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2010 Ecological Survey of the Pacific Northwest National Laboratory Site

MA Chamness
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SD Powell

February 2011



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NATIONAL LABORATORY

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Richland, Washington 99352

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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 (EMSL), and the recently completed Physical Sciences Facility (PSF).

This report describes the results of the annual survey of the biological resources found on the undeveloped portions of the PNNL Site in 2010. A brief description of the methods PNNL ecologists used to conduct the surveys and the results of the surveys are presented. Actions taken to fully delineate noxious weed populations discovered in 2009 and efforts in 2010 to control those weeds also are described. The Appendix provides a list of plant and animal species identified on the PNNL Site.

2.0 Ecological Survey Methods

The primary objective of the field surveys was to determine the occurrence of plant and animal species protected under the *Endangered Species Act of 1973*, candidates for such protection, species listed as threatened, endangered, candidate, sensitive, or monitor species by the state of Washington (WDFW 2010), and species protected under the *Migratory Bird Treaty Act*. PNNL ecologists performed pedestrian and visual reconnaissance of the PNNL Site in April, June and July 2010. Results of previous field surveys are summarized in Larson and Downs (2009).

A second objective of the annual surveys involves documenting the current condition of biological resources and inventorying the wildlife and plant species found on the PNNL site. During pedestrian surveys of the site, any occurrences of those plant species designated as noxious weeds by the Washington State Noxious Weed Control Board were documented, and coordinates were recorded to delineate the locations. During 2010, PNNL ecologists worked with facilities and environmental management staff to identify and prioritize areas where spraying was conducted to control the largest infestations of noxious weeds (RCW 17.10.140) on the PNNL site. Areas to be sprayed were surveyed and flagged by ecologists in the field. PNNL ecologists worked with the facilities and maintenance staff to aid in recognition of targeted weeds, and provided support during hand-spraying of targeted plants.

Field surveys were conducted across the PNNL Site (except in those areas where construction was in progress) during April, June and July, 2010. These consisted of pedestrian surveys to observe and document the vegetation and wildlife that occur on the site. During June, an early morning pedestrian survey was conducted in the riparian zone of the site to document breeding birds. As part of these survey efforts, a more detailed review of the riparian area was performed, locations of noxious weed species were mapped, and staff reviewed and monitored efforts initiated to control noxious weed concentrations in May.

3.0 Survey Results

Biological surveys conducted on the PNNL Site during the spring and summer of 2010 focused on three main objectives:

- Survey of the upland habitats
- Survey, mapping and control of noxious weed populations
- Initial survey of the riparian (riverside) habitat

Results of the 2010 surveys are presented in this report. Additional information on the habitats and biological resources occurring on the PNNL site is described in Larson and Downs (2009).

3.1 Baseline Survey of Upland Habitats

The upland portions of the PNNL site support plant communities dominated primarily 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 also common native shrubs within the site. The most common perennial native bunchgrass in the area is Sandberg's bluegrass (*Poa secunda*), occurring with needle-and-thread grass (*Hesperostipa comata*) and Indian ricegrass (*Achnathrum hymenoides*). The non-native cheatgrass (*Bromus tectorum*) also 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 (*Cymoterus terebinthinus*). Common non-native forbs include tumbled mustard (*Sisymbrium altissimum*), Russian thistle (*Salsola tragus*) and several species listed as Class B noxious weeds, including rush skeletonweed (*Chondrilla juncea*), Russian knapweed (*Acroptilon repens*), and yellow star-thistle (*Centaurea solstitialis*). The weeds listed above are all classified as Class B noxious weeds by the Washington State (WAC 16-750) and are designated for control and/or containment.

Evidence of use by coyote (*Canis latrans*), mule deer (*Odocoileus hemionus*), American badgers (*Taxidea taxus*) and unidentified rabbits and small mammal species was observed throughout the area. A snakeskin from an unidentified snake was also found. A wide variety of migratory bird species were observed in the area. Species that were observed nesting or are likely to nest 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*), western meadowlarks (*Sturnella neglecta*).

In addition to survey data collected for upland migratory bird species, anecdotal observations were made documenting a bank swallow (*Riparia riparia*) colony using a stockpile of soil on the construction site for the Physical Sciences Facility in late June. Bank swallows excavate small diameter holes into firm, banked soils to build their nests and raise their young. This observation was not made as part of the formal surveys of the PNNL Site. In early July, a PNNL biologist noticed that a major portion of the stockpiled soil at the Physical Sciences Facility construction site had been removed for landscaping, which resulted in the partial destruction of the bank swallow habitat within the stockpiled soil. As a result, on July 8, 2010, the event was self-reported to the U.S. Fish & Wildlife Service (USFWS) by PNNL. The issue is part of an ongoing USFWS investigation.



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

3.2 Survey, Mapping, and Control of Noxious Weed Populations

Several species of noxious weeds, including Russian knapweed (*Acroptilon repens*), rush skeletonweed (*Chondrilla juncea*), yellow star-thistle (*Centaurea solstitialis*) and diffuse knapweed (*Centaurea diffusa*) were identified on the PNNL Site in August 2009. In April 2010, Ecology group staff began mapping the locations of these noxious weed populations, completing the mapping in August (Figure 2). As an initial control strategy, staff from PNNL Facilities & Operations, Environmental Services, and the Ecology group focused on hand-spraying herbicides targeting the individual plants within the largest populations of rush skeletonweed and the smaller patches of yellow star-thistle. This type of treatment in 2010 is intended to significantly reduce the population and reduce seed production.

Maintenance staff with current applicators license for Washington State, sprayed the herbicide Milestone (along with a water conditioner, drift control and sticking agents, and blue dye for visibility) using backpack sprayers on May 11 and on May 12, covering a total of ~7 acres over the two days. Three staff with backpack sprayers worked on June 12 to spray ~6 more acres. In addition, staff revisited approximately 2 acres to hit plants missed during the earlier spraying. The Milestone label and MSDS can be found at <http://www.cdms.net/manuf/1prod.asp?pd=8113&lc=0>.

Observations during the 2010 growing season indicated that Milestone appears to be effective in killing rush skeletonweed, yellow star-thistle, and diffuse knapweed when the plants are thoroughly sprayed. If the plants are lightly sprayed, the plants appear to be damaged, but may not be killed.

We estimated the acreage remaining to be sprayed based on mapping with global positioning systems (GPS) in the field. Large, dense areas of noxious weeds were mapped as polygons with a GPS. Smaller patches were identified by recording a point location, and estimating the areal extent based on the comments recorded at each point.

Altogether, we estimate approximately 16.3 additional acres will require herbicide treatment to control noxious weeds in 2011. In addition, the 13 acres treated in 2010 primarily for rush skeletonweed will need to be resurveyed to identify any new seedlings and any plants missed or not killed during the 2010 treatment. Table 1 provides a list of noxious weed species and acreages for each.

Approximately 4 acres of the 16.3 acres yet to be treated are dominated by Russian knapweed and another 1.7 acres contain a mixture of Russian knapweed and rush skeletonweed. Russian knapweed likely will be treated using a different herbicide and/or method than that used on the other noxious weeds to ensure control of this species. Approximately 0.8 acre containing a concentration of Russian knapweed is located near the river in an area that may be of concern to tribes. Spraying in that area will need to be coordinated with cultural resource staff as well as ecological resource staff.

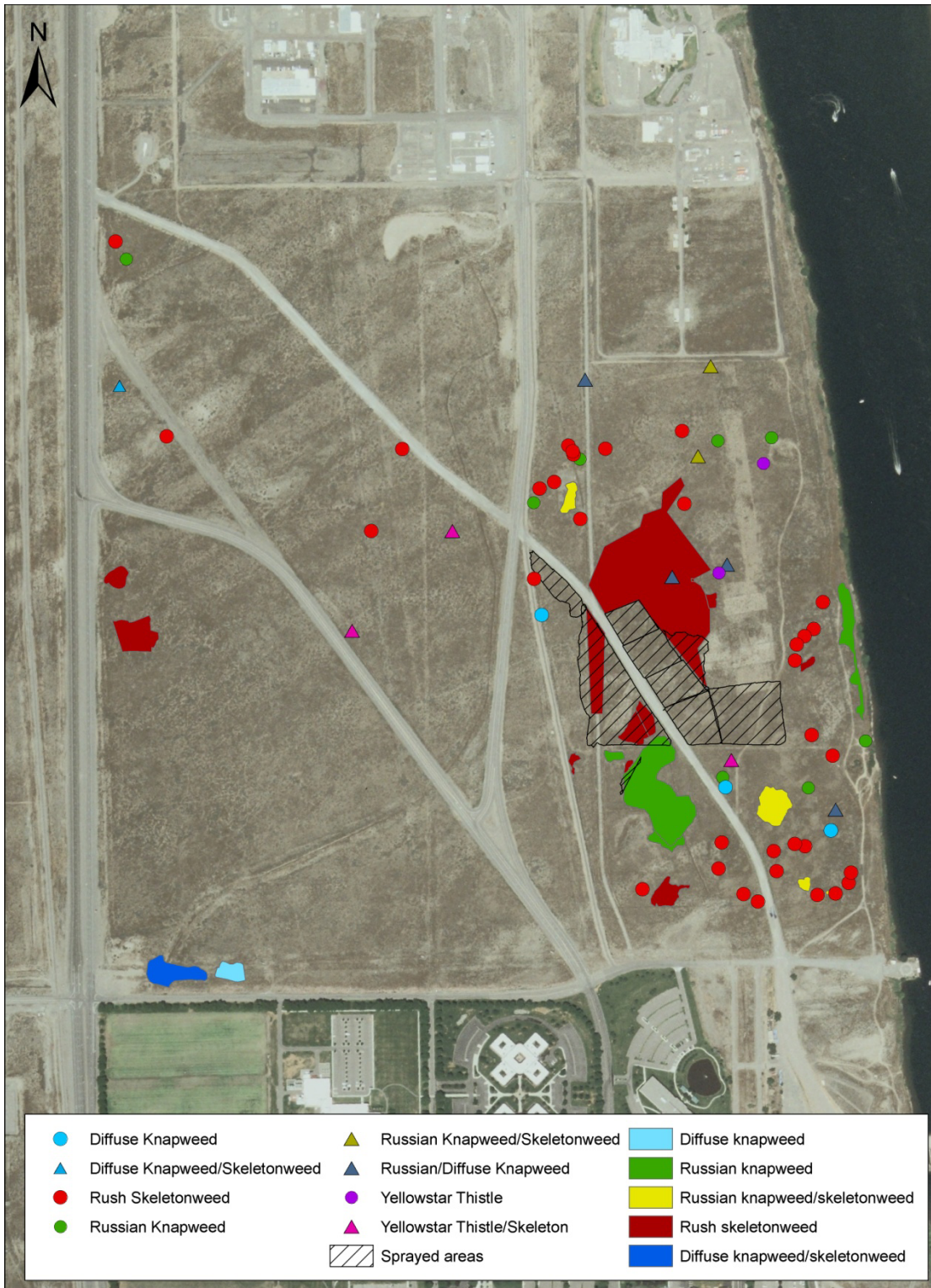


Figure 2. Location of Noxious Weeds Found and Areas Sprayed on the PNNL Site in 2010

Table 1. Estimated Acreages of Noxious Weeds Occurring on the PNNL Site Treated in 2010 and Remaining to be Treated

Species	Acres Treated in 2010	Acres Remaining to be Treated
Rush skeletonweed	13	10.1
Diffuse knapweed	0	0.3
Yellow star-thistle	0	0.2
Russian knapweed	0	4
Rush skeletonweed and Russian knapweed mixed	0	1.7
Total	13	16.3

3.3 Summary of PNSO 2010 Survey Results

As described in survey results documented for 2009 and in this report, the PNNL Site contains various types of shrub-steppe and riparian vegetation that have been invaded by several species of Class B noxious weeds. Although noxious weeds are present in the area, the site continues to provide habitat for a variety of wildlife (Appendix) and plants (101 species). Surveys documented at least 31 different species of birds, and noted evidence of more than 8 mammals using the available habitat.

The invasive and noxious weeds pose a continuing threat to the ecological integrity of the habitat. Herbicide applications in 2010 were successful in providing an initial level of control for populations of noxious weed species; however, additional applications in the spring of 2011, and possibly in the autumn will be required to target the different species of noxious weeds, and make progress in eradicating these plants from the PNNL site. Surveys and spraying to detect and control these species will likely need to be continued over a several year period.

The initial invasion of the noxious weeds onto the PNNL site appears to be related to the roads traversing the site. These roads will continue to provide an avenue for introduction of weed seeds onto the site, and the roadways and adjacent habitat should be surveyed annually to detect new invasions or individuals. In addition, biological control agents may also be helpful in controlling Russian knapweed, and the feasibility of adding biological controls as part of an integrated approach to weed control should be further investigated.

4.0 References

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Appendix

List of Plant and Animal Species Observed on the PNNL Site

Appendix

List of Plant and Animal Species Observed on the PNNL Site

Plants	
<i>Achillea millefolium</i>	yarrow
<i>Achnatherum hymenoides</i>	Indian ricegrass
<i>Acroptilon repens</i>	Russian knapweed
<i>Agoseris heterophylla</i>	annual mountain dandelion
<i>Agropyron cristatum</i>	crested wheatgrass
<i>Ailanthus altissima</i>	tree-of-heaven
<i>Allium schoenoprasum</i>	chives
<i>Ambrosia acanthicarpa</i>	bur ragweed
<i>Amsinckia lycopsoides</i>	fiddleneck
<i>Artemisia campestris ssp. borealis var. scouleriana</i>	northern wormwood
<i>Artemisia dracunculus</i>	tarragon
<i>Artemisia lindleyana</i>	Columbia River mugwort
<i>Artemisia tridentata</i>	big sagebrush
<i>Asclepias speciosa</i>	showy milkweed
<i>Asparagus officinalis</i>	asparagus
<i>Astragalus caricinus</i>	buckwheat milkvetch
<i>Balsamorhiza careyana</i>	Carey's balsamroot
<i>Bassia scoparia</i>	kochia
<i>Bromus tectorum</i>	cheatgrass
<i>Centaurea diffusa</i>	diffuse knapweed
<i>Centaurea solstitialis</i>	yellow starthistle
<i>Chaenactis douglasii</i>	hoary falseyarrow
<i>Chondrilla juncea</i>	rush skeletonweed
<i>Chorispora tenella</i>	blue mustard
<i>Chrysothamnus viscidiflorus</i>	green rabbitbrush
<i>Comandra umbellata ssp. pallida</i>	bastard toadflax
<i>Convolvulus arvensis</i>	field bindweed
<i>Conyza canadensis</i>	horseweed
<i>Coreopsis tinctoria var. atkinsoniana</i>	Columbia tickseed
<i>Crepis atribarba ssp. originalis</i>	slender hawksbeard

Plants	
<i>Cryptantha circumscissa</i>	matted cryptantha
<i>Cryptantha fendleri</i>	Fendler's cryptantha
<i>Dalea ornata</i>	western prairieclover
<i>Descurainia pinnata</i>	western tansymustard
<i>Descurainia sophia</i>	flixweed
<i>Draba verna</i>	spring whitlowgrass
<i>Elymus elymoides</i> ssp. <i>elymoides</i>	bottlebrush grass
<i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i>	thickspike wheatgrass
<i>Epilobium brachycarpum</i>	tall willowherb
<i>Ericameria nauseosa</i> ssp. <i>nauseosa</i> var. <i>speciosa</i>	gray rabbitbrush
<i>Erigeron filifolius</i>	threadleaf fleabane
<i>Eriogonum niveum</i>	snow buckwheat
<i>Eriogonum vimineum</i>	broom buckwheat
<i>Erodium cicutarium</i>	storksbill
<i>Gaillardia aristata</i>	blanket flower
<i>Gilia sinuata</i>	shy gilia
<i>Gratiola neglecta</i>	American hedge-hyssop
<i>Grayia spinosa</i>	spiny hopsage
<i>Gypsophila paniculata</i>	baby's breath
<i>Hesperostipa comata</i>	needle-and-thread grass
<i>Holosteum umbellatum</i>	jagged chickweed
<i>Hymenopappus filifolius</i>	Columbia cutleaf
<i>Hypericum perforatum</i>	Klamath weed
<i>Lactuca serriola</i>	prickly lettuce
<i>Layia glandulosa</i>	white-daisy tidytips
<i>Lepidium perfoliatum</i>	clasping pepperweed
<i>Leptodactylon pungens</i>	prickly phlox
<i>Leymus cinereus</i>	giant wildrye
<i>Logfia arvensis</i>	field fluffweed
<i>Lomatium macrocarpum</i>	bigseed desertparsley
<i>Machaeranthera canescens</i>	hoary aster
<i>Malus pumila</i>	apple
<i>Medicago sativa</i>	alfalfa
<i>Melilotus officinalis</i>	white sweetclover
<i>Mentzelia albicaulis</i>	whitestem stickleaf
<i>Microsteris gracilis</i> var. <i>humilior</i>	pink microsteris

Plants	
<i>Morus alba</i>	white mulberry
<i>Oenothera pallida</i>	pale evening primrose
<i>Opuntia polyacantha</i>	starvation pricklypear
<i>Phacelia hastata</i>	whiteleaf scorpionweed
<i>Phacelia linearis</i>	threadleaf scorpionweed
<i>Phalaris arundinacea</i>	reed canarygrass
<i>Phlox longifolia</i>	longleaf phlox
<i>Plantago lanceolata</i>	English plantain
<i>Plantago patagonica</i>	indian wheat
<i>Poa bulbosa</i>	bulbous bluegrass
<i>Poa secunda</i>	Sandberg's bluegrass
<i>Polygonum convolvulus</i>	climbing bindweed
<i>Prunus virginiana</i> var. <i>melanocarpa</i>	chokecherry
<i>Pseudognaphalium stramineum</i>	cottonbatting cudweed
<i>Pseudoroegneria spicata</i>	bluebunch wheatgrass
<i>Psoraleidum lanceolatum</i>	dune scurfpea
<i>Pteryxia terebinthina</i> var. <i>terebinthina</i>	turpentine springparsley
<i>Purshia tridentata</i>	bitterbrush
<i>Robinia pseudo-acacia</i>	black locust
<i>Rosa woodsii</i> var. <i>ultramontana</i>	Woods' rose
<i>Rubus discolor</i>	Himalayan blackberry
<i>Rumex salicifolius</i> var. <i>mexicanus</i>	willow dock
<i>Rumex venosus</i>	winged dock
<i>Salix exigua</i>	coyote willow
<i>Salsola tragus</i>	Russian thistle
<i>Sisymbrium altissimum</i>	Jim Hill's tumbledustard
<i>Sphaeralcea munroana</i>	Munro's globemallow
<i>Sporobolus cryptandrus</i>	sand dropseed
<i>Stephanomeria paniculata</i>	stiff wirelettuce
<i>Tragopogon dubius</i>	yellow salsify
<i>Tribulus terrestris</i>	puncture vine
<i>Triteleia grandiflora</i> var. <i>grandiflora</i>	Douglas' clusterlily
<i>Ulmus pumila</i>	Siberian elm
<i>Vulpia microstachys</i>	small sixweeks
<i>Vulpia octoflora</i>	slender sixweeks

Birds	
<i>Actitis macularia</i>	spotted sandpiper
<i>Agelaius phoeniceus</i>	red-winged blackbird
<i>Ardea herodias</i>	great blue heron
<i>Callipepla californica</i>	California quail
<i>Carduelis tristis</i>	American goldfinch
<i>Carpodacus mexicanus</i>	house finch
<i>Chondestes grammacus</i>	lark sparrow
<i>Chordeiles minor</i>	common nighthawk
<i>Columba livia</i>	rock dove
<i>Corvus brachyrhynchos</i>	American crow
<i>Corvus corax</i>	common raven
<i>Eremophila alpestris</i>	horned lark
<i>Hirundo pyrrhonota</i>	cliff swallow
<i>Hirundo rustica</i>	barn swallow
<i>Icterus galbula</i>	Bullock's oriole
<i>Larus californicus</i>	California gull
<i>Mergus merganser</i>	common merganser
<i>Numenius americanus</i>	long-billed curlew
<i>Pandion haliaetus</i>	osprey
<i>Passer domesticus</i>	house sparrow
<i>Pelecanus erythrorhynchos</i>	American white pelican
<i>Pica pica</i>	black-billed magpie
<i>Riparia riparia</i>	bank swallow
<i>Sterna paradisaea</i>	arctic tern
<i>Sturnella neglecta</i>	western meadowlark
<i>Sturnus vulgaris</i>	European starling
<i>Turdus migratorius</i>	American robin
<i>Tyrannus tyrannus</i>	eastern kingbird
<i>Tyrannus verticalis</i>	western kingbird
<i>Unidentified bird</i>	Unidentified bird
<i>Zenaida macroura</i>	mourning dove
<i>Zonotrichia leucophrys</i>	white-crowned sparrow

Animals	
<i>Canis latrans</i>	coyote
<i>Castor canadensis</i>	beaver
<i>Erethizon dorsatum</i>	porcupine
<i>Lepus californicus</i>	black-tailed jackrabbit
<i>Odocoileus hemionus</i>	mule deer
<i>Sylvilagus nuttallii</i>	mountain cottontail
<i>Taxidea taxus</i>	badger
<i>Thomomys talpoides</i>	northern pocket gopher
<i>Unidentified/Unlisted herpetofauna</i>	
<i>Unidentified/Unlisted mammal</i>	
<i>Unidentified small mammal</i>	

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