

**WILDLIFE AND BIOLOGICAL RESOURCES EVALUATION
QUICKSILVER OIL PAD SITE
Pirtlaw PartnersLTD. # 32-09
ROUTT COUNTY, COLORADO**



Prepared for:
Quicksilver Resources Inc.
Steamboat Springs, Colorado, 80487
1169 Hilltop Parkway, Suite 204

Prepared by:
Michael Figgs LREP, Inc
and
Olsson Associates

January 9, 2012

1.0 INTRODUCTION

1.1 Project Information

Michael Figgs LREP, Inc., and Olsson Associates (OA) has prepared a Wildlife and Biological Resources Evaluation for the proposed installation of the Pirtlaw 32-09 oil pad site east of Hayden, Colorado in mountain pastureland. The site is located in NE¼ Section 9, Township 6 North, Range 87 West, 6th Principal Meridian. The proposed oil pad site is approximately six miles east of Hayden, Colorado at an elevation of approximately 6,615 feet. Access to the site is approximately 1/2 mile northwest along County Road 70 from Highway 40. The pad is accessed approximately 0.5 miles east on private access from County Road 70.

Primary site specific information was provided by Michael Figgs who serves as Wolf Mountain's environmental specialist and has completed the baseline ecological documentation for the six conservation easements on Wolf Mountain Ranch, including the Phase 1b conservation easement that includes the 32-09 pad site. Additional information used in the preparation of this report was supported by OA through existing data sources along with an onsite visit with the Colorado Division of Wildlife (CDOW) on September 9, 2011. Additionally, GIS GAP analysis information along with GIS data was used as part of this review.

The purpose of the report was to review the wildlife and sensitive plant species that occupy, or may potentially occupy the project area at varying periods throughout the year, and to evaluate species that may potentially be impacted by project development. Factors considered include: 1) existing land management; 2) plants and wildlife with special designations by Federal and State agencies; 3) Colorado Oil and Gas Conservation Commission (COGCC) Sensitive Wildlife Habitat (SWH) and Restricted Surface Occupancy (RSO) and 4) existing vegetation communities. This report provides written documentation describing findings as well as recommended mitigation measures for potential development.

2.0 LANDSCAPE SETTING

2.1 Vegetation and Climate

Mapped data from the Colorado Vegetation Classification project identifies the pad site as occurring within grass/forb mixture and the access road occurring in a combination of sagebrush and grass/forb mixture. Vegetation cover at the pad site and along the access road was examined during a site visit on September 9, 2011. The pad site and the upper access road are located in a reclaimed wheat field. Vegetation occurs on a west-facing slope consisting of short vegetation dominated mostly by smooth brome (*Bromus inermis*), intermediate wheatgrass (*Thinopyrum intermedium*), and slender wheatgrass (*Elymus trachycaulus*). Mountain big sagebrush (*Artemisia tridentata* sp. *vaseyana*) is slowly recolonizing the area.

The climate near Hayden is considered semi-arid with a range of temperatures and precipitation. According to data collected by the Steamboat Springs weather station (057936), the average annual precipitation in the region averages 23.97 inches, and average daily temperatures range from a high of about 80 degrees F in the summer months to a low of about 4 degrees F during the winter months (Western Regional Climate Center 2011).

2.2 Soils

Mapped soil types published by the Natural Resources Conservation Service (NRCS), U.S. Department of Agriculture (USDA), were reviewed to determine the soil types and natural vegetation characteristics of the project site and surrounding area (NRCS 2011).

The NRCS indicates that the soil type found at the project site is (7E) Morapos loam 12 to 25 percent slopes. The NRCS provides the map unit description as:

The Morapos loam makes up 85 percent of the map unit, with other minor components making up to 5% each. Slopes are 12 to 25 percent. This component is on structural benches and hills. The parent material consists of alluvium derived from shale and/or eolian deposits. Depth to a root restrictive layer is more than 80 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low to moderately high. Depth to water table is more than 80 inches. This soil is not flooded. It is not ponded. Nonirrigated land capability classification is 6e. The ecological site is deep loam (R034XY292CO). This soil does not meet hydric criteria.

2.3 Terrain

The project area lies along a west down-sloping mountain side. The elevation at the proposed drill pad is approximately 6,615 mean feet above sea level.

3.0 WILDLIFE AND PLANT EVALUATION

3.1 Evaluation Methods

A preliminary review of the project area was conducted as an aid to help determine the likelihood of the presence of wildlife and/or plant species that are threatened, endangered, or sensitive. Vegetation types were determined through GIS Gap analysis of vegetation communities and an onsite visit. Identification of sensitive wildlife species was aided by using Colorado Oil and Gas Conservation Commission (COGCC) shape files and data from the Natural Diversity Information Source (NDIS) by Colorado Division of Wildlife (Attachment A).

Mr. Figgs, OA and representatives from CDOW conducted an onsite review of the area to identify and locate wildlife species, wildlife sign (tracks, fecal droppings, and vegetation disturbance), vegetation communities, and wildlife habitats. Photographs were taken during the onsite visit and data files were reviewed to describe the general project location, vegetation, terrain, and biological findings.

3.2 Background Information

Lists of Federally threatened, endangered, candidate, and proposed species (USFWS 2010), and State of Colorado threatened, endangered, and special concern species (CDOW 2011) were reviewed to determine which special status wildlife species could be present in the project area. Table 1 provides the United States Fish and Wildlife Service (FWS) list for threatened, endangered, candidate, and proposed species for Routt County.

Table 1
Federal Threatened, Endangered, Candidate, and Proposed Species Listed for Routt County, Colorado

Common Name	Scientific Name	Status	Impact Evaluation
Greater Sage Grouse	<i>Centrocercus urophasianus</i>	Candidate	D
Yellow-Billed Cuckoo	<i>Coccyzus americanus</i>	Candidate	A
Bonytail Chub	<i>Gila elegans</i>	Endangered	A
Colorado Pikeminnow	<i>Ptychocheilus lucius</i>	Endangered	A
Greenback Cutthroat Trout	<i>Oncorhynchus clarki ssp. stomias</i>	Threatened	A
Humpback Chub	<i>Gila cypha</i>	Endangered	A
Razorback Sucker	<i>Xyrauchen texanus</i>	Endangered	A
North American Wolverine	<i>Gulo gulo luscus</i>	Candidate	A

Impact Evaluation

A – Potential habitat is absent from the project area and/or it is out of the known range for the taxon and/or extirpated.
B – No wild population is known in Colorado.
C – The project is located within the range of the species, however due to conditions at the project site, the species would not occur in this location
D – Potential habitat is present, the species is known from the area, and there are no significant impacts and/or appropriate mitigation measures have been taken.

The CDOW website was reviewed in reference to state-listed threatened, endangered, and species of special concern for incorporation into this report. Table 2 provides the listed state threatened and endangered species likely found in Routt County as identified from the CDOW. Table 3 provides a list of state special status wildlife species that are likely found in Routt County by CDOW.

Table 2 - State List Threatened or Endangered Species (DOW)

Common Name	Scientific Name	Status	Impact Evaluation
Boreal Toad	<i>Bufo boreas</i>	State Endangered	A
Canada Lynx	<i>Lynx canadensis</i>	State Endangered	A
Plains Sharp-tailed Grouse	<i>Tympanuchus phasianellus jamesii</i>	State Endangered	A
Southwestern Willow Flycatcher	<i>Empidonax traillii extimus</i>	State Endangered	A
Whooping Crane	<i>Grus americana</i>	State Endangered	A
Wolverine	<i>Gulo gulo</i>	State Endangered	A
Bald Eagle	<i>Haliaeetus leucocephalus</i>	State Threatened	D
Northern River Otter	<i>Lutra canadensis</i>	State Threatened	A
Western Burrowing Owl	<i>Athene cunicularia</i>	State Threatened	A

Impact Evaluation

A – Potential habitat is absent from the project area and/or it is out of the known range for the taxon and/or extirpated.
B – No wild population is known in Colorado.
C – The project is located within the range of the species, however due to conditions at the project site, the species would not occur in this location.

D – Potential habitat is present, the species is known from the area, and there are no significant impacts and/or appropriate mitigation measures have been taken.

Table 3 –State Special Status Species potentially affected by the project (DOW)

Common Name	Scientific Name	Status	Impact Evaluation
Ferruginous Hawk	<i>Buteo regalis</i>	State Special Concern	C
Greater Sandhill Crane	<i>Grus canadensis tabida</i>	State Special Concern	A
Midget Faded Rattlesnake	<i>Crotalus viridis concolor</i>	State Special Concern	A
Northern Leopard Frog	<i>Rana pipiens</i>	State Special Concern	A
Peregrine Falcon	<i>Falco peregrinus</i>	State Special Concern	C
Greater Sage Grouse	<i>Centrocercus urophasianus</i>	State Special Concern	D
Columbian Sharp-Tailed Grouse	<i>Tympanuchus phasianellus columbianus</i>	State Special Concern	D

Impact Evaluation

A – Potential habitat is absent from the project area and/or it is out of the known range for the taxon and/or extirpated.

B – No wild population is known in Colorado.

C – The project is located within the range of the species, however due to conditions at the project site, the species would not occur in this location.

D - Potential habitat is present, the species is known from the area, and there are no significant impacts and/or appropriate mitigation measures have been taken.

4.0 RESULTS OF EVALUATION

4.1 TESS Plant Species

Existing sources reviewed did not identify threatened, endangered, or sensitive species (TESS) near the area. The occurrence and distribution of TESS plants are strongly influenced by geologic formations and the resulting soil types present in an area. Individual plant populations are often scattered and are usually only comprised of a small number of individual plants. This is primarily a result of specific soil and moisture requirements of each species and the high variability in the distribution and surface exposure of the layers within the formation. The site is located on a reclaimed wheat field, and is currently managed for livestock production and big game, therefore it is unlikely that TESS plants are present at the site.

4.2 Federally Threatened, Endangered, and Candidate Species

No Federally listed threatened, endangered, or candidate species were observed during the evaluation. According to NDIS data, the pad site is mapped 1,000 feet south of winter range for greater sage grouse (*Centrocercus urophasianus*; GRSG). No mapped GRSG RSO or SWH occurs within the well pad site (COGCC 2011). Additionally, COGCC shows the nearest GRSG production area mapped as SWH located about 1.9 miles to the northwest, and a lek site mapped as RSO located about 1.7 miles to the northwest (the actual lek site is located about 2.3 miles to the northwest).

4.3 State Listed Threatened, Endangered and Special Concern Wildlife Species

During the evaluation, no state listed threatened, endangered, or special concern wildlife species were observed in the project area. According to COGCC and NDIS, no mapped bald eagle (*Haliaeetus leucocephalus*) nests occur within the well pad site. NDIS data shows three bald eagle nests mapped near the pad site, with one located about 1.6 miles to the northwest, one about 1.7 miles to the northwest, and another 3.6 miles to the east. According to the COGCC, two bald eagle nests are located near the pad site, with one nest located about 1.6 miles northwest and another about 3.5 miles to the east. A mapped bald eagle winter roost site is also located approximately 0.34 miles west of the well pad site (COGCC). This species may utilize habitat within the pad area and along the access road, although the development area is not considered important habitat.

According to CDOW, the pad site is 4.5 miles southwest of a peregrine falcon (*Falco peregrinus*) eyrie, and the Yampa River located approximately 0.4 miles west of the site could provide potential hunting habitat. The larger ponds on Wolf Mountain Ranch also provide potential hunting habitat. The eyrie was documented during the summer of 2010, and is not depicted in the COGCC database. This species could potentially utilize habitat within the pad area and along the access road, although the development area is not considered important habitat.

No mapped GRSG RSO or SWH occurs within the pad site. According to the COGCC, the nearest GRSG production area mapped as SWH is located 1.9 miles to the northwest, and a historic lek site mapped as RSO is located about 1.7 miles to the northwest (the actual lek site is about 2.3 miles to the northwest).

According to NDIS data, the pad site is within overall range for the Columbian sharp-tailed grouse (*Tympanuchus phasianellus columbianus*; CSTG). The proposed well pad site and access road run through a CSTG production area. According to COGCC, CSTG RSO is located 0.1 mile east of the pad site (the actual lek is located 0.5 mile to the east). A second lek site is located approximately 3.2 miles to the north, and a third lek is located approximately 2.2 miles to the northeast over the cliffs to the east, and across the valley of Wolf Creek. The pad and access road should have little to no impact on these distant and topographically isolated sites.

4.4 Raptors

There are no active raptor nests documented in the vicinity of the Project or near the access road leading to the Site. Riparian habitat along the Yampa River east of the pad site has potential habitat to support raptors. Two golden eagle (*Aquila chrysaetos*) nests are located near the pad site, with one 3.0 miles to the south and other 4.5 miles to the northeast. A peregrine falcon eyrie is also located about 4.5 miles northeast of the pad site. Additionally, three bald eagle nest sites are mapped near the pad site, with one located about 1.6 miles to the northwest, one about 1.7 miles to the northwest, and another about 3.6 miles to the east (COGCC and NDIS). A bald eagle winter roost site is also located about 0.34 miles to the west (COGCC). This roost site is generally active during the periods in the winter when there is some open water on the Yampa River. Additionally, according to NDIS, the pad site is also located about 1.4 miles southwest of an inactive Osprey (*Pandion haliaetus*) nest. The cliffs of the Twentymile Sandstone Member of the Williams Fork Formation form prominent outcrops along the west side of Wolf Creek 0.8 mile to the east and south of the pad site, and could provide potential nesting habitat for peregrine falcons, prairie falcons, and golden eagles.

4.6 Terrestrial Species

4.6.1 American Elk and Mule Deer

Elk (*Cervus canadensis*) were observed near the pad site during the onsite visit.

Elk utilize the site for winter range and severe winter range. During the spring, elk follow the snow line to higher elevations. Elk rely primarily on available grasses for food. Areas of foothills grassland, mixed montane shrubland and scattered oakbrush provide necessary forage and production areas, as well as escape, thermal, and loafing cover for elk.

The project area is seasonally occupied by elk. The project area is within CDOW Game Management Unit (GMU) 131 and is mapped by the NDIS as an elk winter concentration area and severe elk winter range. Elk winter concentration areas are considered sensitive wildlife areas under Section 1200 of the COGCC Rules (COGCC 2009) and are defined as follows:

- "Winter Range" is defined as "that part of the overall range where 90 percent of the individuals are located during the average five winters out of ten from the first heavy snowfall to spring green-up."
- "Winter Concentration Area" is defined as "that part of the winter range where densities are at least 200% of the surrounding winter range density during the same period used to define winter range in 5 out of 10 winters."
- "Severe Winter Range" is defined as "that part of the winter range where 90% of the individuals are located when the annual snow-pack is at its maximum and/or temperatures are at a minimum in the two worst winters out of ten."

Mule deer (*Odocoileus hemionus*) are present on the project site on a year-round basis. NDIS also maps the project area as summer range, the pad site and upper portion of the access road as winter range, and the lower portion of the access road as critical winter range.

- "Critical Winter Range" for mule deer is defined as "that part of the overall range where 90% of the individuals are located when the annual snow-pack is at its maximum and/or temperatures are at a minimum in the two worst winters out of ten."

The elements necessary to provide year-round habitat for these species (forage, water, and cover) are present in or near the project area.

4.6.2 Black Bear and Mountain Lion

No black bears (*Ursus americanus*) or mountain lions (*Puma concolor*) were observed during the survey. Both species are known from Wolf Mountain Ranch and black bear are considered fairly common.

Mountain lions have large territories and are highly mobile as they search for food or new territories. Mountain lions typically follow migrating deer herds (their primary food source), preferring to hunt in rocky terrain near woodland habitats. Appropriate habitat conditions occur within or near the project area and mountain lions likely utilize the project area year-round.

Black bears are transient species in the project area due to the distribution of adequate food sources. Black bears are omnivorous and their diet depends largely on what foods are seasonally available, although their mainstay is vegetation. In spring, emerging grasses and succulent forbs are favored, whereas during summer and early fall, bears take advantage of a variety of berries and other fruits. In late fall, preferences are for berries and acorns, where available. When the opportunity is present, black bears eat a diversity of insects, including beetle larvae and social insects (ants, wasps, bees, termites, etc.), and they will prey upon a variety of mammals, including rodents, rabbits, and young or unwary ungulates. Black bear generally hibernate from mid-November through April or May depending on food availability and weather conditions.

4.6.3 Small Mammals

No small mammal species were observed during the onsite evaluation of the Project. Common small mammal species (small game, furbearers, non-game) that may be present include coyote (*Canis latrans*), red fox (*Vulpes vulpes*), bobcat (*Lynx rufus*), ground squirrel (*Spermophilus sp.*), cottontail (*Sylvilagus sp.*), and least chipmunk (*Tamias minimus*).

4.6.4 Other Bird Species

The understory grasses and sagebrush next to the pad site could provide nesting and foraging habitat for various other migratory and non-migratory bird species, depending on the season.

4.6.5 Reptiles

No reptiles were documented during the evaluation. The elevation of the project is not optimal for reptile habitat occurring within the project area.

4.7 Aquatic Species

4.7.2 Fish

No fish were observed during the Project evaluation. No water bodies are located within the vicinity of the Project.

4.7.2 Amphibians

No amphibians were observed during the onsite evaluation.

4.8 Waters of the United States

No jurisdictional Waters of the United States (WOUS) are located within the vicinity of the Project.

4.9. Noxious Weeds

Knapweed (*Centaurea sp.*) were observed at the pad site and along the access road leading the proposed well pad site. No other noxious weeds were observed in the vicinity of the Project.

5.0 AFFECTS TO TESS PLANT SPECIES

No TESS plants were observed during surveys, and there are no known populations of these plants nearby.

6.0 AFFECTS TO WILDLIFE

6.1 Wildlife Impact Assessment

The proposed project may affect winter wildlife habitat at the pad site itself. The primary potential impact to wildlife in the area will be due to increased human presence in the area during construction, maintenance, and operation of the oil drilling site.

6.1.1 Terrestrial Species

6.1.1.1 Elk and Mule Deer

Additional human presence and activities during project development may create a disturbance for elk and mule deer populations within and immediately adjacent to the project area. This disturbance may add stress to these species if operation occurs during the winter, and may cause avoidance of the area during construction.

6.1.1.2 Birds

Passerine Species: There is no expected impact to foraging and nesting habitat for passerine bird species based on COGCC mapping files.

Raptors: There are no active raptor nests documented within the vicinity of the Project, therefore there are no expected impacts to nesting raptors or raptor populations during project construction. The nearest mapped nest is a bald eagle nest located along the Yampa River approximately 1.6 miles northwest of the site. The nearest golden eagle nests are 3.0 miles to the south and 4.5 miles to the northeast. A peregrine falcon eyrie is also located about 4.5 miles to the northeast. All mapped nest sites are well beyond the recommended CDOW buffers, so there are no expected adverse impacts to these sites. The potential nesting habitat along the cliffs west of Wolf Creek are located 0.8 mile to the east and south, and have no direct line-of-sight to the pad site. Accordingly, the recommended CDOW buffer is also met.

A bald eagle winter roost is located 0.34 mile to the west of the pad site, and the project is located within a COGCC SWH for this roost (0.5 mile buffer). In order to protect the roost, no access road construction, pad construction or well drilling activity will take place between December 1 and February 28.

Grouse: The nearest mapped GRSG RSO is located 1.7 miles to the northwest, and the nearest SWH is 1.9 miles to the northwest. Mapped winter range is located 1,000 feet to the north across a drainage. . Accordingly, no impacts to the GRSG lek or the production area is expected.

The pad site and access road is not mapped as an RSO but is within a SWA for the CSTG according to COGCC. No access road, pad construction or well drilling activity will take place between March 15 and July 31. Accordingly, no adverse impacts to the mapped CSTG lek or production area are expected.

Other Birds: Based on the location of the pad site next to the road, any expected impacts will likely be minimal, and compliance with the Migratory Bird Treaty Act (MBTA) will help to offset any potential impacts.

6.1.1.3 Black Bear and Mountain Lion

Due to the large home range of both black bear and mountain lion, and because of the extensive amount of available habitat for these species, no significant affects from this project are expected.

6.1.1.4 Small Mammals

The amount of available habitat for small mammals, including bats, should not be affected by the proposed project. Project development is not expected to affect small mammal populations.

6.1.1.5 Reptiles

Project development is not expected to affect reptile populations due to the available habitat surrounding the area of the pad site.

6.1.2 Aquatic Species

6.1.2.1 Fish

No impacts from the proposed project are expected due to the lack of existing water bodies with supporting habitat within the vicinity of the Project. However; appropriate application of storm water Best Management Practices (BMPs) and Spill Prevention Counter Control (SPCC) measures would virtually eliminate any potential impacts to fish and other aquatic species.

6.1.2.2 Amphibians

The amount of available habitat for amphibians will not be affected by the proposed project. Project development is not expected to affect amphibian populations. No impacts from the proposed project are expected and appropriate application of storm water Best Management Practices (BMPs) and Spill Prevention Counter Control (SPCC) measures would virtually eliminate any potential impacts to fish and other aquatic species.

7.0 MITIGATION RECOMMENDATIONS

The following recommendations for mitigation are presented for maintenance and improvement of wildlife habitat, quality, and prevention of human-caused impacts to resources.

7.1 Maintenance and Restoration of Habitat

Reclamation plans should target restoration of sagebrush shrubland with a diverse native grass and forb understory in support of GRSG and CSTG, which, according to CDOW, are the primary wildlife habitat conservation values of this area. Recommendations include the preparation of a reclamation plan prior to construction, to salvage topsoil and prevent the spread of noxious weeds.

7.2 Planning for Sensitive Time Periods and Areas

Seasonal wildlife restrictions limit work activities. Combined wildlife restrictions allow work activities between March 1 - 14, and between August 1 and November 30.

7.2.1 Mule Deer and Elk

Disturbance associated with construction equipment and personnel may cause elk and mule deer to select habitats in more secluded areas away from the project area. Any construction and/or operational activities during the winter months may impact elk populations based on COGCC mapping and associated SWH regulatory guidance. According to the Colorado Oil and Gas Conservation Commission's amended rules, effective April 1, 2009, elk winter concentration areas and mule deer critical winter range are included in the rules as sensitive wildlife habitat (COGCC 2009). Because of a seasonal wildlife restriction to protect the bald eagle roost site to the west, there will be no construction activities between December 1 and February 28 for Pirtlaw 32-09. Impacts to elk and mule deer are therefore expected to be minimal.

Information obtained from the CDOW during the site visit indicates that the site is more heavily used in the spring beginning about March. Although mapping does not indicate this area as Elk production or an Elk resident population inhabitant, CDOW site knowledge indicates otherwise. Based on the CDOW information, development activities need to be completed by March 15th and that constant coordination with the CDOW is maintained to determine current use of the area by Elk.

7.2.2 Migratory Birds

Flagging or some other marker should be applied to support wires on the tower in order to prevent foraging birds from colliding with the wires.

In order to comply with the Migratory Bird Treaty Act (MBTA) by showing a good faith effort to reduce potential impacts on nesting birds, if any brush/tree clearing should become necessary, it should take place outside of the nesting seasons. Nesting season is generally considered between May 15 and July 31 in this area for most species. June 1 to July 15 is the peak period when most incubation and brood rearing takes place. If brush/tree clearing can occur prior to May 1, most affected birds will relocate to alternate nesting sites. After mid-to late- July, most fledging has occurred and brush/tree clearing impacts would be minimized. Because of the seasonal wildlife restriction to protect CSTG that runs from March 15 to July 31, no significant impacts are expected to nesting migratory birds.

7.2.3 Raptors and Grouse

All raptor nests documented within the vicinity of the Project are well beyond the recommended CDOW buffers, therefore no raptor nesting areas are expected to be disturbed. The Bald and Golden Eagle Protection Act (BGEPA) provides federal protection for both eagle species and project efforts will need to comply with the BGEPA. The bald eagle winter roost west of the pad site will be protected by means of a seasonal wildlife restriction running from December 1 through February 28.

The pad site is 1.7 miles southeast of a historic GRSG lek which is outside COGCC SWH or RSO. The nearest mapped CSTG lek is 0.5 miles to the east. Mitigation measures taken to date and/or recommended are: (1) compliance with the SWH and RSO zones around known lek sites, (2), compliance with seasonal restrictions on construction activity from March 15 through July 31, (3) compliance with CDOW BMPs, (4) reduction of impacts to undocumented, but potential, lek sites and production areas through avoidance of well developed stands of sagebrush and avoidance of knolls, ridge lines and benches that could harbor lek sites, and 5) location of the pad and much of the access road in altered, reclaimed wheat field.

7.2.4 Black Bears

Black bears will likely move through the general project area and could be attracted to human related food sources. In order to prevent human injury and/or the unwanted removal, injury, or destruction of bears, it is recommended that food/garbage storage and removal be done in a timely and secure manner so as to not habituate bears to human activities.

7.3 Other Mitigation Practices

7.3.1 Erosion

Efforts to control soil erosion within the project area should be implemented. Disturbed soils within the project area are susceptible to erosion and downstream water quality could be negatively affected by increased soil erosion. In addition to storm water management around the project site, other current factors (noxious weeds, livestock grazing, other oil & gas development) affecting soil erosion should be managed and remedial measures implemented.

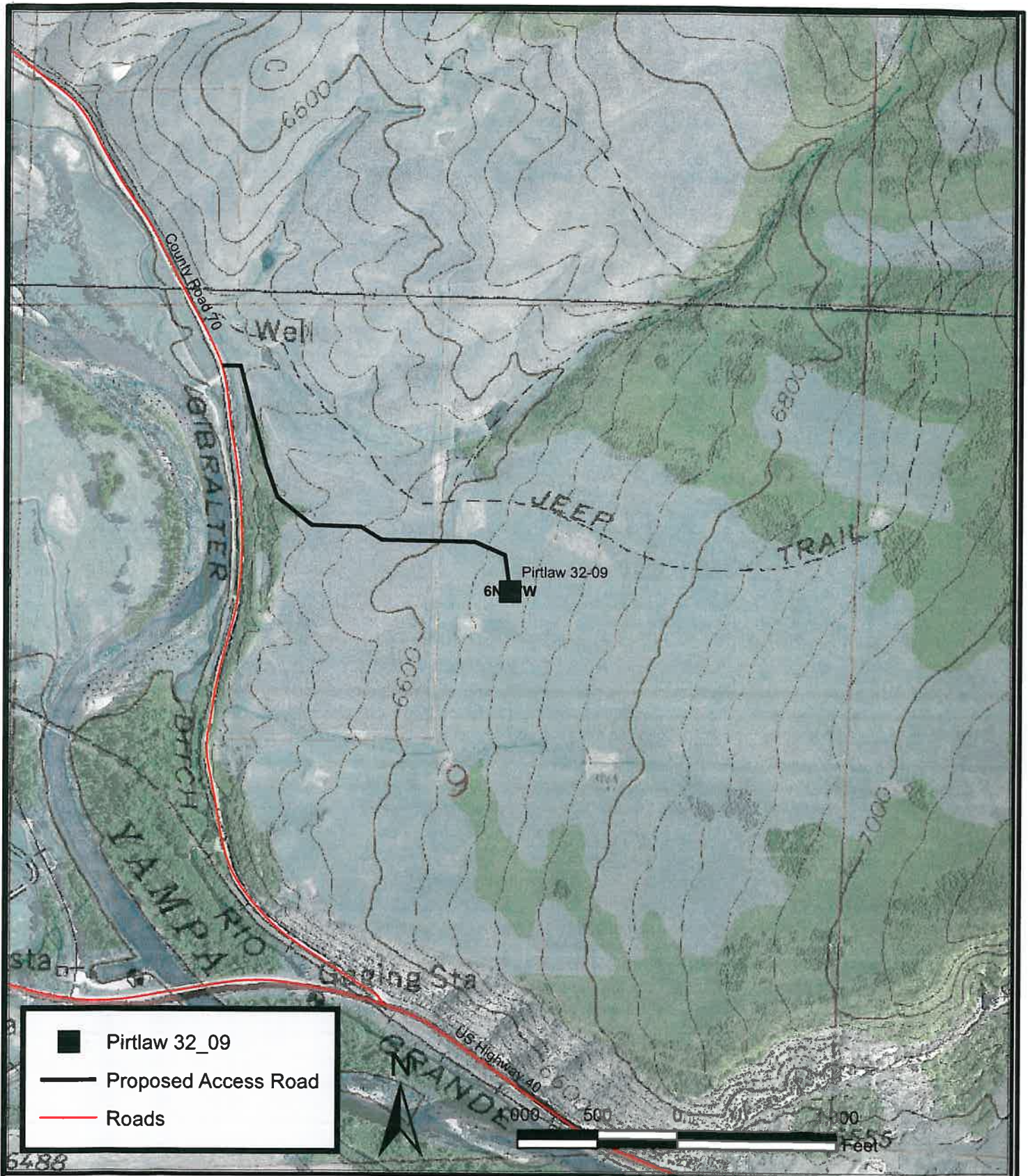
7.3.2 Weeds

Noxious weeds are present at the project site but are not dominant. Additional 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:

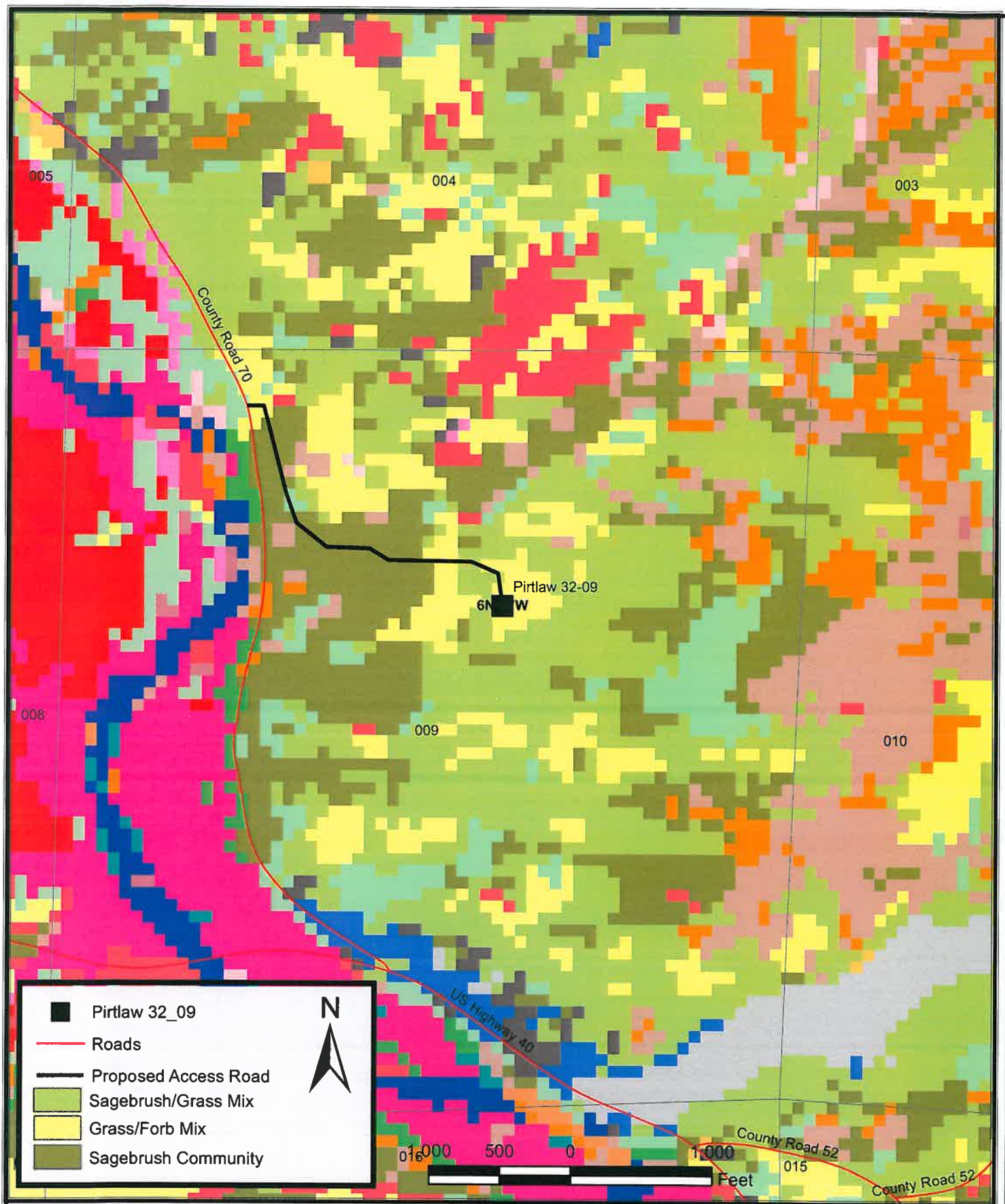
- Prior to delivery to the site, equipment should be thoroughly cleaned of soils remaining from previous construction sites which may be contaminated with noxious weeds.
- If working in sites with weed-seed contaminated soil, equipment should be cleaned of potentially seed-bearing soils and vegetative 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.

ATTACHMENT A



*Note: This figure is associated with a spreadsheet to assist with the identification of parcel stipulations and it is not a standalone figure.
Data was acquired through NAIP 2010 and USGS 2011.

PROJECT: Quicksilver Resources		LOCATION OF Pirtlaw 32-09 Township 6 North - Range 87 West Quicksilver Resources Routt County	 <small>1111 Lincoln Hill, Suite 111 P.O. Box 5452 Limon, NE 68501-0502</small> <small>TEL: 402-676-5311 FAX: 402-676-5182 www.olsonassociates.com</small>	FIGURE
DRAWN BY: HD				1
DATE: 1/9/2011				



*Note: Data was acquired through the Colorado Vegetation Classification Project (1993-1997).

PROJECT: Quicksilver Resources

DRAWN BY: HD

DATE: 1/9/2012

Vegetation Map
Township 6 North - Range 87 West
Quicksilver Resources
Routt County

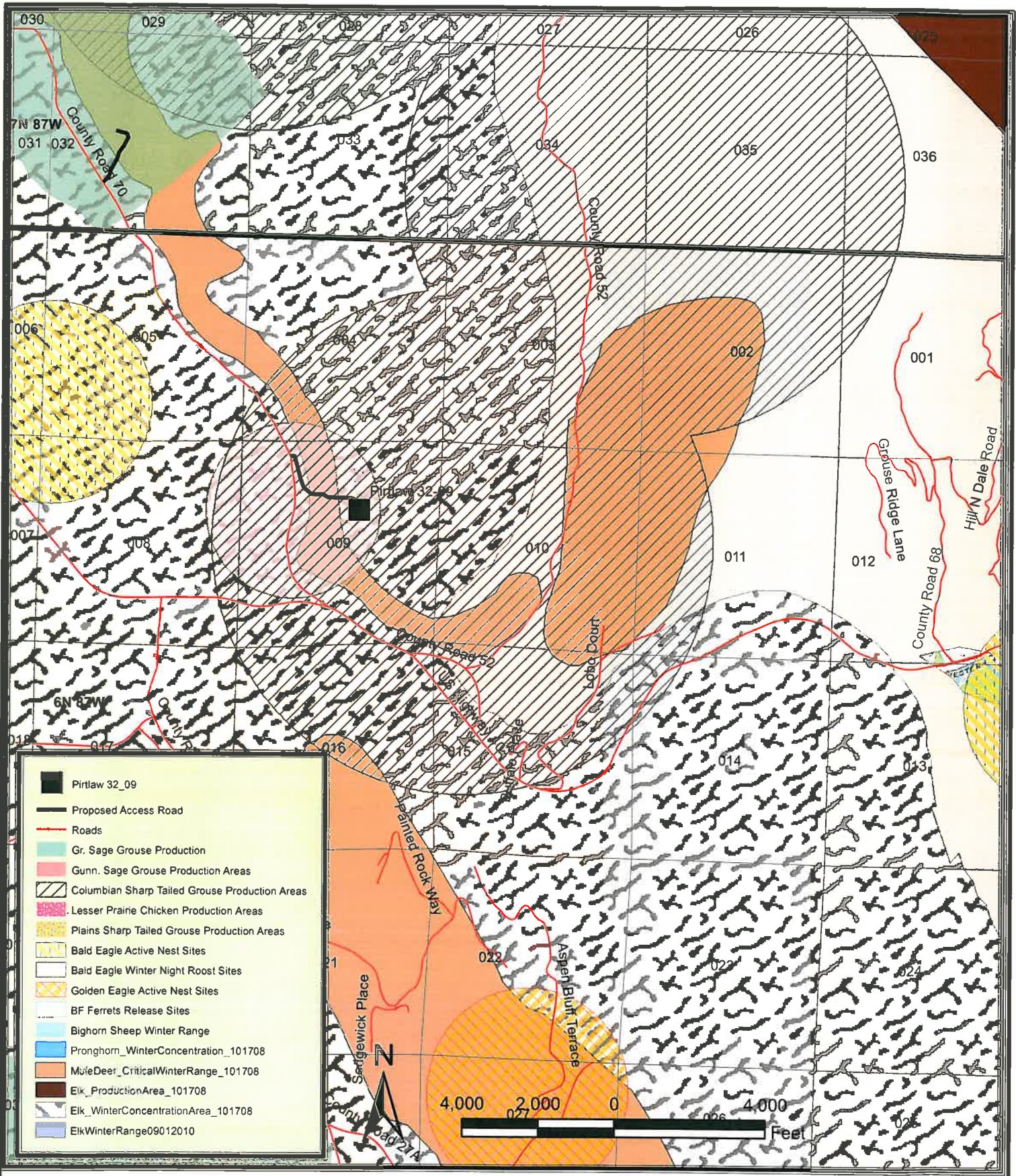
OLSSON
ASSOCIATES

1111 Lincoln Mall, Suite 111
P.O. Box 84666
Lincoln, NE 68501-4506

TEL 402 474 0311
FAX 402 474 5160
www.olssonassociates.com

FIGURE

2



*Note: This figure is associated with a spreadsheet to assist with the identification of parcel stipulations and it is not a standalone figure. Data was acquired through the COGCC (Dec. 2010) using shapefiles with designation having 101708.

PROJECT: Quicksilver Resources

DRAWN BY: HD

DATE: 1/9/2012

SENSITIVE WILDLIFE HABITAT
 Township 6 North - Range 87 West
 Quicksilver Resources
 Routt County

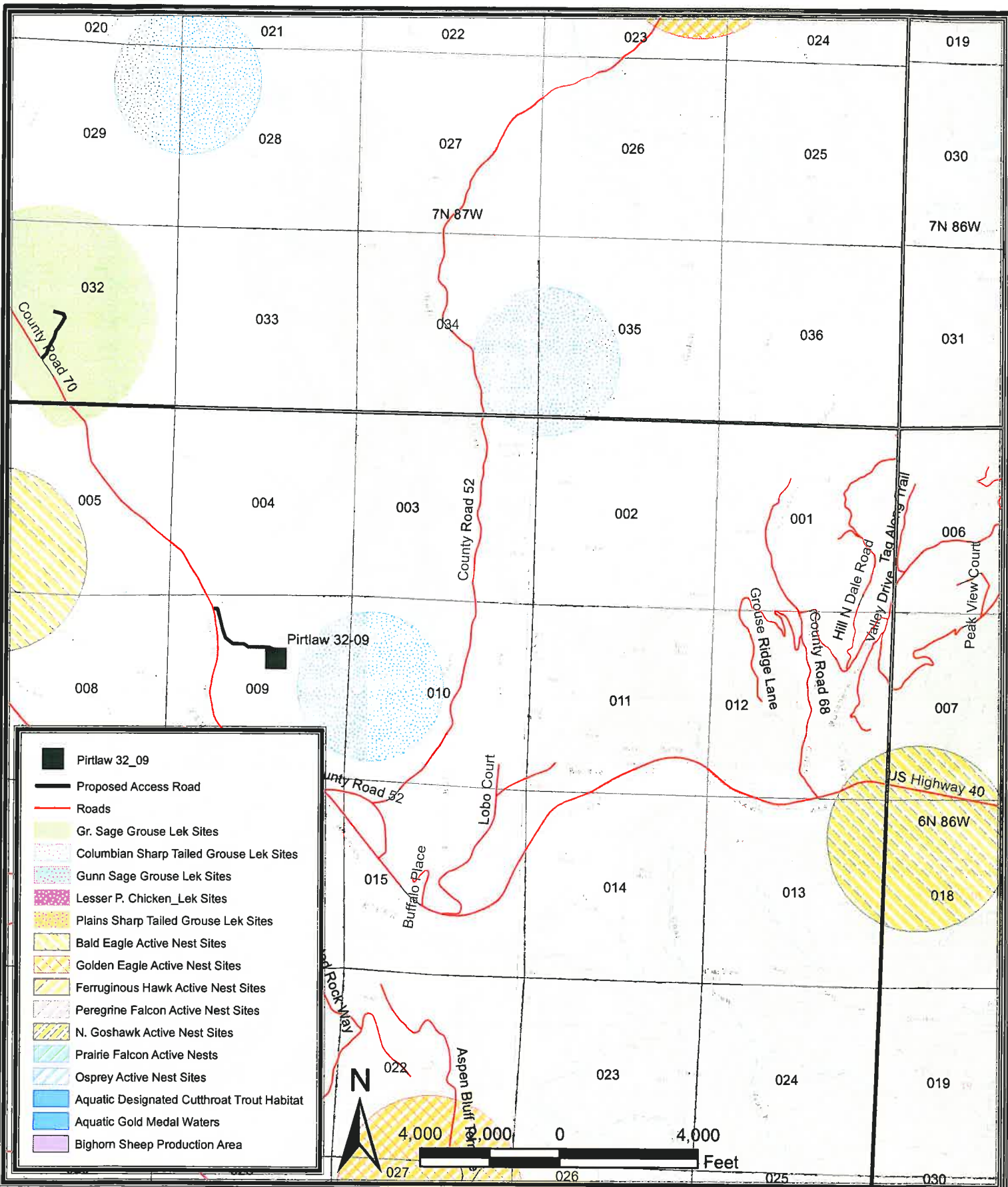
OLSSON
 ASSOCIATES

1111 Lincoln Mall, Suite 111
 P.O. Box 64098
 Lincoln, NE 68501-4008

TEL: 402.474.0311
 FAX: 402.474.5100
www.cogccconsulting.com

FIGURE

3



*Note: This figure is associated with a spreadsheet to assist with the identification of parcel stipulations and it is not a standalone figure. Data was acquired through the COGCC (Dec. 2010) using shapefiles with designation having 101708.

PROJECT: Quicksilver Resources

DRAWN BY: HD

DATE: 1/9/2012

RESTRICTED SURFACE OCCUPANCY
Township 6 North - Range 87 West
Quicksilver Resources
Routt County

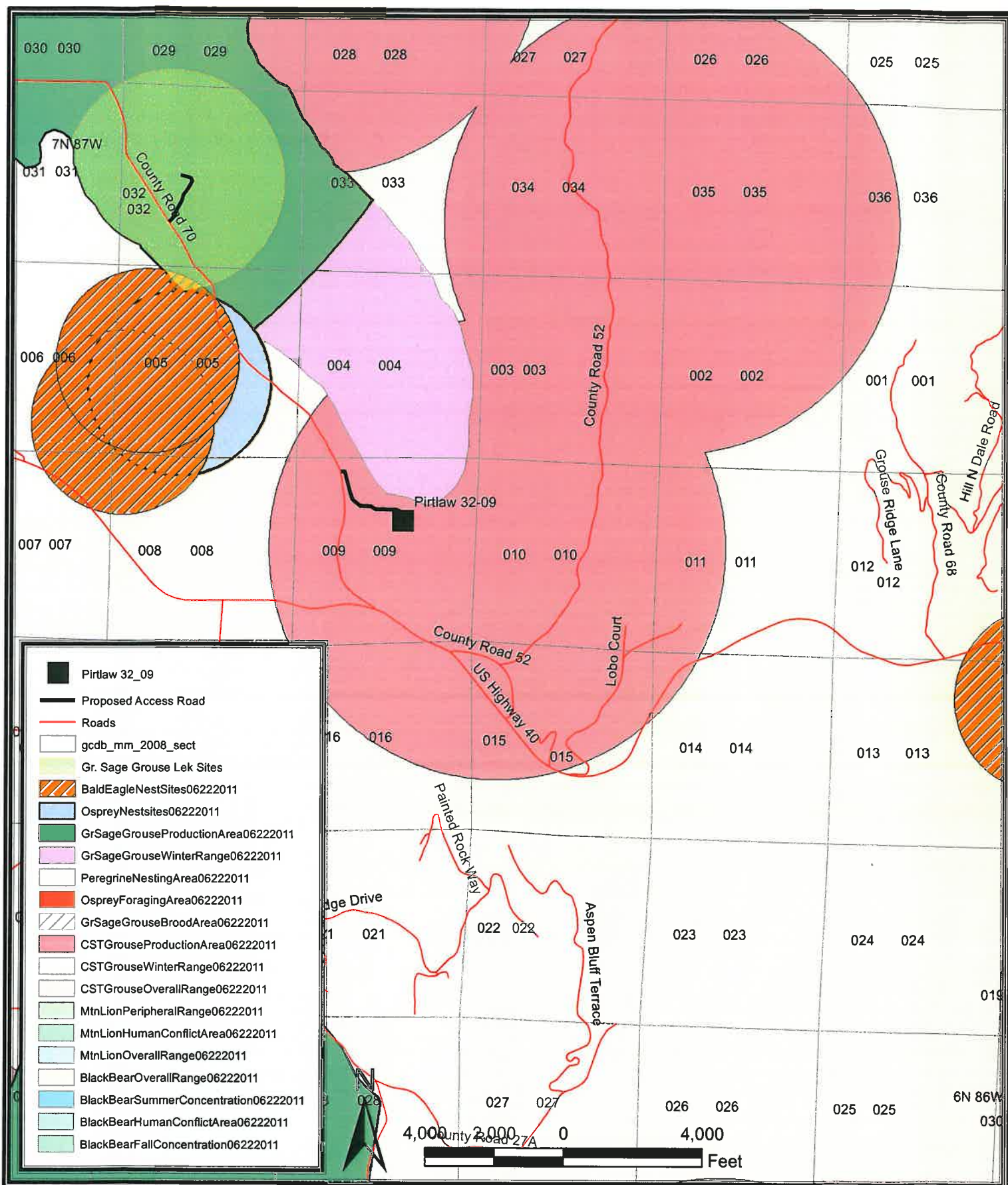
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FIGURE

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*Note: This figure is associated with a spreadsheet to assist with the identification of parcel stipulations and it is not a standalone figure. Data was acquired through the Natural Diversity Information Source (NDIS 2011).

PROJECT: Quicksilver Resources

DRAWN BY: HD

DATE: 1/9/2012

Natural Diversity Information Source
Township 6 North - Range 87 West
Quicksilver Resources
Routt County

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FIGURE

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