

# **Wildlife and Vegetation Impact Analysis**

**LINN Operating Inc.  
O-29 Centralized E&P Waste  
Management Facility**

**OA Project No. 014-1565**

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**Berry Petroleum**  
**29-17 Injection Well**  
**Impact Analysis: Section 4-502 E (8) Environmental Effects**  
**Garfield County Unified Land Use Resolution 2008**



Cover Photo: Looking northeast at the 29-17 pad.

Prepared for:  
**Berry Petroleum Company**

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## **INTRODUCTION**

At the request of Berry Petroleum Company (Berry), WestWater Engineering (WWE) biologists conducted assessments of wildlife, wildlife habitats, sensitive plant species, noxious weeds, and potential Waters of the U.S. jurisdictional areas for Berry's 29-17 Injection Well (Cover Photo; Figure 1). This document reports the results and analysis of the findings that are pertinent to Garfield County Land Use regulations (2008) that apply to this project.

The project area is located on an already developed well pad on private lands approximately 11 miles northwest of Parachute, CO in Section 29, Township 5 South, Range 96 West, 6<sup>th</sup> Principal Meridian. The elevation is approximately 7,900 feet. The site is accessed via Garfield County Road 215 to Garden Gulch Road, and then a private road system.

## **SURVEY METHODS**

A preliminary review of the project area using aerial photographs was conducted to familiarize biologists with the project area and as an aid to help determine the potential presence of wildlife and any threatened, endangered, or sensitive species including plants. Field data collected during the survey were documented and/or recorded with the aid of a handheld global positioning system (GPS) receiver utilizing NAD83 map datum, with all coordinate locations based on the Universal Transverse Mercator (UTM) coordinate system in Zone 12.

WWE biologists conducted pedestrian surveys of the area on June 20, 2012 to identify and locate wildlife species, wildlife sign, vegetative communities, and wildlife habitats. Raptor nest surveys were conducted on foot through suitable tree nesting habitat near the well pad.

Vegetation types were determined through field identification of plants, aerial photography, and on-the-ground assessments of plant abundance. Visual searches for raptor and other bird species nests focused on tree nesting habitat within a 0.25-mile radius of the project site and cliff nesting raptor habitat within 0.5-miles. Nest searches and bird identification were aided with the use of binoculars.

Biologists evaluated the habitat conditions for threatened, endangered, and sensitive plants within 100 meters of project features. Weed surveys were conducted within an approximate 100 foot radius of the project site. Photographs were taken of the general project area.

## **SECTION 4-502 E. - ENVIRONMENTAL EFFECTS**

### **EXISTING ENVIRONMENTAL CONDITIONS**

#### **WATERS OF THE U.S.--Army Corps of Engineers**

WWE biologists determined that no wetlands or drainages showing characteristics of Waters of the U.S. (WOUS) were located in the project area.

#### **VEGETATION**

The project area is located on a ridge-top in the upper elevations of the Roan Plateau. Native vegetation surrounding the site is consistent with aspen woodlands, mountain shrub, and sagebrush communities found throughout the region. Expected native plants are presented in Table 1.

**Table 1. Common plant species observed in the project area.**

<b>Plant Species Within 100 Feet of the Site</b>	
Arrowleaf balsamroot	Poa spp.
Astragalus spp.	Serviceberry
Barberry, creeping	Snowberry
Bitterbrush	Sulfur buckwheat
Delphinium (larkspur)	Sagebrush, mountain
Gambel oak	Yarrow
Indian ricegrass	Wheatgrass, intermediate
Needlegrass spp.	Wheatgrass, western
<b>Additional Common Plant Species Expected Within 0.25 Miles</b>	
Aspen	Mutton grass
Brome, smooth	Rabbitbrush, rubber
Ceanothus	Rabbitbrush, yellow
Chokecherry	Sagebrush, white
Currant	Wavy-leaf thistle
Douglas-fir	Wild rose
Penstemon spp.	

**Threatened, Endangered, Sensitive Plant Species**

A review of the Colorado Natural Heritage Program (CNHP) database, soils and terrain at the project site, and previous WWE surveys indicate that there are no threatened, endangered, and sensitive plant species and their associated suitable habitats known to occur within the project area (Spackman et al.1997) .

**Noxious Weeds**

Noxious weed surveys were conducted on June 20, 2012. Common mullein, bull thistle, and houndstongue were the only State listed weeds found during the survey (Table 2 and Figure 1). Of these, houndstongue is the only species listed by Garfield County.

Nuisance weeds that were observed within 100 feet of the pad include Russian thistle and knotweed.

**Table 2. Locations of noxious weeds found near the 29-17 Injection Well site (Datum: NAD83, UTM Zone 12)**

<b>Common Name Scientific Name</b>	<b>General Location and Comments</b>
Bull thistle ( <i>Cirsium vulgare</i> )	This species was observed in two locations north of the well pad.
Common mullein ( <i>Verbascum Thapsus</i> )	This species was observed in scattered patches in the area north of the well pad location.
Houndstongue ( <i>Cynoglossum officinale</i> )	This species was observed in dense infestations surrounding the entire well pad location.

## **WILDLIFE**

### **Federally and State Listed Candidate, Threatened, Endangered, and Species of Concern**

Federally and state listed species with potential to occur within the project area vicinity are described in Table 3.

**Table 3. Federally and State Listed Candidate, Threatened, Endangered, and Species of Concern with potential to occur in the vicinity of the 29-17 Injection Well**

<b>Common Name</b>	<b>Scientific Name</b>	<b>Status*</b>	<b>Occurrence</b>
<b>BIRDS</b>			
Greater Sage-grouse	<i>Centrocercus urophasianus</i>	FC, SC	Habitat-Yes, within Sage-grouse production area
<b>FISH</b>			
Bonytail	<i>Gila elegans</i>	FE, SE	Occurs downstream in the Colorado River.
Colorado pikeminnow	<i>Ptychocheilus Lucius</i>	FE, ST	Occurs downstream in the Colorado River.
Humpback chub	<i>Gila cypha</i>	FE, ST	Occurs downstream in the Colorado River.
Razorback sucker	<i>Xyrauchen texanus</i>	FE, SE	Occurs downstream in the Colorado River.

\*= FE-Federally Endangered, FT-Federally Threatened, FC-Federal Candidate, SE-State Endangered, ST-State Threatened, SC-State Special Concern.

#### ***Greater Sage-grouse***

Greater Sage-grouse occurs in suitable habitat on the Roan Plateau and is a candidate for listing under the ESA. There is occupied sage-grouse habitat surrounding the project area. However, sage-grouse prefer vast, continuous sagebrush communities, and 29-17 pad is located in a drainage bottom where sagebrush is interspersed with mountain shrub communities. The project area is within a mapped sage-grouse production area by the Natural Diversity Information System (NDIS) maintained by CPW (NDIS 2012) (Figure 2).

Lek sites (breeding/strutting grounds) are important features in sage-grouse habitat. Research by CPW indicates that approximately 80 percent of sage-grouse nesting takes place in suitable habitats within 4 miles of the lek on which they were bred (Colorado Greater Sage-grouse Steering Committee 2008). There are 4 known leks within 4 miles of the 29-17 pad, of which two are considered active. The active leks are the Garden Gulch and Bear Run Leks.

#### ***Fish***

No other federally or state listed species are known to occur at the injection well site. However, runoff from the injection well site would eventually drain into the Colorado River which is designated Critical Habitat by US Fish and Wildlife Service (USFWS) for 4 federally listed endangered species of fish (USFWS 1994). The Colorado pikeminnow and razorback sucker both occur in the Colorado River downstream of the project area. Critical habitat for these two species begins at the Colorado River Bridge in Rifle, CO downstream to Lake Powell (USFWS 1994).

## Raptors

A minimum of eleven raptor species would be expected to nest, reside, forage, or pass through the general project area and are listed in Table 2. The most common raptor species observed in the area include American Kestrel, Cooper's Hawk, and Red-tailed Hawk.

**Table 2. Raptor species that may be present in the project area.**

Common Name	Scientific Name	BCC*
American Kestrel	<i>Falco sparverius</i>	No
Cooper's Hawk	<i>Accipiter cooperii</i>	No
Great Horned Owl	<i>Bubo virginianus</i>	No
Flammulated Owl	<i>Otus flameolus</i>	Yes
Long-eared Owl	<i>Asio otus</i>	No
Northern Goshawk <sup>§</sup>	<i>Accipiter gentilis</i>	No
Northern Harrier	<i>Circus cyaneus</i>	No
Northern Saw-whet Owl	<i>Aegolius acadicus</i>	No
Red-tailed Hawk	<i>Buteo jamaicensis</i>	No
Sharp-shinned Hawk	<i>Accipiter striatus</i>	No
Swainson's Hawk	<i>Buteo swainsoni</i>	No

\* BCC=U.S. Fish and Wildlife Service, Bird of Conservation Concern.

§ BLM Sensitive Species

During the surveys, one occupied Red-tailed Hawk nest (Photo 1) and two unoccupied Red-tailed Hawk nests were observed within a 0.25 mile radius of the pad (Figure 1 and Table 3). The vegetation is composed of sagebrush and mountain shrub communities interspersed with aspen woodlands. Raptor nesting habitat in the aspen stands nearby would be considered good to excellent.

**Table 3. Raptor Nests observed within 0.25 miles of 29-17 Injection Well**

Label	Species Common Name	Zone	UTM Easting	UTM Northing	Occupancy
RTHA-1	Red-tailed Hawk	12	740769	4384736	Occupied
RTHA-2	Red-tailed Hawk	12	741077	4384827	Unoccupied
RTHA-3	Red-tailed Hawk	12	741093	4384794	Unoccupied

## Migratory, Non-migratory, and Birds of Conservation Concern (other than raptors)

WWE biologists conducted pedestrian surveys and reviewed existing literature to determine the potential for the presence of any bird species that could potentially be affected by the project. Particular attention was given to identifying birds that are listed as sensitive by the Bureau of Land Management (BLM), the U.S. Fish and Wildlife Service (USFWS), and the Colorado Parks and Wildlife (CPW). Birds of Conservation Concern (BCC) are species listed by the USFWS that are priorities for conservation action (USFWS 2008). The goal is to prevent or remove the need to list additional species under the Endangered Species Act (ESA) by implementing

proactive management and conservation actions. Species with potential to occur in the project area are listed in Table 4.



Photo 1. Occupied Red-tailed Hawk nest near the 29-17 Injection Well.

**Table 4. BCC and state species of concern that may occur within project area.**

Species Common Name	Species Scientific Name	Status	Habitat Description	Habitat and Species Observations
Brewer's Sparrow	<i>Spizella breweri</i>	BCC	Inhabits sagebrush dominated shrublands and typically are found in habitat that supports sage sparrows.	<i>Habitat</i> – Yes <i>Species</i> – No nesting observed, but nesting is likely nearby.
Cassin's Finch	<i>Carpodacus cassinii</i>	BCC	Occasionally occurs in aspen woodlands.	<i>Habitat</i> -Yes <i>Species</i> -Not observed.

\*BCC=Bird of Conservation Concern

A 100-foot buffer is the typical distance stipulated by the USFWS for the protection of nesting migratory birds, excluding raptors. The aspen woodlands, sagebrush, and mountain shrublands in the area surrounding the project site provide nesting and foraging habitat for various migratory and non-migratory bird species, depending on the season of the year (Andrews & Righter 1992).

### **American Elk and Mule Deer**

Elk and mule deer utilize the summer range extensively on the Roan Plateau, following the snow line up to higher elevations in the spring. Mule deer rely on forbs, sagebrush, and other shrubs to meet their nutritional requirements, while elk rely more on grasses for food. Adjacent areas of aspen and mountain shrub provide necessary forage and production areas as well as escape, thermal, and loafing cover for deer and elk during the summer.

The site is located in CPW Game Management Unit (GMU) 22. The project area is within CPW-NDIS mapped mule deer and American elk overall range. The site is completely within a mapped elk production area (Figure 3) and is approximately 3 miles from an elk winter concentration area, and approximately 2.8 miles from mule deer critical winter range (NDIS 2012). The area provides valuable habitat for big game for much of the year.

### **Black Bear and Mountain Lion**

CPW-NDIS mapping shows the project area to be within overall range for black bear and mountain lion (NDIS 2012). There is plentiful forage nearby and black bears frequent the area.

Black bears are omnivorous and the diet depends largely on what kinds of food are seasonally available, although their mainstay is vegetation. In spring, emerging grasses and succulent forbs are favored. In summer and early fall, bears take advantage of a variety of berries and other fruits. In late fall, preferences are for berries and mast (acorns), where available. Black bear are in hibernation from mid-November through May.

Mountain lion typically follow migrating deer herds in search of deer as the primary food source. They tend to have large territories and are highly mobile as they search for food or new territories. Mountain lions likely inhabit the general project area during the summer months. The project area is not mapped by CPW as a potential mountain lion conflict area.

### **Small Mammals**

Common small mammal species in the project area include black-tailed jackrabbit (*Lepus californicus*), coyote (*Canis latrans*), golden-mantled ground squirrel (*Spermophilus lateralis*), mountain cottontail (*Sylvilagus nuttallii*), least chipmunk (*Tamias minimus*), and a multitude of rodent species.

### **Reptiles**

Western terrestrial garter snakes (*Thamnophis elegans*) have previously been observed in the vicinity of the project area. This species is common on the Roan Plateau and is typically observed around perennial creeks and ponds but can be found far from water. Smooth green snakes (*Liochlorophis vernalis*) were not observed during surveys, but are known to occur on the Roan Plateau (Hammerson 1999) and have been observed at similar elevations on Old Mountain by WWE biologists. Short-horned lizards (*Phrynosoma hernandesi*) are fairly abundant in sagebrush habitats. These species do not have any special protection by CPW or USFWS.

### **Amphibians**

Since there are no permanent water sources near the project area no amphibian species are expected to occupy the area and none would be potentially affected.

## **SECTION 4-502 (8) (a) Determination of Long and Short-term Effects on Flora and Fauna**

### **FAUNA**

#### **Raptors**

No raptor nesting habitat will be directly affected by development of the 29-17 well pad to an injection well. There is a possibility for long or short-term effects related to the increased human presence and activity associated with operation and maintenance of an injection well site; however, activities related to natural gas production and operation are currently occurring within 660 feet of the occupied Red-tailed Hawk nest (Figure 1) on the 29-17 location.

#### **Greater Sage-Grouse**

Approximately 4 acres of sagebrush and aspen habitat has been removed by the project. This vegetation removal has taken place within a mapped sage-grouse production area. An increase in edge habitat could result in additional predation on sage-grouse. An increase in vehicle traffic could result in mortality due to collisions (road-kill); however, the 29-17 well pad is located in the bottom of a draw, and sage-grouse typically occupy sagebrush habitat on broad ridgetops.

#### **American Elk and Mule Deer**

The existence of the injection well reduces available habitat for foraging, escape, and thermal cover by approximately 4 acres; no new vegetation disturbance will occur in the development of this site as an injection well. Human presence and activity may affect animal distribution. Some chemicals on the site may be toxic to wildlife including big-game. Open pits containing fluids could pose a drowning risk if not properly fenced.

#### **Black Bear and Mountain Lion**

A small amount of serviceberry and Gambel oak has been affected by the previous development of the 29-17 well pad, minimally reducing the amount of available forage for black bears; no new vegetation disturbance will occur in the development of the site as an injection well. Human presence and activity may affect animal distribution. Potential encounters of black bear with construction personnel could occur if garbage or food is available to resident bears and incidences of human-black bear interactions sometimes result in the euthanasia of offending bears by the CPW. Open pits containing fluids could pose a drowning risk if not properly fenced. Mountain lion would be minimally affected.

#### **Small Mammals, Birds (BCC), and Reptiles**

Habitat loss to these species is approximately 4 acres. Human presence and activity may affect animal distribution. Some chemicals on the site may be toxic to wildlife, and open pits containing fluids could pose a drowning risk if not properly enclosed and other deterrents put in place.

### **FLORA**

Approximately 4 acres of native vegetation has been previously removed for construction of the 29-17 well pad. No TESS plants have been affected. Implementation of an integrated vegetation and noxious weed management plan would reduce the effects of disturbance to the project site.

**SECTION 4-502 (8) (c) (1) Determination of the effect on significant environmental resources--critical wildlife habitat**

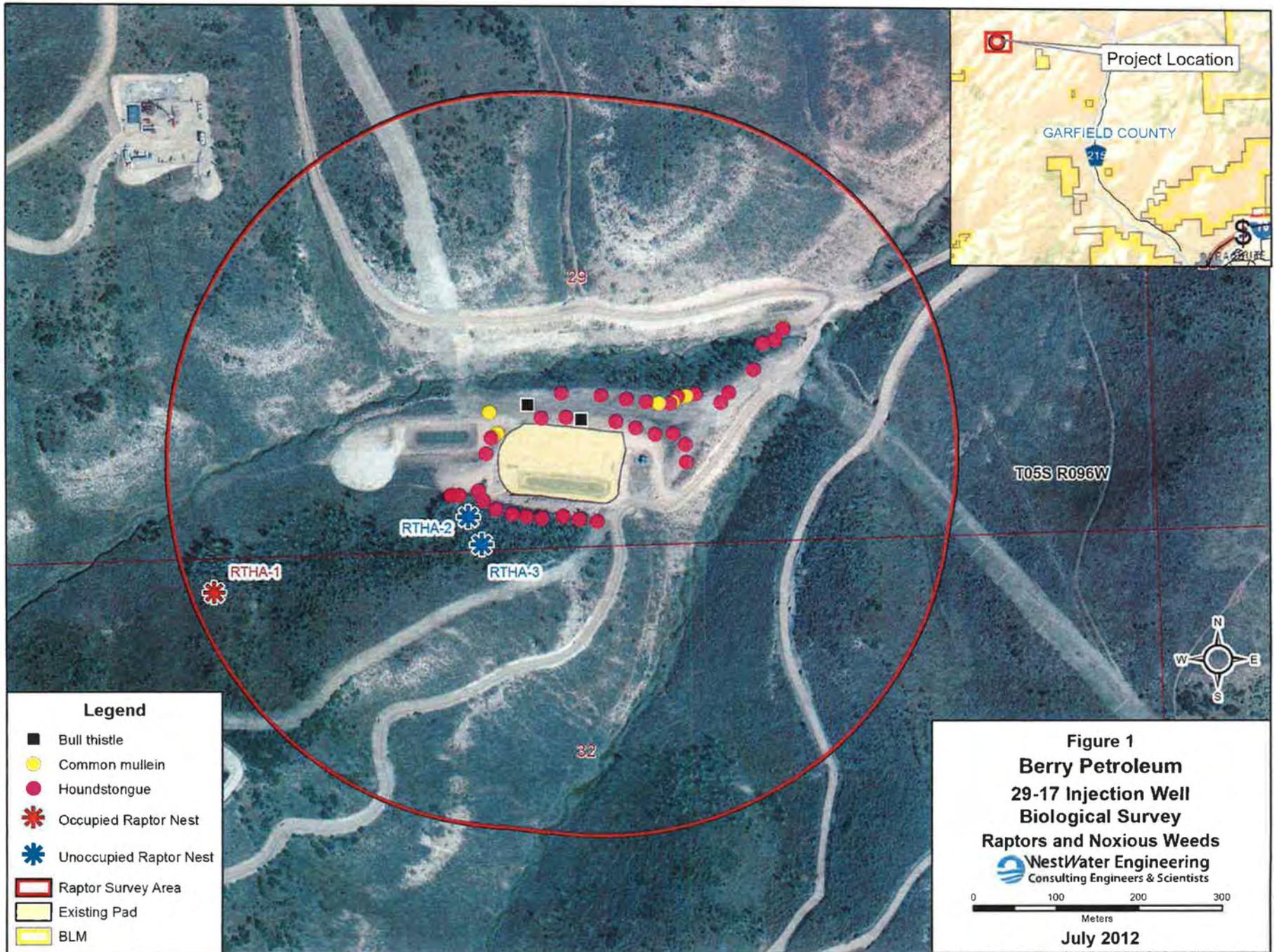
The development of the project is not expected to significantly affect any critical wildlife habitat for any wildlife species. Potential issues are outlined below.

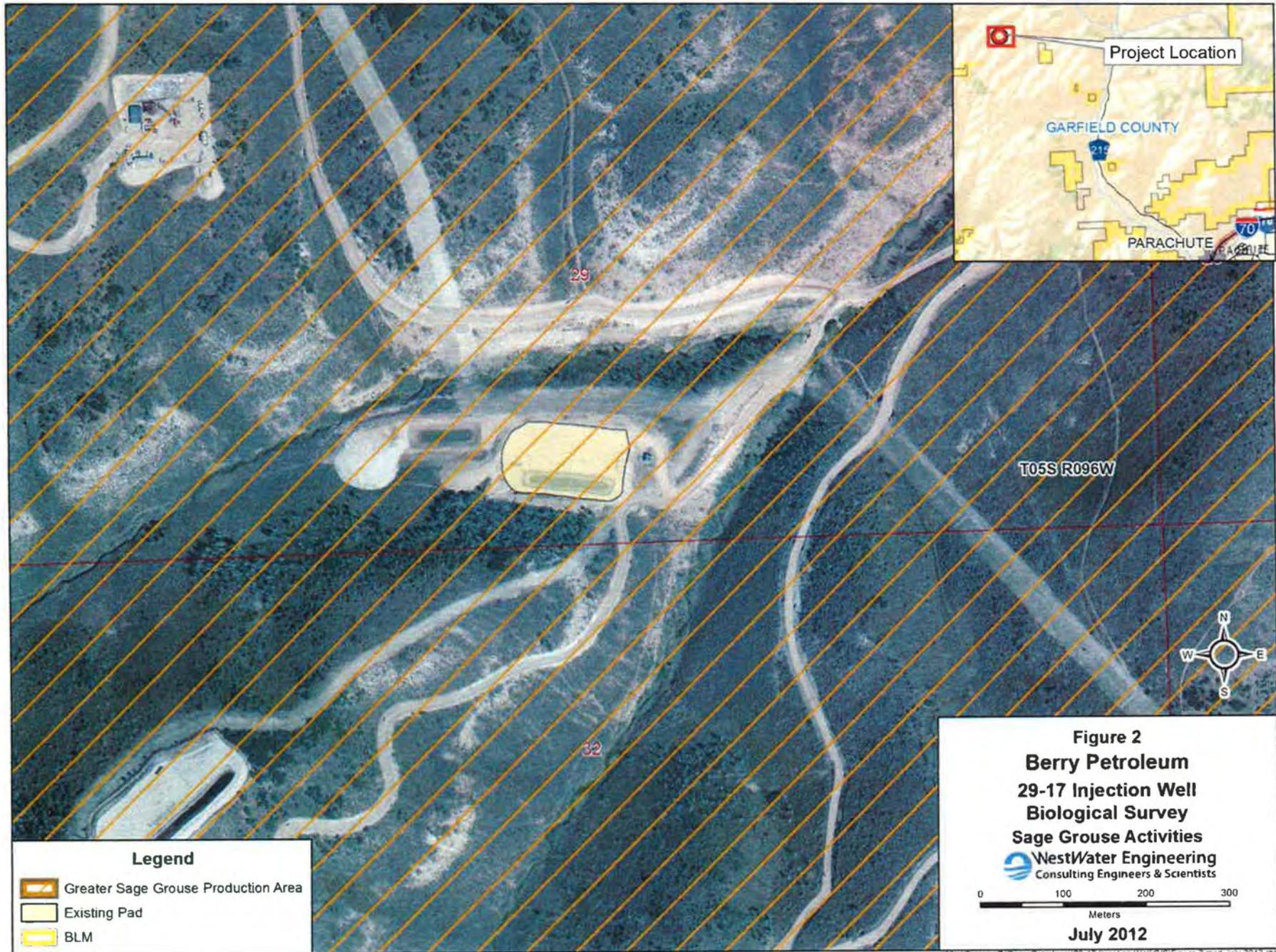
- **Creation of hazardous attractions:** The potential exists that wildlife mortality may result from drowning or ingestion of toxic chemicals. Open pits containing fluids may attract waterfowl and other birds and terrestrial wildlife.
- **Indirect Construction Effects:** Operation of the site introduces factors such as the presence of construction personnel and noise, which have a potential to affect wildlife distribution and habitat use in a negative manner. Since the site exists amid significant human presence related to other activities in the area, the additional disturbance from this project is low but contributes to the cumulative effect.
- **Alteration of Existing Vegetation:** There has been approximately 4 acres of native vegetation removal related to previous development of the 29-17 well pad; no new vegetation disturbance will occur in the development of this site as an injection well.
- **Big Game Production Areas and Migration Corridors:** The injection well site is situated within an elk production area. No specific deer or elk migration corridors are affected, though migration occurs in and around the site.
- **Road-kill:** Speed limits are 25 miles-per-hour or less on the roads within the project area and most wildlife in the area have become habituated to vehicle traffic. The potential for road-kill for most species should be low, with the exception of small mammals, birds (including sage-grouse), and reptiles.
- **Bird Nesting Habitat:** Bird nesting habitat has been lost within the footprint of the injection well site, including sage-grouse nesting and brood rearing habitat.

**REFERENCES**

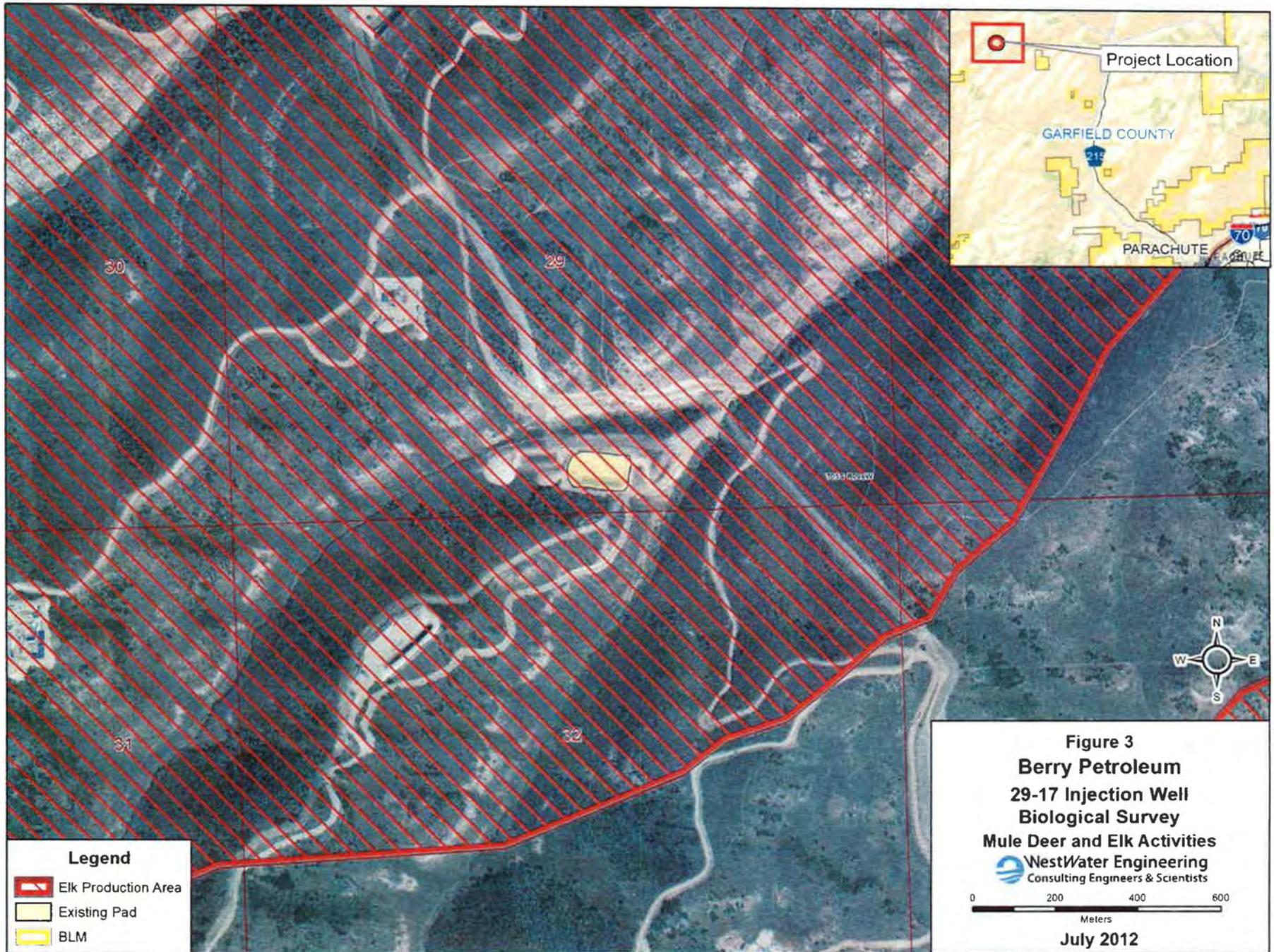
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Map Source: Z:\Berry Petroleum\29-17 Injection Well\GIS\Figure 2.mxd July 2012.rdb



**Berry Petroleum**  
**29-17 Injection Well**  
**Section 7-202 Protection of Wildlife Habitat Areas**  
**Garfield County Unified Land Use Resolution 2008**

**WILDLIFE**

**Raptors**

Activities associated with the injection well have minimal potential to impact raptor populations as no nest trees will be directly affected. One occupied raptor nest and two unoccupied raptor nests were documented near the project area during the 2012 surveys. Activities associated with operation of the site will likely have little indirect affect on raptors given that the Red-tailed Hawk nest within the survey area is 660 feet from the closest disturbance associated with the pad, and these birds are likely habituated to human presence. Personnel should avoid approaching the nest area until the chicks have fledged, which will likely occur by mid-July.

**Greater Sage-grouse**

Sage-grouse occupy and probably nest in the sagebrush habitat on the open ridge tops upslope from the site. Sage-grouse predators such as Red-tailed Hawks and Golden Eagles could benefit from the additional edge habitat created by the site resulting in an increase in predation on sage-grouse. Deterrent devices should be used to prevent raptors from utilizing structures on the site as hunting perches. The potential for road-kill exists, although speed limits are low and signage warning drivers of the presence of sage-grouse is in place.

**American Elk and Mule Deer**

Implementation of an integrated vegetation and noxious weed management plan would improve the existing condition of the area surrounding the 29-17 injection well. A reclamation plan should be implemented to reduce the establishment of noxious weeds in disturbed areas. Reclamation of disturbed areas not utilized as part of the facilities would decrease the presence of noxious weeds and provide forage for mule deer and elk.

Any livestock fencing (barbed wire) should be constructed to minimally affect elk and mule deer movements. The top stand should be smooth wire. Colorado Parks and Wildlife has published guidelines for construction of fencing that reduces impacts to mule deer and elk (CPW <http://wildlife.state.co.us>). Following "wildlife friendly" fencing standards reduces the chance of mortality from animals becoming tangled in fencing and improves the opportunity for less restrictive movements throughout the area.

**Black Bear**

Black bear will likely be foraging in the habitat surrounding the project site, particularly when berries and acorns ripen. Personnel may be unfamiliar with wildlife in the area and should be informed of the potential for bear interactions. Personnel should not feed bears at any time. Bears should not be approached if encountered in the project area. All garbage and any food items should be removed from the site on a daily basis.

### **Mitigation of Habitat Loss to Birds**

Approximately 4 acres of vegetation removal has occurred. Implementation of an integrated vegetation and noxious weed management plan would improve the existing condition of the area surrounding the development. A reclamation plan should be implemented to reduce the continued establishment and/or spread of noxious weeds in disturbed areas. Reclamation of disturbed areas not utilized as part of the facilities would decrease the presence of noxious weeds and replace foraging habitat for birds.

### **Small Mammals and Reptiles**

There are no seasonal restrictions or special requirements for development related to these species.

### **PRESERVATION OF NATIVE VEGETATION**

The best method to mitigate loss of wildlife habitat is to increase the availability of native forage in the form of grasses and shrubs. Native grasses would provide the greatest benefit for wildlife. Application of an integrated vegetation and noxious weed management plan would provide a basis for appropriate mitigation.

### **Treatment and Control of Noxious Weed Infestations**

The highest priority for noxious weed management is to prevent the establishment of any noxious weed infestation of the project site. Noxious weeds aggressively compete with native vegetation. Most have come from Europe or Asia, either accidentally or as ornamentals that have escaped. Once established they tend to spread quickly because the insects, diseases, and animals that normally control them are absent. Prevention is especially valuable in the case of noxious weed management.

Noxious weeds are spread by man, animals, water, and wind. Prime locations for the establishment of noxious weeds include roadsides, construction sites, wetlands, riparian corridors, and areas that are overused by animals or humans. Subsequent to soil disturbances, vegetation communities can be susceptible to infestations of invasive or exotic weed species. Vegetation removal and soil disturbance during construction can create optimal conditions for the establishment of invasive, non-native species. Construction equipment traveling from weed-infested areas into weed-free areas could disperse noxious or invasive weed seeds and propagates, resulting in the establishment of these weeds in previously weed-free areas.

Several simple practices should be employed to prevent most weed infestations. The following practices should be adopted for any activity to reduce the costs of noxious weed control through prevention. The practices include:

- Prior to delivery to the site, equipment should be thoroughly cleaned of soils remaining from previous construction sites which may be contaminated with noxious weeds.
- If working in sites with weed-seed contaminated soil, equipment should be cleaned of potentially seed-bearing soils and vegetative debris at the infested area prior to moving to uncontaminated terrain.
- All maintenance vehicles should be regularly cleaned of soil.
- Avoid driving vehicles through areas where weed infestations exist.

The highest priority for noxious weed management (eradication) is for houndstongue that is prevalent on the project site. Reclamation and revegetation with native desirable plants should be implemented within the disturbed area of the project site once it is no longer needed.

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