BIOLOGICAL SURVEY REPORT
FOR
RUPE HILL ENVIRONMENTAL ASSESSMENT

January 2013

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Prepared for

Wyoming Department of Transportation

Prepared by

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FIGURES

TABLES

ABBREVIATIONS AND ACRONYMS

ac	acre
°C	degrees Celsius
cm	centimeter
CWA	Clean Water Act
EOR	Element of Occurrence
ETR	Endangered, Threatened, or Rare
EPA	Environmental Protection Agency
°F	Degrees Fahrenheit
ft	foot (feet)
GIS	Geographic Information Systems (software)
ha	hectare
in	inch (es)
km	kilometer
m	meter
MBTA	Migratory Bird Treaty Act
NEPA	National Environmental Protection Act
NOAA	National Oceanographic and Atmospheric Administration
NRCS	National Resource Conservation Service
NWI	National Wetland Inventory
USFWS	United States Fish and Wildlife Service
WYNDD	Wyoming Natural Diversity Database

1. INTRODUCTION

The Rupe Hill Landslide west of Sundance, Wyoming, is located near mile post 197.4 on U.S. Highway 14 (US 14) (Figure 2-1). The Rupe Hill Landslide is 1,000 feet in width, extending 500 feet on either side of US 14's centerline. In May 2011 cracks in the highway revealed the landslide. Drill investigations conducted using equipment able to detect subterranean shifting confirmed topographic movement.

Wyoming Department of Transportation (WYDOT) geologists expect further landslide movement to render the road unsafe for travel leading to extended closures of US 14 based on similar events. US 14 is the primary transportation artery connecting Sundance to north-central Wyoming. US 14, between Sundance and Devil's Tower Junction, is also the primary route for westbound travelers to Devil's Tower National Monument, a major tourist attraction and source of revenue for northeastern Wyoming.

2. PROJECT DESCRIPTION

WYDOT considered three preliminary alternatives to address the Rupe Hill Landslide: 1) one realignment north of the existing US 14 corridor, 2) one realignment south of the highway, and 3) an existing alignment alternative (Figure 2-2).

The Rupe Hill Project (project) is in northeastern Wyoming, west of the Town of Sundance, south of the easternmost segment of the Black Hills National Forest, and north of Interstate 90 (I-90) along US 14.

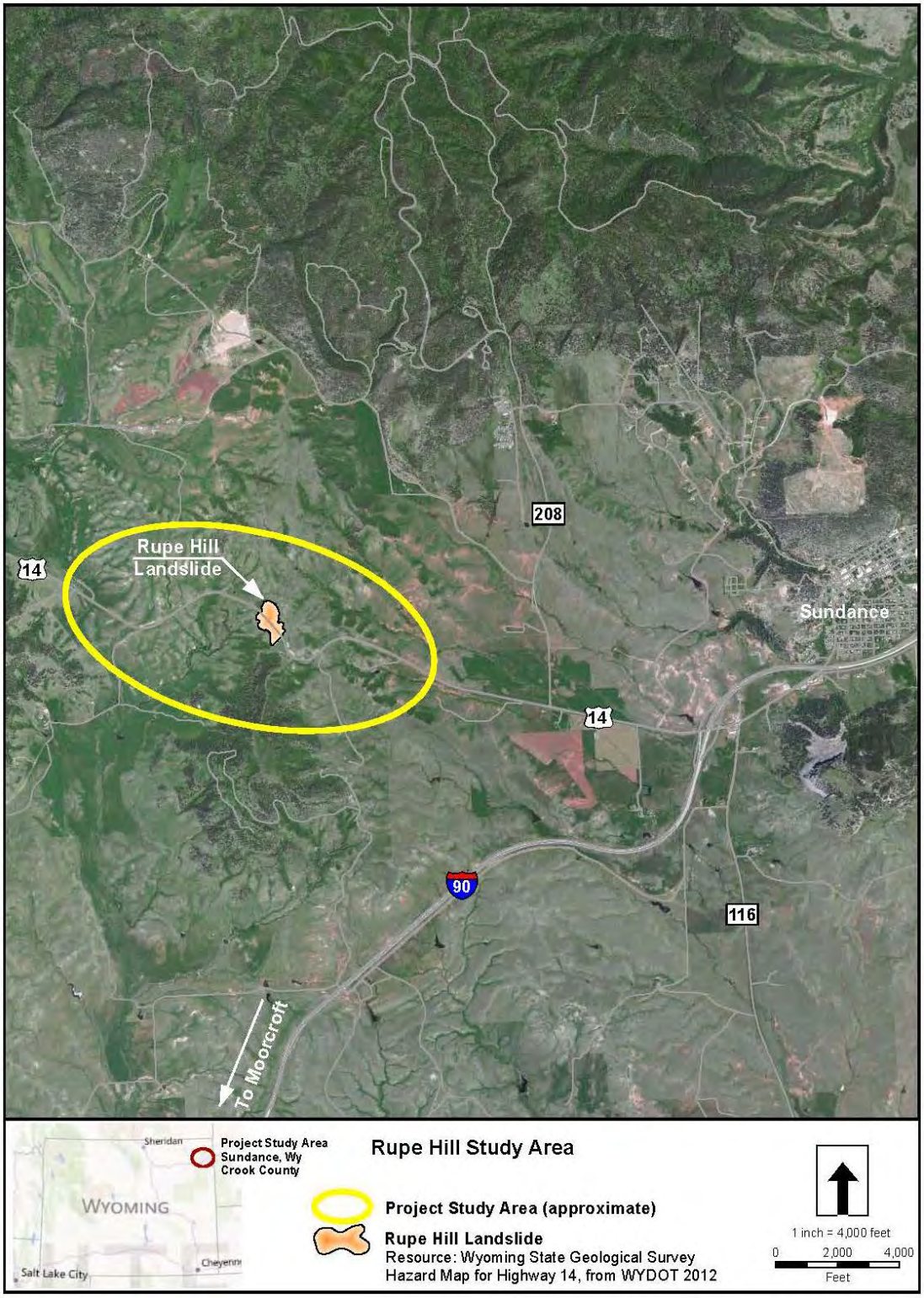

Figure 2-1. Regional View of Project Area

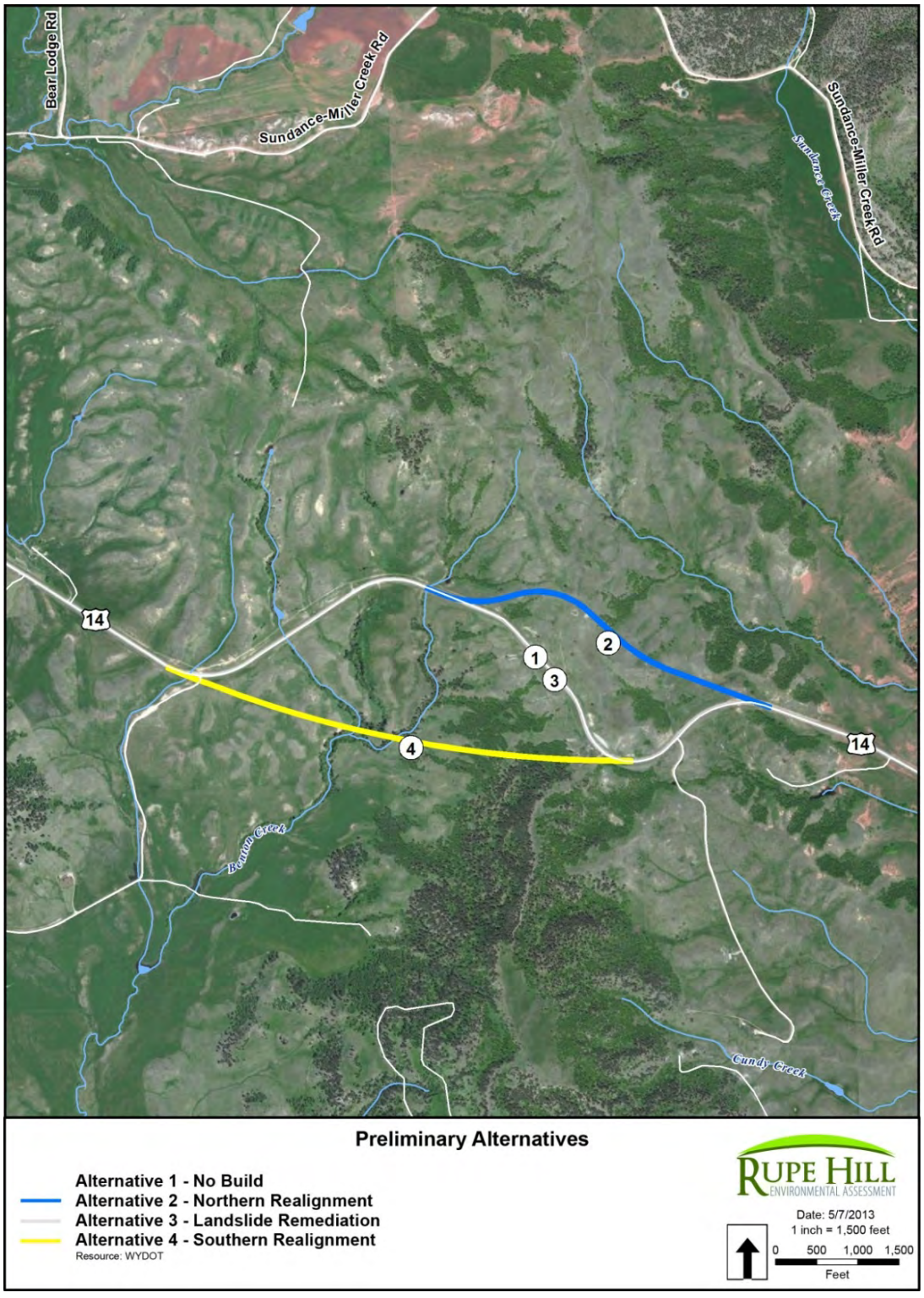

Figure 2-2. Local Map of Project Area with Proposed Alternate Routes

3. ENVIRONMENTAL SETTING

3.1 ECOREGION

Ecoregions, or ecological regions, define areas of environmental similarity, grouping them by type, quality, and quantity of environmental resources. Ecoregions provide geographical context to research, management, and monitoring of ecosystems and ecosystem components (Bailey 1994). The EPA maintains four tiers of ecoregions with assigned Roman numerals. Level I is broad, dividing North America into 15 ecological regions, while Level IV is at the finest level with 93 in Wyoming alone. For the purpose of this report, only Levels III and IV will be used.

The project area lies in the *Middle Rockies* Level III Ecoregion and *Black Hills Foothills* Level IV Ecoregion. The latter is characterized by a ring of foothills surrounding the Black Hills mountainous core. Vegetation includes ponderosa pine (*Pinus ponderosa*) woodlands with an understory of little bluestem (*Schizachyrium scoparium*), blue gramma (*Bouteloua gracilis*), buffalo grass (*Buchloe dactyloides*), and Oregon grape (*Mahonia repens*). Burr oak (*Quercus macrocarpa*) is found in the north, and Rocky Mountain juniper (*Juniperus scoparium*) occurs in the south. Land use is mainly cattle grazing and ranching. Bison (*Bison bison*), pronghorn antelope (*Antilocapra americana*), and elk (*Cervus canadensis*) still graze in some of the grasslands found in the Black Hills Foothills (Chapman 2004).

3.2 ECOSYSTEMS

Within ecoregions, ecosystems, or ecological systems are communities of interactive plants, animals, microbes, and abiotic materials. Ecosystems are differentiated primarily by their dominant vegetation. Three ecosystems were observed in the project area:

1. Northwestern Great Plains-Black Hills Ponderosa Pine
2. Northwestern Great Plains Mixedgrass Prairie
3. Rocky Mountain Lower Montane-Foothill Riparian

Northwestern Great Plains-Black Hills Ponderosa Pine

This ecosystem occurs in the transition zone between the higher Black Hills and lower Great Plains. These can be physiognomically variable, ranging from very sparse patches of trees on drier sites, which can be observed in and around the project area, to nearly closed-canopy forest stands on north slopes or in draws. The latter is common in the project area's periphery. Soils typically range from well-drained sands to sandy loams formed in weathered sandstone or limestone. This system is primarily dominated by ponderosa pine but may include a sparse understory of Rocky Mountain juniper with just a few scattered trees.

Important shrubs below ponderosa pine may include Oregon grape, common juniper *(Juniperus communis),* creeping juniper (*Juniperus horizontalis),* and/or skunkbrush sumac *(Rhus trilobata).*

The herbaceous understory can range from sparse to a dense layer with species typifying the surrounding prairie system, such as little bluestem (NatureServe 2012a).

Northwestern Great Plains Mixedgrass Prairie

This system extends from northern Nebraska into southern Canada and westward through the Dakotas to the Rocky Mountain Front in Montana and Wyoming. Soil texture (which ultimately effects water availability) is the defining environmental descriptor; soils are primarily fine and medium-textured and do not include sands, sandy soils, or sandy loams. This system occurs on a wide variety of landforms and in proximity to a diversity of other systems (NatureServe 2012b).

Graminoids, typically comprising the greatest canopy cover, include buffalo grass, needle-and-thread grass (*Heterostipa comata*), blue gramma, and fescue (*Festuca* spp.). Shrub species, such as prairie sagewort (*Artemisia frigida)* and silver sagebrush (*Artemisia cana)* may also occur. With intensive grazing, cool-season exotics, such as bluegrass, smooth brome, and fringed brome can increase in dominance (NatureServe 2012c).

Rocky Mountain Lower Montane-Foothill Riparian

This ecological system is found throughout the Rocky Mountain and Colorado Plateau regions within a broad elevational range. This system often occurs as a mosaic of tree-dominated communities with a diversity of shrubs. Occurrences are found within the flood zone of rivers, on islands, sand or cobble bars, and stream banks.

Dominant trees include at least one of the following: box elder (*Acer negundo),* cottonwood *(Populus deltoides),* Fremont cottonwood *(Populus fremontii),* Douglas fir *(Pseudotsuga menziesii),* peach-leaf willow *(Salix amygdaloides),* or rocky mountain juniper (*Juniperus scopulorum).* Dominant shrubs include grey alder *(Alnus incana),* birch *(Betula occidentalis),* dogwood *(Cornus sericea),* or hawthorn *(Crataegus rivularis).* Exotic trees of Russian olive (*Eleagnus angustifolia*) and salt cedar (*Tamarix* spp.) are common in some stands (NatureServe 2012d).

3.3 CLIMATE

Sundance experiences a humid continental climate, receiving relatively greater amounts of precipitation due to the orographic influence of the Black Hills. Average January lows are 5.3°F (-14.8°C) with highs of 23°F (-5°C). Average July lows are 61.4°F (16.3°C) and 83.7°F (28.7°C). Over the last 30 years, average annual precipitation has amounted to 18.78 in (47.70cm), with June typically being the wettest month (NOAA 2012).

4. SURVEY METHODS

4.1 LITERATURE SEARCH AND ANALYSIS

HDR submitted an Element Occurrence (EO) request to the Wyoming Natural Diversity Database (WYNDD) in order to assess the most current endangered, threatened, or rare (ETR)

species data. With these data, HDR approached field work able to identify the habitats of locally known ETR animals and vegetative associations for known ETR plants.

National Wetlands Inventory (NWI) and Natural Resource Conservation Survey (NRCS) Web Soil Survey maps were reviewed to determine the presence of hydric soils and potential wetlands in the project area.

4.2 GEOSPATIAL DATA

Prior to field work, HDR GIS specialists created project area maps projecting route alternatives, NWI data, and property boundaries. These data were also uploaded to sub-meter GPS units allowing biologists a high-degree of survey specificity.

4.3 FIELD WORK

HDR biologists, Laura Lutz-Zimmerman and Ben Eddy, surveyed the proposed US 14 re-routes on November 5 and 6, 2012. Biologists recorded vegetation communities, potential wetland crossings, riparian corridors, habitat potentially supporting ETR species, and other natural phenomena of possible influence in route determination.

HDR biologists did not conduct formal wetland delineations. Plant community data were collected (Table 4-1). Biologists recorded plant composition and classified unique communities within the route alternatives. Where species make-up transitioned, community boundaries were noted. Community classifications informed the analysis of potential sensitive species occurrences.

Biologists surveyed the probable north and south routes, though the final route had not been identified at the time of the survey.

Table 4-1. Common Plants Observed in Riparian Areas with Respective Wetland Indicator Status

Common Name	Scientific Name	Indicator Status
Reed canary grass	*Phalaris arundinaceae*	FACW
Box elder	*Acer negundo*	FACW
Cow parsnip	*Heracleum maximum*	FACW
Tapertip flatsedge	*Cyperus acuminatus*	OBL
Broad-leaf cattail	*Typha latifolia*	OBL
Common spikerush	*Eleocharis palustris*	OBL
Nebraska sedge	*Carex nebrascensis*	OBL

OBL = Obligate wetland species; FACW = Facultative wetland species

5. BIOLOGICAL RESOURCES

5.1 VEGETATION

Vegetation Associations

Outside of wet, low-lying areas, very little difference in plant diversity exists within the project area. Larger, deeper ravines south of US 14 support wetland species, such as box elder, cattail, and other wetland obligate species.

Broadly speaking, the project area, both north and south of US 14, is a combination of mixedgrass prairie and bur oak (*Quercus macrocarpa*) woodland. Patches of Rocky Mountain juniper and sagebrush shrubland also grow in the alternatives. Oregon grape, cocklebur (*Xanthium strumarium*), wild licorice (*Glycyrrhiza lepidota*), and mixed grasses, both native and exotic, compose the understory in bur oak woodlands. Ponderosa pine forest grows on the project area periphery.

Mixed-grass prairie communities were dominant, occasionally transitioning into sagebrush shrubland on xeric, south-facing slopes. Several native plant associations were identified during the survey. Associations were established according to Interanational Terrestrial Ecological Systems Classification (ITESC):

- Bluebunch Wheatgrass (*Pseudoroegneria spicata)*—Needle-and-Thread (*Hesperostipa comata)* Herbaceous Vegetation association
- Reed Canarygrass (*Phalaris arundinaceae*) Herbaceous Vegetation association
- Blue Gramma *(Bouteloua gracilis)*—Buffalo Grass *(Buchloe dactyloides)* Herbaceous Vegetation
- Little Bluestem—Sideoats Gramma *(Bouteloua curtipendula*) Western Great Plains Herbaceous Vegetation

- Common spikerush *(Eleocharis palustris)* Great Plains Herbaceous Vegetation
- Box Elder-Disturbed Understory Woodland
- Ponderosa Pine-Big Bluestem/Little Bluestem Woodland
- Western Great Plains Dry Bur Oak Forest and Woodland

Bluebunch Wheatgrass-Needle-and-Thread Herbaceous Vegetation

This grassland association occurs across north-central Wyoming east to the Big Horn Mountains and the northwestern Great Plains. Stands occur on a variety of sites, including windswept slopes and ridges. Bare soil, leaf litter, and gravel cover most of the ground surface. The vegetation is characterized by an open to moderately dense bunchgrass layer codominated by bluebunch wheatgrass and needle-and-thread grass. The dwarf-shrubs sand sage (*Artemisia frigida)* and snakeweed (*Gutierrezia sarothrae)* occur with sparse cover. Other graminoids include sideoats gramma (*Bouteloua gracilis),* sedges *(Carex* spp.), and junegrass (*Koeleria macrantha).* Associated forbs include vetches (*Astragalus* spp.), Hood's phlox *(Phlox hoodii),* and globe mallow (*Sphaeralcea munroana).* Consistent with what biologists observed, the exotic annual grass Cheatgrass (*Bromus tectorum)* is present to abundant on some sites (NatureServe 2012e).

This association was observed on hilltops and slopes both north and south of US 14.

Reed Canarygrass Herbaceous Vegetation association

This herbaceous association is found throughout the West. Its distribution as a natural type is complicated because this native species is widely cultivated as a forage crop and has escaped and established in wetlands and riparian areas, displacing the local flora. Stands are found along riparian areas, pond and lake margins, wet meadows, and intermittent drainages. The poorly drained alluvial soils are commonly fine-textured (occasionally coarse-textured) and may be flooded for brief to extended periods. Though this association is dominated by reed canary grass, associated species may include horsetail (*Equisetum arvense),* horsemint *(Mentha arvensis),* and many other species in trace amounts where disturbed. Introduced species, such as bromes *(Bromus spp.)* and yellow clover *(Melilotus officinalis),* are common in disturbed stands (NatureServe 2012f).

This association occurs in riparian corridors south of US 14.

Blue Gramma-Buffalo Grass Herbaceous Vegetation association

This association is common across much of the Great Plains. Stands occur on flat to rolling uplands. The surface soil may be sandy loam, loam, silty loam, or loamy clay. This community is characterized by moderate to dense sod of short grasses with scattered mid grasses and forbs. Other short graminoids found in this community are hairy gramma (*Bouteloua hirsuta)* and threadleaf sedge (*Carex filifolia).* Several mid grasses occur regularly, such as purple threeawn (*Aristida purpurea),* side oats gramma *(Bouteloua curtipendula),* western wheatgrass *(Pascopyrum smithii),* little bluestem, squirreltail *(Elymus elymoides),* sand dropseed *(Sporobolus cryptandrus),* and needle-and-thread grass. Forbs, such as vetches, scarlet gaura (*Gaura coccinea),* plains prickly pear (*Opuntia polyacantha),* plantain *(Plantago patagonica),* prairie coneflower *(Ratibida*

columnifera), and globemallow (*Sphaeralcea coccinea)*, are common throughout this community (NatureServe 2012g).

This association was observed throughought the project area in non-forested areas both north and south of US 14.

Little Bluestem—Side Oats Gramma Western Great Plains Herbaceous Vegetation

This association occurs throughout the Great Plains. Stands occur on shallow sandy or rocky soil, usually on level or gently sloping terrain, although it may also occur on moderate slopes. The vegetation of this community is dominated by mid grasses with tall and short grasses present to abundant. The vegetation cover is moderate to dense. Little bluestem and side oats gramma are the dominant species. Sand bluestem (*Andropogon hallii),* blue gramma, junegrass, needle-and-thread grass, and sand dropseed are common grasses of this community. Forbs do not make up a large amount of the canopy, but buckwheat (*Eriogonum* spp.) and purple prairie clover (*Dalea purpurea)* are typically in stands of this community. Woody plants, such as the short shrubs snakeweed and soaptree yucca (*Yucca glauca)*, are sometimes present (NatureServe 2012h).

This is the most abundant association in the project area, observed both north and south of US 14.

Common Spikerush Great Plains Herbaceous Vegetation

The spikerush wet meadow community is found in the central Great Plains of the United States and Canada. Stands occur in small depressions formed by intermittent streambeds or depression ponds that flood early in the season. Soils are generally fine-textured. Stands are composed of submerged and emergent rooted vegetation less than 3.3 feet (1 meter) tall that is dominated by common spikerush, often in nearly pure stands. Vegetative cover can be sparse to dense (10 percent to 90 percent), but common spikerush is the dominant species and the only species with 100 percent constancy. Other species, when present, can contribute as much as 40 percent cover but never exceed that of common spikerush itself (NatureServe 2012i).

This association was observed in one intermittent streambed north of US 14.

Box Elder-Disturbed Understory Woodland

This riparian association is found in the Colorado Plateau and other areas of the western U.S. on upper alluvial terraces. Sites are on gentle slopes or flat areas near streams. Soils are usually sandy. The dominant tree species is box elder with scattered Utah juniper *(Juniperus osteosperma)*, or Rocky Mountain juniper (Figure 5-1). There is a sparse shrub layer with big sagebrush (*Artemisia tridentata),* rabbitbrush (*Chrysothamnus nauseosus),* skunkbrush sumac, wax currant *(Ribes cereum), and* bur oak. Herbaceous cover and species composition are variable. The herbaceous stratum may be dominated by introduced species, such as bromes (*Bromus* spp.*)* bluegrass *(Poa pratensis),* tumble mustard *(Sisymbrium altissimum),* and perennial pepperweed *(Lepidium latifolium) (*NatureServe 2012j).This association was observed in the Benton Creek riparian corridor south of US 14.

Figure 5-1. Wetland Graminoids and Box Elder in Wetland South of US 14

Ponderosa Pine-Big Bluestem/Little Bluestem Woodland

This woodland occurs in the western Black Hills of South Dakota and in the Powder River Basin and Little Missouri drainage of Wyoming and Montana. Ponderosa is the only tree in the overstory. Shrubby Rocky Mountain juniper *(Juniperus scopulorum)* may occur in the understory. The ground layer is dominated by little bluestem with big bluestem and/or sideoats gramma (*Bouteloua curtipendula)*. This type occurs on warm slopes in Montana, but more mesic sites in drier portions of the Black Hills and Wyoming. Soils are well-drained and often derived from sandstone (NatureServe 2012k).

This association was observed at the periphery of the project area both north and south of US 14.

Western Great Plains Dry Bur Oak Forest and Woodland

This system is dominated by bur oak and found in upland areas in the northern part of the Western Great Plains. It often occurs as small to large patches on buttes, escarpments, and in foothill zones, usually on northerly facing slopes. The herbaceous layer can vary from sparsely to moderately vegetated and is composed of prairie grasses or woodland *Carex* spp. Historically, higher cover of grass species occurred because these stands were more open due to more frequent fires. A few good examples of this system likely remain because of past timber

harvesting and heavy grazing. Where it occurs at elevations above 3,000 feet (915 meters) , Ponderosa woodlands are probably adjacent (NatureServe 2012l).

Bands of this association were observed both north and south of US 14.

5.2 ENDANGERED, THREATENED, OR RARE PLANTS

Table 5-1 contains plants considered either endangered, threatened, or rare by the USFWS or the State of Wyoming with the geographic potential to grow in the project area. None of the species below were observed during the 2012 biological survey.

Table 5-1. ETR Plants Potentially Occurring in Crook County, Wyoming

Common Name	Scientific Name	Status	Habitat	Habitat Present/Where
Ute's Ladies'-tresses	*Spiranthes diluvialis*	FT	Seasonally moist soils, wet meadows of drainages < 7,000'	Unlikely, no wet meadows observed in project area
Gastony's cliffbrake	*Pelleae gastonyi*	S1	Calcareous cliffs, crevices, and ledges; often dry, usually on limestone.	No, calcareous substrates observed in project area
Moschatel	*Adoxa moschatellina*	S2	Moist, mossy stream sides and moist forest hillsides	Yes, in riparian corridors north an south of US 14
Groundnut	*Amphicarpaea bracteata*	S1	Mature woodland, thickets, and moist slopes	No, obligate habitat not observed in project area
Small-flower columbine	*Aquilegia brevistyla*	S1	Moist habitat types associated with calcareous substrate. In the Black Hills it can be found alongside *Pinus ponderosa*.	Yes, mesic soils in ponderosa forest north and south of US 14
Curtis' threeawn	*Aristida curtissii*	S1	Open prairie	Yes, in prairie habitat north and south of US 14
Whorled milkweed	*Asclepias verticillata*	S1	Prairies, pastures, and open roadsides.	Yes, in any non-forested area north and south of US 14
Round-leaf water hyssop	*Bacopa rotundifolia*	S1	Mud flats and shallow standing water	Yes, in mud flats associated with riparian corridors south of US 14
Prairie moonwort	*Botrychium campestre*	S1	Well-drained dry-to-mesic soils in sunlit, non-forested habitats at low elevations. Grows in former disturbance	No, surveyed soil disturbance areas with habitat requirements

Table 5-1. ETR Plants Potentially Occurring in Crook County, Wyoming

Common Name	Scientific Name	Status	Habitat	Habitat Present/Where
			areas.	
Narrowleaf moonwort	*Botrychium lineare*	S1	Meadows dominated by knee-high grass. Grows in former disturbance areas.	No, sufficiently tall grass not present in soil disturbance areas
Pointed mariposa	*Calochortus apiculatus*	S1	Mesic forests	Yes, mesic forests observed along riparian corridors south of US 14
Marsh bellflower	*Campanula aparinoides*	S1	Damp meadows and swamps	Yes, swampy areas observed south of US 14
Foxtail sedge	*Carex alopecoidea*	S2	Marshes, swales, and wet meadows; moist forests and clearings	Yes, habitat present in riparian corridors south of US 14
Beautiful sedge	*Carex concinna*	S2	Forests and wooded areas, on calcareous substrates, common in flood channels	Unlikely, calcareous substrates not observed in project area
Ebony sedge	*Carex eburnea*	S1	Wet sand, rocky soil in calcareous region; under cedar, on logs conifer swamps	Unlikely, calcareous substrates not observed in project area
Bronze sedge	*Carex foenea*	S1	Dry to moist, acidic sands, gravels, open disturbed places, grasslands, open woods	Yes, duturbance areas meeting habitat requirements present north and south of US 14
Meadow sedge	*Carex granularis*	S2	Openings in woodlands, swamps, riverbottom prairies, moist dolomite prairies, weedy meadows, fens and seeps	Yes, swampy areas present south of US 14
Great bladder sedge	*Carex intumescens*	S1	Swamps and thickets, swamps, depressions and stream banks in oak and beech-maple forests; less often in coniferous swamps (cedar, tamarack, spruce, fir).	Unlikely, associated species not observed in project area

Table 5-1. ETR Plants Potentially Occurring in Crook County, Wyoming

Common Name	Scientific Name	Status	Habitat	Habitat Present/Where
Hairy wild rye	*Elymus villosus*	S1	Deciduous woodlands, rocky wooded slopes, savannas, small meadows, and thickets; usually found in higher quality wooded habitats.	No, high-quality wooded habitats not observed in project area
Dwarf scouring rush	*Equisetum scirpoides*	S1	Low wet places in woods, moist shaded hillsides, peat bogs	No, habitat not observed in project area
Narrowleaf pinweed	*Lechea intermedia*	S1	Dry; inland sands, rocks, woods, rocks; in rocky, sandy soil	Yes, substrate requirements observed north and south of U.S.14
Spring forget me not	*Myosotis verna*	S1	Open woodlands, barren wooded slopes, sandy savannas, sand prairies, fields, roadside embankments; occurs where there is some history of disturbance.	Yes, habitat requirements with historic disturbance present north and south of US 14

FT=Federally Threatened; S1=State Critically Imperiled; S2=State Imperiled; Source WYNDD 2012.

Wyoming Natural Diversity Database GAP Data

The Wyoming Natural Diversity Database (WYNDD) supplied vegetation cover GAP data for this project. GAP data is derived from a statewide vegetation mapping effort by the U.S. Geological Service (USGS) and University of Wyoming, Laramie. Data was specifically tailored or "clipped" to illustrate vegetation cover 0.25 mile in all directions from the proposed alternative routes.

Figure 5-2. WYNDD Vegetation Cover GAP Data "Clipped" to a ¼ Mile Buffer Around the Proposed Alternatives

Noxious Weeds

Scotch thistle (*Onopardum acanthium*) was observed at several locations along the southern alignment. The Wyoming Weed and Pest Control Act designates Scotch thistle as a noxious weed. Noxious weeds are designated as such because of their capacity to form dense monocultures and their difficulty of removal and control. Additionally, common licorice, which was found in both the north and south alternatives, is a "declared weed" for Crook County by the Wyoming Weed and Pest Council. Although "declared weeds" are not considered as detrimental as noxious weeds, they still have the capacity to disrupt natural systems and agriculture.

Figure 5-3. Common Licorice (left) and Scotch Thistle (right)

5.3 WILDLIFE AND WILDLIFE HABITAT

Wildlife Habitat

The project area supports a combination of woodland and grassland wildlife habitat. However, without a perennial water source, the project area may not provide optimal habitat.

Wildlife Species

Mammals

The project area's proximity to the Thunder Basin National Grassland and Black Hills National Forest specifically, and wider Black Hills ecosystem generally, makes it potentially utilizable for any number of large mammals including elk, black bear (*Ursus americanus*), and mule deer (*Odocoileus hemionus*). Large tracts of protected and/or uninhabitat land adjacent to the project area increases the likelihood that tertiary predators, such as grey wolf (*Canis lupus*) and mountain lion (*Puma concolor*), use the area for hunting grounds. However, biologists observed only mule deer (*Odocoileus hemionus*) and small, common mammals, such as eastern cottontail (*Sylvilagus floridanus*) and thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*).

Birds

HDR's biologists observed a number of birds protected by the Migratory Bird Treaty Act (MBTA) in the project area, on both sides of US 14. Species common to the Black Hills, such as northern flicker (*Colaptes auratus*) and black-billed magpie (*Pica hudsonia*), were abundant during surveys. Additionally, biologists photographed a bald eagle (*Haliaeetus leucocephalus*) feeding on road-killed deer near the north shoulder of US 14 (Figure 5-4). It is highly unlikely the eagle nests in or near the project area because of the the lack of a major water body in the area. The presence of Keyhole Reservoir to the west or Cook Lake, roughly 10 miles to the north of the project area, may explain the protected bird's presence. Bald (and Golden) Eagles area protected by the Bald and Golden Eagle Protection Act (BGEPA), a statue that can limit the removal of certain prey species and limit construction in proximity to eagle nests.

Figure 5-4. Bald Eagle Scavenging Road Kill on North Side of US 14

Wildlife species observed within the project area are presented in Table 5-2.

Table 5-2. Wildlife Species Observed within the Project Area

Common Name	Scientific Name	North/South of US 14
Birds		
Dark-eyed Junco	*Junco hyemalis*	North
Clay-colored sparrow	*Spizella pallida*	South
Pygmy nuthatch	*Sitta pygmaea*	South
Northern flicker	*Colaptes auratus*	South
Mammals		
Eastern cottontail	*Sylvilagus floridanus*	South
Mule deer	*Odocoileus hemionus*	North/South
Thirteen-lined ground squirrel	*Spermophilus tridecemlineatus*	North/South

Endangered, Threatened, and Rare Animals

Table 5-3 presents the WYNDD ETR species list for Crook County, Wyoming. No state or federally listed species were observed in the project area during the October 2012 surveys. However, potentially suitable habitat was observed in the project area.

Table 5-3. Protected Animals with the Potential to Occur in Crook County, Wyoming

Common Name	Scientific Name	Status	Habitat	Habitat Present
Mammals				
Grey wolf	*Canis lupus*	EP,S1	Wilderness	Possible hunting grounds
Black-footed ferret	*Mustela nigripes*	FE, S1	Open grasslands, steppe, shrub in and around prairie dog towns	N
Swift fox	*Vulpes velox*	FE, S2	Open prairie and arid plains	Y
Birds				
Greater sage grouse	*Centrocercus urophasianus*	FC, S4	Wide-open sagebrush steppe	N
Mountain plover	*Charadrius montanus*		Nesting habitat includes high plains/shortgrass prairie; occasionally sagebrush-blue gramma habitat	Y

Table 5-3. Protected Animals with the Potential to Occur in Crook County, Wyoming

Common Name	Scientific Name	Status	Habitat	Habitat Present
Amphibians				
Northern leopard frog	*Rana pipiens*	S3	Springs, slow streams, marshes, bogs, ponds, canals, flood plains, reservoirs, and lakes; usually in or near permanent water	N

Notes: FE = Federally Endangered; FC = Federal Candidate; EP=Experimental Population; Y = Yes; N = No
Source: WYNDD 2012.

Agency Coordination

U.S. Fish and Wildlife Service
In a letter addressed to WYDOT, dated November 28, 2012, the USFWS outlined its recommendations for the Rupe Hill project. The USFWS recommends preconstruction surveys for MBTA-protected birds as well as bald and golden eagles (*Aquila chrysaetos*) protected by the Bald and Golden Eagle Protection Act (BGEPA). Surveys for eagles may need to extend up to a mile from the project area prior to construction in order to mitigate for impacts to the nesting raptors. The USFWS also recommends mitigating actions to prevent impacts to Ute's ladies' tresses and greater sage grouse, the former a federally protected species the latter under consideration for federal protection, considered potentially present in the project area.

Wyoming Game and Fish Department
In a letter addressed to WYDOT, dated December 18, 2012, the Wyoming Game and Fish Department (WGFD) outlined its recommendations for the Rupe Hill project. The WGFD recommends the installation of Type E fencing to prevent road crossings from the abundant regional deer population. Additionally, WGFD encourages the placement of "deer crossing" warning signs ½ mile from the crest of the project area hill.

With respect to revegetation of the right-of-way, WGFD suggests a mixture of cool-season, unpalatable grasses to limit grazing by deer. Specifically, the recommended seed mixture is as follows:

- Revenue slender wheatgrass 0.5 lb/acre
- Rosana western wheatgrass 3.0 lb/acre
- Critana thickspike wheatgrass 3.0 lb/acre
- Shoshone beardless wildrye 3.0 lb/acre
- Tall wheatgrass 4.0 lb/acre

If straw is utlized to prevent erosion, small-grain straw is not recommended as it may attract foraging by deer and wild turkey.

If construction occurs in riparian areas, WGFD specifies BMP's designed to prevent invasion by aquatic, invasive species.

6. WATER RESOURCES/WETLANDS

6.1 WETLANDS

A Wetland and Waters of the U.S. delineation was not completed in 2012 because permission to access the property was received after the traditional delineation field season had ended. However, based on National Wetland Inventory (NWI) maps and a field reconnaissance, there appears to be potential for wetlands within the project area. A Wetland and Waters of the U.S. delineation will be completed in spring 2013, after preliminary plans are available and as soon as weather permits. All applicable permits will be acquired before construction of the project.

Estimated Potential Impacts

Based on the data collected, potential impacts to wetland habitat by each of the three preliminary alternatives include:

1. Northern alignment—less than 0.3 acre of potential wetland habitat
2. On alignment repair alternative—no potential wetland habitat
3. Southern alignment—less than 0.1 acre

Figure 6-1 depicts the location of potential wetlands in the project area.

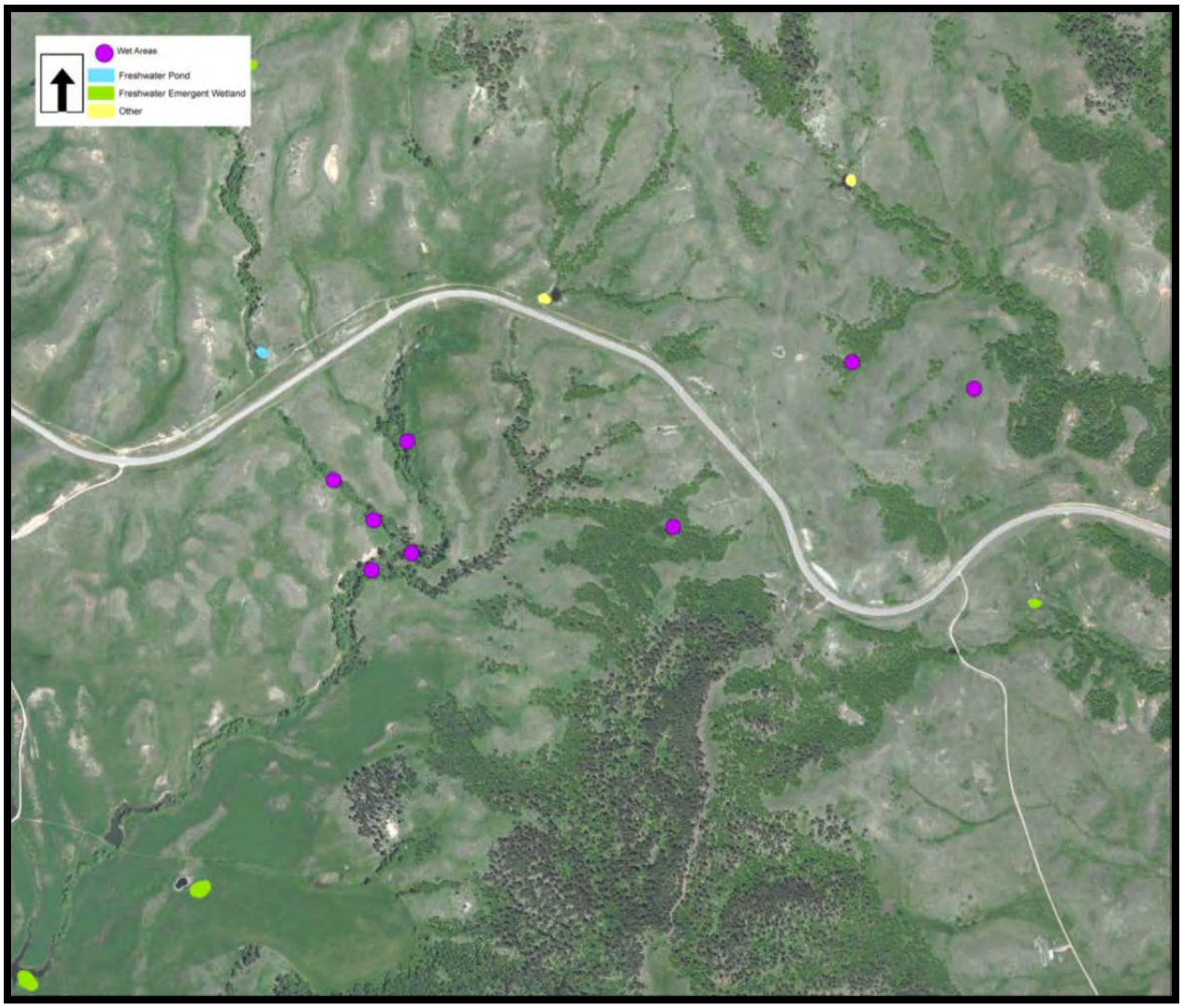

Figure 6-1. Location of Potential Wetlands

National Wetlands Inventory

The U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) program compiles wetland location data from across the United States and makes available GIS shapefiles on a Web-based database. Figure 6-2 illustrates wetlands data within the project area gathered by the NWI program.

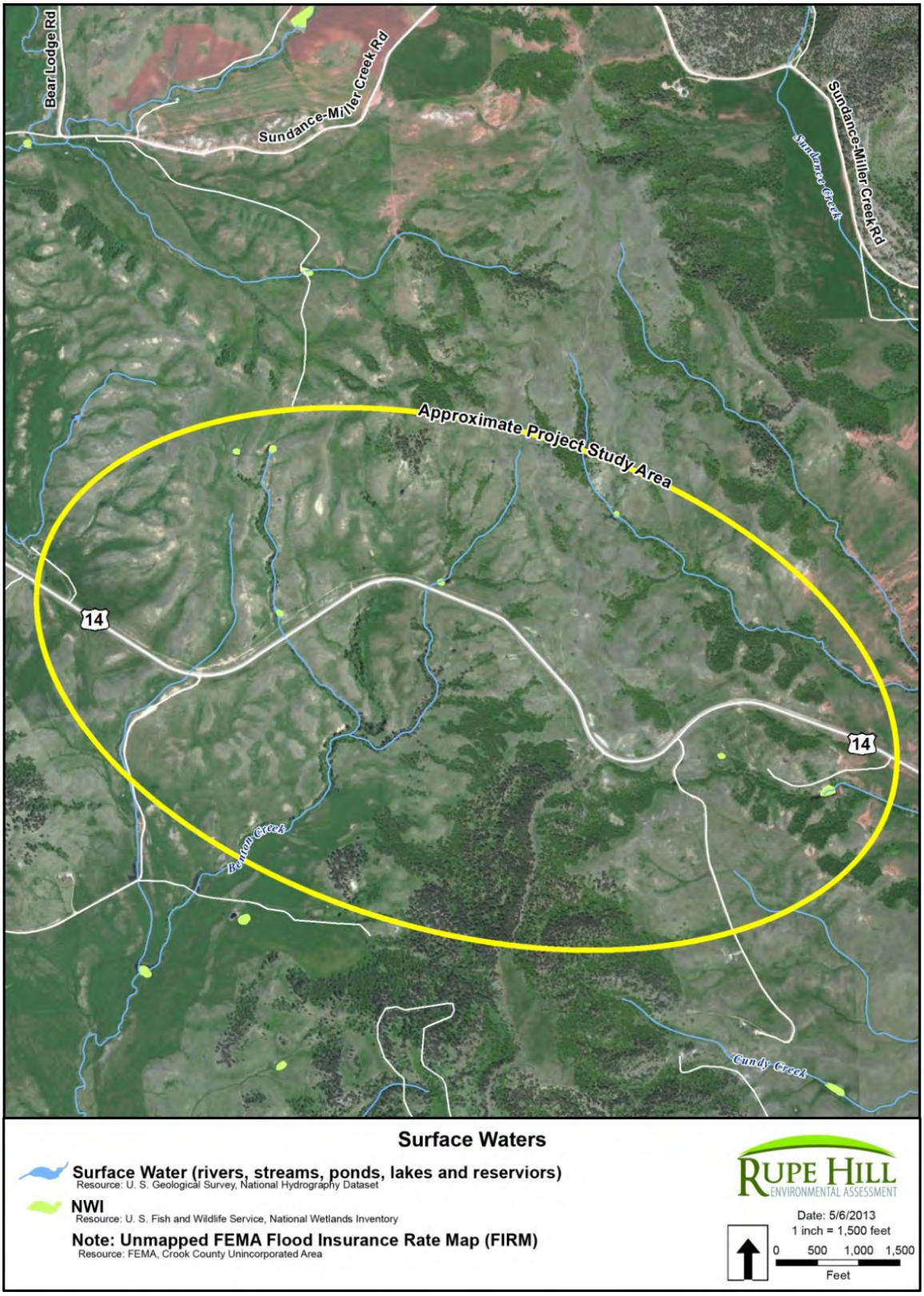

Figure 6-2. NWI Mapped Wetlands near the Project Area

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8. REFERENCES

Bailey 1994	Bailey, R.G., Avers, P.E., King, T., and McNab, W.H., eds., 1994, Ecoregions and subregions of the United States (map)
Chapman 2004	Chapman, S.S., Bryce, S.A., Omernik, J.M., Despain, D.G., ZumBerge, J., and Conrad, M., 2004, Ecoregions of Wyoming (color poster with map, descriptive text, summary tables, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:1,400,000).
NatureServe 2012a	NatureServe Data Query, 2012. http://www.natureserve.org/explorer/servlet/NatureServe Accessed November, 2012
NatureServe 2012b	NatureServe Data Query, 2012. http://www.natureserve.org/explorer/servlet/NatureServe Accessed November, 2012
NatureServe 2012c	NatureServe Data Query, 2012. http://www.natureserve.org/explorer/servlet/NatureServe Accessed November, 2012
NatureServe 2012d	NatureServe Data Query, 2012. http://www.natureserve.org/explorer/servlet/NatureServe Accessed November, 2012
NatureServe 2012e	NatureServe Data Query, 2012. http://www.natureserve.org/explorer/servlet/NatureServe Accessed November, 2012
NatureServe 2012f	NatureServe Data Query, 2012. http://www.natureserve.org/explorer/servlet/NatureServe Accessed November, 2012
NatureServe 2012g	NatureServe Data Query, 2012. http://www.natureserve.org/explorer/servlet/NatureServe Accessed November, 2012
NatureServe 2012h	NatureServe Data Query, 2012. http://www.natureserve.org/explorer/servlet/NatureServe Accessed November, 2012
NatureServe 2012i	NatureServe Data Query, 2012. http://www.natureserve.org/explorer/servlet/NatureServe Accessed November, 2012
NatureServe 2012j	NatureServe Data Query, 2012. http://www.natureserve.org/explorer/servlet/NatureServe Accessed November, 2012
NatureServe 2012k	NatureServe Data Query, 2012. http://www.natureserve.org/explorer/servlet/NatureServe Accessed November, 2012
NatureServe 2012l	NatureServe Data Query, 2012. http://www.natureserve.org/explorer/servlet/NatureServe Accessed November, 2012
NOAA 2012	Climatography of the United States NO.81". National Oceanic and Atmospheric Administration. http://cdo.ncdc.noaa.gov/climatenormals/clim81/WYnorm.pdf. Accessed November 2012

APPENDIX A
PLANTS OBSERVED IN THE PROJECT AREA

Plants Observed in the Project Area

Common Name	*Scientific Name*	North or South of US 14
Alyssumleaf Phlox	*Phlox alyssifolia*	N/S
Arkansas rose	*Rosa arkansana*	N/S
Bebb's willow	*Salix bebbiana*	S
Big bluestem	*Andropogon gerardii*	S
Blue gramma	*Bouteloua gracilis*	N/S
Bluegrass	*Poa pratensis*	N/S
Box elder	*Acer negundo*	S
Broadleaf cattail	*Typha latifolia*	S
Buckwheat	*Eriogonum* spp.	N/S
Buffalo grass	*Buchloe dactyloides*	N/S
Buffalo pea	*Thermopsis rhombifolia*	N/S
Canary reed grass	*Phalaris arundinaceae*	S
Cheatgrass	*Bromus tectorum*	N/S
Clover	*Trifolium parryi*	N/S
Common juniper	*Juniperus communis*	N/S
Common licorice	*Glycyrrhiza lepidota*	N
Common spikerush	*Eleocharis palustris*	N/S
Common yarrow	*Achillea millefolium*	N/S
Cow parsnip	*Heracleum maximum*	S
Creeping juniper	*Juniperus horizontalis*	N
Crested wheatgrass	*Agropyron cristatum*	S
Curly-cup gumweed	*Grindellia squarossa*	N/S
Foxtail barley	*Hordeum jubatum*	S
Fringed brome	*Bromus ciliatus*	N/S
Bur oak	*Quercus macrocarpa*	N/S
Hairy false golden aster	*Heterotheca villosa*	N/S
Hairy gramma	*Bouteloua hirsutus*	N/S
Hawthorn	*Crataegus rivularis*	S
Hood's phlox	*Phlox hoodii*	N/S
Horsemint	*Mentha arvensis*	N/S
Horsetail	*Equisetum arvense*	N
Junegrass	*Koeleria macrantha*	N/S

Plants Observed in the Project Area

Common Name	*Scientific Name*	North or South of US 14
Little bluestem	*Schizachyrium scoparium*	N/S
Locoweed	*Oxytropis sericea*	N/S
Lupine	*Lupinus polyphyllus*	S
Milkvetch	*Astragalus bisculatus*	N/S
Milkweed	*Asclepias speciosa*	N
Nebraska sedge	*Carex nebrascensis*	N/S
Needle-and-thread grass	*Heterostipa comata*	N/S
Northern bedstraw	*Galium boreale*	N/S
Oregon grape	*Mahonia repens*	N/S
Plains prickly pear	*Opuntia polyacantha*	N/S
Ponderosa Pine	*Pinus ponderosa*	N/S
Prairie coneflower	*Ratibida columnifera*	N/S
Purple prairie clover	*Dalea purpurea*	N/S
Rabbitbrush	*Chrysothamnus nauseosus*	N/S
Rocky Mountain juniper	*Juniperus scopulorum*	N/S
Salsify	*Tragopogon dubius*	N/S
Sand dropseed	*Sporobolus cryptandrus*	N/S
Sand sage	*Artemisia frigida*	N/S
Scarlet globemallow	*Sphaeralcea coccinea*	N/S
Scarlet Gaura	*Gaura coccinea*	N
Scotch thistle	*Onopardum acanthium*	S
Side oats gramma	*Bouteloua curtipendula*	N/S
Silver sagebrush	*Artemisia cana*	N/S
Skunk sumac	*Rhus trilobata*	N/S
Smooth brome	*Bromus inermis*	N/S
Snakeweed	*Gutierrezia sarothrae*	N/S
Tall cinquefoil	*Potentilla arguta*	N/S
Tapertip flatsedge	*Cyperus acuminata*	S
Threadleaf sedge	*Carex filifolia*	N/S
Timothy	*Phleum pratense*	N/S
Tumble mustard	*Sisymbrium altissimum*	N/S
Utah Juniper	*Juniperus osteosperma*	N/S

Plants Observed in the Project Area

Common Name	*Scientific Name*	North or South of US 14
Vetch	*Vicia americana*	N/S
Western dock	*Rumex occidentalis*	N/S
Western flax	*Linum lewisii*	N/S
Western wheatgrass	*Pascopyrum smithii*	N/S
Winterberry	*Symphoricarpos oreophilus*	N/S
Wyoming big sagebrush	*Artemisia tridentata* ssp. *wyomingensis*	N/S
Yellow clover	*Melilotus officinalis*	N