

SECTION 9 UNUSUAL NATURAL AREAS

The Project area was evaluated for the presence of unusual natural areas. According to the Preservation of Unusual Natural Areas standard of the No Adverse Environmental Effect Standard of the Site Law (06-096 CMR 375.12), an unusual natural area is defined as “any land or water area, usually only a few acres in size, which is undeveloped and which contains natural features of unusual geologic, botanical, zoological, ecological, hydrological, other scientific, educational, scenic, or recreational significance.”

A. Agency Consultation

Tetra Tech contacted the Maine Natural Areas Program (MNAP) to request information regarding RTE plants or rare natural communities; MDIFW for information about habitats for State-listed RTE wildlife species; and USFWS for information for Federally listed RTE species or designated Critical Habitat documented on or in the vicinity of the Project.

The July 27, 2020 MNAP consultation letter (see Exhibit 7-2 [Agency Correspondence]) indicated that red-stemmed gentian (*Gentiana rubricaulis*), Goldie’s wood fern (*Dryopteris goldiana*), and Clinton’s bulrush (*Tricophorum clintonii*) have been documented within the Project area; however, the consultation letter was based on a previous layout for the Project that included the existing 115-kV transmission line to Wyman Hydro Substation. On February 12, 2021, a new request was submitted to MNAP with the updated Project area to account for adjustments to the turbine layout and the addition of access roads and pads for ADLS towers. MNAP responded with a new letter sent on March 4, 2021 (see Exhibit 7-2 [Agency Correspondence]), which indicated that no rare botanical features are specifically documented within the revised Project area.

In their March 10, 2020 Preliminary Resource Recommendations letter (see Exhibit 7-2 [Agency Correspondence]), MDIFW requested additional wildlife and wildlife habitat surveys. However, none of the investigations performed revealed the presence of any unusual natural areas. The results of the wildlife and wildlife habitat surveys are provided in Section 7 (Wetlands, Watercourses, Wildlife and Fisheries) and Exhibit 7-8 (Comprehensive Wildlife Report).

The USFWS IPaC online review process was queried for the Project on December 4, 2020, and then again on February 12, 2021 using the new Project area layout. Three species were included on the Official Species List: Canada lynx, northern long-eared bat, and Atlantic salmon. No Critical Habitat for Canada lynx or Atlantic Salmon is present in the Project area, and Critical Habitat has not been designated for northern long-eared bat. The IPaC report is available in Exhibit 7-3 (USFWS IPaC Database Review) and results of the surveys performed for Canada lynx and northern long-eared bat are described in Section 7 (Wetlands, Watercourses, Wildlife and Fisheries) and detailed in Exhibit 7-8 (Comprehensive Wildlife Report).

B. Field Surveys

Field surveys for potential RTE plants and natural communities were completed between late July and September 2020. In addition, wetland delineation efforts for the Project included a field evaluation of hydrologic, soil, and vegetative conditions for the entire Project area. A complete report of the rare plant and natural community survey is provided in Exhibit 9-1 (Rare Plants, Rare Natural Communities, and Invasive Plants Survey Report). No rare plants or rare natural communities were identified within the Project area. The 2020 field survey study area did not include the locations for the proposed ADLS tower locations and associated access roads. These areas will be surveyed in July 2021 and a supplemental RTE survey report will be provided to the MDEP for inclusion in the permitting record.

Exhibits

- Exhibit 9-1 Rare Plants, Rare Natural Communities, and Invasive Plants Survey Report

Western Maine Renewable Energy Project

MDEP Site Location of Development/NRPA Combined Application

EXHIBIT 9-1 RARE PLANTS, RARE NATURAL COMMUNITIES, AND INVASIVE
PLANTS SURVEY REPORT

Rare Plants, Rare Natural Communities, and Invasive Plants Survey Report

**Western Maine Renewable Energy Project
Somerset County, Maine**



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EXECUTIVE SUMMARY

Western Maine Renewables, LLC is working to develop the Western Maine Renewable Energy Project (Project), a commercial wind energy project at the decommissioned Moscow Air Force Station Transmit Site in the Town of Moscow, Somerset County, Maine (Project Area). As part of Project planning and compliance with state natural resource regulations, a survey for rare plants, rare natural communities, and invasive plants was performed within the Project Area. No rare plant populations or rare natural communities were identified in the Project Area. Invasive species were identified throughout the Project Area including reed canary grass (*Phalaris arundinacea*), spotted knapweed (*Centaurea stoebe*), purple loosestrife (*Lythrum salicaria*), Canada thistle (*Cirsium arvense*), bull thistle (*Cirsium vulgare*), and western lupine (*Lupinus polyphyllus*). Reed canary grass and spotted knapweed were ubiquitous in all areas except the western string of turbine pad sites, while other species were less common. Construction crews should be made aware of the presence of invasive plants and implement practices to reduce their spread. This report will be amended after additional surveys are conducted during the 2021 growing season to account for minor changes in the Project Area, and the addition of radar-assisted lighting towers and associated access road.

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1.0 INTRODUCTION

Western Maine Renewables, LLC is working to develop the Western Maine Renewable Energy Project (Project), a commercial wind energy project at the decommissioned Moscow Air Force Station Transmit Site in the Town of Moscow, Somerset County, Maine (Project Area; Appendix A). As currently envisioned, the Project would consist of approximately 14 Vestas 4.2-megawatt wind turbines on 105-meter towers generating a total of 58.8 megawatts of energy. A substation will be located within the Project Area and power from the wind turbines will be transmitted from the Project substation via an existing 115-kilovolt transmission line to the existing Wyman Hydro Substation. The Project Area, excluding the 115-kilovolt transmission right-of-way (ROW), is approximately 390 acres. The Project is in the planning process and will require permits from the United States Army Corps of Engineers, the Maine Department of Environmental Protection, and the Town of Moscow.

As part of Project planning and compliance with state natural resource regulations, a survey for rare plants, rare natural communities, and invasive plants was performed within the Project Area. The Project Area is primarily forested timberlands with three open fields, now covered with scrub-shrub vegetation that is reverting to forestland, and other habitat types (e.g., forested wetlands). Much of the Project Area was once occupied by the now-abandoned Moscow Air Force Station.

This report describes the methods used to identify, characterize, and document occurrences of rare plants, rare natural communities, and invasive plants; and then presents and describes the results of the survey. Appendix A includes maps of the Project Area with survey results, Appendix B is a table of invasive plants documented in the Project Area, Appendix C presents representative photos of invasive plants documented within the Project Area, and Appendix D is a copy of the consultation letter received from the Maine Natural Areas Program (MNAP) for this Project.

2.0 METHODS

The survey began with an initial desktop analysis which included reviewing the MNAP consultation letter (Appendix D), examining Beginning with Habitat online maps (MDIFW 2020), reviewing MNAP natural community fact sheets (MNAP 2020), and examining photographs and plant lists from wetland and vernal pool surveys conducted in the Project Area. A field survey was conducted between late July and September 2020 to verify information from the desktop analysis and to document plants and natural communities not identified during the desktop analysis. The field survey was conducted using meandering transects focused on areas identified during the desktop analysis and any other areas with high potential for rare plants, rare natural communities, and invasive plants. Data and photographs were collected electronically on iPads using the ArcGIS Collector application. GPS units tethered to the iPad provided sub-meter accuracy for data collection. The extent of plant populations and natural communities within the Project Area were mapped using points and polygons. For ubiquitous invasive plants, mapping was limited to indicating general locations or extents of populations.

Additional surveys will be completed during the 2021 growing season to account for minor changes to the Project Area, and the addition of radar-assisted lighting towers and associated access road.

3.0 RESULTS

No rare plant populations or rare natural communities were identified in the Project Area. Characteristics of a “Hardwood Seepage Forest,” a state-listed S3 natural community, were observed in the western Project Area but the area did not have a strong showing of the herbaceous plants that are typical of that community. Invasive species were identified throughout the Project Area, with the western turbine pad

survey areas being least affected (Appendix A). The six species observed within the Project Area include: Reed canary grass (*Phalaris arundinacea*), spotted knapweed (*Centaurea stoebe*), purple loosestrife (*Lythrum salicaria*), Canada thistle (*Cirsium arvense*), bull thistle (*Cirsium vulgare*), western lupine (*Lupinus polyphyllus*). Reed canary grass and spotted knapweed were ubiquitous in all areas except the western string of turbine pad sites, while other species were less common (Appendix B, Appendix C).

Reed canary grass dominated the vegetation cover in many of the wetlands near disturbed areas during the late summer months. The species was present along the main travel roads and generally was found to cover upwards of 50 percent of open wetland areas near roads. The ROW in the southeast corner of the substation was dominated by over an acre of predominantly reed canary grass, as was the smaller transmission-line ROW that continues northwest from this location (Appendix A, Appendix B, Appendix C).

Spotted knapweed was also common throughout much of the disturbed areas of the Project Area, especially where vegetative cover was otherwise sparse. This plant was ubiquitous along roads and other compacted cleared areas, but often as a few dispersed individuals and was not always mapped. Presence was particularly notable in the access road that traveled north to the northern radar fields and within the graveled area for the proposed substation.

Western lupine was identified along the road embankment and ditch for the access road along the northern side of the southern radar field. The plants occurred mostly in clumps and were identified by their taller stature and having more leaflets than would be present for the native rare wild lupine (*Lupinus perennis*). This species was noted casually during wetland surveys and is present in other areas of the site but not in dense numbers observed near the southern radar field.

For some invasive species, only a single population was identified within the Project Area during the surveys. Due to the meandering survey methodology, it is possible that some populations were missed. While Canada thistle is relatively common in the area, only one population was confirmed within the Project Area. The MNAP considers this a “severely invasive” species. It is a perennial species that spreads by rhizomes and seed production (MNAP 2019). One small population of purple loosestrife (including nine plants) was identified at the northern end of the southern radar field. This species is listed as very invasive by MNAP and reproduces by seeds which can stay viable for several years (MNAP 2019). Two bull thistle populations were observed; one in a distinct cluster of up to 80 individuals on a raised berm adjacent to the road, another with only a few individuals in a road ditch north of the southern radar field. This species reproduces exclusively by seed but can have 100–300 seeds per flower head (DiTomaso et al.2013).

4.0 CONCLUSION AND DISCUSSION

No state or federally listed rare plants were observed within the Project Area. The MNAP consultation letter indicated that red-stemmed Gentian (*Gentiana rubricaulis*), Goldie’s wood fern (*Dryopteris goldiana*), and Clinton’s bulrush (*Tricophorum clintonii*) have been documented near the Project Area; however, these species were not observed within the Project Area. No rare natural communities were identified within the Project Area. Characteristics of a “Hardwood Seepage Forest” were observed within the western Project Area but the area did not have a strong showing of the herbaceous plants that are typical for that community.

Invasive species were present in much of the project area; reed canary grass (1-Severely Invasive) and spotted knapweed (2-Very Invasive) being the most prevalent. Reed canary grass was present along most of the roadways, however, it became scarce west of Bassett Brook. This species also dominated the vegetation coverage of many of the open wetlands in late summer. Reed canary grass was also abundant

in the turbine pad survey areas in both the radar fields, especially near wetlands and damp open areas. Reed canary grass spreads by rhizomes and is difficult to control once established. Digging the plants up can be effective for small patches. Cleaning equipment after work in areas of reed canary grass can reduce spread to other areas during construction.

Spotted knapweed was also common along, and within, roadways and was generally present in areas of compact soil and gravel additions. As such, multiple pockets of this invasive species were found within the southeast corner of the survey area for the proposed substation. This plant, like reed canary grass, tends to thrive in disturbed areas, therefore cleaning equipment when moving between areas with the species to areas without can help control spread of the species.

One population of bull thistle (4-Potential to be invasive, monitor) was found along stream road, near the intersection with the road going west to the western string of turbine pads. Though containing upwards of 60 plants, the population was in a distinct cluster. A small population of Canada thistle (1-Very Invasive) was observed north of the south access road. Due to the spreading nature of this plant, construction crews should be aware of its potential presence to reduce the chance of further spread.

One population of purple loosestrife was observed within the Project Area; near the building on the north end of the southern radar field. The population consisted of 9 plants, although only one was large and flowering. While not identified within the turbine pads in this field, care during construction could aid in preventing further spread of this (2-Very Invasive) weed.

Western lupine was observed in dense patches along the northern access road to the southern radar field. The species was observed casually in other areas of the project during other resource surveys but not as a dominant cover, as was noted in the identified populations. MNAP lists this species as “4-Potential to be invasive, monitor.” In dense stands it can outcompete other species and change soil properties in nutrient poor sites, potentially altering natural community structure. This species can hybridize with other lupine species, although it is unknown if it hybridizes with the native sundial lupine.

Hemp nettle (*Galeopsis Tetrahit*) was also found in highly disturbed areas within the site. Although not on the MNAP 2019 advisory list, it is listed as an invasive species in multiple states and Canada. Bird’s-foot trefoil (*Lotus Corniculatus*) is another non-native plant that was observed in highly disturbed areas (especially along road/transmission line berms) and would dominate the herbaceous layer. Although not on the MNAP 2019 advisory list, this species is widespread and can be an agricultural pest (GoBotany 2020).

This report will be amended after additional surveys are conducted during the 2021 growing season to account for minor changes in the Project Area, and the addition of radar-assisted lighting towers and associated access road.

5.0 REFERENCES

- DiTomaso, J.M., G.B. Kyser et al. 2013. Weed Control in Natural Areas in the Western United States. Weed Research and Information Center, University of California. 544pp.
- GoBotany. 2020. Lotus corniculatus L. – garden bird’s-foot-trefoil. Web page. Accessed November 2020 at: <https://gobotany.nativeplanttrust.org/species/lotus/corniculatus/>.
- Maine Department of Inland Fisheries and Wildlife. 2020. Beginning with Habitat. Available at <https://www.maine.gov/ifw/fish-wildlife/wildlife/beginning-with-habitat/index.html>. Accessed July 2020.
- Maine Natural Areas Program (MNAP). 2019. Maine Invasive Plants: Field Guide. Publisher: Maine Natural Areas Program, Department of Agriculture, Conservation and Forestry. ISBN: 978-0-578-40484-4.
- _____. 2020. Natural Community Fact Sheets. Available at <https://www.maine.gov/dacf/mnap/features/commsheets.htm>. Accessed July 2020.

APPENDIX A. MAPS

*The maps in this appendix will be updated after additional surveys are conducted during the 2021 growing season to account for minor changes in the Project Area, and the addition of radar-assisted lighting towers and associated access road.

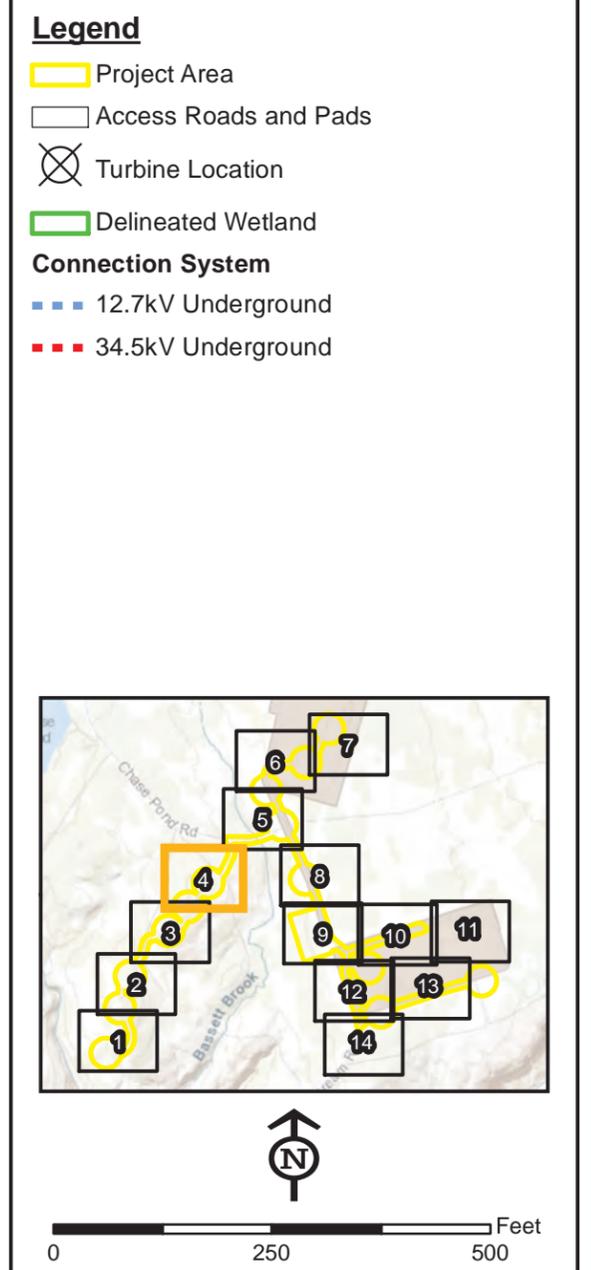
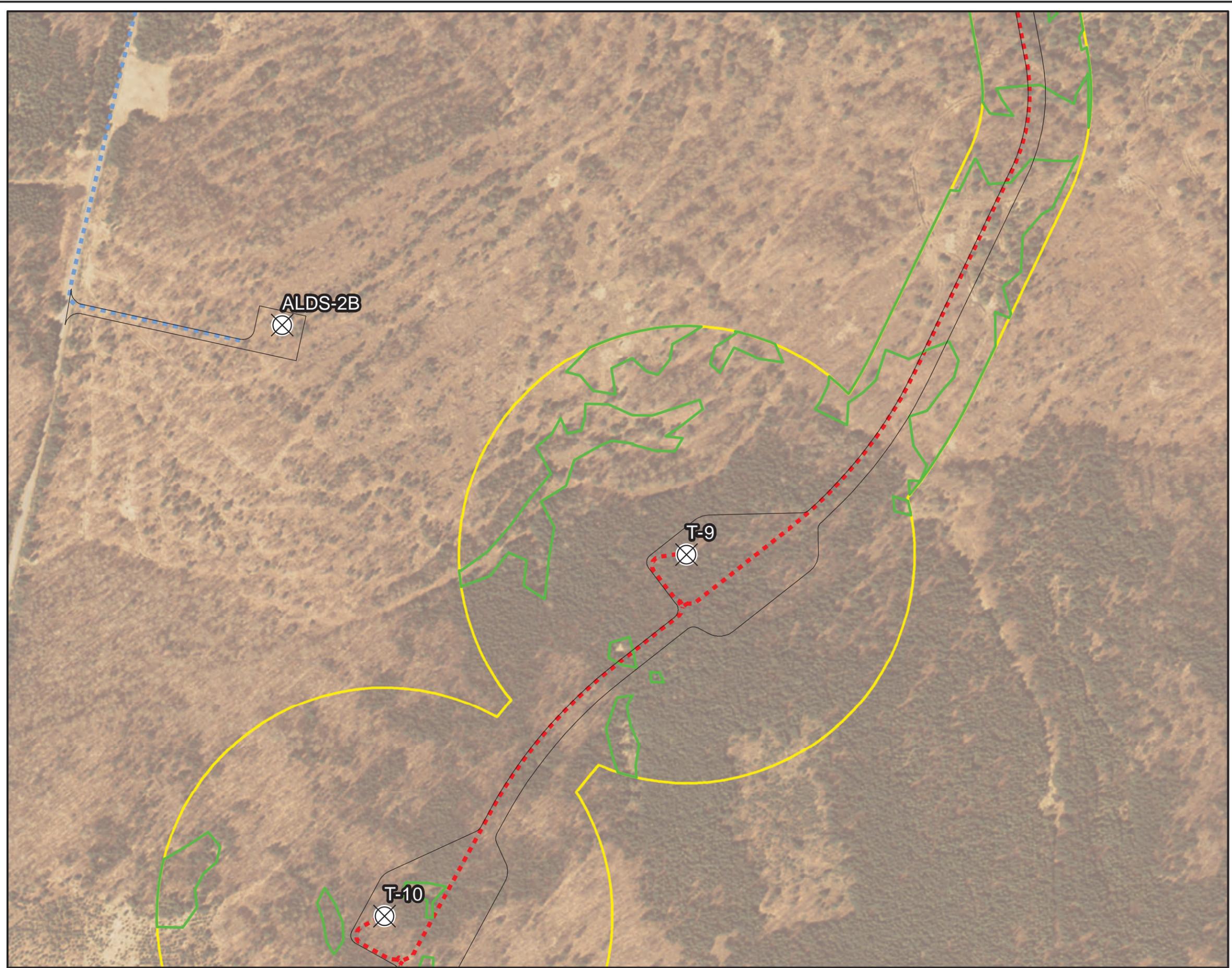


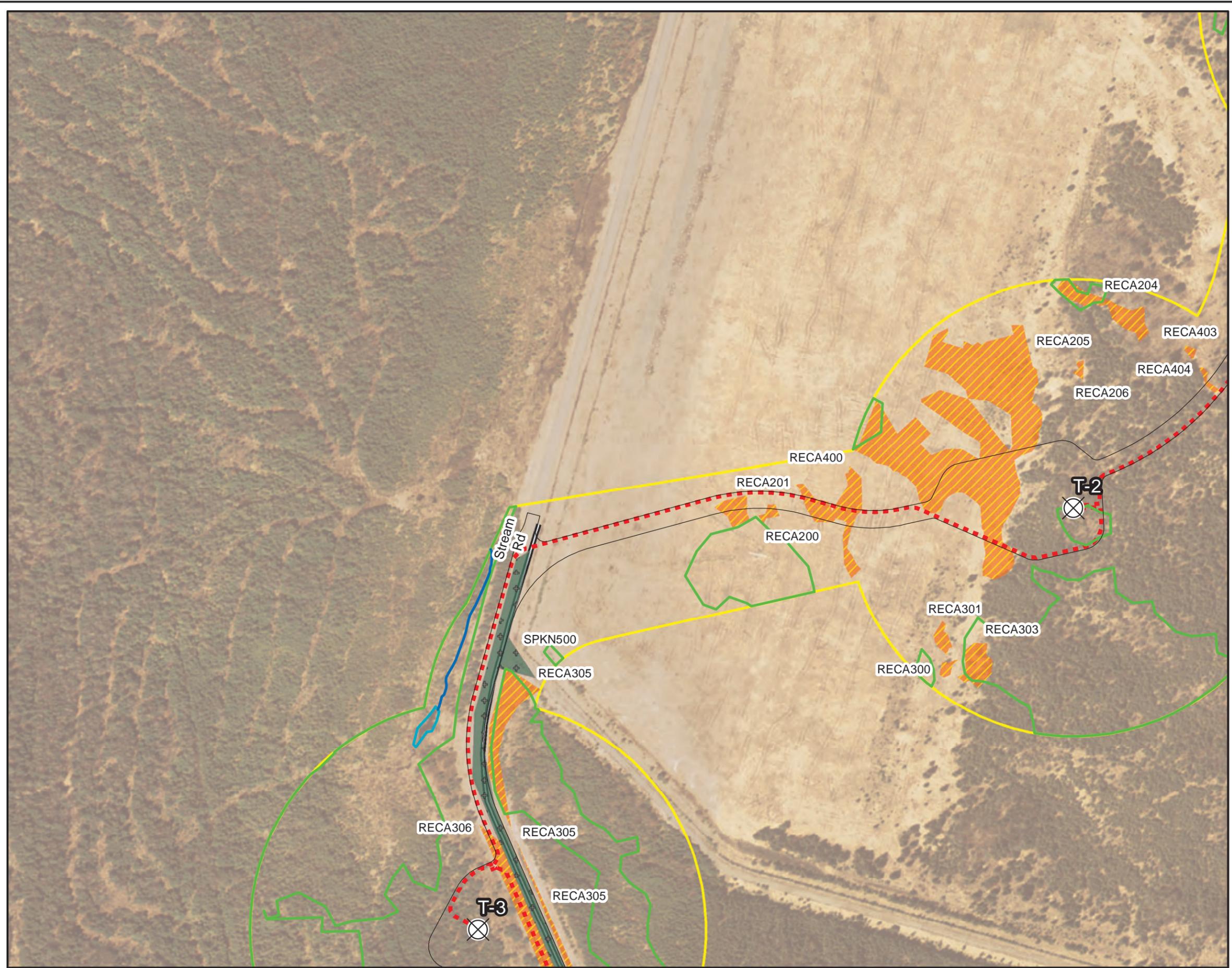
Figure 2
Invasive Species Survey Results
 Plate 4 of 14
 Western Maine Renewable Energy Project

Prepared For:

Prepared By:	Date: 05/2021
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Source: Esri, et. al., 2020; Tetra Tech, 2020

Coordinate System: World Geodetic System, 1984
 Universal Transverse Mercator, Zone 19 North



Legend

- Project Area
- Access Roads and Pads
- X Turbine Location
- Delineated Wetland
- Delineated Vernal Pool
- Delineated Stream

Invasive Plant Group

- Reed Canary Grass
- Spotted Knapweed

Connection System

- 34.5kV Underground

Figure 2
Invasive Species Survey Results
 Plate 6 of 14
 Western Maine Renewable Energy Project

Prepared For:

Prepared By:	Date: 05/2021
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Source: Esri, et. al., 2020; Tetra Tech, 2020

Coordinate System: World Geodetic System, 1984
 Universal Transverse Mercator, Zone 19 North

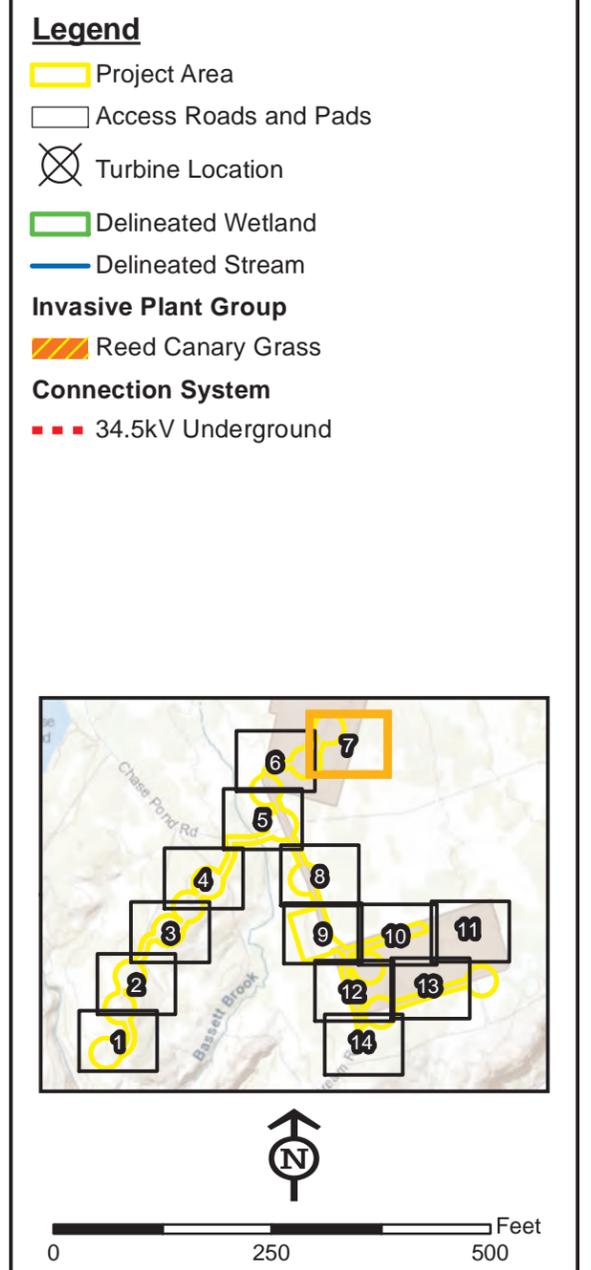
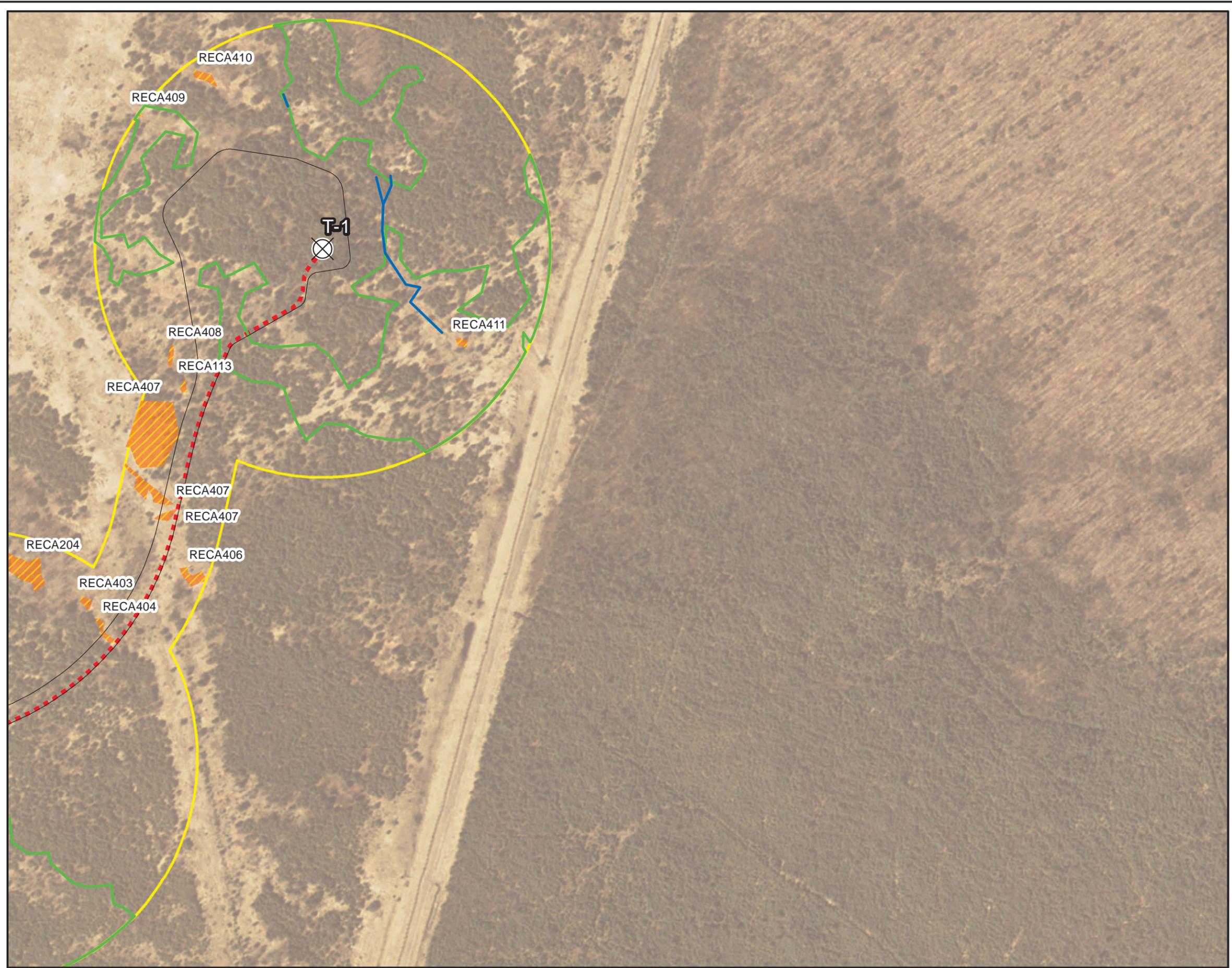


Figure 2
Invasive Species Survey Results
 Plate 7 of 14
 Western Maine Renewable Energy Project

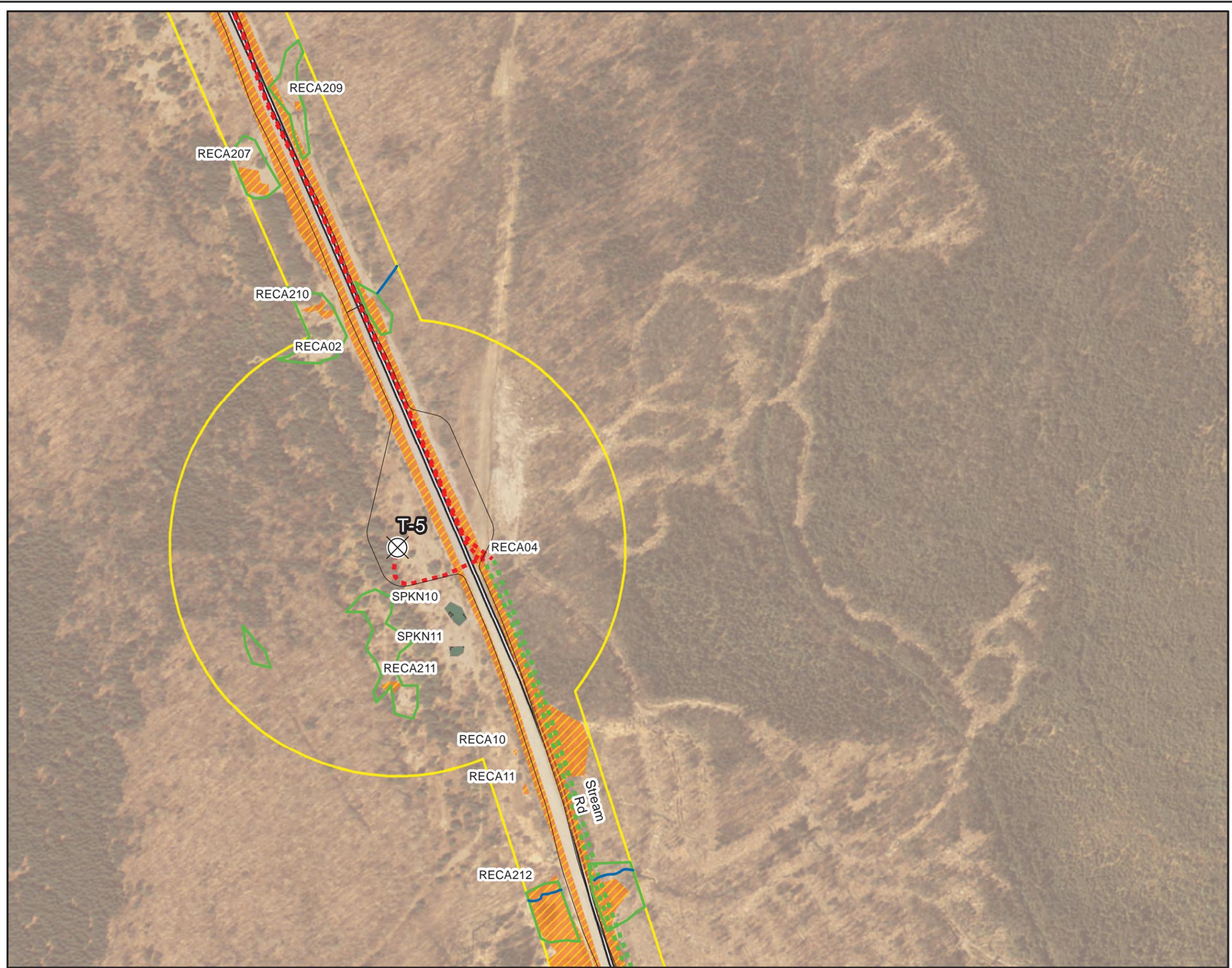
Prepared For:

Prepared By:	Date: 05/2021
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Source: Esri, et. al., 2020; Tetra Tech, 2020

Coordinate System: World Geodetic System, 1984
 Universal Transverse Mercator, Zone 19 North

Document Path: Z:\projects\94\PROJECTS\PA\T\01\94_7130_MOSCOW\1\mde_bam\GIS\MAJOR\RES\VT\WORK\PA\NO_1\TP_20210516\T_1\MOSCOW_INVASIVE_PLANT_RESULTS_DDP_21.mxd



Legend

- Project Area
- Access Roads and Pads
- Turbine Location
- Delineated Wetland
- Delineated Stream

Invasive Plant Group

- Reed Canary Grass
- Spotted Knapweed

Connection System

- 34.5kV Overhead
- 34.5kV Underground

N

0 250 500 Feet

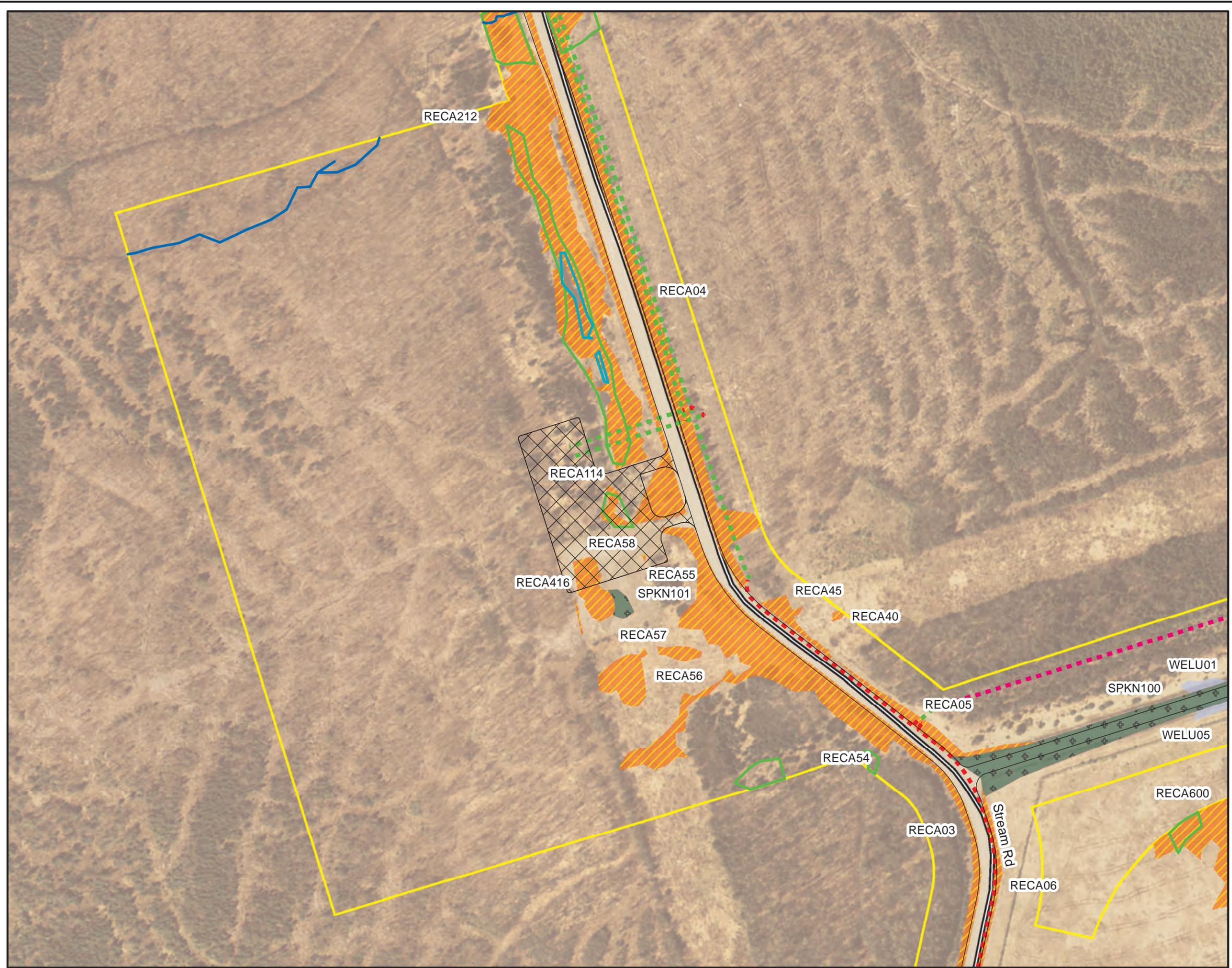
Figure 2
Invasive Species Survey Results
 Plate 8 of 14
Western Maine Renewable Energy Project

Prepared For:

Prepared By: **TETRA TECH** Date: **05/2021**

Source: Esri, et. al., 2020; Tetra Tech, 2020

Coordinate System: World Geodetic System, 1984
 Universal Transverse Mercator, Zone 19 North



Legend

- Project Area
- Access Roads and Pads
- Proposed Substation Area
- Delineated Wetland
- Delineated Vernal Pool
- Delineated Stream

Invasive Plant Group

- Reed Canary Grass
- Spotted Knapweed
- Western Lupine

Connection System

- 12.7kV Overhead
- 34.5kV Overhead
- 34.5kV Underground

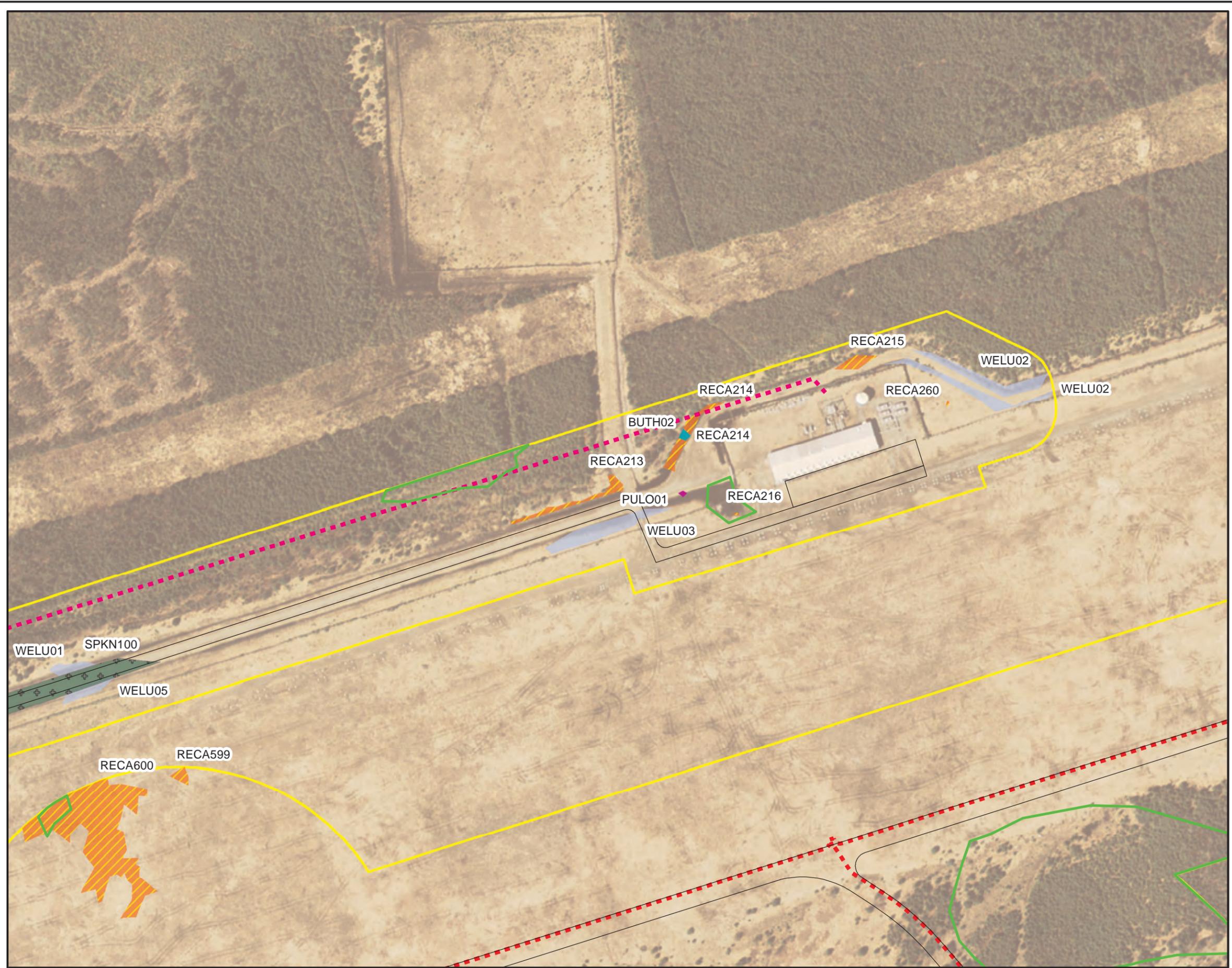
Figure 2
Invasive Species Survey Results
 Plate 9 of 14
 Western Maine Renewable Energy Project

Prepared For:

Prepared By: **TETRA TECH** Date: **05/2021**

Source: Esri, et. al., 2020; Tetra Tech, 2020

Coordinate System: World Geodetic System, 1984
 Universal Transverse Mercator, Zone 19 North



Legend

- Project Area
- Access Roads and Pads
- Delineated Wetland

Invasive Plant Group

- Bull Thistle
- Purple Loosestrife
- Reed Canary Grass
- Spotted Knapweed
- Western Lupine

Connection System

- 12.7kV Overhead
- 34.5kV Underground

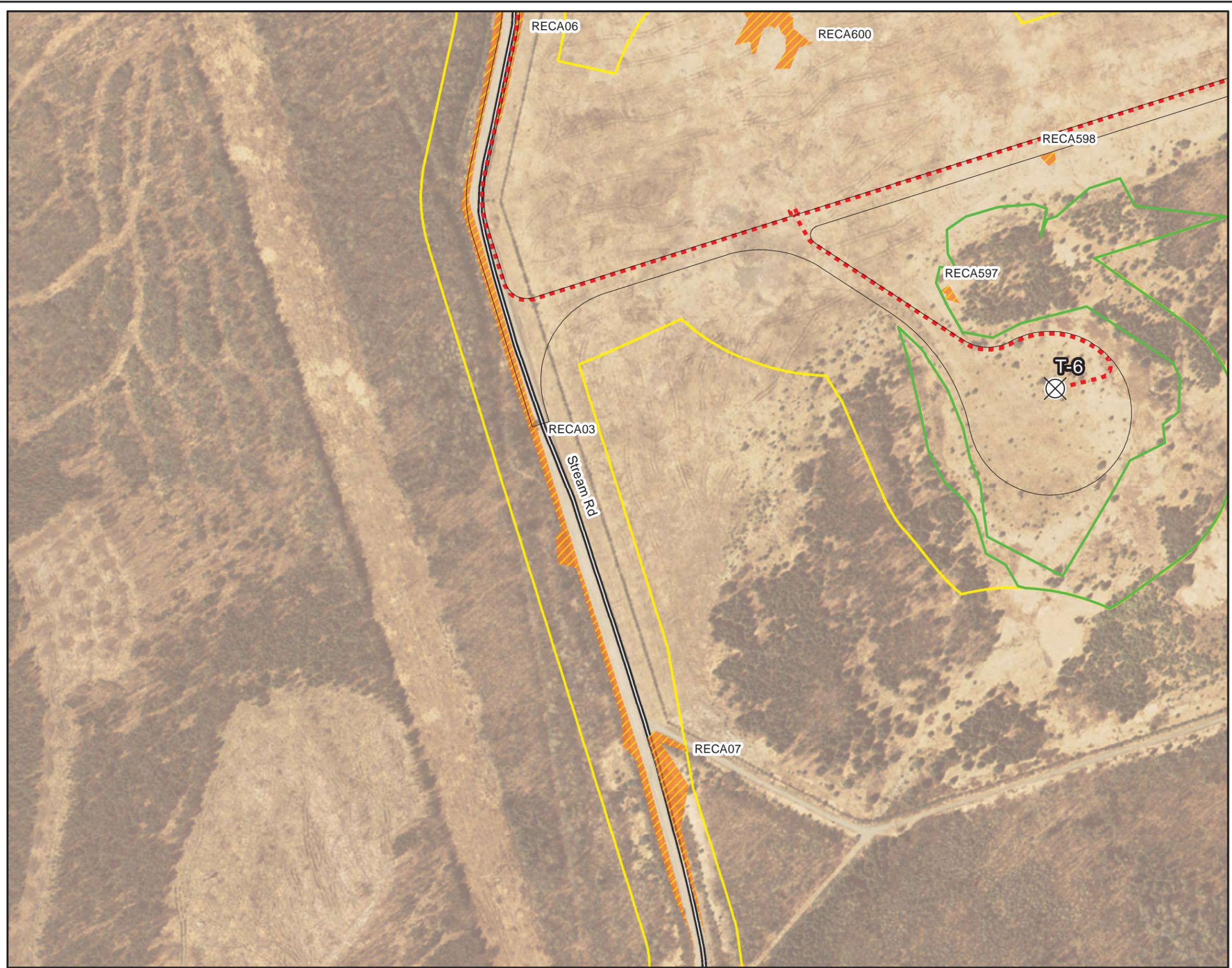
Figure 2
Invasive Species Survey Results
 Plate 10 of 14
 Western Maine Renewable Energy Project

Prepared For:

Prepared By: **TETRA TECH** Date: **05/2021**

Source: Esri, et. al., 2020; Tetra Tech, 2020

Coordinate System: World Geodetic System, 1984
 Universal Transverse Mercator, Zone 19 North



Legend

- Project Area
- Access Roads and Pads
- X Turbine Location
- Delineated Wetland

Invasive Plant Group

- Reed Canary Grass

Connection System

- 34.5kV Underground

N

0 250 500 Feet

Figure 2
Invasive Species Survey Results
 Plate 12 of 14
Western Maine Renewable Energy Project

Prepared For:

Prepared By:	Date: 05/2021
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Source: Esri, et. al., 2020; Tetra Tech, 2020

Coordinate System: World Geodetic System, 1984
 Universal Transverse Mercator, Zone 19 North

APPENDIX B. INVASIVE PLANT TABLE

Plant Species (Status)	Location	Summary
Canada Thistle (1 - Severely Invasive)		
CATH220AR	North of access road along south side of southern radar field.	Small population 40–60 plants. About 1/3 of plants in flower, the rest in vegetative stage.
Reed Canary Grass (1 - Severely Invasive)		
RECA02	West of Stream Rd, north of substation area and west along access road to western pad.	Reed canary grass was ubiquitous along roadways and generally extending down into the ditch. Population is adjacent to additional populations in wetlands and other areas.
RECA03	West side of Stream Rd, south of substation area.	Reed canary grass along roadway and in ditch, as well as the opposite side of the ditch in places; adjacent to larger clumps.
RECA04	East of Stream road; north of large transmission line crossing.	Reed canary grass along roadway and in ditch; includes some areas up the hillslope and adjacent to denser populations in wetlands.
RECA05	East of Stream Rd, south of ROW crossing.	Reed canary grass along road and ditch and extending east along the north side of access road to the north side of the southern radar field.
RECA06	East of Stream Rd, along southern Radar field.	Reed canary grass along road and in ditch along the western side of the southern radar field; becomes patchy at south end of field.
RECA07	Along access roads at SE corner of southern Radar field.	Reed canary grass along the road edge and in the ditch along Stream Road and the northern section of the access road to the southern end of the south radar field.
RECA10	West of Stream Rd, just north of substation area.	Small patch of reed canary grass on higher ground, separate from ditch population.
RECA11	West of Stream Rd, just north of substation area.	Small patch of reed canary grass on higher ground, separate from ditch population; south of RECA10 (and slightly larger).
RECA40	CMP ROW east side of Stream Rd.	Small dense patch of grass east of road and ditch population.
RECA45	CMP ROW east side of Stream Rd.	Medium-sized patch with moderate to dense growth.
RECA54	CMP ROW in southeast corner of substation survey area.	Approximately 1.0 acre of reed canary grass dominated meadow surrounding the area where the CMP ROW turns ENE and out of the project Survey area.
RECA55	West of Stream Rd, substation survey area.	Reed canary grass growing on spoil pile in compacted area of substation survey area. Dense patches interspersed with blackberry.
RECA56	West of Stream Rd, substation survey area.	Small patch of reed canary grass near road entrance to cleared area of the substation survey area.
RECA57	CMP ROW in southeast corner of substation survey area.	Large patch of dense growth near and around the corner tower for the CMP powerline.

Plant Species (Status)	Location	Summary
RECA58	Gravel area in substation survey area.	Small patch of reed canary grass, diffuses into forested area between this population and RECA54.
RECA113	Northern-most pad survey area.	Small patch in forested area between RECA407 and RECA408.
RECA114	Just north of gravel area in substation survey area.	Dene patches of reed canary grass around water feature and feathering into woods. Connects to RECA115.
RECA200	Southwest corner of middle radar field; near end of access road to 2 nd pad from north.	Patches of reed canary grass interspersed with other wetland vegetation. Population extends into radar field.
RECA201	Southwest corner of middle radar field; near end of access road to 2 nd pad from north.	Patches of reed canary grass interspersed with other wetland vegetation. Population extends into radar field.
RECA204	North edge of second pad from north.	Patch of reed canary grass with dense cover in open and more dispersed under tree cover.
RECA205	Southwest corner of middle radar field.	Large area of reed canary grass forming dense and disperse patches along in the cleared section of the pad survey area, very dense along treeline.
RECA206	East of RECA205.	Small patch of reed canary grass in forested area.
RECA207	West side of Stream Rd. in Wetland W62EI.	Dense cover sometimes mixed with other herbaceous plants. Covers about 50-percent of the wetland.
RECA209	East of Stream Rd. in Wetland W61EI.	Small patch of moderate density in other wetland vegetation.
RECA210	North section of Wetland W64EI, west of Stream Rd.	Dense coverage in depression connecting wetland to W63EI on east side of road.
RECA211	East side of stream road in wetland W63EI.	Dense cover along band of stream and near road. Wetland coverage dominated by patches of reed canary grass and bluejoint.
RECA212	Along small T-line ROW east of proposed substation survey area.	Sometimes dense distribution of reed canary grass filling up most of the open area around and within the wetland (W68EI); very sparse coverage in open water areas where rush and sedges dominate; continues north into wetland (W67EI), with full late summer coverage.
RECA213AR	Just west of building at the north end of the southern radar field and access road running north.	Small grouping of reed canary grass within the ditch and sideslopes.
RECA214AR	Road and ditch around the building at the north end of the southern radar field.	Patches of reed canary grass connected by sparser areas within and along sides of ditch.
RECA215	Road ditch north of building on north end of southern radar field.	Moderate patch size with reed canary grass in road ditch and along both sideslopes.
RECA216	Just east of building at north end of southern radar field.	Small patch of reed canary grass in disturbed area.
RECA217	South access road to southern radar field.	North side of access road, along ditch and road verge and intermixed with other vegetation in areas.

Plant Species (Status)	Location	Summary
RECA218	West end of southern access road to southern field.	Moderate patch of moderate density intermingled with blackberry and Canada thistle, north of access road.
RECA222	West end of southern access road to southern field.	Dense monoculture patch covering much of the southwestern end of wetland north of access road.
RECA223	West end of southern access road to southern field.	Moderate density patch of reed canary grass in wetland. Patches of weed are interspersed with other wetland vegetation.
RECA224	West end of southern access road to southern field.	Moderate density patch of reed canary grass in wetland. Patches of weed are interspersed with other wetland vegetation.
RECA226	South access road to southern field.	Dense vegetation coverage over much of the non-forested or lightly forested area in the western portion of the wetland north of the road (W05NJ).
RECA230	South access road to southern field.	Dense patch of reed canary grass not in a wetland.
RECA231	South access road to southern field.	Small patch with dense area in middle surrounded by other vegetation on north side of road.
RECA232	South access road to southern field.	Small dense patch of reed canary grass, just east of larger population (RECA233).
RECA233	South access road to southern field.	Large dense population that covers the majority of the southern half of wetland (W04NJ) on north side of access road.
RECA234	South access road to southern field.	Small population in upland area north of access road.
RECA235	Western end of south access road to southern field.	Population in wetland around pond. Extensive population with some very dense cover.
RECA236	Eastern end of south access road to southern field.	Dense population of reed canary grass along connecting waterway and wetland north of access road.
RECA260	North side of southern radar field.	Small patch of reed canary grass east of buildings at northern end of field.
RECA300	Southwest corner of second pad from north.	Patches of dense growth interspersed with sparse growth; next to forested area.
RECA301	Southwest corner of second pad from north.	Patches of dense growth interspersed with sparse growth; next to forested area.
RECA303	Southwest corner of second pad from north.	Patches of dense growth interspersed with sparse growth; next to forested area.
RECA305	East side of Road, north of Stream Rd intersection with forest road.	Reed canary grass along road edge and ditch, some denser patches.
RECA306	West side of Road, north of Stream Rd intersection with forest road	Reed canary grass along road edge and ditch, some denser patches
RECA404/403	North edge of second pad from north; adjacent to start of access rd.	Moderately dense/patchy coverage in partial canopy cover; intermixed with brambles
RECA406	Southeast end of access road to north pad.	Smaller clump along southeast end of access road to northern most pad survey area.

Plant Species (Status)	Location	Summary
RECA407	Southwest corner of northernmost pad.	Generally, very dense, mostly monoculture, of reed canary grass. Feathers into forested area and becomes less dense.
RECA408	Southwest corner of northernmost pad.	Small patch of reed canary grass north of RECA407.
RECA409	West side of northern pad.	Small area of grass connected to much larger population outside project survey area to west.
RECA410	Northwest side of northern pad.	Small area of grass connected to much larger population outside project survey area to west.
RECA411	East area of northern pad.	Small clump of reed canary grass in wetland with abundant bluejoint and other vegetation.
RECA416	Southeast corner of substation survey area.	Approximately 0.3 acre patch on spoil pile in southeast corner of substation survey area.
RECA420	Western end of south access road for southern radar field.	Large area of monoculture vegetative cover adjacent to and within wetland north of access road.
RECA421	Western end of south access road for southern radar field.	Monoculture reed canary grass between the southern edge of the access road and the treeline.
RECA422	South of southern access road for southern radar field.	Monoculture reed canary grass between the southern edge of the access road and the treeline.
RECA450	Along southern access road to south radar field.	Reed canary grass along road and embankment and extending out into wetlands and forest edges south of access road.
RECA597	Southern radar field, western side.	Small patch and southeastern edge of survey area, near wetlands.
RECA598	Southern radar field, western side.	Small patch at eastern edge of pad survey area.
RECA599	Southern radar field, western side.	Small patch within survey area, extending outside of the circle to the north.
RECA600	Southern radar field, western side.	North section of pad survey area extending south towards the middle of the circle.
Purple Loosestrife (2 - Very Invasive)		
PULO01AR	Project Road.	North Side of southern radar field; single plant, large and healthy.
Spotted Knapweed (3-Invasive, habitat-specific threats)		
SPKN10	North of substation survey area.	Moderate-sized population in turbine pad survey area to the north of the substation survey area.
SPKN11	North of substation survey area.	Moderate-sized population in turbine pad survey area to the north of the substation survey area.
SPKN100	North access road to south radar field.	Plants along edge of roadway extending into the road, less vigorous in travel lane.

Plant Species (Status)	Location	Summary
SPKN101	Substation survey area north of ROW.	Dense population near spoil pile with plants dispersed throughout compacted area.
SPKN500	Road to northern radar fields.	Large population of over 500 individuals scattered along road edges and within the road itself.
Bull Thistle (4-Potential to be Invasive, monitor)		
BUTH01	West side of road north of gate to northern radar fields.	Moderate sized population (40-60 plants) along raised berm to west of road.
BUTH02	North end of southern radar field.	Small population (3-7 plants) along ditch just north of the building and near the road to the ROW.
Western Lupine (4-Potential to be Invasive, monitor)		
WELU01AR	Along north side of access road to southern radar field.	Disperse population with 75-100 individuals. Some areas with denser clumps; along road ditch and embankment.
WELU02AR	East of building at north end of radar field.	Dense population in and around ditch to south of the access road.
WELU03AR	West of building at north end of radar field.	Disperse population denser in this location but plants present along road and field edge.
WELU05AR	East side of road leading to middle radar field.	Disperse population within road ditch.

APPENDIX C. INVASIVE PLANT PHOTOS



Canada Thistle CATH220



Canada Thistle CATH220



Reed Canary Grass RECA422/217



Reed Canary Grass RECA04



Reed Canary Grass RECA45



Reed Canary Grass RECA45



Reed Canary Grass RECA54



Reed Canary Grass RECA54



Reed Canary Grass

RECA212



Reed Canary Grass

RECA212



Reed Canary Grass

RECA207



Reed Canary Grass

RECA209



Reed Canary Grass RECA205



Reed Canary Grass RECA205



Reed Canary Grass RECA205



Reed Canary Grass RECA205



Reed Canary Grass RECA407



Reed Canary Grass RECA407



Purple Loosestrife PULO01



Purple Loosestrife PULO01



Spotted Knapweed

SPKN10



Spotted Knapweed

SPKN11



Spotted Knapweed

SPKN101



Spotted Knapweed

SPKN500



Western Lupine WELU01



Western Lupine WELU02



Bull Thistle BUTH01



Bull Thistle BUTH02

**APPENDIX D. CONSULTATION LETTER FROM MAINE NATURAL
AREAS PROGRAM**



STATE OF MAINE
DEPARTMENT OF AGRICULTURE, CONSERVATION & FORESTRY

177 STATE HOUSE STATION
 AUGUSTA, MAINE 04333

JANET T. MILLS
 GOVERNOR

AMANDA E. BEAL
 COMMISSIONER

July 20, 2020

Mao Lin
 Tetra Tech
 451 Presumpscot St.
 Portland, ME 04103

Via email: mao.lin@tetrattech.com

Re: Rare and exemplary botanical features in proximity to: Moscow Renewable Energy Project, Proposed Wind and Solar Generation Facility, Moscow and Caratunk, Maine

Dear Mr. Lin:

I have searched the Maine Natural Areas Program’s Biological and Conservation Data System files in response to your request received July 16, 2020, with updated mapping for the project received January 30, 2020 for information on the presence of rare or unique botanical features documented from the vicinity of the project in Moscow and Caratunk, Maine. Rare and unique botanical features include the habitat of rare, threatened, or endangered plant species and unique or exemplary natural communities. Our review involves examining maps, manual and computerized records, other sources of information such as scientific articles or published references, and the personal knowledge of staff or cooperating experts.

Our official response covers only botanical features. For authoritative information and official response for zoological features you must make a similar request to the Maine Department of Inland Fisheries and Wildlife, 284 State Street, Augusta, Maine 04333.

According to the information currently in our Biological and Conservation Data System files, the powerline right-of-way intersects with three rare plant species. Please see the table below and attached map and factsheets for more information about these species. If there is to be any additional clearing or new infrastructure associated with the right-of-way, MNAP requests a more detailed site plan and a site visit so that we may better comment on how the proposed activities may affect these rare plants at this location.

Feature	State Status	State Rank	Global Rank	Occurrence Rank	Site
Red-stemmed Gentian <i>Gentiana rubricaulis</i>	T	S1	G4?	B Good	ROW South of Beaudoin Road, Moscow
Goldie’s Wood Fern <i>Dryopteris goldiana</i>	SC	S2	G4G4	CD Fair-Poor	ROW South of Deadwater Radar Station
Clinton’s Bulrush <i>Tricophorum clintonii</i>	SC	S3	G4	C Fair	ROW near Chase Stream, Moscow

If a field survey of the project area is conducted, please refer to the enclosed supplemental information regarding rare and exemplary botanical features documented to occur in the vicinity of the project site. The list may include

MOLLY DOCHERTY, DIRECTOR
 MAINE NATURAL AREAS PROGRAM
 90 BLOSSOM LANE, DEERING BUILDING



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 WWW.MAINE.GOV/DACF/MNAP

information on features that have been known to occur historically in the area as well as recently field-verified information. While historic records have not been documented in several years, they may persist in the area if suitable habitat exists. The enclosed list identifies features with potential to occur in the area, and it should be considered if you choose to conduct field surveys.

This finding is available and appropriate for preparation and review of environmental assessments, but it is not a substitute for on-site surveys. Comprehensive field surveys do not exist for all natural areas in Maine, and in the absence of a specific field investigation, the Maine Natural Areas Program cannot provide a definitive statement on the presence or absence of unusual natural features at this site.

The Maine Natural Areas Program (MNAP) is continuously working to achieve a more comprehensive database of exemplary natural features in Maine. We would appreciate the contribution of any information obtained should you decide to do field work. MNAP welcomes coordination with individuals or organizations proposing environmental alteration or conducting environmental assessments. If, however, data provided by MNAP are to be published in any form, the Program should be informed at the outset and credited as the source.

The Maine Natural Areas Program has instituted a fee structure of \$75.00 an hour to recover the actual cost of processing your request for information. You will receive an invoice for \$225.00 for three hours of our services.

Thank you for using MNAP in the environmental review process. Please do not hesitate to contact me if you have further questions about the Natural Areas Program or about rare or unique botanical features on this site.

Sincerely,



Kristen Puryear | Ecologist | Maine Natural Areas Program
207-287-8043 | kristen.puryear@maine.gov

Moscow Renewable Energy Project Moscow & Caratunk, Maine



Rare Plant



Rare/Exemplary Natural Community



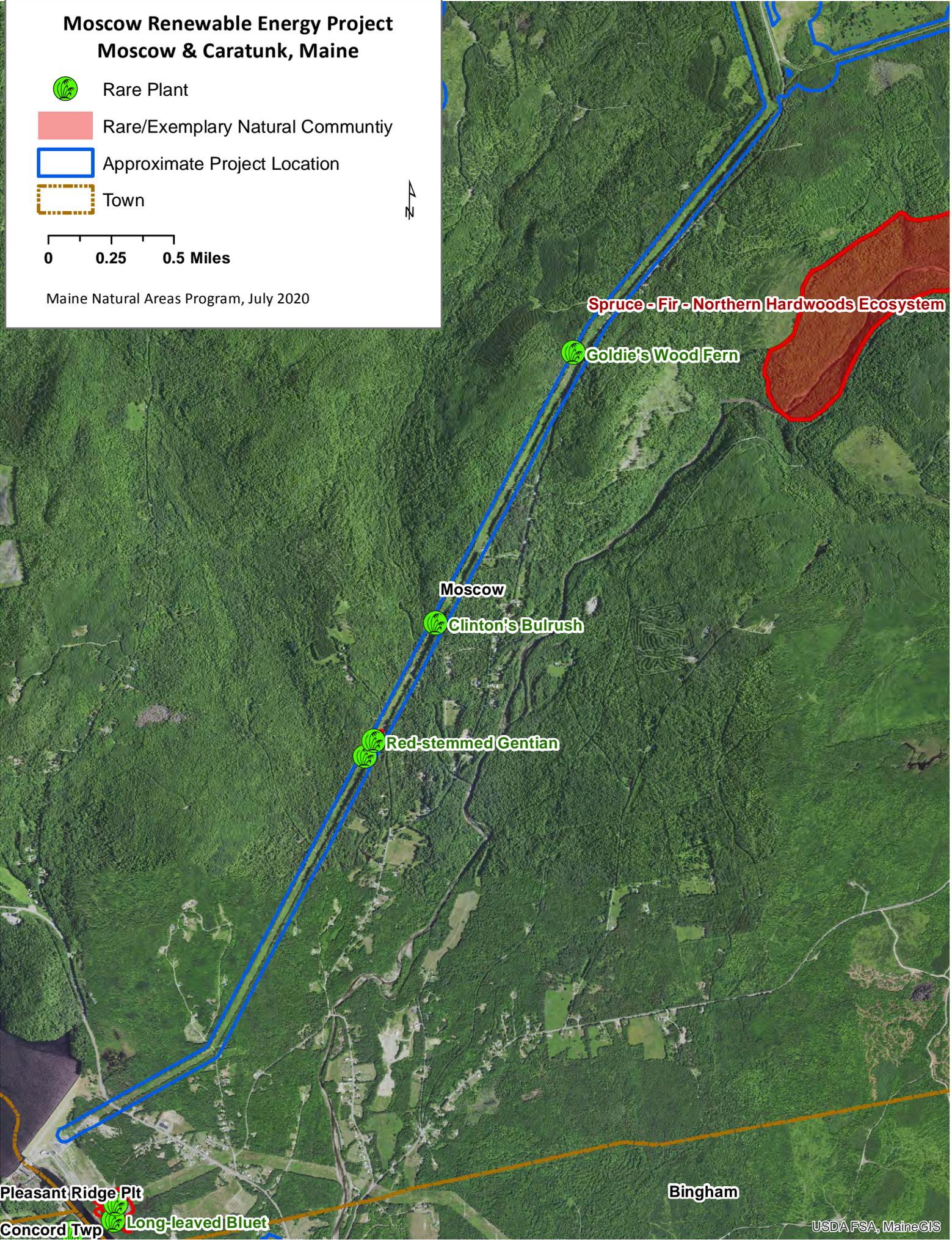
Approximate Project Location



Town

0 0.25 0.5 Miles

Maine Natural Areas Program, July 2020



Spruce - Fir - Northern Hardwoods Ecosystem

Goldie's Wood Fern

Moscow

Clinton's Bulrush

Red-stemmed Gentian

Pleasant Ridge Plt

Concord Twp

Long-leaved Bluet

Bingham

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Dryopteris goldiana (Hook. ex Goldie) Gray

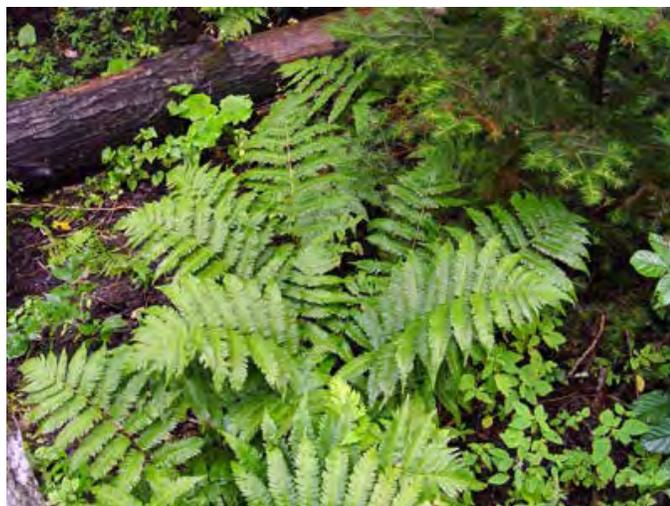
Goldie's Wood Fern

- [State Rank](#): S2
- [Global Rank](#): G4
- [State Status](#): Special Concern

Habitat: Rich mostly calcareous woods. [Hardwood to mixed forest (forest, upland)]

Range: Southeastern Canada to the Carolinas; Tennessee, Iowa, and Minnesota.

Aids to Identification: Goldie's wood-fern has a short, creeping rhizome and large, deep green leaves in a crown-like cluster 1-1.5 m high. The twice-divided leaves are about 3/4 broad as long at the base, tapering quickly to a point. The stalk is covered with distinct shiny brown scales about 2.5 cm long.



Ecological characteristics: Known in Maine from rich hardwood forests.

Phenology: Sori apparent in July - August, fronds evergreen.

Family: Polypodiaceae

Synonyms: *Aspidium goldianum* Hook. ex Goldie.

Known Distribution in Maine: This rare plant has been documented from a total of 26 town(s) in the following county(ies): Aroostook, Franklin, Kennebec, Oxford, Penobscot, Piscataquis, Somerset.

Reason(s) for rarity: Habitat naturally scarce.

Conservation considerations: Effects of logging are not well known; partial removal of the canopy would be less likely to adversely affect the plant than would complete canopy removal.



Credits



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Maine Natural Areas Program

Gentiana rubricaulis Schwein.

Red-stemmed Gentian

- [State Rank](#): S1
- [Global Rank](#): G4?
- [State Status](#): Threatened

Habitat: Moist woods, wet meadows, and shores, especially nongranitic substrates.



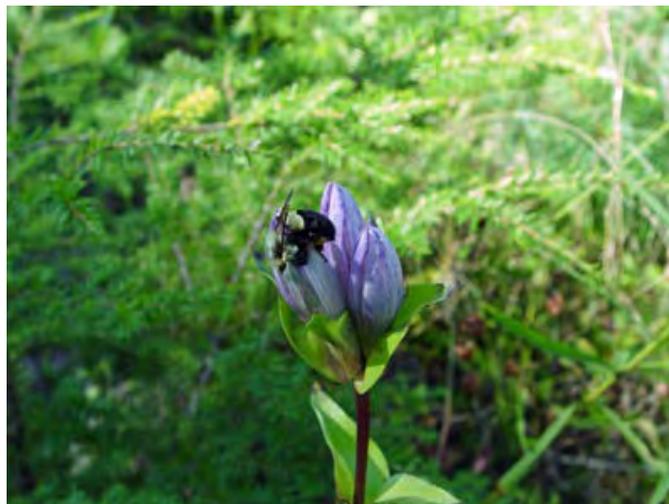
Family: Gentianaceae

Synonyms: *Dasystephana grayi* (Kusnez.) Britt; *Gentiana linearis* Froel. ssp. *rubricaulis* (Schwein.) J. Gillet; *Gentiana linearis* Froel. var. *lanceolata* Gray; *Gentiana linearis* Froel. var. *latifolia* Gray.



Range: Isolated stations in Maine and New Brunswick; otherwise Ontario to Saskatchewan, Minnesota, Wisconsin, Michigan, and Nebraska.

Phenology: Flowers August to September.



Known Distribution in Maine: This rare plant has been documented from a total of 6 town(s) in the following county(ies): Kennebec, Somerset.



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Maine Natural Areas Program

Trichophorum clintonii (Gray) S.G. Smith

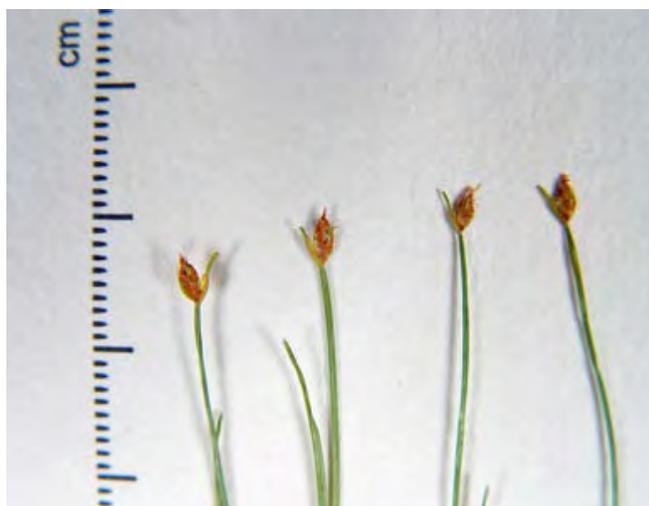
Clinton's Bulrush

- [State Rank](#): S3
- [Global Rank](#): G4
- [State Status](#): Special Concern

Habitat: Dry or springy argillaceous or slaty ledges, gravel or open woods and turfy shores. [Open wetland, not coastal nor rivershore (non-forested, wetland); Non-tidal rivershore (non-forested, seasonally wet)]

Range: Quebec and New Brunswick to New York and Minnesota .

Aids to Identification: Members of the genus *Trichophorum* are sedges with solitary, terminal spikelets subtended by an enlarged scale. The achenes, which lack tubercles possessed by spikerushes, are subtended by 3-6, brown or white, perianth bristles. This short bulrush characteristically grows in dense, low tufts. The lower sheaths are bladeless, the upper bearing leaves shorter than the stem. The terminal spikelet is 4-5 mm wide and has 4-7 flowers. The achenes (fruits) are pale brown, 3-angled, and 1.4-2 mm wide. The triangular stem (in cross section) separates this from the very similar *T. cespitosum*, which has a round stem. Also closely related to *T. alpinum*, it can be distinguished by its brown bristles about 2 mm long.



Ecological characteristics: This species has been found in Maine growing on calcareous, ledgy shores.

Phenology: Perennial. Fruits May - July.

Family: Cyperaceae

Synonyms: *Baeothryon cespitosum* (L.) A. Dietr.; *Scirpus clintonii* Gray.

Known Distribution in Maine: This rare plant has been documented from a total of 23 town(s) in the following county(ies): Aroostook, Kennebec, Penobscot, Piscataquis, Somerset.

Reason(s) for rarity: At southern limit of range.

Conservation considerations: Known populations are small, but not currently subject to any particular human threat; it seems to persist on the few river ledges where it grows. Heavy recreational use of ledges could pose problems.

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Rare and Exemplary Botanical Features within 4 miles of
 Project: Moscow Renewable Energy Project, Decommissioned Air Force Radar Installation,
 Moscow and Caratunk, Maine

Common Name	State Status	State Rank	Global Rank	Date Last Observed	Occurrence Number	Habitat
Bulrush Sedge						
	SC	S2	G5	2001-08-31	7	Rocky summits and outcrops (non-forested, upland), Non-tidal rivershore (non-forested, seasonally wet)
Circumneutral Outcrop						
	<null>	S2	GNR	2001-08-31	9	Rocky summits and outcrops (non-forested, upland)
Clinton's Bulrush						
	SC	S3	G4	2001-08-31	23	Open wetland, not coastal nor rivershore (non-forested, wetland), Non-tidal rivershore (non-forested, seasonally wet)
	SC	S3	G4	2018-07-12	36	Open wetland, not coastal nor rivershore (non-forested, wetland), Non-tidal rivershore (non-forested, seasonally wet)
Goldie's Wood Fern						
	SC	S2	G4G5	2018-07-12	31	Hardwood to mixed forest (forest, upland)
Hemlock Forest						
	<null>	S4	G4G5	2001-08-22	20	Conifer forest (forest, upland), Hardwood to mixed forest (forest, upland)
Hyssop-leaved Fleabane						
	SC	S2	G5	1906-07	16	Non-tidal rivershore (non-forested, seasonally wet), Rocky summits and outcrops (non-forested, upland)
Long-leaved Bluet						
	SC	S2S3	G5TNR	1906-07-03	8	Non-tidal rivershore (non-forested, seasonally wet)
	SC	S2S3	G5TNR	2018-06-06	17	Non-tidal rivershore (non-forested, seasonally wet)
New England Violet						
	SC	S2	G4	1925-07-07	14	Non-tidal rivershore (non-forested, seasonally wet)
Red-stemmed Gentian						
	T	S1	G4?	1902-08-29	2	Open wetland, not coastal nor rivershore (non-forested, wetland), Old field/roadside (non-forested, wetland or upland)
	T	S1	G4?	2018-07-06	6	Open wetland, not coastal nor rivershore (non-forested, wetland), Old field/roadside (non-forested, wetland or upland)

Rare and Exemplary Botanical Features within 4 miles of
 Project: Moscow Renewable Energy Project, Decommissioned Air Force Radar Installation,
 Moscow and Caratunk, Maine

Common Name	State Status	State Rank	Global Rank	Date Last Observed	Occurrence Number	Habitat
Richardson's Tansy-mustard	T	S1	G4?	2018-07-11	8	Open wetland, not coastal nor rivershore (non-forested, wetland), Old field/roadside (non-forested, wetland or upland)
Showy Orchis	PE	SH	G5T5	1934-08-21	2	Rocky summits and outcrops (non-forested, upland)
Spruce - Fir - Northern Hardwoods Ecosystem	E	S1	G5	1907-06-13	17	Hardwood to mixed forest (forest, upland)
Sycamore	<null>	S5	GNR	2013-11-01	9	Conifer forest (forest, upland), Hardwood to mixed forest (forest, upland)
Upper Floodplain Hardwood Forest	PE	SX	G5	1948-07-13	1	Forested wetland, Hardwood to mixed forest (forest, upland)
White Cedar Woodland	<null>	S3	GNR	2015-09-10	36	Forested wetland
	<null>	S2	GNR	2001-08-31	3	Conifer forest (forest, upland), Dry barrens (partly forested, upland)

STATE RARITY RANKS

- S1** Critically imperiled in Maine because of extreme rarity (five or fewer occurrences or very few remaining individuals or acres) or because some aspect of its biology makes it especially vulnerable to extirpation from the State of Maine.
- S2** Imperiled in Maine because of rarity (6-20 occurrences or few remaining individuals or acres) or because of other factors making it vulnerable to further decline.
- S3** Rare in Maine (20-100 occurrences).
- S4** Apparently secure in Maine.
- S5** Demonstrably secure in Maine.
- SU** Under consideration for assigning rarity status; more information needed on threats or distribution.
- SNR** Not yet ranked.
- SNA** Rank not applicable.
- S#?** Current occurrence data suggests assigned rank, but lack of survey effort along with amount of potential habitat create uncertainty (e.g. S3?).

Note: **State Rarity Ranks** are determined by the Maine Natural Areas Program for rare plants and rare and exemplary natural communities and ecosystems. The Maine Department of Inland Fisheries and Wildlife determines State Rarity Ranks for animals.

GLOBAL RARITY RANKS

- G1** Critically imperiled globally because of extreme rarity (five or fewer occurrences or very few remaining individuals or acres) or because some aspect of its biology makes it especially vulnerable to extinction.
- G2** Globally imperiled because of rarity (6-20 occurrences or few remaining individuals or acres) or because of other factors making it vulnerable to further decline.
- G3** Globally rare (20-100 occurrences).
- G4** Apparently secure globally.
- G5** Demonstrably secure globally.
- GNR** Not yet ranked.

Note: **Global Ranks** are determined by NatureServe.

STATE LEGAL STATUS

Note: State legal status is according to 5 M.R.S.A. § 13076-13079, which mandates the Department of Conservation to produce and biennially update the official list of Maine's **Endangered and Threatened** plants. The list is derived by a technical advisory committee of botanists who use data in the Natural Areas Program's database to recommend status changes to the Department of Conservation.

- E** ENDANGERED; Rare and in danger of being lost from the state in the foreseeable future; or federally listed as Endangered.
- T** THREATENED; Rare and, with further decline, could become endangered; or federally listed as Threatened.

NON-LEGAL STATUS

- SC** SPECIAL CONCERN; Rare in Maine, based on available information, but not sufficiently rare to be considered Threatened or Endangered.
- PE** Potentially Extirpated; Species has not been documented in Maine in past 20 years or loss of last known occurrence has been documented.

ELEMENT OCCURRENCE RANKS - EO RANKS

Element Occurrence ranks are used to describe the quality of a rare plant population or natural community based on three factors:

- **Size**: Size of community or population relative to other known examples in Maine. Community or population's viability, capability to maintain itself.
- **Condition**: For communities, condition includes presence of representative species, maturity of species, and evidence of human-caused disturbance. For plants, factors include species vigor and evidence of human-caused disturbance.
- **Landscape context**: Land uses and/or condition of natural communities surrounding the observed area. Ability of the observed community or population to be protected from effects of adjacent land uses.

These three factors are combined into an overall ranking of the feature of **A**, **B**, **C**, or **D**, where **A** indicates an **excellent** example of the community or population and **D** indicates a **poor** example of the community or population. A rank of **E** indicates that the community or population is **extant** but there is not enough data to assign a quality rank. The Maine Natural Areas Program tracks all occurrences of rare (S1-S3) plants and natural communities as well as A and B ranked common (S4-S5) natural communities.

Note: **Element Occurrence Ranks** are determined by the Maine Natural Areas Program for rare plants and rare and exemplary natural communities and ecosystems. The Maine Department of Inland Fisheries and Wildlife determines Element Occurrence ranks for animals.

Visit our website for more information on rare, threatened, and endangered species!
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