Grant County
PUBLIC UTILITY DISTRICT

Connecting Generations
Since 1938

BY ELECTRONIC FILING

March 29, 2017

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
Mail Code: DHAC, PJ-12
888 First Street, NE
Washington, DC 20426

RE: Priest Rapids Hydroelectric Project No. 2114-165
Article 413 License Compliance Filing – Rare, Threatened and Endangered Plant Monitoring Survey Report.

Dear Secretary Bose,

Please find attached the 2016 Rare, Threatened and Endangered Plant Monitoring Plan report consistent with the requirements of Article 413 of the Priest Rapids Hydroelectric Project.

On November 10, 2010, the Federal Energy Regulatory Commission (FERC) issued an Order approving Public Utility District No. 2 of Grant County, Washington's (Grant PUD's) Rare, Threatened and Endangered Plant Monitoring Plan. Under this Order, Grant PUD is required to conduct a survey for 13 species from April to August, depending on the species, the year following FERC approval of the plan and then every fifth year thereafter. This report presents the results of the 2016 monitoring efforts.

Consistent with the License and approving Order, the enclosed document was provided on February 9, 2017 to U.S. Fish and Wildlife Service, Washington Natural Heritage Program, U.S. Bureau of Reclamation, Wanapum People, and the Washington Department of Fish and Wildlife for a 30 day comment period. During the review period no comments were received.

ADDRESS PO Box 878
Ephrata, WA 98823
PHONE 509 766 2505
FAX 509 754 6770
grantpud.org

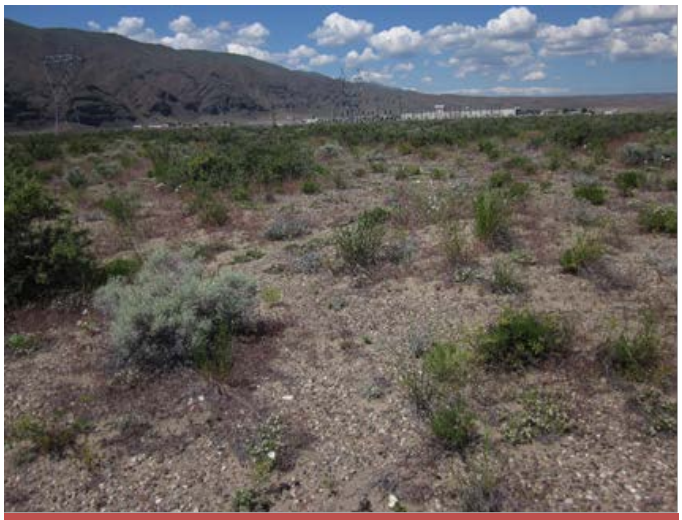
FERC staff with any questions should contact Fish and Wildlife Manager, Tom Dresser, at 509-754-5088 Ext. 2312 or tdresse@gcpud.org.

Respectfully,

Ross Hendrick
Manager - License and Environmental Compliance

Cc Joe Arnett, WNHP
Alyssa Buck, Wanapum People
Steve Lewis, USFWS
Tim McCracken USFWS
Ted Benson, USBR
Patrick Verhey, WDFW

ADDRESS PO Box 878
Ephrata, WA 98823
PHONE 509 766 2505
FAX 509 754 6770
grantpud.org



2016 RTE Plant Monitoring Report

Priest Rapids Project FERC No. 2114

Grant County Public Utility District No. 2
Ephrata, Washington

February 2017

This page intentionally left blank.

Table of Contents

List of Tables

List of Appendices

This page intentionally left blank.

1 Introduction

On April 17, 2008, the Federal Energy Regulatory Commission (FERC) issued a subsequent license to Grant County Public Utility District No. 2 (Grant PUD) for continued operation and maintenance of the Priest Rapids Hydroelectric Project (the Project), FERC No. 2114. License article 413 required Grant PUD to develop and implement a Rare, Threatened, and Endangered (RTE) Plant Monitoring Plan (Plan) addressing RTE plant species within the Priest Rapids Project Boundary. On January 9, 2009, Grant PUD filed the Plan with FERC and on November 10, 2010, FERC issued the *Order Approving Northern Wormwood Conservation Plan and Rare, Threatened, and Endangered Plant Monitoring Plan*, approving the Plan as sufficient to meet the requirements of License article 413.

The goal of the Plan is "to observe the distribution and population trends of RTE plants occurring within the Project, inform the state listing process… aid potential conservation efforts, enhance ecological knowledge with respect to listed plants, and observe long-term trends of the species." According to the Plan, Grant PUD must revisit known RTE plant occurrences within the Priest Rapids Project Boundary beginning the first year after plan approval, and every fifth year thereafter. The Plan further requires Grant PUD to measure the abundance, map the distribution, and track long-term population trends of each RTE plant identified within the Plan. This report presents the results of the 2016 monitoring efforts, the second monitoring effort conducted under the Plan.

In addition to these efforts, the Plan requires Grant PUD to implement a Noxious Weed Management Program on Grant PUD-managed lands.

The Priest Rapids Project includes two hydroelectric developments (Priest Rapids and Wanapum dams) on the Columbia River in central Washington, transmission lines spanning approximately 58 miles, and associated facilities. The FERC Project Boundary includes over 12,000 acres of riparian and terrestrial habitats adjacent to the Columbia River that are managed or owned by Grant PUD, state, federal, county, and private entities. RTE plant surveys conducted within the Project Boundary between 2000-2002 documented occurrences of fourteen RTE plant species. One of these plants (northern wormwood [*Artemisia borealis* var. *wormskioldii*]) is the subject of separate monitoring, conservation, and reporting efforts. The remaining species were targeted during Grant PUD's efforts in 2016 and are addressed here.

2 Methods

Prior to field efforts, Grant PUD developed field maps depicting current RTE plant occurrences with data obtained from the Washington Natural Heritage Program (WNHP), aerial imagery, along with layers showing the Project boundary, major roads, and key Project features. A WNHP data search was completed to update RTE plant occurrence information within the Project boundary. An "occurrence" is defined here as a geographically distinct plant group or groups; these are generally mapped as polygons or polygon groups in a geographic information system (GIS) environment. The WNHP refers to occurrences mapped within their GIS system as "Element Occurrences." Known RTE plant occurrences include all those documented during Grant PUD relicensing studies during 2000-2002 and new RTE plant polygons that have been located during surveys in the vicinity of known occurrences.

To conduct monitoring, Grant PUD botanists that are proficient with the flora of central Washington revisited the locale of each known polygon and surveyed for RTE species using a systematic search approach. At each site, all suitable habitat was searched for the presence of RTE plants.

When RTE species were located, surveyors recorded standard field data describing the occurrence and local habitats, including dominant species, presence of exotic species, phenological state, and observed disturbances, if any. In addition, a census (a complete count of all individuals or stems) was completed for species in which individuals are discernible (for example, stems of rhizomatous plants like beaked spikerush [*Eleocharis rostellata*], are not individually counted). For all RTE plant occurrences, a Global Positioning System (GPS) unit was used to delineate the outside boundary of the occurrence or polygons within it. In combination with the census data, this boundary information can be compared with future data for use in estimating species population trends.

Grant PUD engaged in consultation with WNHP botanist Joe Arnett during April 2016 to determine an appropriate approach to RTE occurrences that have not been located during multiple monitoring efforts. The WNHP advised that polygons could be removed from future RTE plant monitoring efforts if they have been surveyed twice, have no evident target plants and have significantly degraded or destroyed habitat. Habitats may be sufficiently degraded or destroyed such that it is highly unlikely that RTE plants will recolonize or be found there in the future. Survey results presented in Appendix A include recommendations by Grant PUD to end monitoring efforts for certain RTE occurrences meeting these criteria.

3 Results

3.1 Summary of 2016 Surveys

Excepting those noted below, each previously recorded RTE plant occurrence within the Project Boundary, and each polygon within these occurrences, were surveyed during 2016. Results from these efforts are provided below and summarized in Table 3-1. Whether or not the occurrence was located, all polygons were checked against current WHNP GIS database information and WNHP sighting forms from earlier survey efforts. Each polygon has a unique Source Feature Identification number that allows differentiation between multiple polygons that are maintained as a single Element Occurrence within the WNHP system. Information on each polygon visited, the associated Source Feature ID number and current and past survey data are provided in Appendix A.

Cool, moist winter and spring weather conditions preceding and during the 2016 growing season created particularly favorable germination and growing conditions for many annual plant species. As a result, populations of many annual species were similar or increased in size relative to past survey efforts. In addition, new RTE plant occurrences and polygons were located during surveys of known RTE plant polygons. These include:

- Great Basin gilia (Aliciella [Gilia] leptomeria)
- Geyers milk-vetch (Astragalus geyeri)
- Naked-stalked evening-primrose (Chylismia [Camissonia] scapoidea ssp. scapoidea)
- Narrow-stem cryptantha (Cryptantha gracilis)
- Gray cryptantha (Cryptantha leucophaea)
- Miner's candle (Cryptantha scoparia)
- Small-flower evening-primrose (Eremothera [Camissonia] minor)
- Suksdorf's monkeyflower (Erythranthe [Mimulus] suksdorfii)
- Awned halfchaff sedge (Lipocarpha aristulata)

Of these, occurrences of Great Basin gilia, small flower evening-primrose and naked-stalked evening-primrose had not previously been located in the Project area. Sighting forms for new occurrences will be submitted to the WNHP.

A number of RTE plant polygons included in the pre-2000 WNHP database had no plants when surveyed during relicensing surveys occurring between 2000 and 2002. Several of these older polygons were visited during the 2016 surveys to determine whether target plants were present and whether habitat was of sufficient quality to support plants. In most cases, target plants were not relocated in the polygon and the habitat was deemed sufficiently degraded such that it is unlikely that target plants will be found there in the future. These include: a Nuttall's sandwort (*Minuartia nuttallii* var. *fragilis*) polygon in Sentinel Gap, a white eatonella (*Eatonella nivea*) population near Desert Aire and several scattered gray cryptantha polygons. A cespitose evening-primrose (*Oenothera cespitosa* ssp. *cespitosa*) polygon near Beverly Trestle was found to have plants.

Unusually high river levels precluded survey efforts for 1 awned halfchaff sedge (*Lipocarpha aristulata*) polygon in Buckshot Slough, and 3 grand redstem (*Ammannia robusta)* polygons. The habitats potentially supporting these species were submerged during appropriate survey times. In addition, 5 gray cryptantha polygons were visited in September when the species is senescent, rather than May because of logistical reasons. These polygons yielded no plants although habitat quality was considered fair to good. As a result, gray cryptantha polygons should be surveyed in May when the species is blooming during future surveys.

GIS data developed during 2016 have been provided to the WNHP and are maintained on file at Grant PUD. As they are considered sensitive data, they are not included in this report.

3.2 Individual Species Results

Great Basin gilia (*Aliciella* [*Gilia*] *leptomeria*) – A new population of Great Basin gilia was located in the vicinity of the Wanapum Switchyard in 2016. Approximately 315 Great Basin gilia plants, in four small polygons were growing in sandy, moderately weedy habitat in gaps between sagebrush (*Artemisia tridentata*). Great Basin gilia is an annual species in the phlox family.

Grand redstem (*Ammannia robusta*) – The three previously recorded grand redstem polygons within the Project Boundary were submerged by high water during its late season survey window, and were not surveyed or located during 2016. These will be revisited during 2017. Grand redstem is an annual species in the loosestrife family.

Geyer's milk-vetch (*Astragalus geyeri*) – Conditions for Geyer's milk-vetch germination and growth appeared to be ideal in 2016 as three out of four known polygons had plant counts in the thousands. The Sentinel Gap polygon had decreased numbers; 30 plants were present in 2016, down from several hundred plants in 2000. The Sentinel Gap area has burned recently and now appears to have a higher density and cover of nonnative plants than previously. A new Geyer's milk-vetch polygon with 300 plants was located near a known polygon at Wanapum Switchyard. Although this is an annual species, surveyors observed large plants that appeared to be functioning as perennials in at least one instance. Geyer's milk-vetch is an annual species (or largely so) in the pea family.

Naked-stalked evening-primrose (*Chylismia* [*Camissonia*] *scapoidea* ssp. *scapoidea*) – In 2016, a new population of 15 naked-stalked evening-primrose plants was located on gravel fill substrate at the top of the Beverly Trestle. Additional plants may be present in the area. Naked-stalked evening-primrose is an annual species in the evening-primrose family.

Narrow-stem cryptantha (*Cryptantha gracilis*) – Neither of two previously documented narrow-stem cryptantha polygons supported plants in 2016. When surveyed in 2001, these polygons had approximately 1000 and 50 plants, respectively. Two new narrow-stem cryptantha polygons were located in the transmission line ROW between the 2 old polygons. These polygons support 40 and over 1000 plants. The habitats in which these polygons are mapped have high cover of the nonnative annual grass cheatgrass (*Bromus tectorum*), and appear to have burned sometime between 2011 and 2001. Narrow-stem cryptantha is an annual species in the borage family.

Gray cryptantha (*Cryptantha leucophaea*) – In 2016, a total of 26 gray cryptantha polygons of widely varying size and population numbers are visited in the Project Boundary. Of these, plants were not located in 11 polygons; most of which have been subject to habitat degradation, agricultural development, recent fire, or other substantial disturbance. Three polygons had substantial decreases population size, while 5 polygons had population sizes similar to those reported during the 2000-2002 surveys. Two small new gray cryptantha polygons were located. Five gray cryptantha polygons that were visited in September yielded no plants although habitat quality was considered fair to good. These polygons will be surveyed in May in the future. Gray cryptantha is a perennial species in the borage family.

Miner's candle (*Cryptantha scoparia*) – The Frenchman Coulee miner's candle polygon had 50 plants in 2016. This is similar to its population size when initially surveyed in 2001 (fewer than 50 plants). Six new miner's candle polygons with several thousand plants were located growing in the same vicinity as Suksdorf's monkeyflower in the Project transmission line corridor in the Babcock Bench area. Miner's candle is an annual species in the borage family.

Beaked spikerush (*Eleocharis rostellata*) – In 2016, three of the previously recorded beaked spikerush polygons were a similar size as when they were initially documented in 2000-2002. The Class B noxious weed purple loosestrife (*Lythrum salicaria*) is common in the Borden Springs polygon. Four beaked spikerush polygons were not relocated during surveys. Habitat was dominated by the Class B noxious weed common reed *(Phragmites australis*) at the two Moran Slough polygons, and by the invasive tree species Russian olive (*Elaeagnus angustifolia*) at one of the Buckshot Slough polygons. Beaked spikerush is a rhizomatous perennial in the sedge family.

Small flower evening-primrose (*Eremothera* [*Camissonia*] *minor*) – Two new populations of this small annual species were located while doing surveys of other RTE plant populations. A larger population with over 500 plants was found growing in very alkaline soils with Geyer's milk-vetch along Lower Crab Creek. A smaller population of approximately 40 plants was located growing with the new Great Basin gilia population in the Wanapum Switchyard area. Small flower evening-primrose is an annual in the evening primrose family.

Dwarf evening-primrose (*Eremothera* [*Camissonia] pygmaea*) – In 2016, the northern dwarf evening-primrose polygon had 9 plants, down from approximately 150 in 2000. The southern polygon had three plants in 2016 and 2000, although it had 50 plants in 2011. The Sentinel Gap area has burned at least once in recent years. Dense stands of cheatgrass are present in and around these polygons. This is an annual species in the evening-primrose family.

Suksdorf's monkeyflower (*Erythranthe* [*Mimulus*] *suksdorfii*) Two of the three Suksdorf's monkeyflower polygons on Babcock Bench were relocated in 2016 and had similar plant numbers as in the 2000-2002 survey. The third Babcock Bench polygon was not located. These three polygons were not located in 2011, potentially because weather conditions that year were not conducive for many annual species to germinate and grow. In 2016, two new Suksdorf's monkeyflower polygons were located north of Wanapum Switchyard. One polygon is located in an old two-track road and has 75 plants, while the other is in sandy shrub-steppe and has over 100 plants. Suksdorf's monkeyflower is an annual species in the lopseed family.

Sagebrush stickseed (*Hackelia hispida* var. *disjuncta*) – The Moses Coulee sagebrush stickseed polygon had 36 plants in 2016, down from 80 plants counted in 2011. In 2016, 17% of plants were juvenile or vegetative, while in 2011, 80% of the plants observed were juvenile or vegetative. This variation is not unusual for short-lived perennial species. Sagebrush stickseed is a perennial species in the borage family.

Awned halfchaff sedge (*Lipocarpha aristulata*) – The Goose Island awned halfchaff polygon appeared vigorous, with several hundred plants. Many plants were submerged in several inches of water at the time of the survey. A new awned halfchaff polygon with at least 75 plants was located on the shore of Goose Island just southeast of the existing one. There appears to be an active invasion of common reed in and around Goose Island, and in the vicinity of both polygons. This Class B noxious weed is a large perennial grass with creeping rhizomes and feathery plume-like flower heads. It forms dense monotypic stands in wetlands and alters wetland hydrology, structure and function (NWCB 2016). The Feather Slough polygon was submerged by high water during its late season survey window, and not surveyed; this occurrence will be revisited in 2017. Awned halfchaff sedge is an annual species in the sedge family.

Hoover's desert-parsley (*Lomatium tuberosum*) – No Hoover's desert-parsley plants were located in the southern Hoover's desert-parsley polygon in either 2011 or 2016. That polygon had three plants in 2000. The northern polygon had three plants in 2016, down from seven plants in 2011 when it was initially located. The habitat at these polygons is a steep, west-facing basalt talus slope. The Sentinel Gap area has burned at least once in recent years. Dense stands of cheatgrass are present in and around these polygons. Hoover's desert-parsley is a perennial species in the parsley family.

Annual sandwort (*Minuartia pusilla* var. *pusilla*) – In 2016, an estimated count of approximately one thousand plants was observed in the annual sandwort polygon at Wanapum Switchyard. It is difficult to accurately count this species because the plants are minute and had senesced by the time of the survey on May 3. Annual sandwort is an annual species in the pink family.

Cespitose evening-primrose (*Oenothera cespitosa* ssp. *cespitosa*) – The Lower Crab Creek cespitose evening-primrose polygon supported substantially fewer plants (36 plants) in 2016 than in 2011 (96 plants). The general area appears to have become increasingly weedy. Additionally, a known population of cespitose evening-primrose in the Beverly Trestle area was surveyed. With more than 300 plants, this is a vigorous polygon. This area has burned in the last several years. Cespitose evening-primrose is a perennial species in the evening-primrose family.

Snowball cactus (*Pediocactus nigrispinus*) – Snowball cactus was moved to the WNHP Sensitive list from the Review Group 1 list since the 2011 survey and was therefore included in 2016 efforts. There are two populations of snowball cactus known from the Project Boundary, both located during relicensing surveys. A vigorous population of thousands of snowball cactus plants grows on most of Quilomene Island. A smaller population of 110 plants grows along approximately 1,100 feet of transmission line ROW on Babcock Bench. Snowball cactus is a perennial in the cactus family.

Lowland toothcup (*Rotala ramosior*) – In 2011, a small lowland toothcup polygon (20 plants) was located on Goose Island in the vicinity of an awned halfchaff sedge polygon. The polygon was relocated in 2016. There appears to be an aggressive invasion of common reed in and around Goose Island, including in the vicinity of the lowland toothcup and awned halfchaff polygons. Lowland toothcup is an annual species in the loosestrife family.

Table 3-1. Summary Results of 2016 Rare, Threatened and Endangered Plant monitoring for the Priest Rapids Hydroelectric Project.

Common Name	Scientific Name	State listing Status	Currently Documented Polygons	General Polygon Trend(s)
Great Basin gilia	*Aliciella leptomeria*	Threatened	4 small polygons; Wanapum Switchyard	4 new polygons
Grand redstem	*Ammannia robusta*	Threatened	3 polygons; Lower Crab Cr.	3 not surveyed
Geyer' milk-vetch	*Astragalus geyeri*	Threatened	5 polygons; private, federal and Grant PUD property	3 increase, 1 decrease, 1 new polygon
Naked-stalked evening-primrose	*Chylismia scapoidea*	Sensitive	1 small polygon; Beverly Trestle	1 new polygon
Narrowstem cryptantha	*Cryptantha gracilis*	Sensitive	4 polygons; T-line ROW, private property	2 not located, 2 new polygons
Gray cryptantha	*Cryptantha leucophaea*	Sensitive	26 polygons; T-line ROW, federal, private and Grant PUD property	11 not located,3 decrease, 5 similar, 2 new polygons, 5 unknown
Miner's candle	*Cryptantha scoparia*	Sensitive	7 polygons; T-line ROW, French-man Coulee, Babcock Bench	1 similar, 6 new polygons
Beaked spike-rush	*Eleocharis rostellata*	Sensitive	7 polygons; Moran and Buckshot Sloughs, Wanapum Switchyard, Borden Springs	3 similar, 4 not located
Small flower evening-primrose	*Eremothera minor*	Sensitive	2 polygons; Wanapum Switchyard, Lower Crab Creek	2 new polygons
Dwarf evening-primrose	*Eremothera pygmaea*	Sensitive	2 polygons; T-line ROW, Grant PUD property	2 decrease (variable)
Suksdorf's monkey-flower	*Erythranthe suksdorfii*	Sensitive	6 polygons; T-line ROW at Babcock Bench, Wanapum Switchyard	2 similar, 1 not located, 3 new polygons
Sagebrush stickseed	*Hackelia hispida var. disjuncta*	Sensitive	1 polygon; T-line ROW at Moses Coulee, private property	1 decrease
Awned halfchaff sedge	*Lipocarpha aristulata*	Threatened	3 polygons; Feather Slough (Grant PUD), Goose Island	1 similar, 1 not surveyed, 1 new polygon
Hoover's desert-parsley	*Lomatium tuberosum*	Sensitive	2 polygons; T-line ROW, Grant PUD property	1 decrease; 1 not located
Annual sandwort	*Minuartia pusilla*	Sensitive	1 large polygon; Wanapum Switchyard	1 similar
Cespitose evening-primrose	*Oenothera cespitosa*	Sensitive	2 polygons; Crab Creek, Beverly Trestle	1 decrease, 1 increase
Snowball cactus	*Pediocactus nigrispinus*	Sensitive	2 polygons; Quilomene Island, Babcock Bench	2 similar
Lowland toothcup	*Rotala ramosior*	Threatened	1 polygon; new in 2011 on Goose Island	1 not located

4 Discussion

In 2016, general population trends were mixed among the 78 polygons currently mapped within the Priest Rapids Project Boundary (Table 4-1). When surveyed, 20 polygons had no target plants present and nine polygons had substantially decreased numbers of individuals. These results were due to a variety of reasons, including: wildfire, habitat degradation, weed invasion, and habitat destruction. Fifteen polygons had similar plant numbers and 4 had substantially increased plant numbers. Twenty-one RTE plant polygons were newly located. This includes seven new polygons of three RTE plant species that had not previously been located in the Project Boundary and 13 new polygons of 6 RTE plant species.

Table 4-1. General RTE Plant Population Trends and Polygon Numbers in the Priest Rapids Hydroelectric Project, 2016.

General Population Trends Within Polygons
20 Polygons were not located
9 Polygons had a decrease in plant numbers
15 Polygons had a similar number of plants
4 Polygons had an increase in plant numbers
21 Newly located polygons
9 Polygons were not surveyed
78 Total number of polygons in the Project area

The 2016 winter and spring seasons were cool with above average rainfall amounts. These weather conditions often result in above average numbers and diversity of annual plants. In particular, these favorable conditions were reflected in the increased plant numbers in several Geyer's milk-vetch populations as well as in the number of new polygons of RTE plants. Overall, the mixed trend results of this survey reflect the dynamic nature of plant populations over time.

Of all of the RTE plant species in the Project area, likely population trends were most apparent for gray cryptantha, a perennial species that typically occurs in high-quality, sandy, open shrub-steppe habitats. Of the 21 polygons visited, 11 do not currently support plants. Eight of these 11 polygons have habitats which are sufficiently degraded that future surveys are not recommended. Three polygons have substantially reduced population numbers. Much of the habitat in and adjacent to these polygons has been affected by habitat degradation and agricultural conversion. Once disturbed, these lands are often dominated by exotic species such as cheatgrass, which gray cryptantha does not successfully compete with. Cheatgrass cover in some of these disturbed habitats exceeds 80%. The 5 gray cryptantha polygons that appeared to support similar plant numbers and polygon boundaries (as recorded during earlier survey efforts) did not appear to have been subject to recent habitat degradation or physical disturbance. Two new gray cryptantha polygons were identified during the course of surveys. These small polygons have four and nine plants, respectively. Based on input from the WNHP, regional population numbers of this endemic species have been declining for a number of years. No evidence of Project effects on the species was observed.

Another species that appears to have had significant population declines in the Project Boundary is the perennial rhizomatous wetland species beaked spikerush. Plants were not located in 4 out of 7 polygons during both the 2011 and 2016 surveys. It appears as though noxious weeds have outcompeted beaked spikerush at three of these locations. Future surveys of these polygons are not recommended.

A total of 14 RTE plant polygons are recommended for removal from the list of polygons requiring future surveys because target plants have been absent for two surveys, and local habitats have been degraded or destroyed such that plants are unlikely to recolonize them. These include: eight gray cryptantha polygons, one white eatonella polygon, four beaked spikerush polygons, and one Nuttall's sandwort population.

Efforts are planned to address polygons not surveyed during 2016. Three grand redstem polygons and one awned halfchaff sedge polygons not visited due to high water will be surveyed in 2017. In addition, five gray cryptantha polygons visited in September when plants were senescent will be revisited in May 2017 during their flowering season. Results from 2017 surveys will be provided to WNHP.

This page intentionally left blank.

Appendix A.
2016 RTE Plant Survey Data

This page intentionally left blank.

RTE Plant Species	EO#	Source Feat ID #	T R S	General Location	2016 Survey Result Summary (surveys only within Project area boundary)	General Pop Trend 2016	End Surveys
Aliciella leptomeria	new	new '16	16 23 16	Wanapum Switchyard	315 plants in 4 small polygons; nice sandy habitat	unknown	
Ammannia robusta	6	9034	15 23 03	Crab Creek	Polygon underwater, not surveyed.	not surveyed	
Ammannia robusta	6	13936	15 23 03	Crab Creek	Polygon underwater, not surveyed.	not surveyed	
Ammannia robusta	6	13937	15 23 03	Crab Creek	Polygon underwater, not surveyed.	not surveyed	
Astragalus columbianus	13	16144	16 23 33	YTC Beverly Trestle	Searched, not found; area burned recently	unknown	
Astragalus columbianus	13	16145	16 23 33	YTC Beverly Trestle	Searched, not found; area burned recently	unknown	
Astragalus geyeri	1	13935	16 24 32	Lower Crab Creek	1000s plants, vig pop, good habitat, middle not surveyed	increase	
Astragalus geyeri	2	826	15 23 10	Sentinel Gap	30(+10?) plants, area 30'x30', very weedy	decrease	
Astragalus geyeri	7	13785	16 23 16	West of Wanapum Switchyard	> 1000 plants, powerline construction disturbance	increase	
Astragalus geyeri	[7]	new '16	16 23 16	West of Wanapum Switchyard	300 plants, 50x200, nice sandy hab between sage	unknown	
Astragalus geyeri	8	13790	16 23 09	North of Wanapum Switchyard	several 1000 plants, vigorous	increase	
Chylismia scapoidea	new	new '16	16 23 33	Beverly Trestle	15 plants, on trestle, several close points	unknown	
Cryptantha gracilis	13	13781	21 22 27	Moses Coulee	Searched, not found	not relocated	
Cryptantha gracilis	13	13782	21 22 27	Moses Coulee	Searched, not found	decrease	
Cryptantha gracilis	[13]	new '16	21 22 27	Moses Coulee	700+ plants, nice habitat	unknown	
Cryptantha gracilis	[13]	new '16	21 22 27	Moses Coulee	40 plants	unknown	
Cryptantha leucophaea	3	15128	20 22 13	West Bar	20 plants, most open sandy area, weedy, not vigorous	similar	
Cryptantha leucophaea	3	10229	20 22 13	West Bar	Searched, not found; degraded habitat	not relocated	x
Cryptantha leucophaea	3	13940	20 22 13	West Bar	Searched, not found; degraded habitat	not relocated	x
Cryptantha leucophaea	20	8245	16 23 27	N of Crab Creek near Beverly	135 plants; most in south half; north half, few pts	similar	
Cryptantha leucophaea	20	8233	16 23 34	Near Beverly	Searched, not found, degraded habitat	not relocated	x
Cryptantha leucophaea	23	13861	13 24 03	East of Priest Rapids Dam	Searched not found, habitat weedy	not relocated	
Cryptantha leucophaea	[23]	new '16	13 24 03	East of Priest Rapids Dam	9 plants, new lx in exist poly, sandy blowout, weedy area	new	
Cryptantha leucophaea	25	19907	14 23 08	YTC	No plants found Sept, habitat fair. May survey	unknown	
Cryptantha leucophaea	25	2693	14 23 17	YTC	No plants found Sept, habitat fair. May survey	unknown	
Cryptantha leucophaea	25	10247	14 23 17	YTC	No plants found Sept, habitat fair. May survey	unknown	
Cryptantha leucophaea	29	13931	13 23 1	South of Priest Rapids Dam	12 scattered plants, several dead crle observed	similar	
Cryptantha leucophaea	29	13930	13 23 2	South of Priest Rapids Dam	16 plants, most near rd, 20' x 100', nice hab	similar	
Cryptantha leucophaea	29	13933	13 23 01	South of Priest Rapids Dam	Searched, not found	not relocated	
Cryptantha leucophaea	29	13932	13 23 02	South of Priest Rapids Dam	Searched, not found	not relocated	
Cryptantha leucophaea	29	13929	13 23 01	South of Priest Rapids Dam	16 plants, 7 points, nice hab, most plts near road	decrease	
Cryptantha leucophaea	29	2879	13 24 06	South of Priest Rapids Dam	Searched, no plants found	not relocated	x
Cryptantha leucophaea	[29]	new '16	13 23 01	South of Priest Rapids Dam	4 plants, new point, rel. nice habitat, near canal	new	
Cryptantha leucophaea	33	13945	17 23 34	Dunes SE of Vantage Bridge	Habitat converted to agriculture	not relocated	x
Cryptantha leucophaea	33	13944,3	16 23 09	North of Wanapum Switchyard	30 plants, good habitat, plant decrease	decrease	
Cryptantha leucophaea	33	8288	16 23 34	North of Wanapum Switchyard	Searched, not found, poor habitat	not relocated	x
Cryptantha leucophaea	45	13934	14 23 05	Near Mattawa	No plants found Sept, habitat good. May survey	unknown	
Cryptantha leucophaea	45	15049	14 23 5	Near Mattawa	No plants found Sept, habitat good. May survey	unknown	
Cryptantha leucophaea	60	8297	15 23 10	Sentinel Gap	Searched, not found; poor habitat	not relocated	x
Cryptantha leucophaea	60	10282	15 23 10	Sentinel Gap	Searched, not found; poor habitat	not relocated	x
Cryptantha leucophaea	11A	new '11	16 23 16	Wanapum Switchyard Access	2 plants, not vigorous, habitat good	similar	
Cryptantha leucophaea	11B	new '11	16 23 16	Mid Bench Wanapum Switchyard	2 plants, not vigorous, habitat good	decrease	
Cryptantha scoparia	6	13786	18 23 17	Frenchman Coulee	50 plants, on side of 2-track road	similar	
Cryptantha scoparia	new	new '16	20 23 18,19	Babcock Bench	several 1000 plants, 6 polys; with erysuk, pedsim	unknown	
Eatonella nivea	9	10287	14 23 16	Desert Aire	Searched, not found; poor habitat	not relocated	x
Eleocharis rostellata	5	14177	14 23 05	Borden Springs	Rhiz. patch relocated. Purple loosestrife cover higher.	similar	
Eleocharis rostellata	10	8290	16 23 16	Wanapum Switchyard	Rhiz patch approx same size.	similar	
Eleocharis rostellata	11	13783	14 23 09	Buckshot Slough	Searched, not found. Dense Russian olive patch.	not relocated	x
Eleocharis rostellata	[11]	new '11	14 23 09	Buckshot Slough	Northern patch relocated. Very weedy, Sonchus, Cirsium.	similar	
Eleocharis rostellata	12	13784	14 23 35	By Priest Rapids Dam	Plants not found.	not relocated	x
Eleocharis rostellata	13	13797	13 23 01	Moran Slough	Searched, not found. Phragmites dominates habitat	not relocated	x

RTE Plant Species	EO#	Source Feat ID #	T R S	General Location	2016 Survey Result Summary (surveys only within Project area boundary)	General Pop Trend 2016	End Surveys
Eleocharis rostellata	13	13798	13 23 01	Moran Slough	Searched, not found. Phragmites dominates habitat	not relocated	x
Eremothera minor	new	new '16	16 23 16	Wanapum Switchyard	40 plants; nice sandy habitat, with Aliciella	unknown	
Eremothera minor	new	new '16	16 24 31	Lower Crab Creek	500+ plants, vigorous, good habitat/some plants out of PA	unknown	
Eremothera pygmaea	46	13813	15 23 15	Sentinel Bluffs	9 plants in 50 x 50 area, weedy hab, burned recently	decrease	
Eremothera pygmaea	46	13814	15 23 15	Sentinel Bluffs	3 plants, (2 seedlings), weedy hab, burned recently	decrease	
Erythranthe suksdorfii	29	13799	20 23 18	Babcock Bench	Searched, not found	not relocated	
Erythranthe suksdorfii	29	13800	20 23 19	Babcock Bench	50+ plants, south of dirt road	similar	
Erythranthe suksdorfii	29	13801	20 23 20	Babcock Bench	35+ plants, moist weedy swale	similar	
Erythranthe suksdorfii	new	new '16	16 23 09	North of Wanapum Switchyard	100+ plants, stab sandy substrate, 1 point	unknown	
Erythranthe suksdorfii	new	new '16	16 23 16	North of Wanapum Switchyard	75 plants in road, by gate,	unknown	
Hackelia hispida var. disjuncta	40	13793,4	21 22 27	Moses Coulee	36 plants, (30 adults)	decrease	
Lipocarpha aristulata	7	13812	14 23 34	Goose Island	Several 100 plants, some underwater. Phragmites rapidly invade this area.	similar	
Lipocarpha aristulata	[7]	new '16	14 23 34	Goose Island	75+ plants in new polygon. Phragmites invasion.	new	
Lipocarpha aristulata	7	13810	14 23 16	Feather Slough	Underwater in September.	not surveyed	
Lomatium tuberosum	8	15751	15 23 15	Sentinel Bluffs	Searched, not found. Recently burned, weedy.	not relocated	
Lomatium tuberosum	[8]	new '11	15 23 15	Sentinel Bluffs	3 senescent plants, area recently burned, weedy	decrease	
Minuartia fragilis nuttallii	1	8397	15 23 10	Sentinel Gap	Searched, not found; poor habitat	not relocated	x
Minuartia pusilla pusilla	1	8228	16 23 16	West of Wanapum Switchyard	1000s of plants, senescent, small, long narrow pop extended	similar/inc	
Oenothera caespitosa	1	16142	16 23 33	Beverly Trestle	300+ plants, vigorous pop; area burned recently	similar/inc	
Oenothera caespitosa	13	8244	15 23 03	Crab Creek	36 plants, hab. weedier, pts clustered to south	decrease	
Pediocactus nigrispinus	36	13792	19 22 35	Quilomene Island	1625 plants counted, likely 2-3x number, vigorous pop.	similar	
Pediocactus nigrispinus	01B	new '01	20 23 18,19	Babcock Bench	110 plants, 1100' long, good habitat, w/ erysuk, crysco	similar	
Rotala ramosior	new	new '11	14 23 34	Goose Island	Plants not found, in active Phragmites invasion area.	not relocated	