U.S. DEPARTMENT OF ENERGY

PNNL-21164

Prepared for the U.S. Department of Energy
under Contract DE-AC05-76RL01830

2011 Annual Ecological Survey: Pacific Northwest National Laboratory Site

JM Becker
MA Chamness

February 2012

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Pacific Northwest National Laboratory
Richland, Washington 99352

Acronyms and Abbreviations

DOE	U.S. Department of Energy
GPS	global positioning system
MBTA	Migratory Bird Treaty Act
PNNL	Pacific Northwest National Laboratory
PNSO	Pacific Northwest Site Office

Contents

Figures

1.0 Introduction

The U.S. Department of Energy (DOE) Pacific Northwest Site Office (PNSO) oversees and manages the DOE contract for the Pacific Northwest National Laboratory (PNNL), a DOE Office of Science multi-program laboratory located in Richland, Washington. PNSO is responsible for ensuring that all activities conducted on the PNNL site comply with applicable laws, policies, and DOE Orders.

The *DOE Pacific Northwest Site Office Cultural and Biological Resources Management Plan* (DOE/PNSO 2008) addresses the requirement for annual surveys and monitoring for species of concern and to identify and map invasive species. In addition to the requirement for an annual survey, proposed project activities must be reviewed to assess any potential environmental consequences of conducting the project. The assessment process requires a thorough understanding of the resources present, the potential impacts of a proposed action to those resources, and the ultimate consequences of those actions.

The PNNL site is situated on the southeastern corner of the DOE Hanford Site, located at the north end of the city of Richland in south-central Washington. The site is bordered on the east by the Columbia River, on the west by Stevens Drive, and on the north by the Hanford Site 300 Area (Figure 1). The environmental setting of the PNNL site is described in Larson and Downs (2009). There are currently two facilities on the PNNL site: the William R. Wiley Environmental Molecular Sciences Laboratory and the Physical Sciences Facility.

This report describes the annual survey of biological resources found on the undeveloped upland portions of the PNNL site. The annual survey is comprised of a series of individual field surveys conducted on various days in late May and throughout June 2011. A brief description of the methods PNNL ecologists used to conduct the baseline surveys and a summary of the results of the surveys are presented. Appendix A provides a list of plant and animal species identified in the upland areas of the PNNL site in 2011. Efforts in 2011 to control noxious weed populations (comprising plant species designated as Class B noxious weeds by the Washington State Noxious Weed Control Board) discovered in 2009 and initially treated with herbicides in 2010 are described in Appendix B.

2.0 Baseline Survey Methods

The primary objective of the field surveys was to determine the occurrence of plant and animal species protected under the federal *Endangered Species Act of 1973*; candidates for such protection; priority habitats and species listed as threatened, endangered, candidate, sensitive, or monitor by the State of Washington; and species protected under the federal *Migratory Bird Treaty Act* (MBTA). PNNL ecologists performed pedestrian and visual reconnaissance of the PNNL site in late May and throughout June 2011. The results of previous annual field surveys are summarized in Larson and Downs (2009) and Chamness et al. (2010).

Lists that document priority habitats and species of concern in Washington State are maintained by the Washington Department of Fish and Wildlife (2008, 2011) and Washington State Department of Natural Resources (2011). Lists that document plant and animal species with Federally endangered, threatened, proposed, or candidate status are maintained in Title 50 of the Code of Federal Regulations (CFR) Part 17 (50 CFR 17.11; 50 CFR 17.12). A list that documents migratory birds protected under the MBTA is maintained by the U.S. Fish and Wildlife Service (2011).

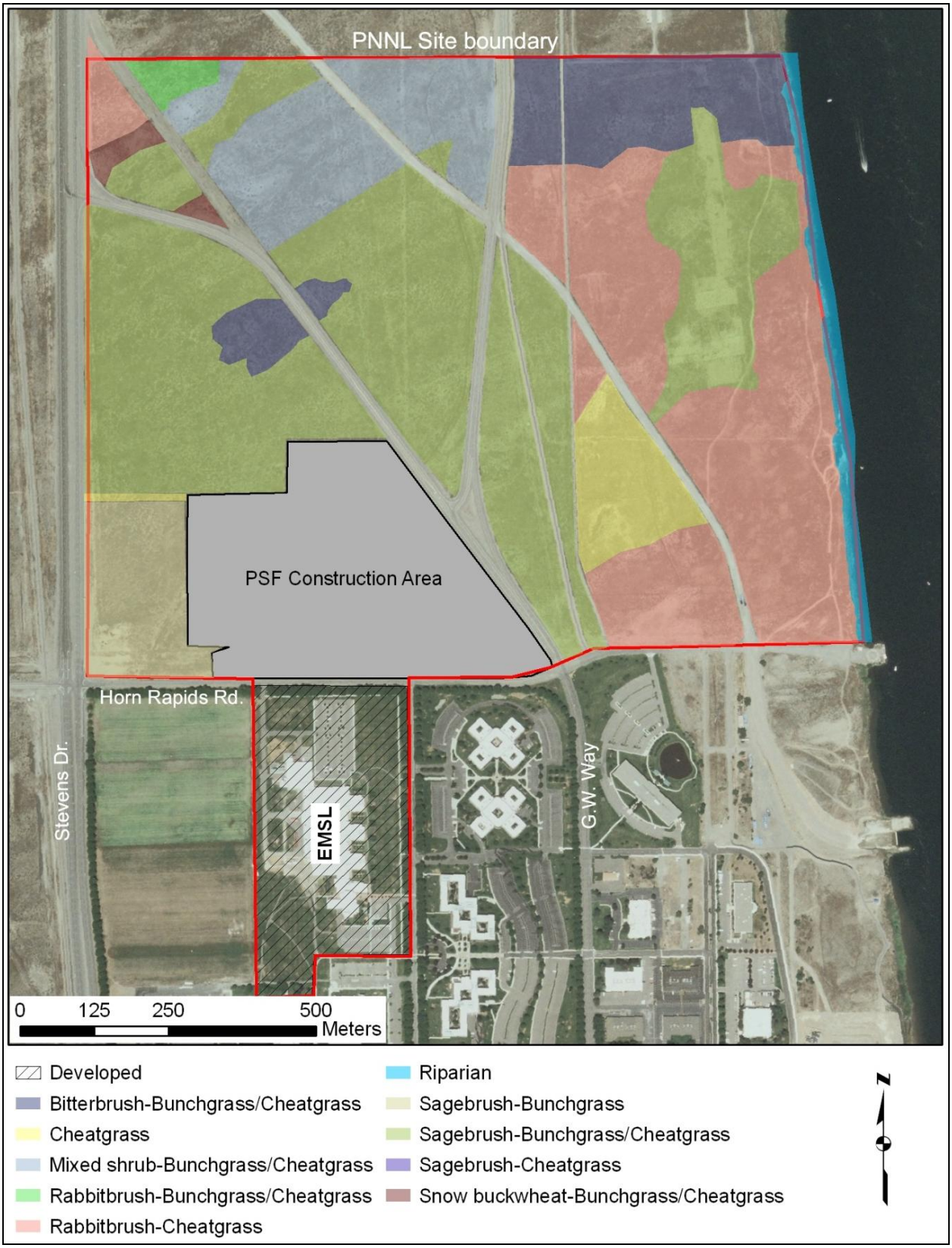

Figure 1. Plant Communities Found on the Pacific Northwest National Laboratory Site

The PNNL site was subdivided into ten polygons separated primarily by unimproved access roads. Polygons were used for convenience in surveying and tracking the locations of habitats and species across the PNNL site. A separate field survey was conducted and a separate species list was compiled for each polygon. Plant communities within each polygon were classified based on the dominant species of overstory (shrubs) and understory (grasses and forbs) present. The percent cover of dominant vegetation was visually estimated and recorded. Direct and indirect wildlife observations (e.g., sightings and signs) were recorded. During the surveys, where practical, coordinates were recorded to delineate the locations of noxious weeds.

Appendix A provides a list of plant and animal species identified across the upland areas of the PNNL site in 2011. The data for each of the ten polygons, including vegetation cover estimates, are not provided in this report, but may be made available for project impact assessment purposes. Due to annual variability in wildlife use and detectability, survey routes, and observers, the 2011 survey data would need to be combined with the 2009 (Larson and Downs 2009) and 2010 (Chamness et al. 2010) survey data to produce the most complete list of plants and animals known to occur on the PNNL site. Such a data compilation is not provided in this report, but may be made available for project impact assessment purposes.

Areas treated with herbicides in 2010 to control noxious weeds were re-visited and any reoccurring noxious weeds were treated with herbicides to maximize control of the weeds. As time and weather allowed, herbicide treatment was expanded into areas where noxious weeds had been identified but not yet treated. Appendix B provides a discussion of the control efforts in 2011.

3.0 Results

No Federally or state-listed threatened or endangered plant or animal species were observed on the PNNL site during the 2011 surveys. A list of plant and animal species identified in upland areas of the PNNL site in 2011 is provided in Appendix A.

The riparian corridor of the Columbia River was not surveyed in 2011 because high water precluded access to the shoreline. The most recent survey of the riparian corridor was completed in 2010. The most recent description of riparian zone biota on the PNNL site can be found in Chamness et al. (2010).

Herbicides were applied in spring 2011 to control noxious weeds in areas where a complete kill had not been achieved in 2010 (Chamness et al. 2010) and at some additional locations that had not been treated previously. The 2011 field surveys, conducted after the herbicide applications, include a record of locations of noxious weeds that had been treated but not killed and locations of noxious weeds that had not been previously treated. Noxious weed control activities undertaken in 2011 are described in detail Appendix B.

3.1 Upland Plant Communities

The upland areas of the PNNL site are dominated by shrub-steppe, which is considered a priority habitat by the Washington Department of Fish and Wildlife. Shrub-steppe plant communities of the PNNL site are largely dominated by big sagebrush (*Artemisia tridentata*) and perennial bunchgrasses

(Figure 1). Antelope bitterbrush (*Purshia tridentata*) and gray and green rabbitbrush (*Ericameria nauseosa* and *Chrysothamnus viscidiflorus*) are common native shrubs. The most common perennial native bunchgrass in the area is Sandberg's bluegrass (*Poa secunda*), although needle-and-thread grass (*Hesperostipa comata*) and Indian ricegrass (*Achnatherum hymenoides*) also occur. The non-native cheatgrass (*Bromus tectorum*) occurs in all plant communities in the PNNL site. Common native forb species include Carey's balsamroot (*Balsamorhiza careyana*), long-leaved phlox (*Phlox longifolia*), yarrow (*Achillea millefolium*), and turpentine springparsley (*Pteryxia terebinthina*). Common non-native forbs include tumblemustard (*Sisymbrium altissimum*), Russian thistle (*Salsola tragus*), and several species listed as Class B noxious weeds, including diffuse knapweed (*Centaurea diffusa*), rush skeletonweed (*Chondrilla juncea*), Russian knapweed (*Acroptilon repens*), and yellow star-thistle (*Centaurea solstitialis*). The Class B noxious weeds listed above are all classified as such by the State of Washington (WAC 16-750-011) and designated for control and/or containment. See Appendix B for a detailed description of 2011 noxious weed control activities.

3.2 Animal Species

Evidence of use by coyote (*Canis latrans*), mule deer (*Odocoileus hemionus*), northern pocket gopher (*Thomomys talpoides*), and black-tailed jackrabbit (*Lepus californicus*) was observed in upland areas. The black-tailed jackrabbit, also recorded in the 2009 and 2010 annual surveys, is associated with shrub-steppe, and suitable habitat exists for it across the upland portion of the PNNL site.

Several migratory bird species were also observed. Species that were observed and were likely nesting in the area include, but are not limited to, mourning doves (*Zenaida macroura*), lark sparrows (*Chondestes grammacus*), horned larks (*Eremophila alpestris*), California quail (*Callipepla californica*), and western meadowlarks (*Sturnella neglecta*). One active meadowlark nest was also observed. Sage sparrows (*Amphispiza belli*) were heard calling and were likely nesting in the area. The sage sparrow is a migratory species and a sagebrush habitat obligate; suitable habitat exists for it across much of the upland portion of the PNNL site. This species was not observed in 2009 or 2010. Finally, a short-eared owl (*Asio flammeus*) was observed but did not appear to be nesting onsite. The short-eared owl is considered migratory across its range, but is a year-long resident that is uncommon in the Hanford Site locale (Landeen et al. 1992). This species was not observed in 2009 (Larson and Downs 2009) or 2010 (Chamness et al. 2010).

Both the sage sparrow and the black-tailed jackrabbit are listed as Candidate Species of Concern by the Washington State Department of Fish and Wildlife. The Candidate Species designation includes species for which evidence suggests that its status may meet the listing criteria defined for state endangered, threatened, or sensitive.

4.0 References

50 CFR 17.11. Code of Federal Regulations, Title 50, *Wildlife and Fisheries*, Part 17, "Wildlife and Fisheries," Subpart 11, Endangered and Threatened Wildlife.

50 CFR 17.12. Code of Federal Regulations, Title 50, *Wildlife and Fisheries*, Part 17, "Wildlife and Fisheries," Subpart 11, Endangered and Threatened Plants.

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Appendix A

List of Plant and Animal Species on the PNNL Site in 2011

Appendix A

List of Plant and Animal Species on the PNNL Site in 2011

Plants	
Achillea millefolium	yarrow
Achnatherum hymenoides	Indian ricegrass
Acroptilon repens	Turkestan knapweed
Agoseris heterophylla	annual mountain dandelion
Agropyron cristatum	crested wheatgrass
Ailanthus altissima	tree-of-heaven
Ambrosia acanthicarpa	bur ragweed
Amsinckia lycopsoides	fiddleneck
Amsinckia tesselata	devil's lettuce
Artemisia tridentata	big sagebrush
Asparagus officinalis	asparagus
Balsamorhiza careyana	Carey's balsamroot
Bassia scoparia	kochia
Bromus tectorum	cheatgrass
Cardaria draba	whitetop
Centaurea diffusa	tumble knapweed
Centaurea solstitialis	yellow star-thistle
Chaenactis douglasii	hoary falseyarrow
Chondrilla juncea	rush skeletonweed
Chrysothamnus viscidiflorus	green rabbitbrush
Comandra umbellata ssp. pallida	bastard toadflax
Convolvulus arvensis	field bindweed
Conyza canadensis	horseweed
Crepis atribarba ssp. originalis	slender hawksbeard
Cryptantha circumscissa	matted cryptantha
Dalea ornata	Blue Mountain prairie clover
Descurainia pinnata	western tansymustard
Elymus elymoides ssp. elymoides	squirreltail
Elymus lanceolatus ssp. lanceolatus	thickspike wheatgrass
Epilobium brachycarpum	tall willowherb
Ericameria nauseosa ssp. nauseosa var. speciosa	gray rabbitbrush
Eriogonum niveum	snow buckwheat
Erodium cicutarium	storksbill
Hesperostipa comata	needle-and-thread grass
Holosteum umbellatum	jagged chickweed
Hymenopappus filifolius	Columbia cutleaf
Lactuca serriola	prickly lettuce
Layia glandulosa	white-daisy tidytips

Leymus cinereus	basin wildrye
Machaeranthera canescens	hoary aster
Malus pumila	apple
Melilotus officinalis	sweetclover
Morus alba	white mulberry
Oenothera pallida	pale evening primrose
Opuntia polyacantha	starvation pricklypear
Phacelia hastata	whiteleaf scorpionweed
Phacelia linearis	threadleaf scorpionweed
Phlox longifolia	longleaf phlox
Plantago patagonica	Indian wheat
Poa secunda	Sandberg's bluegrass
Prunus virginiana var. melanocarpa	chokecherry
Pseudoroegneria spicata	bluebunch wheatgrass
Psoralidium lanceolatum	lemon scurfpea
Pteryxia terebinthina var. terebinthina	turpentine springparsley
Purshia tridentata	bitterbrush
Robinia pseudo-acacia	black locust
Rosa woodsii var. ultramontana	Woods' rose
Rumex venosus	winged dock
Salix exigua	coyote willow
Salsola kali	Russian thistle
Sisymbrium altissimum	Jim Hill's tumblemustard
Sphaeralcea munroana	Munro's globemallow
Sporobolus cryptandrus	sand dropseed
Taraxacum officinale	common dandelion
Tragopogon dubius	yellow salsify
Birds	
Agelaius phoeniceus	red-winged blackbird
Amphispiza belli	sage sparrow
Asio flammeus	short-eared owl
Buteo jamaicensis	red-tailed hawk
Callipepla californica	California quail
Charadrius vociferus	killdeer
Chondestes grammacus	lark sparrow
Eremophila alpestris	horned lark
Hirundo rustica	barn swallow
Icterus galbula	Bullock's oriole
Pica pica	black-billed magpie
Sturnella neglecta	western meadowlark
Sturnus vulgaris	European starling
Tyrannus tyrannus	eastern kingbird
Zenaida macroura	mourning dove
Zonotrichia leucophrys	white-crowned sparrow

Mammals	
Canis latrans	coyote
Lepus californicus	black-tailed jackrabbit
Odocoileus hemionus	mule deer
Thomomys talpoides	northern pocket gopher

Appendix B

Mapping and Control of Noxious Weeds on the PNNL Site in 2011

Appendix B

Mapping and Control of Noxious Weeds on the PNNL Site in 2011

Several species of noxious weeds, including diffuse knapweed (*Centaurea diffusa*), rush skeletonweed (*Chondrilla juncea*), yellow star-thistle (*Centaurea solstitialis*), and Russian knapweed (*Acroptilon repens*) were identified on the PNNL site in August 2009 (Larson and Downs 2009) and mapped in more detail in 2010 (Chamness et al. 2010). In 2010, as an initial control strategy, PNNL staff hand-sprayed herbicides targeting individual plants within the largest populations of rush skeletonweed and the smaller patches of yellow star-thistle on the eastern third of the PNNL site north of Horn Rapids Road and east of George Washington Way. Hand-spraying herbicides minimizes impacts to non-targeted species and cultural resources and is the preferred herbicide application method. This treatment was effective in killing the visible (above-ground) portion of targeted plants. However, in 2011, small rush skeletonweed plants were observed in the vicinity of larger plants which had been sprayed and whose above-ground parts were killed in 2010.

Rush skeletonweed spreads by seed (each mature plant may produce between 1,500 and 20,000 seeds), by shoot buds found along lateral roots and on the root crown, and from root fragments in the soil (NWCB 2010). Thus, these small plants were likely either sprouts from the roots of plants treated in 2010 or had grown from buried seed. Because of below-ground shoot formation, rush skeletonweed can require multiple herbicide applications to kill an entire plant. Yellow star-thistle reproduces only by seed (NWCB 2010), but its seed may remain viable in the soil for several years, requiring additional surveys and treatment.

PNNL staff (with current Washington State applicator licenses) sprayed the herbicide Milestone (along with a water conditioner, drift control and sticking agents, and blue dye for visibility) using backpack sprayers. Spraying occurred when staff were available until weather conditions became unsuitable for use of the herbicide (i.e., on May 18, 20, 24, and 25 and June 1 and 9). The Milestone label restricts use to temperatures less than 80°F. Rush skeletonweed becomes less susceptible to herbicides once daily temperatures are consistently above 80°F.

The control strategy for 2011 was to first hand-spray any rush skeletonweed or yellow star-thistle plants reoccurring in areas treated in 2010, then treat other areas containing a high density of rush skeletonweed or yellow star-thistle. Approximately 24 acres were hand-sprayed in 2011. Areas sprayed in 2011 and 2010 are shown as cross-hatched areas in Figure B.1. Note that only rush skeletonweed, yellow star-thistle, and on occasion diffuse knapweed were sprayed in these areas. Russian knapweed, shown as green or yellow polygons in Figure B.1, was not sprayed in either 2011 or 2010.

Locations of rush skeletonweed and yellow star-thistle were noted during the ecological survey with a global positioning system (GPS). These GPS points, shown as dots on Figure B.1, indicate small clusters of primarily rush skeletonweed and diffuse knapweed with a few locations of yellow star-thistle. Some of these GPS points fall within areas that were treated in 2011 and/or 2010, while many others lie outside the previously treated noxious weed areas (Figure B.1).

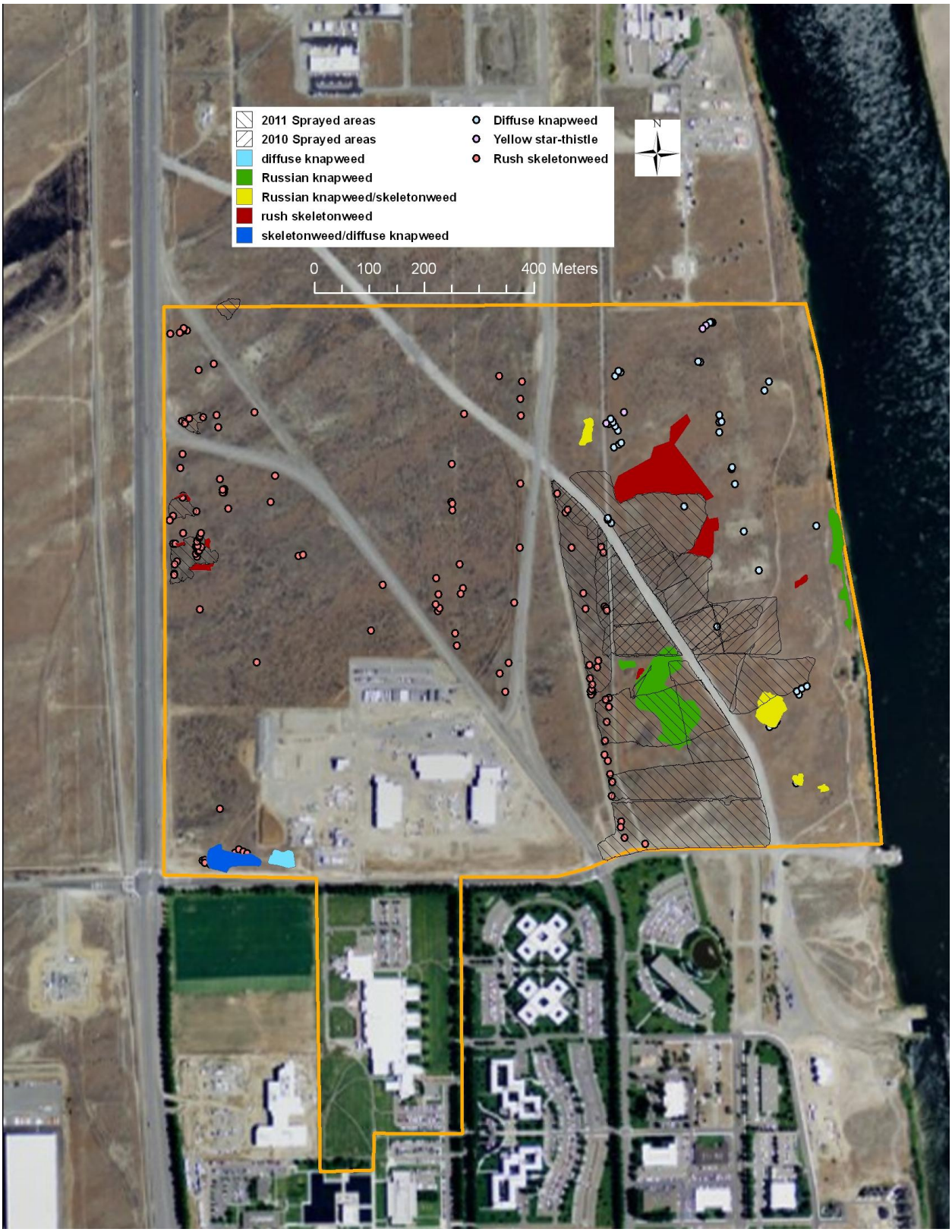

Figure B.1. Locations of Noxious Weeds Found and Areas Sprayed on the PNNL Site. Cross-hatched areas were sprayed in both 2010 and 2011.

Diffuse knapweed occurs across much of the PNNL site but is usually not found in dense clusters. Blue polygons in Figure B.1 show the only identified dense populations of this weed. It reproduces by seed (a single flower stalk may produce 1,200 seeds) and from the root crown (NWCB 2010). Diffuse knapweed may be treated using herbicides such as Milestone and/or biological controls. Because it is so widespread on the PNNL site, biological controls are being investigated as a practical way to control diffuse knapweed. Biological controls are slow acting, and results may not be evident for several years.

Russian knapweed reproduces by seed, spreads laterally by its root system, and can regenerate from root fragments (NWCB 2010). Russian knapweed can be treated with herbicides and possibly with biological controls. Approximately 0.8 acre of concentrated Russian knapweed is located near the Columbia River in an area that may be of particular concern to the Tribes (i.e., Confederated Tribes and Bands of the Yakama Nation, Nez Perce Tribe, Wanapum, and Confederated Tribes of the Umatilla Indian Reservation). Another 2.75 acres of moderately dense Russian knapweed occurs further inland. Because of the relatively large and dense populations of Russian knapweed and the decision not to use widespread herbicide applications, biological controls are being investigated as a control method.

It is recommended that the 24 treated acres and 4 previously untreated acres of land containing primarily rush skeletonweed be revisited and treated as necessary in 2012. The red, dark blue and yellow polygons in Figure B.1 show those areas containing rush skeletonweed that have not yet been treated. Biological controls for diffuse and Russian knapweed should be identified and if possible, applied within the PNNL site. Noxious weed control activities on the PNNL site, particularly those near the river, will be coordinated with cultural and ecological resource staff and representatives of interested Tribes.

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