanum</i>	larger mouse-eared chickweed	Caryophyllaceae

CODE	Scientific name (Hultén 1968; or Kartesz *)	Common name	Family
CEGL2	<i>Cerastium glomeratum</i> Thuill.	stickt chickweed	Caryophyllaceae
CHALA	<i>Chenopodium album</i> L.	lamb's quarters	Chenopodiaceae
CHBE4	<i>Chenopodium berlandieri</i> L.	pitseed goosefoot	Chenopodiaceae
CHLE4	<i>Chenopodium leptophyllum</i> (Moq.) Nutt. ex S. Wats.	narrowleaf goosefoot	Chenopodiaceae
CIIN	<i>Cichorium intybus</i>	chicory	Asteraceae
CIAR4	<i>Cirsium arvense</i> (L.) Scop.	Canada thistle	Asteraceae
CIVU	<i>Cirsium vulgare</i> (Savi) Ten.	bull thistle	Asteraceae
COLI2	<i>Collomia linearis</i>	tiny trumpet	Polemoniaceae
COAR4	<i>Convolvulus arvensis</i>	field bindweed	Convolvulaceae
COCA5	<i>Conyza canadensis</i>	Canadian horseweed	Asteraceae
COCO7	<i>Cotula coronopifolia</i> L.	Brass Buttons	Asteraceae
CRTE3	<i>Crepis tectorum</i> L.	annual hawksbeard	Asteraceae
CYSC4	<i>Cytisus scoparius</i> (L.) Link	Scotch Broom	Fabaceae
DAGL	<i>Dactylis glomerata</i> L.	orchard grass	Poaceae
DACA6	<i>Daucus carota</i> L.	Queen Anne's lace	Apiaceae
DESO	<i>Delphinium sonnei</i> Greene		Brassicaceae
DEEL	<i>Deschampsia elongata</i> (Hook.) Munro	slender hairgrass	Poaceae
DEPI	<i>Descurainia pinnata</i>	western tansy mustard	Brassicaceae
DESO2	<i>Descurainia sophia</i> (L.) Webb ex Prantl	tansy mustard	Brassicaceae
DIDE	<i>Dianthus deltoides</i> L.	maiden pink	Caryophyllaceae
DIPU	<i>Digitalis purpurea</i> L.	purple foxglove, foxglove	Scrophulariaceae
DRMO	<i>Dracocephalum moldavica</i> L.	Moldavian dragonhead	Lamiaceae
ELRE4	<i>Elymus repens</i> (L.) Beauv.*	quackgrass	Poaceae
ELSI	<i>Elymus sibiricus</i> L.	Siberian wild rye	Poaceae
ELTRS	<i>Elymus trachycaulus</i>	slender wheatgrass	Poaceae
ERCI6	<i>Erodium cicutarium</i>	redstem stork's bill	Geraniaceae
ERGA	<i>Erucastrum gallicum</i> (Willd.) O.E. Schulz*	common dogmustard	Brassicaceae
ERCH9	<i>Erysimum cheiranthoides</i> L. subsp. <i>cheiranthoides</i>	wormseed mustard	Brassicaceae
EUNE3	<i>Euphrasia nemorosa</i>	common eyebright	Scrophulariaceae
LOAR10	<i>Festuca arundinacea</i> (Schreb.) S.J. Darbyshire	tall fescue	Poaceae
FRAN	<i>Fragaria ananassa</i> Duchesne (pro sp.) [<i>chiloensis</i> x <i>virginiana</i>]	domestic strawberry	Rosaceae
GABI3	<i>Galeopsis bifida</i> Boenn.	splitlip hempnettle	Lamiaceae
GATE2	<i>Galeopsis tetrahit</i> L.	brittlestem hempnettle	Lamiaceae
GEPU2	<i>Geranium pusillum</i> L.*	small geranium	Geraniaceae
GNPA	<i>Gnaphalium palustre</i>	marsh cudweed	Asteraceae
HEAN3	<i>Helianthus annuus</i> L.	annual (common) sunflower	Asteraceae
HIAU	<i>Hieracium aurantiacum</i> L.	orange hawkweed	Asteraceae
HICA10	<i>Hieracium caespitosum</i> Dumort.	meadow hawkweed	Asteraceae
HILA8	<i>Hieracium lachenalii</i> K.C. Gmel.	Common hawkweed	Asteraceae
HIPIP	<i>Hieracium pilosella</i> L.	mouseear hawkweed	Asteraceae
HIUM	<i>Hieracium umbellatum</i>	Narrow-leaf Hawkweed	Asteraceae
HOLA	<i>Holcus lanatus</i> L.	Common velvetgrass	Poaceae
HOJU	<i>Hordeum jubatum</i> L.	foxtail barley	Poaceae

CODE	Scientific name (Hultén 1968; or Kartesz *)	Common name	Family
HOMUL	<i>Hordeum murinum</i> L. spp <i>leporinum</i> (Link)	Leporium barley	Poaceae
HOVU	<i>Hordeum vulgare</i> L.	common barley	Poaceae
HYPE	<i>Hypericum perforatum</i> L.	common St. Johnswort	Clusiaceae
HYRA3	<i>Hypochoeris radicata</i> L.	cat's-ears	Asteraceae
IMGL	<i>Impatiens glandulifera</i>	ornamental jewelweed	Balsaminaceae
LASE	<i>Lactuca serriola</i> L.	prickly lettuce	Asteraceae
LAAL	<i>Lamium album</i>	white deadnettle	Lamiaceae
LASQ	<i>Lappula squarrosa</i>	European stickweed	Boraginaceae
LEAU2	<i>Leontodon autumnalis</i> L.	fall dandelion	Asteraceae
LEHI4	<i>Leontodon hirtus</i> L.	rough hawkbit	Asteraceae
LEDED	<i>Lepidium densiflorum</i>	common pepperweed	Brassicaceae
LEDE	<i>Lepidium densiflorum</i> Schrad	common peppergrass	Brassicaceae
LEA2	<i>Lepidium ramosissimum</i>	many-branched pepperwood	Brassicaceae
LEMA8	<i>Leucanthemum maximum</i>	shasta daisy	Asteraceae
LEVU	<i>Leucanthemum vulgare</i> Lam.*	ox-eye daisy	Asteraceae
LEOF	<i>Levisticum officinale</i> W.D.J. Koch	garden lovage	Apiaceae
LIP13	<i>Linaria pinifolia</i>	pine needle toadflax	Scrophulariaceae
LIVU2	<i>Linaria vulgaris</i> P. Mill.	butter and eggs	Scrophulariaceae
LOPEM2	<i>Lolium multiflorum</i> Lam.	Italian rye grass	Poaceae
LOPEP	<i>Lolium perenne</i> L.	perennial rye grass	Poaceae
LOTA	<i>Lonicera tatarica</i> L.	Tatarian honeysuckle	Caprifoliaceae
LOCO6	<i>Lotus corniculatus</i>	bird's foot trefoil	Fabaceae
LUPOP4	<i>Lupinus polyphyllus</i> Lindl.	large-leaf lupine	Fabaceae
LUPOP4	<i>Lupinus x pseudopolyphyllus</i> *	Kenai lupine	Fabaceae
LYCH3	<i>Lychnis chalconica</i> L.	maltese cross	Caryophyllaceae
LYHY2	<i>Lythrum hyssopifolia</i> L.*	hyssop loosestrife	Lythraceae
LYSA2	<i>Lythrum salicaria</i>	Purple Loosestrife	Lythraceae
MADI6	<i>Matricaria discoidea</i> DC	pineappleweed	Asteraceae
MESAF	<i>Medicago falcata</i> L.	yellow alfalfa	Fabaceae
MELU	<i>Medicago lupulina</i> L.	black medic, hop clover	Fabaceae
MEMI	<i>Medicago minima</i>	burr medic	Fabaceae
MESAS	<i>Medicago sativa</i> L.	alfalfa	Fabaceae
SINO	<i>Melandrium noctiflorum</i> (L.) Fries	night-flowering catchfly	Caryophyllaceae
MEAL12	<i>Melilotus alba</i> Medikus	white sweet clover	Fabaceae
MEOF	<i>Melilotus officinalis</i> (L.) Lam.	yellow sweet clover	Fabaceae
MESP3	<i>Mentha spicata</i>	spearmint	Lamiaceae
MYMU	<i>Mycelis muralis</i>	wall lettuce	Asteraceae
MYSC	<i>Myosotis scorpioides</i> L.	true forget-me-not	Boraginaceae
MYSP2	<i>Myriophyllum spicatum</i> L. (sens. str.)*	Eurasian watermilfoil	Halagoraceae
NEPA3	<i>Neslia paniculata</i> (L.) Desv.	ball mustard	Brassicaceae
ONVI	<i>Onobrychis viciifolia</i> Scop.*	sainfoin, saintfoin	Fabaceae
ONAC	<i>Onopordum acanthium</i>	Scotch Thistle	Asteraceae
PANU3	<i>Papaver nudicaule</i> L.	Iceland poppy	Papaveraceae
PHAR3	<i>Phalaris arundinacea</i>	Reed Canary Grass	Poaceae
PHCA5	<i>Phalaris canariensis</i> L.	Canary grass	Poaceae

CODE	Scientific name (Hultén 1968; or Kartesz *)	Common name	Family
PHPR3	<i>Phleum pratense</i> L.	Timothy	Poaceae
PLLA	<i>Plantago lanceolata</i> L.	ribgrass, buckhorn, English plantain	Plantaginaceae
PLMA2	<i>Plantago major</i> L. var. <i>major</i>	common plantain	Plantaginaceae
POPRP2	<i>Poa angustifolia</i> L.	Kentucky bluegrass	Poaceae
POAN	<i>Poa annua</i> L.	annual bluegrass	Poaceae
POCO	<i>Poa compressa</i> L.	Canada bluegrass	Poaceae
POGL	<i>Poa glauca</i> Vahl.	glaucous bluegrass	Poaceae
POPA2	<i>Poa palustris</i> L.	fowl bluegrass	Poaceae
POPR	<i>Poa pratensis</i> L.	bluegrass	Poaceae
POPRI2	<i>Poa subcoerulea</i> Sm.	spreading bluegrass	Poaceae
POTR2	<i>Poa trivialis</i> L.	rough bluegrass	Poaceae
POAV	<i>Polygonum aviculare</i> L.	knotweed	Polygonaceae
POCO10	<i>Polygonum convolvulus</i> L.	black bindweed, wild buckwheat	Polygonaceae
POCU6	<i>Polygonum cuspidatum</i>	Japanese knotweed	Polygonaceae
POLA4	<i>Polygonum lapathifolium</i> L.	willow weed	Polygonaceae
POPE3	<i>Polygonum persicaria</i> L.	lady's-thumb	Polygonaceae
ARAN7	<i>Potentilla anserina</i> L.	silverweed	Rosaceae
POGR9	<i>Potentilla gracilis</i> Dougl. ex Hook.	slender cinquefoil	Rosaceae
PONO3	<i>Potentilla norvegica</i> L.	Norwegian cinquefoil	Rosaceae
PRPA5	<i>Prunus padus</i> L.	European birdcherry	Rosaceae
RAAC3	<i>Ranunculus acris</i> L.	tall buttercup	Ranunculaceae
RARE3	<i>Ranunculus repens</i> L.	creeping buttercup	Ranunculaceae
RASA2	<i>Raphanus sativus</i> L.	cultivated radish	Brassicaceae
ROSY	<i>Rorippa sylvestris</i> (L.) Bess.*	creeping yellowcress	Brassicaceae
RUDI2	<i>Rubus discolor</i> Weihe and Nees	Himalayan blackberry	Rosaceae
RUACA	<i>Rumex acetosa</i> L. spp. <i>acetosa</i>	garden sorrel	Polygonaceae
RUAC3	<i>Rumex acetosella</i> L. ssp. <i>acetosella</i>	sheep sorel	Polygonaceae
RUAC3	<i>Rumex acetosella</i> L. ssp. <i>angiocarpus</i> (Murb.) Murb.	sheep sorel	Polygonaceae
RUCR	<i>Rumex crispus</i> L.	curled dock	Polygonaceae
RULO2	<i>Rumex longifolius</i> DC.	garden dock	Polygonaceae
RUOB	<i>Rumex obtusifolius</i> L.	bitter dock	Polygonaceae
SAOF4	<i>Saponaria officinalis</i> L.	bouncingbet	Caryophyllaceae
SCMA8	<i>Scirpus paludosus</i> A. Nels.	bayonet grass	Cyperaceae
SEJA	<i>Senecio jacobea</i> L.	tansy ragwort, stinky Willie	Asteraceae
SEVU	<i>Senecio vulgaris</i> L.	common groundsel	Asteraceae
SEVI4	<i>Setaria viridis</i> L. Beauv.	green bristlegrass	Poaceae
SIDI4	<i>Silene dioica</i> (L.) Clairville	red catchfly	Caryophyllaceae
SILA21	<i>Silene latifolia</i> Poir.	bladder campion	Caryophyllaceae
SILAA3	<i>Silene latifolia</i> Poir. ssp. <i>alba</i> (P. Mill.) Greuter & Burdet	bladder campion	Caryophyllaceae
SIVU	<i>Silene vulgaris</i>	maidens tears	Caryophyllaceae
SIAL5	<i>Sinapis alba</i> L.	white mustard	Brassicaceae
SIAR4	<i>Sinapsis arvensis</i> L.	charlock	Brassicaceae
SIAL2	<i>Sisymbrium altissimum</i> L.	tumbling mustard	Brassicaceae

CODE	Scientific name (Hultén 1968; or Kartesz *)	Common name	Family
SOAR2	<i>Sonchus arvensis</i>	Perennial Sowthistle	Asteraceae
SOAS	<i>Sonchus asper</i> (L.) Hill	spiny sowthistle	Asteraceae
SOOL	<i>Sonchus oleraceus</i> L.	common sowthistle	Asteraceae
SOSO2	<i>Sorbaria sorbifolia</i> (L.) A.Braun	false spiraea	Rosaceae
SOAU	<i>Sorbus aucuparia</i>	European mountain ash	Rosaceae
SPAR	<i>Spergula arvensis</i> L.	spurry	Caryophyllaceae
SPRU	<i>Spergularia rubra</i> (L.) J.& K. Presl	purple sand spurry	Caryophyllaceae
STME2	<i>Stellaria media</i> (L.) Vill.	common chickweed	Caryophyllaceae
SYOF	<i>Symphytum officinale</i>	common comfrey	Boraginaceae
TAVU	<i>Tanacetum vulgare</i> L.	common tansy	Asteraceae
TAOF	<i>Taraxacum officinale</i> Weber	common dandelion	Asteraceae
TALA2	<i>Taraxacum scanicum</i> Dahlst.	rock dandelion	Asteraceae
THAR5	<i>Thlaspi arvense</i> L.	pennycress	Brassicaceae
TRDU	<i>Tragopogon dubius</i> Scop.*	yellow salsify, goatsbeard	Asteraceae
TRAU2	<i>Trifolium aureum</i> Pollich	golden clover	Fabaceae
TRDU2	<i>Trifolium dubium</i> Sibthorp	Suckling clover	Fabaceae
TRHY	<i>Trifolium hybridum</i> L.	alsike clover	Fabaceae
TRPR2	<i>Trifolium pratense</i> L.	red clover	Fabaceae
TRRE3	<i>Trifolium repens</i> L.	white clover	Fabaceae
TRPE21	<i>Tripleurospermum inodorum</i> (L.) Schultz-Bip.	scentless mayweed	Asteraceae
TRAE	<i>Triticum aestivum</i> L.	wheat	Poaceae
VESES	<i>Veronica serpyllifolia</i> L. subsp. <i>serpyllifolia</i>	thyme-leaf speedwell	Scrophulariaceae
VIOP	<i>Viburnum opulus</i>	American cranberrybush	Caprifoliaceae
VICRC	<i>Vicia cracca</i> L.	bird vetch, dog pea	Fabaceae
VITR	<i>Viola tricolor</i> L.	johnny jumpup	Fabaceae

Appendix E. Non-Native Species Observed on the Richardson Highway: Data from both the AKEPIC Database and this Survey

Milepoint Location	AKEPIC	PMC Survey	Species Code	Scientific Name	Common Name	Family
0.00300000000		x	TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
0.09700000000		x	TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
0.14500000000		x	TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
0.22800000000		x	TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
0.22800000000		x	LEVU	Leucanthemum vulgare Lam.*	ox-eye daisy	Asteraceae
0.33100000000		x	TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
0.33100000000		x	LEVU	Leucanthemum vulgare Lam.*	ox-eye daisy	Asteraceae
0.49767692499	x		RARE3	Ranunculus repens L.	creeping buttercup	Ranunculaceae
0.49767692499	x		TRRE3	Trifolium repens L.	white clover	Fabaceae
0.49767692499	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
0.49767692499	x		LEVU	Leucanthemum vulgare Lam.*	ox-eye daisy	Asteraceae
0.49767692499	x		RUCR	Rumex crispus L.	curled dock	Polygonaceae
0.49767692499	x		PLMA2	Plantago major L. var. major	common plantain	Plantaginaceae
0.52700000000		x	TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
0.52700000000		x	LEVU	Leucanthemum vulgare Lam.*	ox-eye daisy	Asteraceae
1.61109682319	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
1.61109682319	x		TRPR2	Trifolium pratense L.	red clover	Fabaceae
1.61109682319	x		MEAL12	Melilotus alba Medikus	white sweet clover	Fabaceae
1.61109682319	x		PLMA2	Plantago major L. var. major	common plantain	Plantaginaceae
1.61109682319	x		ACMIM2	Achillea millefolium L. sens. str.	common yarrow	Asteraceae
1.99543484953	x		PLMA2	Plantago major L. var. major	common plantain	Plantaginaceae
1.99543484953	x		TRRE3	Trifolium repens L.	white clover	Fabaceae
1.99543484953	x		LEVU	Leucanthemum vulgare Lam.*	ox-eye daisy	Asteraceae

Milepoint Location	AKEPIC	PMC Survey	Species Code	Scientific Name	Common Name	Family
1.99543484953	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
3.46805287960	x		PLMA2	Plantago major L. var. major	common plantain	Plantaginaceae
3.46805287960	x		TRRE3	Trifolium repens L.	white clover	Fabaceae
3.46805287960	x		RUCR	Rumex crispus L.	curled dock	Polygonaceae
3.46805287960	x		MADI6	Matricaria discoidea DC	pineappleweed	Asteraceae
3.46805287960	x		POAN	Poa annua L.	annual bluegrass	Poaceae
3.46805287960	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
5.56708858153	x		MADI6	Matricaria discoidea DC	pineappleweed	Asteraceae
5.56708858153	x		POAN	Poa annua L.	annual bluegrass	Poaceae
5.56708858153	x		TRRE3	Trifolium repens L.	white clover	Fabaceae
5.56708858153	x		PLMA2	Plantago major L. var. major	common plantain	Plantaginaceae
5.56708858153	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
6.57014425039	x		PHPR3	Phleum pratense L.	Timothy	Poaceae
6.57014425039	x		MADI6	Matricaria discoidea DC	pineappleweed	Asteraceae
6.57014425039	x		PLMA2	Plantago major L. var. major	common plantain	Plantaginaceae
6.57014425039	x		TRRE3	Trifolium repens L.	white clover	Fabaceae
6.57014425039	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
7.40099270888	x		HICA10	Hieracium caespitosum Dumort.	meadow hawkweed	Asteraceae
9.85500000000		x	TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
15.84300000000		x	BRINI	Bromus inermis Leyss.	smooth brome	Poaceae
17.44600000000		x	BRINI	Bromus inermis Leyss.	smooth brome	Poaceae
17.44600000000		x	PLMA2	Plantago major L. var. major	common plantain	Plantaginaceae
21.64000000000		x	TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
28.78500000000		x	POPR	Poa pratensis L.	bluegrass	Poaceae
33.01415360840	x		POPR	Poa pratensis L.	bluegrass	Poaceae

Milepoint Location	AKEPIC	PMC Survey	Species Code	Scientific Name	Common Name	Family
33.01415360840	x		PHPR3	Phleum pratense L.	Timothy	Poaceae
33.01415360840	x		CEFO2	Cerastium fontanum Baumg. ssp. triviale (Link) Jalas	larger mouse-eared chickweed	Caryophyllaceae
33.01415360840	x		MADI6	Matricaria discoidea DC	pineappleweed	Asteraceae
33.01415360840	x		ACMIM2	Achillea millefolium L. sens. str.	common yarrow	Asteraceae
33.01415360840	x		POAN	Poa annua L.	annual bluegrass	Poaceae
33.01415360840	x		POPRI2	Poa subcoerulea Sm.	spreading bluegrass	Poaceae
33.01415360840	x		HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
36.32800000000		x	HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
36.48207108280	x		ACMIM2	Achillea millefolium L. sens. str.	common yarrow	Asteraceae
36.48207108280	x		ALPR3	Alopecurus pratensis L.	meadow foxtail	Poaceae
36.48207108280	x		ELRE4	Elymus repens (L.) Beauv.*	quackgrass	Poaceae
36.48207108280	x		PONO3	Potentilla norvegica L.	Norwegian cinquefoil	Rosaceae
36.48207108280	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
36.48207108280	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
36.48207108280	x		PLMA2	Plantago major L. var. major	common plantain	Plantaginaceae
36.48207108280	x		PHPR3	Phleum pratense L.	Timothy	Poaceae
36.48207108280	x		MADI6	Matricaria discoidea DC	pineappleweed	Asteraceae
36.48207108280	x		HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
38.97615442950	x		HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
38.97615442950	x		TRPE21	Tripleurospermum inodorum (L.) Schultz-Bip.	scentless mayweed	Asteraceae
38.97615442950	x		PONO3	Potentilla norvegica L.	Norwegian cinquefoil	Rosaceae
38.97615442950	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae

Milepoint Location	AKEPIC	PMC Survey	Species Code	Scientific Name	Common Name	Family
38.97615442950	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
38.97615442950	x		MADI6	Matricaria discoidea DC	pineappleweed	Asteraceae
40.09200000000		x	TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
41.35600000000		x	CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
41.43000680300	x		HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
41.43000680300	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
41.43000680300	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
41.43000680300	x		MADI6	Matricaria discoidea DC	pineappleweed	Asteraceae
41.62672359700	x		LASQ	Lappula squarrosa	European stickweed	Boraginaceae
41.62672359700	x		RUCR	Rumex crispus L.	curled dock	Polygonaceae
42.09100000000		x	ALPR3	Alopecurus pratensis L.	meadow foxtail	Poaceae
42.92530697100	x		PLMA2	Plantago major L. var. major	common plantain	Plantaginaceae
42.92530697100	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
42.92530697100	x		RULO2	Rumex longifolius DC.	garden dock	Polygonaceae
42.92530697100	x		CEFO2	Cerastium fontanum Baumg. ssp. triviale (Link) Jalas	larger mouse-eared chickweed	Caryophyllaceae
42.92530697100	x		BRINI	Bromus inermis Leyss.	smooth brome	Poaceae
42.92530697100	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
42.92530697100	x		ALPR3	Alopecurus pratensis L.	meadow foxtail	Poaceae
42.92530697100	x		ACMIM2	Achillea millefolium L. sens. str.	common yarrow	Asteraceae
42.92530697100	x		HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
44.56039620880	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
44.56039620880	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae

Milepoint Location	AKEPIC	PMC Survey	Species Code	Scientific Name	Common Name	Family
44.56039620880	x		MADI6	Matricaria discoidea DC	pineappleweed	Asteraceae
44.72300000000		x	PHAR3	Phalaris arundinacea	Reed Canary Grass	Poaceae
44.79918105860	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
44.79918105860	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
44.79918105860	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
44.99451936060	x		PHPR3	Phleum pratense L.	Timothy	Poaceae
44.99451936060	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
44.99451936060	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
46.87924148990	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
46.87924148990	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
46.87924148990	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
46.87924148990	x		PHPR3	Phleum pratense L.	Timothy	Poaceae
46.87924148990	x		MADI6	Matricaria discoidea DC	pineappleweed	Asteraceae
47.12766873830	x		ACMIM2	Achillea millefolium L. sens. str.	common yarrow	Asteraceae
47.12766873830	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
47.12766873830	x		SPRU	Spergularia rubra (L.) J. & K. Presl	purple sand spurry	Caryophyllaceae
47.12766873830	x		MADI6	Matricaria discoidea DC	pineappleweed	Asteraceae
47.12766873830	x		PONO3	Potentilla norvegica L.	Norwegian cinquefoil	Rosaceae
47.12766873830	x		HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
47.12766873830	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
47.12766873830	x		PLMA2	Plantago major L. var. major	common plantain	Plantaginaceae
47.71862468230	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae

Milepoint Location	AKEPIC	PMC Survey	Species Code	Scientific Name	Common Name	Family
47.71862468230	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
47.71862468230	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
48.01315101880	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
48.01315101880	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
48.01315101880	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
49.44885991740	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
49.44885991740	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
49.88116086160	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
49.88116086160	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
49.88116086160	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
50.03855603890	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
51.14374044000	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
51.14374044000	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
51.14374044000	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
51.27521266130	x		HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
51.27521266130	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
51.27521266130	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
51.27521266130	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
51.27521266130	x		PONO3	Potentilla norvegica L.	Norwegian cinquefoil	Rosaceae
51.27521266130	x		PLMA2	Plantago major L. var. major	common plantain	Plantaginaceae
51.27521266130	x		ACMIM2	Achillea millefolium L. sens. str.	common yarrow	Asteraceae
51.27521266130	x		MADI6	Matricaria discoidea DC	pineappleweed	Asteraceae

Milepoint Location	AKEPIC	PMC Survey	Species Code	Scientific Name	Common Name	Family
51.27521266130	x		CABU2	Capsella bursa-pastoris (L.) Medik.	shepherd's purse	Brassicaceae
52.02161666210	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
52.02161666210	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
52.02161666210	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
53.94212046660	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
53.94212046660	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
54.20000000000		x	CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
54.20000000000		x	POPR	Poa pratensis L.	bluegrass	Poaceae
55.14969987190	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
55.14969987190	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
55.14969987190	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
55.14969987190	x		ACMIM2	Achillea millefolium L. sens. str.	common yarrow	Asteraceae
55.14969987190	x		SPRU	Spergularia rubra (L.) J.& K. Presl	purple sand spurry	Caryophyllaceae
55.95136170210	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
55.95136170210	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
57.22423701670	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
58.12000000000		x	MADI6	Matricaria discoidea DC	pineappleweed	Asteraceae
58.26466981280	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
58.26466981280	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
59.27869642090	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
59.27869642090	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae

Milepoint Location	AKEPIC	PMC Survey	Species Code	Scientific Name	Common Name	Family
59.27869642090	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
59.28148333000	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
59.28148333000	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
59.28148333000	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
59.94300000000		x	ALPR3	Alopecurus pratensis L.	meadow foxtail	Poaceae
60.40624896180	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
60.40624896180	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
60.40624896180	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
62.05336533590	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
62.05336533590	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
62.05336533590	x		PHPR3	Phleum pratense L.	Timothy	Poaceae
62.05336533590	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
62.50394864860	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
62.50394864860	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
62.50394864860	x		HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
62.50394864860	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
64.14838593780	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
64.14838593780	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
64.14838593780	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
64.86600000000		x	CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
65.81719199470	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae

Milepoint Location	AKEPIC	PMC Survey	Species Code	Scientific Name	Common Name	Family
65.81719199470	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
65.81719199470	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
67.13566034170	x		PHPR3	Phleum pratense L.	Timothy	Poaceae
67.13566034170	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
67.13566034170	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
68.68352800040	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
68.68352800040	x		BRINI	Bromus inermis Leys.	smooth brome	Poaceae
68.68352800040	x		ACMIM2	Achillea millefolium L. sens. str.	common yarrow	Asteraceae
68.68352800040	x		LEDE	Lepidium densiflorum Schrad	common peppergrass	Brassicaceae
68.68352800040	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
68.88178798780	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
68.88178798780	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
70.12681784060	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
70.12681784060	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
72.78470554640	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
72.78470554640	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
74.75421231080	x		PONO3	Potentilla norvegica L.	Norwegian cinquefoil	Rosaceae
74.75421231080	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
74.75421231080	x		HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
74.75421231080	x		BRINI	Bromus inermis Leys.	smooth brome	Poaceae
74.75421231080	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae

Milepoint Location	AKEPIC	PMC Survey	Species Code	Scientific Name	Common Name	Family
74.80643240210	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
75.66241844330	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
75.66241844330	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
76.62100000000		x	BRINI	Bromus inermis Leyss.	smooth brome	Poaceae
76.62100000000		x	CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
78.11418001730	x		MADI6	Matricaria discoidea DC	pineappleweed	Asteraceae
78.11418001730	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
78.11418001730	x		PONO3	Potentilla norvegica L.	Norwegian cinquefoil	Rosaceae
78.11418001730	x		ACMIM2	Achillea millefolium L. sens. str.	common yarrow	Asteraceae
82.95951242690	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
82.95951242690	x		PONO3	Potentilla norvegica L.	Norwegian cinquefoil	Rosaceae
82.95951242690	x		LEDE	Lepidium densiflorum Schrad	common peppergrass	Brassicaceae
82.95951242690	x		ACMIM2	Achillea millefolium L. sens. str.	common yarrow	Asteraceae
82.95951242690	x		BRINI	Bromus inermis Leyss.	smooth brome	Poaceae
82.95951242690	x		HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
83.42600000000		x	MEOF	Melilotus officinalis (L.) Lam.	yellow sweet clover	Fabaceae
84.90000000000		x	HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
84.90000000000		x	ALPR3	Alopecurus pratensis L.	meadow foxtail	Poaceae
84.90000000000		x	CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
84.90000000000		x	BRINI	Bromus inermis Leyss.	smooth brome	Poaceae
84.94500000000		x	TRHY	Trifolium hybridum L.	alsike clover	Fabaceae

Milepoint Location	AKEPIC	PMC Survey	Species Code	Scientific Name	Common Name	Family
84.945000000000		x	MEOF	Melilotus officinalis (L.) Lam.	yellow sweet clover	Fabaceae
86.474000000000		x	LEVU	Leucanthemum vulgare Lam.*	ox-eye daisy	Asteraceae
86.52360145740	x		BRINI	Bromus inermis Leyss.	smooth brome	Poaceae
86.52360145740	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
86.52360145740	x		MADI6	Matricaria discoidea DC	pineappleweed	Asteraceae
86.52360145740	x		HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
86.52360145740	x		ACMIM2	Achillea millefolium L. sens. str.	common yarrow	Asteraceae
86.52360145740	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
89.98616104580	x		ACMIM2	Achillea millefolium L. sens. str.	common yarrow	Asteraceae
90.923000000000		x	CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
91.560000000000		x	POPR	Poa pratensis L.	bluegrass	Poaceae
92.913000000000		x	MEAL12	Melilotus alba Medikus	white sweet clover	Fabaceae
92.913000000000		x	MESAF	Medicago falcata L.	yellow alfalfa	Fabaceae
92.913000000000		x	BRINI	Bromus inermis Leyss.	smooth brome	Poaceae
92.913000000000		x	MADI6	Matricaria discoidea DC	pineappleweed	Asteraceae
92.913000000000		x	HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
94.86530491380	x		HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
94.86530491380	x		LEDE	Lepidium densiflorum Schrad	common peppergrass	Brassicaceae
94.86530491380	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
94.86530491380	x		PONO3	Potentilla norvegica L.	Norwegian cinquefoil	Rosaceae
94.86530491380	x		ACMIM2	Achillea millefolium L. sens. str.	common yarrow	Asteraceae
94.86530491380	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae

Milepoint Location	AKEPIC	PMC Survey	Species Code	Scientific Name	Common Name	Family
94.868000000000		x	MEAL12	Melilotus alba Medikus	white sweet clover	Fabaceae
95.899000000000		x	ALPR3	Alopecurus pratensis L.	meadow foxtail	Poaceae
95.899000000000		x	MEAL12	Melilotus alba Medikus	white sweet clover	Fabaceae
95.899000000000		x	BRINI	Bromus inermis Leyss.	smooth brome	Poaceae
96.848000000000		x	HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
99.60376403290	x		MADI6	Matricaria discoidea DC	pineappleweed	Asteraceae
99.60376403290	x		BRINI	Bromus inermis Leyss.	smooth brome	Poaceae
99.60376403290	x		HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
99.60376403290	x		ACMIM2	Achillea millefolium L. sens. str.	common yarrow	Asteraceae
99.60376403290	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
99.60376403290	x		PLMA2	Plantago major L. var. major	common plantain	Plantaginaceae
109.811000000000		x	HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
111.758000000000		x	CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
113.168000000000		x	HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
113.168000000000		x	BRINI	Bromus inermis Leyss.	smooth brome	Poaceae
113.168000000000		x	CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
113.39142817200	x		ACMIM2	Achillea millefolium L. sens. str.	common yarrow	Asteraceae
113.39142817200	x		LEDE	Lepidium densiflorum Schrad	common peppergrass	Brassicaceae
113.39142817200	x		HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
113.39142817200	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
116.762000000000		x	MEAL12	Melilotus alba Medikus	white sweet clover	Fabaceae
117.68873436100	x		ACMIM2	Achillea millefolium L. sens. str.	common yarrow	Asteraceae

Milepoint Location	AKEPIC	PMC Survey	Species Code	Scientific Name	Common Name	Family
117.68873436100	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
117.68873436100	x		MEAL12	Melilotus alba Medikus	white sweet clover	Fabaceae
117.68873436100	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
117.68873436100	x		LEDE	Lepidium densiflorum Schrad	common peppergrass	Brassicaceae
117.76800000000		x	HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
120.79600000000		x	MEAL12	Melilotus alba Medikus	white sweet clover	Fabaceae
121.27900000000		x	BRINI	Bromus inermis Leys.	smooth brome	Poaceae
121.68354919800	x		BRINI	Bromus inermis Leys.	smooth brome	Poaceae
121.68354919800	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
121.68354919800	x		ERCH9	Erysimum cheiranthoides L. subsp. cheiranthoides	wormseed mustard	Brassicaceae
121.68354919800	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
121.68354919800	x		HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
121.68354919800	x		LEDE	Lepidium densiflorum Schrad	common peppergrass	Brassicaceae
124.90100000000		x	MEAL12	Melilotus alba Medikus	white sweet clover	Fabaceae
125.92600000000	x		PONO3	Potentilla norvegica L.	Norwegian cinquefoil	Rosaceae
125.92600000000	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
125.92600000000	x		MEAL12	Melilotus alba Medikus	white sweet clover	Fabaceae
125.92600000000	x		ERCH9	Erysimum cheiranthoides L. subsp. cheiranthoides	wormseed mustard	Brassicaceae
125.92600000000	x		ACMIM2	Achillea millefolium L. sens. str.	common yarrow	Asteraceae
125.92600000000	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae

Milepoint Location	AKEPIC	PMC Survey	Species Code	Scientific Name	Common Name	Family
125.926000000000	x		BRINI	Bromus inermis Leys.	smooth brome	Poaceae
125.926000000000	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
126.967000000000		x	MEAL12	Melilotus alba Medikus	white sweet clover	Fabaceae
128.020000000000		x	MEAL12	Melilotus alba Medikus	white sweet clover	Fabaceae
128.976000000000		x	MEAL12	Melilotus alba Medikus	white sweet clover	Fabaceae
129.038000000000		x	MEAL12	Melilotus alba Medikus	white sweet clover	Fabaceae
129.275000000000		x	MEAL12	Melilotus alba Medikus	white sweet clover	Fabaceae
129.40596235300	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
129.40596235300	x		MEAL12	Melilotus alba Medikus	white sweet clover	Fabaceae
129.473000000000		x	MEAL12	Melilotus alba Medikus	white sweet clover	Fabaceae
129.551000000000		x	MEAL12	Melilotus alba Medikus	white sweet clover	Fabaceae
129.834000000000		x	VICRC	Vicia cracca L.	bird vetch, dog pea	Fabaceae
129.900000000000		x	MEAL12	Melilotus alba Medikus	white sweet clover	Fabaceae
129.989000000000		x	MEAL12	Melilotus alba Medikus	white sweet clover	Fabaceae
130.039000000000		x	MEAL12	Melilotus alba Medikus	white sweet clover	Fabaceae
130.07072657400	x		LASQ	Lappula squarrosa	European stickweed	Boraginaceae
130.07072657400	x		MADI6	Matricaria discoidea DC	pineappleweed	Asteraceae
130.07072657400	x		ERCH9	Erysimum cheiranthoides L. subsp. cheiranthoides	wormseed mustard	Brassicaceae
130.07072657400	x		MEAL12	Melilotus alba Medikus	white sweet clover	Fabaceae
130.07072657400	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
130.07072657400	x		CHALA	Chenopodium album L.	lamb's quarters	Chenopodiaceae
130.07072657400	x		BRINI	Bromus inermis Leys.	smooth brome	Poaceae
130.07072657400	x		POAV	Polygonum aviculare L.	knotweed	Polygonaceae

Milepoint Location	AKEPIC	PMC Survey	Species Code	Scientific Name	Common Name	Family
130.07072657400	x		ACMIM2	Achillea millefolium L. sens. str.	common yarrow	Asteraceae
130.28700000000		x	MEAL12	Melilotus alba Medikus	white sweet clover	Fabaceae
130.91100000000		x	MEAL12	Melilotus alba Medikus	white sweet clover	Fabaceae
130.94100000000		x	MEAL12	Melilotus alba Medikus	white sweet clover	Fabaceae
131.03300000000		x	MEAL12	Melilotus alba Medikus	white sweet clover	Fabaceae
131.50100000000		x	MEAL12	Melilotus alba Medikus	white sweet clover	Fabaceae
131.62200000000		x	MEAL12	Melilotus alba Medikus	white sweet clover	Fabaceae
131.63400000000		x	MEAL12	Melilotus alba Medikus	white sweet clover	Fabaceae
131.83651602300	x		PLMA2	Plantago major L. var. major	common plantain	Plantaginaceae
131.83651602300	x		HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
131.83651602300	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
131.83651602300	x		TRRE3	Trifolium repens L.	white clover	Fabaceae
131.83651602300	x		ACMIM2	Achillea millefolium L. sens. str.	common yarrow	Asteraceae
131.83651602300	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
131.83651602300	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
131.99400000000		x	TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
131.99400000000		x	CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
135.09575991000	x		ACMIM2	Achillea millefolium L. sens. str.	common yarrow	Asteraceae
135.09575991000	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
135.09575991000	x		TRPR2	Trifolium pratense L.	red clover	Fabaceae
135.09575991000	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
135.09575991000	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae

Milepoint Location	AKEPIC	PMC Survey	Species Code	Scientific Name	Common Name	Family
135.10643635100	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
135.10643635100	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
135.10643635100	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
135.10700000000	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
135.10700000000	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
135.10700000000	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
136.88900000000		x	CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
137.92200000000		x	MEAL12	Melilotus alba Medikus	white sweet clover	Fabaceae
138.74374615500	x		ACMIM2	Achillea millefolium L. sens. str.	common yarrow	Asteraceae
138.74374615500	x		HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
138.74374615500	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
138.74374615500	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
139.58236157600	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
139.58236157600	x		HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
139.71500000000		x	CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
142.29600000000		x	TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
142.32692271100	x		ACMIM2	Achillea millefolium L. sens. str.	common yarrow	Asteraceae
142.32692271100	x		TRRE3	Trifolium repens L.	white clover	Fabaceae
142.32692271100	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
142.32692271100	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
142.32692271100	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae

Milepoint Location	AKEPIC	PMC Survey	Species Code	Scientific Name	Common Name	Family
143.54200000000		x	CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
144.30083275700	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
144.30083275700	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
144.94500000000		x	TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
145.74421326700	x		HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
145.74421326700	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
145.74421326700	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
145.74421326700	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
145.74421326700	x		ACMIM2	Achillea millefolium L. sens. str.	common yarrow	Asteraceae
145.74421326700	x		PLMA2	Plantago major L. var. major	common plantain	Plantaginaceae
145.74421326700	x		MADI6	Matricaria discoidea DC	pineappleweed	Asteraceae
145.74421326700	x		TRRE3	Trifolium repens L.	white clover	Fabaceae
147.91800000000		x	TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
149.98871354600	x		HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
149.98871354600	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
149.98871354600	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
149.99362576900	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
149.99362576900	x		HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
149.99362576900	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
149.99362576900	x		ACMIM2	Achillea millefolium L. sens. str.	common yarrow	Asteraceae

Milepoint Location	AKEPIC	PMC Survey	Species Code	Scientific Name	Common Name	Family
149.99362576900	x		ERCH9	Erysimum cheiranthoides L. subsp. cheiranthoides	wormseed mustard	Brassicaceae
149.99362576900	x		LEDE	Lepidium densiflorum Schrad	common peppergrass	Brassicaceae
149.99362576900	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
149.99400000000	x		ACMIM2	Achillea millefolium L. sens. str.	common yarrow	Asteraceae
149.99400000000	x		ERCH9	Erysimum cheiranthoides L. subsp. cheiranthoides	wormseed mustard	Brassicaceae
149.99400000000	x		LEDE	Lepidium densiflorum Schrad	common peppergrass	Brassicaceae
149.99400000000	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
149.99400000000	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
149.99400000000	x		HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
149.99400000000	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
150.48400000000		x	BRINI	Bromus inermis Leyss.	smooth brome	Poaceae
150.48400000000		x	TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
150.63311511000	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
150.63311511000	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
150.63311511000	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
153.52900000000		x	CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
153.52900000000		x	HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
153.59799976600	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
153.59799976600	x		HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
153.59799976600	x		MADI6	Matricaria discoidea DC	pineappleweed	Asteraceae

Milepoint Location	AKEPIC	PMC Survey	Species Code	Scientific Name	Common Name	Family
153.59799976600	x		ERCH9	Erysimum cheiranthoides L. subsp. cheiranthoides	wormseed mustard	Brassicaceae
153.59799976600	x		ACMIM2	Achillea millefolium L. sens. str.	common yarrow	Asteraceae
153.59799976600	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
153.60148755200	x		HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
153.60148755200	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
153.60148755200	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
157.16312871100	x		MADI6	Matricaria discoidea DC	pineappleweed	Asteraceae
157.16312871100	x		HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
157.16312871100	x		TRRE3	Trifolium repens L.	white clover	Fabaceae
157.16312871100	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
157.16312871100	x		PLMA2	Plantago major L. var. major	common plantain	Plantaginaceae
157.16312871100	x		ACMIM2	Achillea millefolium L. sens. str.	common yarrow	Asteraceae
157.16378271200	x		HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
158.26130151800	x		HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
160.82000000000		x	HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
160.82000000000		x	MEAL12	Melilotus alba Medikus	white sweet clover	Fabaceae
160.91057546700	x		CEFO2	Cerastium fontanum Baumg. ssp. triviale (Link) Jalas	larger mouse-eared chickweed	Caryophyllaceae
160.91057546700	x		ACMIM2	Achillea millefolium L. sens. str.	common yarrow	Asteraceae
160.91057546700	x		MADI6	Matricaria discoidea DC	pineappleweed	Asteraceae
160.91057546700	x		LEDE	Lepidium densiflorum Schrad	common peppergrass	Brassicaceae
160.91057546700	x		HOJU	Hordeum jubatum L.	foxtail barley	Poaceae

Milepoint Location	AKEPIC	PMC Survey	Species Code	Scientific Name	Common Name	Family
160.91057546700	x		PLMA2	Plantago major L. var. major	common plantain	Plantaginaceae
163.51712134300	x		HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
163.51712134300	x		MADI6	Matricaria discoidea DC	pineappleweed	Asteraceae
163.81700000000		x	PLMA2	Plantago major L. var. major	common plantain	Plantaginaceae
164.16760072900	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
164.16760072900	x		PLMA2	Plantago major L. var. major	common plantain	Plantaginaceae
164.16760072900	x		MADI6	Matricaria discoidea DC	pineappleweed	Asteraceae
164.16760072900	x		ACMIM2	Achillea millefolium L. sens. str.	common yarrow	Asteraceae
168.79356153900	x		ACMIM2	Achillea millefolium L. sens. str.	common yarrow	Asteraceae
168.79356153900	x		PLMA2	Plantago major L. var. major	common plantain	Plantaginaceae
168.79356153900	x		MADI6	Matricaria discoidea DC	pineappleweed	Asteraceae
168.79356153900	x		HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
172.30279997500	x		HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
172.90702766900	x		CRTE3	Crepis tectorum L.	annual hawksbeard	Asteraceae
172.90702766900	x		POAV	Polygonum aviculare L.	knotweed	Polygonaceae
172.90702766900	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
172.90702766900	x		MADI6	Matricaria discoidea DC	pineappleweed	Asteraceae
172.90702766900	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
172.90702766900	x		HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
172.90702766900	x		BRINI	Bromus inermis Leyss.	smooth brome	Poaceae
172.90702766900	x		ELRE4	Elymus repens (L.) Beauv.*	quackgrass	Poaceae
172.90702766900	x		ACMIM2	Achillea millefolium L. sens. str.	common yarrow	Asteraceae
177.24372377100	x		PHPR3	Phleum pratense L.	Timothy	Poaceae

Milepoint Location	AKEPIC	PMC Survey	Species Code	Scientific Name	Common Name	Family
177.24372377100	x		ELRE4	Elymus repens (L.) Beauv.*	quackgrass	Poaceae
177.24372377100	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
177.24372377100	x		HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
177.24372377100	x		ACMIM2	Achillea millefolium L. sens. str.	common yarrow	Asteraceae
177.24372377100	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
177.24375049700	x		ACMIM2	Achillea millefolium L. sens. str.	common yarrow	Asteraceae
177.24375049700	x		PLMA2	Plantago major L. var. major	common plantain	Plantaginaceae
179.90879440200	x		HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
181.85154708200	x		HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
181.85154708200	x		TRPE21	Tripleurospermum inodorum (L.) Schultz-Bip.	scentless mayweed	Asteraceae
181.85154708200	x		ACMIM2	Achillea millefolium L. sens. str.	common yarrow	Asteraceae
181.85154708200	x		TAOF	Taraxacum officinale Weber	common dandelion	Asteraceae
181.85154708200	x		PLMA2	Plantago major L. var. major	common plantain	Plantaginaceae
181.85154708200	x		MADI6	Matricaria discoidea DC	pineappleweed	Asteraceae
182.93181977900	x		HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
182.93181977900	x		MADI6	Matricaria discoidea DC	pineappleweed	Asteraceae
182.93293411100	x		HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
182.93293411100	x		MADI6	Matricaria discoidea DC	pineappleweed	Asteraceae
185.91076800700	x		MADI6	Matricaria discoidea DC	pineappleweed	Asteraceae
185.91076800700	x		ERCH9	Erysimum cheiranthoides L. subsp. cheiranthoides	wormseed mustard	Brassicaceae
185.91076800700	x		HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
185.91145353100	x		MADI6	Matricaria discoidea DC	pineappleweed	Asteraceae

Milepoint Location	AKEPIC	PMC Survey	Species Code	Scientific Name	Common Name	Family
185.91145353100	x		ERCH9	Erysimum cheiranthoides L. subsp. cheiranthoides	wormseed mustard	Brassicaceae
185.91145353100	x		HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
187.73866889500	x		TRHY	Trifolium hybridum L.	alsike clover	Fabaceae
218.00700000000		x	HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
225.94000000000		x	HOJU	Hordeum jubatum L.	foxtail barley	Poaceae
269.19545721500	x		MEAL12	Melilotus alba Medikus	white sweet clover	Fabaceae

D. Notes (species):

Disturbance Type : Fill Importation (e.g., Road or Railroad Grade), Material Extraction (e.g., Rock Quarry or Gravel Pit, ORV Disturbance, Mowing, Trampling, Logging, Mining, Grazing, Plowing, Mechanical Brush/Tree Cutting, Herbicide Application, Other Mechanical Substrate Alteration Or Removal, Abandoned Homesite, River Action (i.e., Flooding,/Erosion-Ice Scour/Deposition, Stream Action, Forest Fire, Land Slide/Avalanche, Caribou/moose/animal related disturbed site, Windthrow, Wind Erosion/Deposition, Thermal Disturbance (Solifluction, Thermokarst, Permafrost Melt, etc.), Glaciation, Volcanic Action, Coastal/Beach

Exotic Plant Species Code: use USDA name code provided in the appendices or find it at <http://akweeds.uaa.alaska.edu>

Infested Area: 1/1000 acre minimum area for data collected (**0.001 acre** = 3.7 ft radius, **0.01 acre** = 12 ft radius, **0.1 acre** = 37 ft radius, **1/2 acre** = 83 ft radius, **1 acre** = 118 ft radius)

Canopy Cover: recommended 1%, 5%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 95%, 100%

Stem Count: 1-5, 6-25, 26-50, 51-150, 151-500, 500+

Collection Location: ALA, Not Collected, Not Curated, TNES, WTU, Other, None

Control Action: Manual (Pulling/Digging), Mechanical (Mowing/Weedwacking), Broadcast Herbicide, Spot Herbicide, Aerial Herbicide, Other, None

Aggressiveness: Low, Medium, High

Appendix G. AKEPIC Invasiveness Ranking

Non-native species PRESENT in Alaska

Species Biography	Risk Assessment Report	Scientific Name	Common Name	Rank 0-100 (low-high)	Climate similarity of Alaska ecogeographic regions and areas where the species occurs		
					South Coastal	Interior Boreal	Arctic Alpine
ACMIM-bio	ACMIM-rank	<i>Achillea millefolium</i> var. <i>millefolium</i> L.	common yarrow	48	Yes	Yes	Yes
ACPT-bio	ACPT-rank	<i>Achillea ptarmica</i> L.	sneezewort	46	Yes	Yes	Yes
ALPE-bio	ALPE-rank	<i>Alliaria petiolata</i> (Bieb.) Cavara & Grande	garlic mustard	70	Yes	No	No
ANCO-bio	ANCO-rank	<i>Anthemis cotula</i> L.	Mayweed chamomile, dog fennel	41	Yes	Yes	No
BRIN-bio	BRIN-rank	<i>Bromus inermis</i> ssp. <i>inermis</i> Leyss.	smooth brome	62	Yes	Yes	Yes
BRTE-bio	BRTE-rank	<i>Bromus tectorum</i> L.	cheatgrass	78	Yes	Yes	Yes
CARA-bio	CARA-rank	<i>Campanula rapunculoides</i> L.	Creeping bellflower	64	Yes	Yes	Yes
CABU-bio	CABU-rank	<i>Capsella bursa-pastoris</i> (L.) Medik. L.	shepherd's purse	40	Yes	Yes	Yes
CAAR-bio	CAAR-rank	<i>Caragana arborescens</i> Lam.	Siberian pea shrub	66	No	Yes	Yes
CEBI-bio	CEBI-rank	<i>Centaurea biebersteinii</i> DC	spotted knapweed	86	Yes	Yes	No
CEFO-bio	CEFO-rank	<i>Cerastrium fontanum</i> ssp. <i>vulgare</i> (Hartman) Breuter & Burdert & <i>C. glomeratum</i> Thill.	mouse-ear chickweed, big chickweed & sticky chickweed	39	Yes	Yes	Yes
CHAL-bio	CHAL-rank	<i>Chenopodium album</i> L.	lambsquarters	35	Yes	Yes	Yes
CIAR4-bio	CIAR4-rank	<i>Cirsium arvense</i> L. Scop.	Canada thistle	76	Yes	Yes	Yes
CIVU-bio	CIVU-rank	<i>Cirsium vulgare</i> (Savi) Ten.	bull thistle, common thistle	61	Yes	Yes	Yes

COAR-bio	COAR-rank	<i>Convolvulus arvensis</i> L.	field bindweed, morning glory	58	Yes	Yes	Yes
COCO7-bio	COCO7-rank	<i>Cotula coronopifolia</i> L.	common brassbuttons	42	Yes	No	No
CRTE-bio	CRTE-rank	<i>Crepis tectorum</i> L.	narrow-leaf hawk's beard	52	Yes	Yes	Yes
CYSC-bio	CYSC-rank	<i>Cytisus scoparius</i> (L.) Link	English broom, Scotch broom	69	Yes	No	No
DAGL-bio	DAGL-rank	<i>Dactylis glomerata</i> L.)	orchardgrass	53	Yes	Yes	Yes
DESO-bio	DESO-rank	<i>Descurainia sophia</i> (L.) Webb ex Prantl.	flixweed	41	Yes	Yes	Yes
DIPU-bio	DIPU-rank	<i>Digitalis purpurea</i> (L.)	purple foxglove	51	Yes	Yes	No
ELRE-bio	ELRE-rank	<i>Elymus repens</i> (L.) Gould	quackgrass, couchgrass, dog grass	59	Yes	Yes	Yes
GABI-bio	GABI-rank	<i>Galeopsis bifida</i> Boenn. and G. tetrahit L.	split-lip hemp-nettle	40	Yes	Yes	Yes
GLHE-bio	GLHE-rank	<i>Glechoma hederacea</i> L.	ground ivy	48	Yes	Yes	Yes
GYPA-bio	GYPA-rank	<i>Gypsophila paniculata</i> L.	baby's breath	57	Yes	Yes	Yes
HESMAT-bio	HESMAT-rank	<i>Hesperis matronalis</i> L.	dame's rocket	41	Yes	Yes	No
HIAU&HICA-bio	HIAU&HICA-rank	<i>Hieracium aurantiacum</i> L. and <i>Hieracium caespitosum</i>	orange hawkweed, devil's paintbrush & meadow hawkweed	79	Yes	Yes	Yes
HIUM-bio	HIUM-rank	<i>Hieracium umbellatum</i> L.	narrow-leaved hawkweed	46	Yes	Yes	Yes
HOJU-bio	HOJU-rank	<i>Hordeum jubatum</i> L.	foxtail barley	63	Yes	Yes	Yes
HOMUL-bio	HOMUL-rank	<i>Hordeum murinum</i> ssp. <i>leporinum</i> (Link) Arcang.	leporinum barley, lepor barley	60	No	Yes	No
HYPE-bio	HYPE-rank	<i>Hypericum perforatum</i>	St. Johnswort	52	Yes	Yes	Yes
IMGL-bio	IMGL-rank	<i>Impatiens glandulifera</i> Royle	ornamental jewelweed	82	Yes	Yes	No
LASQ-bio	LASQ-rank	<i>Lappula squarrosa</i> (Retz.)	European stickweed,	44	Yes	Yes	Yes

		Dumont.	bristly sheepburr				
LEDE-bio	LEDE-rank	<i>Lepidium densiflorum</i> var. <i>densiflorum</i> Schrad. , <i>L. densiflorum</i> var. <i>elongatum</i> (Rydb.) Thellung. tall	common pepperweed, pepperweed	25	Yes	Yes	Yes
LEVU-bio	LEVU-rank	<i>Leucanthemum vulgare</i> Lam.	oxeye daisy, white daisy	61	Yes	Yes	Yes
LIVU-bio	LIVU-rank	<i>Linaria vulgaris</i> Miller	yellow toadflax, butter and eggs	69	Yes	Yes	Yes
LOPEM-bio	LOPEM-rank	<i>Lolium perenne</i> ssp. <i>multiflorum</i> (Lam.) Husnot	annual ryegrass	41	Yes	Yes	Yes
LOTA-bio	LOTA-rank	<i>Lonicera tatarica</i> L.	bush honeysuckle	66	Yes	Yes	No
LUPO-bio	LUPO-rank	<i>Lupinus polyphyllus</i> ssp. <i>polyphyllus</i> Lindl.	bigleaf lupine	55	Yes	Yes	Yes
LYSA&LYVI-bio	LYSA&LYVI-rank	<i>Lythrum salicaria</i> L. & <i>L. virgatum</i> L.	purple loosestrife, spike loostrife	84	No	Yes	No
MADI-bio	MADI-rank	<i>Matricaria discoidea</i> DC.	disc mayweed, pineappleweed	33	Yes	Yes	Yes
MELU-bio	MELU-rank	<i>Medicago lupulina</i> L.	Black medic	48	Yes	Yes	Yes
MESAF-bio	MESAF-rank	<i>Medicago sativa</i> ssp. <i>falcata</i> (L.) Arcang.	Yellow alfalfa	64	Yes	Yes	Yes
MESAS-bio	MESAS-rank	<i>Medicago sativa</i> ssp. <i>sativa</i> L.	Alfalfa	59	Yes	Yes	Yes
MEAL-bio	MEAL-rank	<i>Melilotus alba</i> Medikus	white sweetclover	80	Yes	Yes	Yes
MEOF-bio	MEOF-rank	<i>Melilotus officinalis</i> (L.) Lam	yellow sweetclover, king's crown	65	Yes	Yes	Yes
MYMU-bio	MYMU-rank	<i>Mycelis muralis</i> (L.) Dumort.	wall lettuce	32	Yes	No	No
NYODO-bio	NYODO-rank	<i>Nymphaea odorata</i> ssp. <i>odorata</i> Ait.	white waterlilly	80	Yes	No	No
PHAR-bio	PHAR-rank	<i>Phalaris arundinacea</i> L.	reed canarygrass, canarygrass	83	Yes	Yes	Yes
PHPR-bio	PHPR-rank	<i>Phleum pratense</i> L.	common timothy	56	Yes	Yes	Yes
PLMA-bio	PLMA-rank	<i>Plantago major</i> L.	common plantain	44	Yes	Yes	Yes

POAN-bio	POAN-rank	<i>Poa annua</i> L.	annual bluegrass	46	Yes	Yes	Yes
POCO-bio	POCO-rank	<i>Poa compressa</i> L.	Canada bluegrass	39	Yes	Yes	Yes
POPR&POTRI-bio	POPR&POTRI-rank	<i>Poa pratensis</i> L. ssp. <i>pratensis</i> , <i>P. p pratensis</i> ssp. <i>irrigata</i> (Lindm.) (Lindb.f.), <i>P. trivalis</i> L.	Kentucky bluegrass, spreading bluegrass and rough bluegrass	52	Yes	Yes	Yes
POAV-bio	POAV-rank	<i>Polygonum aviculare</i> L.	prostrate knotweed, yard knotweed	45	Yes	Yes	Yes
FACO-bio	FACO-rank	<i>Polygonum convolvulus</i> L. (<i>Fallopia convolvulus</i> (Linnaeus) Á. Löve).	black bindweed	50	Yes	Yes	Yes
POCU-bio	POCU-rank	<i>Polygonum cuspidatum</i> Sieb & Zucc.	Japanese knotweed	87	Yes	Yes	No
POPE&POLA-bio	POPE&POLA-rank	<i>Polygonum persicaria</i> L. (<i>Persicaria maculosa</i> Gray), <i>Polygonum lapathifolium</i> L. or <i>Persicaria lapathifolia</i> (Linnaeus) Gray	spotted ladysthumb, curlytop knotweed	49	Yes	Yes	Yes
PRPA-bio	PRPA-rank	<i>Prunus padus</i> L.	European bird cherry	74	Yes	Yes	No
RARE-bio & RAAC-bio	RARE-rank & RAAC-bio	<i>Ranunculus repens</i> L., <i>Ranunculus acris</i> L.	creeping buttercup and tall buttercup	54	Yes	Yes	Yes
RUDI-bio	RUDI-rank	<i>Rubus discolor</i> Weihe & Nees	Himalyan blackberry	77	Yes	No	No
RUAC-bio	RUAC-rank	<i>Rumex acetosella</i> L.	sheep sorrel	51	Yes	Yes	Yes
RUCR&RUOB-bio	RUCR&RUOB-rank	<i>Rumex crispus</i> L., <i>R. obtusifolius</i> L. and <i>R. longifolius</i> DC.	curly dock, bitter dock, dooryard dock	48	Yes	Yes	Yes
SAOF-bio	SAOF-rank	<i>Saponaria officinalis</i> L.	bouncing bet, soapwort	34	Yes	Yes	No
SEJA-bio	SEJA-rank	<i>Senecio jacobaea</i> L.	ragwort, stinking willie	63	Yes	Yes	Yes
SEVU-bio	SEVU-rank	<i>Senecio vulgaris</i> L.	common groundsel, old-	35	Yes	Yes	Yes

			man-in-the-Spring				
Silene-bio	Silene-rank	<i>Silene noctiflora</i> L., <i>S. latiflora</i> ssp. <i>alba</i> L., <i>S. vulgaris</i> (Moench), <i>S. dioica</i> L.	night-flowering catchfly, white cockle, bladder campion, Clairville red catchfly	45	Yes	Yes	Yes
SOAR-bio	SOAR-rank	<i>Sonchus arvensis</i> L. ssp. <i>uliginosus</i> (Bieb.) Nyman	perennial sowthistle, moist sowthistle	61	Yes	Yes	No
SOAU-bio	SOAU-rank	<i>Sorbus aucuparia</i> L.	European mountain ash, rowan	59	Yes	No	No
SPAR-bio	SPAR-rank	<i>Spergula arvensis</i> L.	Corn spurry	32	Yes	Yes	No
STME-bio	STME-rank	<i>Stellaria media</i> L. (Vill.)/disturbed sites	common chickweed	42	Yes	Yes	Yes
STME-bio	STME-rank	<i>Stellaria media</i> L. (Vill.)/sea bird colonies	common chickweed	54	Yes	Yes	Yes
TAVU-bio	TAVU-rank	<i>Tanacetum vulgare</i> L.	common tansy, garden tansy	57	Yes	Yes	Yes
TAOF-bio	TAOF-rank	<i>Taraxacum officinale</i> G.H. Weber ex Wigg	common dandelion	58	Yes	Yes	Yes
TRDU-bio	TRDU-rank	<i>Tagopogon dubius</i> Scop.	yellow salsify, goat's bear	50	Yes	Yes	No
TRHY-bio	TRHY-rank	<i>Trifolium hybridum</i> L.	alsike clover	57	Yes	Yes	Yes
TRPR-bio	TRPR-rank	<i>Trifolium pratense</i> L.	red clover	53	Yes	Yes	Yes
TRRE-bio	TRRE-rank	<i>Trifolium repens</i> L.	white clover, ladino clover	59	Yes	Yes	Yes
TRPE-bio	TRPE-rank	<i>Tripleurospermum perforata</i> (Merat) M. Lainz	scentless false mayweed, scentless chamomile	48	Yes	Yes	Yes
VETH-bio	VETH-rank	<i>Verbascum thapsus</i> L.	common mullein	52	Yes	Yes	No
VICR-bio	VICR-rank	<i>Vicia cracca</i> L.	bird vetch, cow vetch, tufted vetch	73	Yes	Yes	Yes
VIVI-bio	VIVI-rank	<i>Vicia villosa</i> Roth	winter vetch	49	Yes	Yes	No

Non-native species NOT recorded in Alaska, but with a high probability of occurring in Alaska. They have been found in Washington state and neighboring Canadian provinces and territories.

Species Biography	Risk Assessment Report	Scientific Name	Common Name	Rank 0-100 (low-high)	Climate similarity of Alaska ecogeographic regions and areas where the species occurs		
					South Coastal	Interior Boreal	Arctic Alpine
ALGL-bio	ALGL-rank	<i>Alnus glutinosa</i> (L.) Gaerth.	European alder, black alder	61	Yes	Yes	Yes
BRSY-bio	BRSY-rank	<i>Brachypodium sylvaticum</i> (Huds.) Beauv.	false-brome	70	Yes	Yes	Yes
CANU-bio	CANU-rank	<i>Carduus nutans</i> L., <i>C. acanthoides</i> L., <i>C. pycnocephalus</i> L., <i>C. tenuiflorus</i> W. Curtis	musk thistle, plumeless thistle, Italian thistle, slender-flowered thistle	61	Yes	Yes	Yes
CRVU-bio	CRVU-rank	<i>Crupina vulgaris</i> Cass.	common crupina, bearded creaper	rejected from consideration	No	No	No
EUES-bio	EUES-rank	<i>Euphorbia esula</i> L.	leafy spurge	84	Yes	Yes	No
HERMAN-bio	HERMAN-rank	<i>Heracleum mantegazzianum</i> Sommier & Levier	giant hogweed	81	Yes	Yes	Yes
HYVE-bio	HYVE-rank	<i>Hydrilla verticillata</i> (L. f) Royle	hydrilla	80	Yes	Yes	Yes
LELA-bio	LELA-rank	<i>Lepidium latifolium</i> L.	perennial pepperweed, tall whitetop	72	No	Yes	Yes
LIDA-bio	LIDA-rank	<i>Linaria dalmatica</i> L.	Dalmatian toadflax	63	No	Yes	No
MYSP-bio	MYSP-rank	<i>Myriophyllum spicatum</i> L.	Eurasian watermilfoil	90	Yes	Yes	No
PORE-bio	PORE-rank	<i>Potentilla recta</i> L.	sulphur cinquefoil	57	Yes	Yes	No
SPAL-bio	SPAL-rank	<i>Spartina alterniflora</i> Loisel,	Atlantic cordgrass, saltmarsh grass,	86	Yes	No	No

Appendix H. Willow Control

Problem: Species in the genus *Salix* are primary successional plants that are fast growing and easily spread by seed and vegetative plant parts. They are also highly desirable to moose and other wildlife.

Location: The species are spread throughout Alaska and thrive on well drained, gravelly soils that are common in ROW's.

Primary Species of Concern:

Salix alaxensis, *S. commutata*, *S. pulchra*, *S. bebbiana*, *S. interior*, *S. barclayi*
Species vary regionally and with changes in elevation.

Urgency:

Willows are one of the most common objectionable ROW species since they are fast growing and attract wildlife.

Control Actions:

Mechanical mowing or hydro-axing is effective in controlling the height of willow plants though this method is not sustainable since treatments must be completed frequently to maintain desirable conditions. Also, many species of willow root readily from cuttings, thus debris remaining after mowing may result in increased plant density.

Chemical control has been highly effective on willows. Basal spray and cut-stump treatments show willows to be susceptible to chemicals with the active ingredients triclopyr, imazapyr, and 2,4-D + 2,4-DP (Heiligmann, R. B. and D. Krause, 2006). Willows treated through injection or applications to girdles or frills were susceptible to triclopyr, picloram, and imazapyr. Intermediate susceptibility was shown when using this method with 2,4-D + 2,4-DP and glyphosate (Heiligmann, R. B. and D. Krause, 2006).

Biological control options are limited with willows since they proliferate even in the presence of their natural predators. Also, any biological control actions would affect non-target populations of willow which would be undesirable.

Cultural control options are possibly the most sustainable method for willows. The establishment of a solid stand of turf grass on a quality, nutrient rich topsoil would likely exclude willows trying to establish from seed or cuttings.

Appendix I. Best Management Practices for White Sweetclover

Problem: White sweetclover is an introduced legume that is spreading along Alaska's transportation corridors. It is moving on to natural disturbances such as sand and gravel bars along rivers.

Location: The species is common on the ROW throughout Interior and South Central Alaska. Population levels appear to be greatest near population centers. White sweetclover has been used as a forage and green manure crop in agriculture and is highly desirable to bee keepers.

Primary Species of Concern:

Melilotus albus is the white sweetclover. Currently it appears to be more prolific than its close relative *Melilotus officinalis* (yellow sweetclover).

Urgency:

White sweetclover is expanding along the ROW in many locations. It has been observed invading natural habitats where it likely competes with native plant populations. This could result in a long term impact on the productivity of wildlife in these areas.

Control Actions:

The United States Geological Survey (USGS) National Prairie Wildlife Research Center has developed a complete description of control strategies for sweetclovers at the Scotts Bluff National Monument (SCBL):

“Chemical, cultural, and mechanical control have all been used on white and yellow sweetclovers. An important consideration in controlling these species is that the seeds have the potential to remain viable in the seed bank for more than 10 years. Many sources of new propagules surround SCBL. Also, control methods may harm other plants and result in a disturbance that will favor reinvasion by sweetclovers or other exotic species.

Fire may either reduce or stimulate sweetclovers. The response depends on timing of the prescribed burn. Prescribed burns conducted in March or early April often stimulate germination. Also, germination may be stimulated by fall burns. One method of controlling sweetclovers with prescribed fire is to burn in early May when second-year shoots are visible. This treatment is followed by a prescribed burn in early July of the following year. Disadvantages are that it is often difficult to get a thorough burn in July, and July burning often results in damage to desirable warm-season species. Annual prescribed burning in May will eliminate second-year plants and may stimulate germination. Thus, first-year plants will be present as long as seeds remain in the soil, but flowering by second-year plants will not occur. Another technique is to conduct a prescribed burn in the dormant season in fall or early spring to stimulate germination. This is followed by a prescribed burn or mowing in late May of the following year when plants are in their second growing season. Mowing on a schedule similar to burning has been shown to control sweetclover. It is often

less effective because it does not kill the plants, and flowers on low, uncut branches will produce seed. The key to these control methods is timing. It is important that crown shoots have begun to elongate on second-year plants before applying burning or mowing treatments. Any second-year plants escaping fire because of an incomplete burn must be mowed or treated with an herbicide prior to seed production.

A few chemical control options exist for sweetclover. Many herbicides are not specific to sweetclovers or may not be specifically licensed for this particular use. It is important to read and follow all label directions. The herbicide 2,4-D partially controlled sweetclover. Second-year plants were much less susceptible to 2,4-D than were first-year plants. Other herbicides that may control sweetclover include Arsenal (imazapyr), Tordon (picloram), Escort (metsulfuron methyl), Oust (sulfomethuron methyl), Banvel (dicamba), and Curtail (clopyralid and 2,4-D).

Research into the biological control of sweetclover has not received attention because of the importance of sweetclovers in agriculture. However, both species have some introduced and North American pests that may have some potential. The sweetclover weevil [*Sitona cylindricollis* Fahr. (Coleoptera:Curculionidae)], a native of Europe, was accidentally introduced into North America. Adults feed on the foliage of sweetclover, and larvae feed on the roots. Early spring or fall feeding by this weevil on seedlings may be severe enough to kill plants. A sweetclover root borer [*Walshia miscecolorella* Chambers (Lepidoptera:Walshiidae)] is a native insect that, on rare occasions, has reached high densities and damaged sweetclover over relatively large areas. The ashgray blister beetle (*Epicauta fabricii* LeConte), striped blister beetle (*E. vittata* F.), and margined blister beetle (*E. pestifera* Werner) have all been documented as feeding on sweetclover, but have rarely damaged the plants. A root rot (*Rhizoctonia* sp.) has been reported to damage sweetclovers. Both sweetclovers are palatable plants to most grazers. Domestic livestock, deer, rabbits, and other herbivores readily feed on these plants. Heavy grazing in the spring may reduce the density of sweetclovers.” (U.S. Geological Survey, Northern Prairie Wildlife Research Center, 2006)