RM POTASH'S PROSPECTING PERMIT APPLICATIONS AND ASSOCIATED EXPLORATION PLAN PROJECT
BIOLOGICAL SURVEY RESULTS

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Acronyms and Abbreviations

	Full Phrase
BLM	Bureau of Land Management
TRFO	Tres Rios Field Office
ESA	Endangered Species Act
GPS	Global Positioning System
JBR	JBR Environmental Consultants
NEPA	National Environmental Policy Act

BIOLOGICAL SURVEY REPORT

1.0 PROJECT BACKGROUND AND PURPOSE OF THE SURVEY

1.1 Proposed Project

RM Potash, Inc. (RM Potash) has submitted Potassium (potash) Prospecting Permit Applications and an associated exploration plan to the Bureau of Land Management (BLM), Tres Ríos Field Office (TRFO) to conduct exploration operations for potash about 15 miles north of Dove Creek and US Highway 491 (aka US 666) in the vicinity of Egnar, within San Miguel and Dolores Counties, Colorado (**Figure 1**).

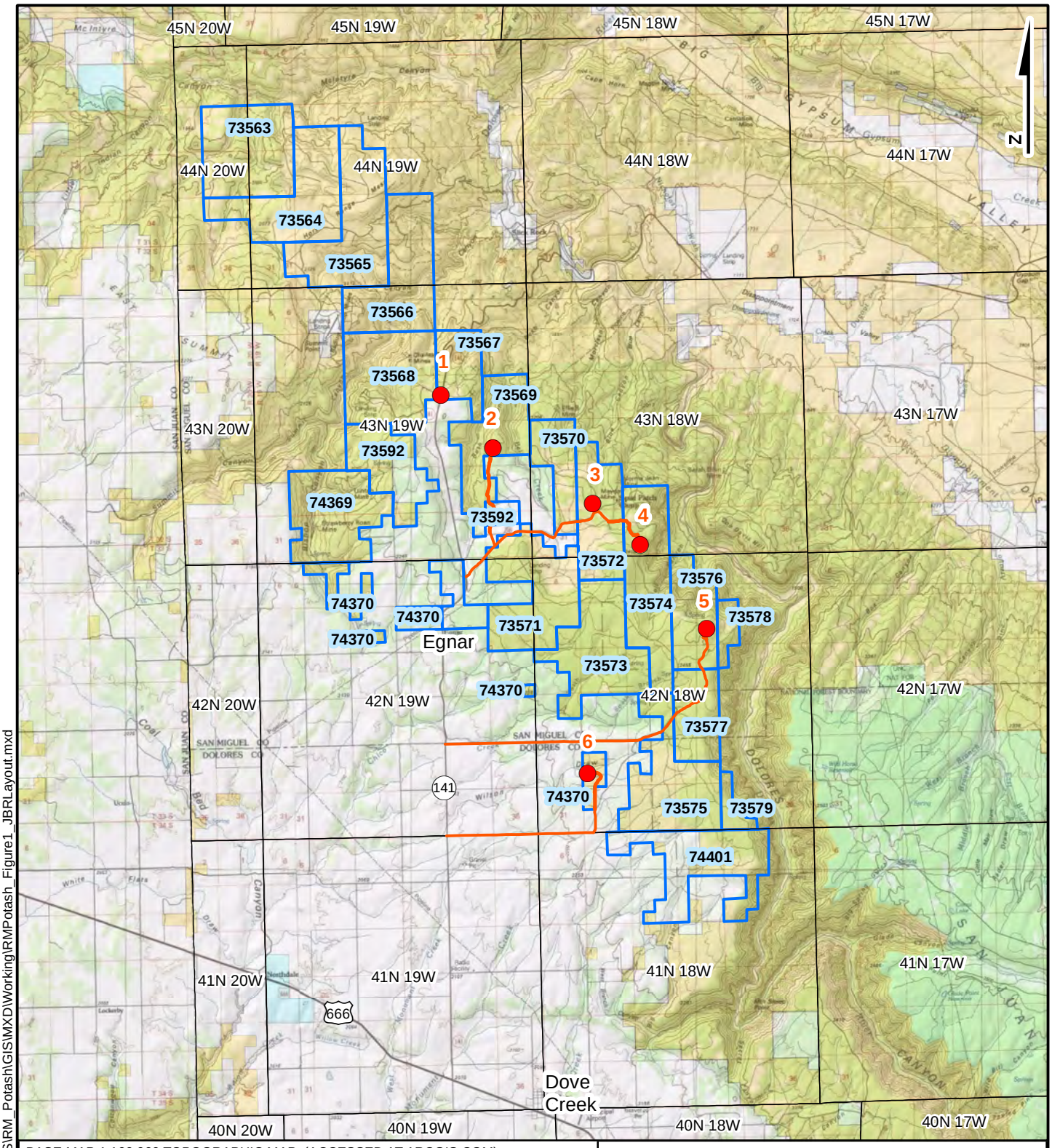
RM Potash has submitted 21 prospecting permit applications with a combined area of approximately 40,000 acres (**Figure 1**). There are six individual leases included in this exploration project: COC73567, COC73569, COC73572, COC73574, COC73576, and COC74370. The six leases total 9,954 acres. RM Potash's proposed explorations would be limited to a much smaller area identified as the "project area" within each of those lease areas (**Figure 2**). Generally, these project areas would consist of a 10-acre area around each proposed drill pad (200 x 200 feet) and a 100-foot wide corridor centered on all proposed access roads. The project area would cover about 65 acres, although actual disturbance would be much less. In addition, the project includes improving existing access roads, most of which would be within the leased lands. Separate rights-of-way would be needed for a small percentage of the proposed access roads.

The BLM is analyzing potential impacts of approving six prospect permit applications and implementing the Exploration Plan that RM Potash submitted for the proposed exploration project. RM Potash submitted the draft exploration plan in April 2009, amended in December 2009.

NEPA Log Number: DOI-BLM-CO-S010-2009-0076
BLM Project Leader: James Blair

1.2 Purpose of the Survey

Under the National Environmental Policy Act (NEPA), federal agencies must consider the environmental impacts of their proposed actions, and to consider reasonable alternatives to those actions. RM Potash's proposed project would require a BLM action [approval of initial drill sites (up to six) and the associated prospecting permit applications], so the BLM must evaluate the potential environmental impacts of RM Potash's proposal. Included in the NEPA evaluation are potential biological impacts. Therefore, in June 2011 JBR Environmental Consultants, Inc. (JBR) conducted biological resource surveys within the Project Area. The methodologies and results of these surveys are described below.



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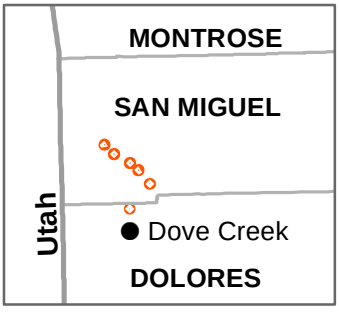

- Prospect Drill Holes
- Access Routes
- Prospect Permit Application Boundary and Serial Numbers
- Bureau of Land Management
- US Forest Service
- Private
- State

2.5 1.25 0 2.5 Miles

RM POTASH
POTASH EXPLORATION PROJECT

FIGURE 1
General Project Location and Prospecting Permit Application Boundaries

JBR

DRAWN BY	DATE DRAWN
STopham	11-22-11

SCALE: 1 in = 3 miles

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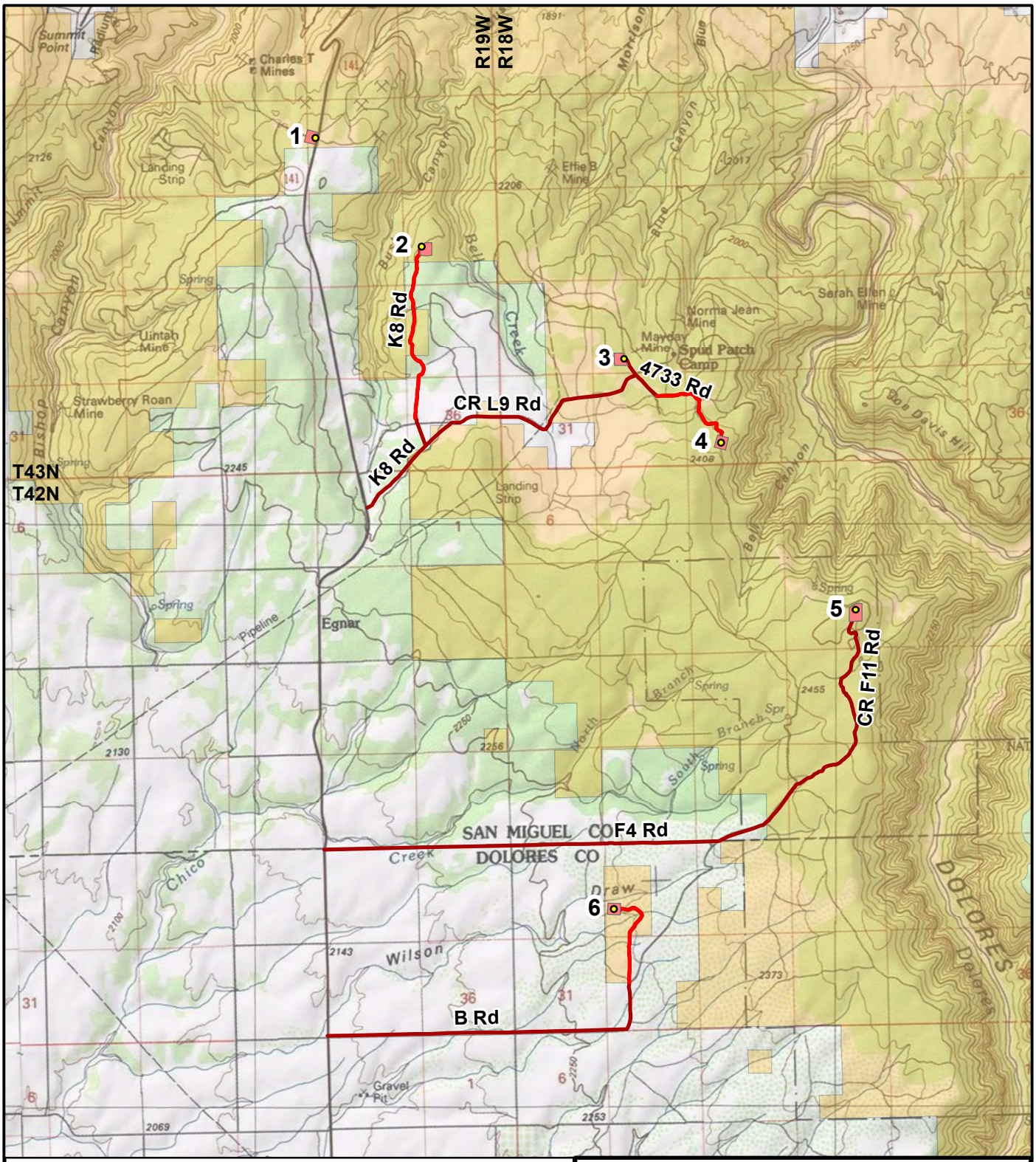

Base Map: Copyright:© 2011 National Geographic Society, i-cubed
(http://goto.arcgisonline.com/maps/USA_Topo_Maps)
Nucla, CO., 1983 and Delta, CO., 1980, 1:100,000 Topographic Maps.
Coordinate System: NAD83 UTM Zone 12

Legend

- Proposed Drill Holes
- 10 Acre Study Areas
- Access Roads
- Access Roads Requiring Improvement

Land Ownership

- BLM
- Private

N

0 2 Miles

RM POTASH
POTASH EXPLORATION PROJECT

FIGURE 2
Project Areas and Land Status

JBR

DRAWN BY	DATE DRAWN
CP	12/03/2011

SCALE 1:96,000

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2.0 General Description and Vegetation

The Project Area is located between 7,200 and 8,200 feet elevation. Soils in the Project Area are mostly of the order Mollisols and are dominantly loam (e.g., Monticello-Witt loams, Gurley-Skein loams, Nortez-Fivepine loams, and Granath loam). Other soils in the area include rock outcrops (e.g., Rock outcrop-Orthents complex and Gladel-Bond-Rock outcrop complex) and the Nortez-Granath and Ormiston-Fivepine complexes (NRCS 2009).

The Project Area lies in the Colorado Plateaus Ecoregion (CEC 2010, http://www.epa.gov/wed/pages/ecoregions/na_eco.htm#CEC 1997).

> The ecoregion has a dry, mid-latitude steppe climate. It is marked by hot summers with low humidity, and cool to cold dry winters. Low elevation basins and canyons sparsely vegetated with blackbrush, shadscale, fourwing saltbush, and galleta grass. Uplands and higher valleys have Wyoming big sagebrush, black sagebrush, pinyon-juniper woodlands and at higher elevations some areas of Gambel oak, mountain mahogany, aspen, and some Douglas-fir. Many ephemeral and intermittent streams. Perennial streams originate in adjacent mountainous ecoregions. Rugged tableland topography with precipitous side-walls mark abrupt changes in local relief, often from 300 to 600 meters. The region has large low lying areas in river canyons. The uplifted, eroded, and deeply dissected tableland of sedimentary rock contains benches, mesas, buttes, cliffs, canyons, and salt valleys.

Based on Provisional Southwest Regional GAP data (USGS 2004), the majority of the Project Area occurs within the following three landcover categories.

Inter-Mountain Basins Big Sagebrush Shrubland. This category is described as (USGS 2005, http://earth.gis.usu.edu/swgap/legenddataquery.php SCODE = S054):

> This ecological system occurs throughout much of the western US, typically in broad basins between mountain ranges, plains and foothills between 1,500-2,300 meters elevation. Soils are typically deep, well-drained and non-saline. These shrublands are dominated by *Artemisia tridentata tridentata* and/or *Artemisia tridentata wyomingensis*. Scattered *Juniperus* spp., *Sarcobatus vermiculatus*, and *Atriplex* spp. may be present in some stands. Perennial herbaceous components typically contribute less than 25% vegetative cover. Common graminoid species include *Achnatherum hymenoides*, *Bouteloua gracili*s, *Elymus lanceolatus*, *Festuca idahoensis*, *Hesperostipa comata*, *Leymus cinereus*, *Pleuraphis jamesii*, *Pascopyrum smithii*, *Poa secunda*, or *Pseudoroegneria spicata*.

Colorado Plateau Pinyon-Juniper Woodland. This category is described as (USGS 2005, http://earth.gis.usu.edu/swgap/legenddataquery.php SCODE = S039):

> This ecological system occurs in dry mountains and foothills of the Colorado Plateau region including the Western Slope of Colorado to the Wasatch Range, south to the Mogollon Rim and east into the northwestern corner of New Mexico. It is typically found at lower elevations ranging from 1,500-2,440 meters. These woodlands occur on warm, dry sites on mountain slopes, mesas, plateaus, and ridges. *Pinus edulis* and/or *Juniperus osteosperma* dominate the tree canopy. Understory layers are variable and may be dominated by shrubs, graminoids, or be absent. Associated species include *Arctostaphylos patula*, *Artemisia tridentata*, *Cercocarpus intricatus*, *Cercocarpus montanus*, *Coleogyne ramosissima*, *Purshia stansburiana*, *Purshia tridentata*, *Quercus gambelii*, *Bouteloua gracilis*, *Pleuraphis jamesii*, or *Poa fendleriana*.

Rocky Mountain Gambel Oak-Mixed Montane Shrubland. This category is described as (USGS 2005, http://earth.gis.usu.edu/swgap/legenddataquery.php SCODE = S046):

> This ecological system occurs in the mountains, plateaus and foothills in the southern Rocky Mountains and Colorado. These shrublands are most commonly found along dry foothills, lower mountain slopes, and at the edge of the western Great Plains from approximately 2,000 to 2,900 m in elevation, and are often situated above pinyon-juniper woodlands. The vegetation is typically dominated by *Quercus gambelii* alone or codominant with *Amelanchier alnifolia, Amelanchier utahensis, Artemisia tridentata, Cercocarpus montanus, Prunus virginiana, Purshia stansburiana, Purshia tridentata, Robinia neomexicana, Symphoricarpos oreophilus, or Symphoricarpos rotundifolius*.

On June 2, 2008, JBR biologist Seth Topham visited the Project Area in order to describe and map the existing vegetative communities. Prior to the survey, all proposed drill hole locations and potential access routes were uploaded to a Trimble global positioning system (GPS). While vegetation composition varied slightly among the 6 drill holes, the greater Project Area is located at approximately 7,500 feet elevation and is dominated by pinion-juniper forest and typical associated vegetation: big sagebrush (*Artemisia tridentata*), Gambel oak (*Quercus Gambelii*), and alder-leaf mountain mahogany (*Cercocarpus montanus*). Drill hole 5 is slightly higher in elevation (8,180 feet) and vegetation is dominated by ponderosa pine (*Pinus ponderosa*) and Gambel oak. Drill hole 6, the most southern drill hole, is dominated by alder-leaf mountain mahogany and big sagebrush vegetation. The remaining drill holes are all dominated by pinyon-juniper. **Appendix A** contains photographs of each of the six drill holes showing the general vegetation and habitat

types at each location. A complete list of plant species observed is provided in **Appendix B**.

3.0 Biological Surveys, Methods, and Results

As mentioned above, on June 02, 2011, a JBR biologist visited the site and in addition to recording information on general vegetation, the biologist also conducted sensitive plant, general biology, and raptor surveys at each of the proposed drill holes and any potential access roads that might need to be improved. Each drill hole location was mapped using GIS and uploaded to a Trimble GPS for navigating in the field. Each drill hole was also buffered by 0.5 mile to delineate the raptor survey area and by 100 feet to delineate the sensitive plant survey area.

Standard data sheets were completed each day documenting the date and time of the survey, the name of the surveyor, and ground and weather conditions. Photos were taken throughout the Project Area. All mapping/GPS work was completed using a Trimble GPS. Data collected was differentially corrected and converted to ESRI-compatible shapefiles (UTM NAD 83).

3.1 General Biology

All plants and animals (or their sign) observed were recorded. A complete list of bird and plant species observed is provided as **Appendix B**. No mammals were observed during the survey; however, the following mammal sign was recorded: elk (*Cervus canadensis*), mule deer (*Odocoileus hemoinus*), cougar (*Puma concolor*), cottontail rabbit (*Sylvilagus audubonii*), jack rabbit (*Lepus californicus*), and coyote (*Canis latrans*).

Based on GIS data provided by the Colorado Division of Wildlife, Natural Diversity Information Source (http://ndis.nrel.colostate.edu/ftp/ftp_response.asp), the Project Area is located near (1 - 4 miles) bighorn sheep (*Ovis canadensis*) winter range. Regarding elk (*Cervus canadensis*), the middle and southern portions of the Project Area provide winter, summer, and production habitat and the entire Project Area is identified as winter range for mule deer (*Odocoileus hemionus*).

3.2 Raptors

In addition to the general biological survey within the Project Area, JBR biologists surveyed all areas within 0.5 mile for raptor nests. Raptor nest surveys were conducted by scanning cliff faces, trees, rock outcrops, etc. with binoculars and spotting scopes from vantage points providing coverage of the area. Also, when a raptor was observed, it was monitored until the biologist was able to determine that it wasn't nesting in the buffer area. No raptor nests were identified. However, given the number of trees available within the 0.5-mile buffer area, a nest could have been missed during the one-day survey; additional surveys may be required immediately prior to drilling.

3.3 Special Status Species

Special status species are discussed further in the Biological Assessment and Evaluation for this project (JBR 2011).

Within the sensitive plant survey area, the biologist walked generally parallel and somewhat meandering transects across the area ensuring 100% visual observation of the surface. Prior to conducting sensitive plant surveys, information regarding the sensitive plants that could potentially occur within the Project Area was reviewed after being provided by Cara MacMillian (BLM botanist, via email on 3/31/2011 – **Appendix C**). There were no Threatened, Endangered, or Candidate species, but a total of seven BLM Sensitive species, initially identified as having the potential to occur within the Project Area based upon habitat types. The JBR biologist familiarized himself with the special status (Endangered, Threatened, Candidate, and BLM Sensitive Species) plant species potentially occurring in the area by understanding what they look like and their habitat requirements. During the survey, the biologist carried pictures and descriptions of each of these species. No special status plant species were observed, and based on actual, on-the-ground surveys, it does not appear that the Project Area provides habitat for any sensitive plants.

Other than raptors, JBR did not conduct any species-specific surveys for special status wildlife species. Suitable habitat does exist for the Gunnison sage-grouse (*Centrocercus minimus*, Candidate), especially at site 6, which occurs within a sage-grouse production area. The BLM and Colorado Division of Wildlife conducted surveys in 2011, but the results of the survey were unavailable at the time of this report. In addition to sage-grouse, the Project Area also provides habitat for several Sensitive raptors and bats and for the longnose leopard lizard (*Gambelia wislizenii*). The Project Area does not provide habitat for any Threatened or Endangered wildlife species and no Special Status Species or their sign were observed during surveys.

3.4 Noxious, Non-Native, and Invasive Species

In conjunction with the general biology survey, JBR listed all noxious, non-native, and invasive species discovered (see **Appendix B**). However, during the surveys, no noxious, non-native and invasive species were observed, besides cheatgrass.

4.0 REFERENCES

Commission for Environmental Cooperation (CEC). 2010. Level III North American terrestrial ecoregions: United States descriptions. Montreal, Canada.

JBR Environmental Consultants, Inc. (JBR). 2011. RM Potash's potassium Prospecting Permit Applications and Associated Exploration Plan - Biological Assessment/Biological Evaluation. Sandy, Utah.

Natural Resource Conservation Service (NRCS). 2009. Soil Survey Geographic (SSURGO) Database. GIS data retrieved from ArcGIS Online <services.arcgisonline.com>.

US Geological Survey (USGS). 2004. National Gap Analysis Program. Provisional Digital Land Cover Map for the Southwestern United States. Version 1.0. RS/GIS Laboratory, College of Natural Resources, Utah State University.

US Geological Survey (USGS). 2005. National Gap Analysis Program. Southwest Regional GAP Analysis Project—Land Cover Descriptions. RS/GIS Laboratory, College of Natural Resources, Utah State University.

Appendix A

Photos of Drill Sites

Drill Location 1 – Stake with Pink Flagging Marks Drill Site

Drill Location 2 – Stake with Pink Flagging Marks Drill Site

Drill Location 3 – Stake with Pink Flagging Marks Drill Site

Drill Location 4 – Stake with Pink Flagging Marks Drill Site

Drill Location 5 – Stake with Pink Flagging Marks Drill Site

Drill Location 6 – Stake with Pink Flagging Marks Drill Site

Appendix B
Plant and Bird Species Lists

Common Name	Genus	Species
Indian rice grass	*Achnatherum*	*hymenoides*
crested wheatgrass	*Agropyron*	*cristatum*
yellow stonecrop	*Amerosedum*	*lanceolatum*
pussy toes	*Antennaria*	*dimorpha*
big sage	*Artemisia*	*tridentata*
stinking milkvetch	*Astragalus*	*praelongus*
arrowleaf balsamroot	*Balsamorhiza*	*sagittata*
cheat grass	*Bromus*	*tectorum*
desert paintbrush	*Castilleja*	*angustifoloa*
alderleaf mountain-mahogany	*Cercocarpus*	*montanus*
yellow rabbitbrush	*Chrysothamnus*	*viscidiflorus*
wingnut cryptantha	*Cryptantha*	*pterocarya*
yellow cryptantha	Cryptantha	*confertiflora*
larkspur	*Delphinium*	*sp.*
squirrel tail	*Elymus*	*elymoides*
rabbit brush	*Ericameria*	*nauseosa*
whiplash daisy	*Erigeron*	*flagellaris*
crispleaf buckwheat	*Eriogonum*	*corymbosum*
sulphur flower	*Eriogonum*	*umbellatum*
scarlet gilia	*Gilia*	*aggregata*
broom snakeweed	*Gutierrezia*	*sarothrae*
Utah juniper	*Juniperus*	*osteosperma*
nineleaf biscuitroot	*Lomatium*	*triternatum*
lupine	*Lupinus*	*sp.*
Oregon grape	*Mahonia*	*repens*
black medick	*Medicago*	*lupulina*
Mojave prickly-pear	*Opuntia*	*erinacea*
potato cactus	*Opuntia*	*fragilis*
mountain ball cactus	*Pediocactus*	*sampsonii*
mat penstemon	*Penstemon*	*caespitosus*
squaw apple	*Peraphyllum*	*ramosissimum*
desert phlox	*Phlox*	*austromontana*
Bell's twinpod plant	Physaria	*bellii*
spiny sagebrush	*Picrothamnus*	*desertorum*
pinyon pine	*Pinus*	*edulis*
Ponderosa pine	*Pinus*	*ponderosa*
curly grass	*Pleuraphis*	*jamesii*
bitter brush	*Purshia*	*tridentata*

Gambel oak	*Quercus*	*gambelii*
globemallow	*Sphaeralcea*	*ambigua*
dandelion	*Taraxacum*	*sp.*
banana yucca	*Yucca*	*baccata*

Common Name	**Scientific Name**
Black-Chinned Hummingbird	*Archilochus alexandri*
Black-Throated Gray Warbler	*Dendroica nigrescens*
Blue-Gray Gnatcatcher	*Polioptila caerulea*
Chipping Sparrow	*Spizella passerina*
Common Raven	*Corvus corax*
Mourning Dove	*Zenaida macroura*
Northern Flicker	*Colaptes auratus*
Spotted Towhee	*Pipilo maculatus*
Turkey Vulture	*Cathartes aura*
Western Bluebird	*Sialia mexicana*
Western Scrub-Jay	*Aphelocoma californica*
Yellow-Rumped Warbler	*Dendroica coronata*
Red-tailed Hawk	*Buteo jamaicensis*

Appendix C

Sensitive Plant Species Correspondence

RARE PLANT SURVEY NEEDS

Project Name: RM Potash Exploration

Table 1. Survey results.

	A field survey was completed on **<date>** by **<name of specialist>**.
	No field survey is required because there is no habitat at the site of the proposed project.
x	A field survey is needed for the following species:

A review of records & biological files was conducted on **March 31, 2011.**

Table 2. Federally listed species for the San Juan BLM Resource Area based on February 28, 2006 list from the FWS.

Species	**Status**	**Habitat Present?**	**Species Affected?**
Sclerocactus mesae-verdae	Threatened	Shale or adobe clay badlands of the Mancos and Fruitland formations, 4,000 to 5,000 feet	N
Astragalus humillimus	Endangered	Exfoliating Point Lookout Sandstone formation of the Mesa Verde Group, 5,000 to 6,500 feet	N
Astragalus tortipes	Candidate	Gravels derived from a volcanic intrusion into Mancos Shale, 5,700 feet	N
Pediocactus knowltonii (BLM lands only)	Endangered	Alluvial deposits forming rolling gravelly hills in pinyon - juniper and sagebrush types, 6400 feet	N
Ipomopsis polyantha var. polyantha (Pagosa gilia)	Candidate	Mancos shale; barren shrublands; around 7,000'.	N

Table 3.Colorado Bureau of Land Management sensitive fish, plant, and wildlife species based on Information Bulletin No. CO-2010-007 (December 2009) for the San Juan Public Lands. See Appendix 1 for flowering and fruiting times. K-Known to occur in the SJPA, L-Likely to occur in the SJPA, P-Possible to occur in the SJPA.

Species	K/L/P	Habitat	Survey Required	Species Impacted?
Amsonia jonesii (Jones' bluestar)	K	Runoff-fed draws on sandstone in pinyon-juniper, and desert shrub communities, 3900'-7000'.	Y	No known occurrences in the project area.
Astragalus naturitensis (Naturita milkvetch)	K	Sandstone mesas, ledges, crevices and slopes, 5,000' to 7,000'.	Y	No known occurrences in the project area, but two populations adjacent and to the east: located on the rims of Summit Canyon and McIntyre Canyon.
Astragalus ripleyi (Ripley milkvetch)	P(FS)	Volcanic substrates in mixed-canopy ponderosa pine-Arizona fescue savannah, or along the edges of mixed coniferous woodlands where Arizona fescue is dominant, 8200'-9300'. (known on Rio Grande NF)	N	
Astragalus sesquiflorus (sandstone milkvetch)	L	Sandstone rock ledges, fissures of slickrock, talus under cliffs, and sometimes in sandy washes, 5000' - 5500 '.	Y	No known occurrences in the project area.
Cryptantha gypsophila (Gypsum Valley cateye)	K	Scattered gypsum outcrops of the Paradox Member of the Hermosa Formation in Western Colorado.	N	
Cryptogramma stelleri (fragile rockbrake)	K(FS), P(BLM)	Sheltered calcareous cliff crevices and rock ledges, typically in coniferous forest or other boreal habitats.	N	
Erigeron kachinensis (kachina fleabane)	K	Saline soils in alcove and seeps in canyon walls, 4,800' - 5,600'.	Y	No known occurrences in the project area.
Eriogonum clavellatum (Comb Wash buckwheat)	P	Shale soils in shadscale communities, 4,300' -to 5,500'. (known in 4 corners area and adjacent Utah)	N	
Guiterrezia elegans (Lone Mesa snakeweed)	K	Grayish, argillaceous shale outcrops. Tends to be dominant plant in openings between low shrubs of *Artemisia, Chrysopsis,* and *Tetraneuris.*	N	
Lesquerella pruinosa (Pagosa bladderpod)	K	Mancos shale; ponderosa pine, Gambel oak; 6,800'- 8,000'.	N	
Lygodesmia doloresensis (Dolores River skeletonplant)	P	Reddish, purple, sandy alluvium and colluvium of the Cutler Formation between the canyon walls and the Dolores river in juniper, shadscale, and sagebrush communities; 4,000'-5,500'.	N	
Mimulus eastwoodiae (Eastwood's monkeyflower)	K	Shallow caves and seeps on canyon walls, 4,700'- 5,800'.	Y	No known occurrences in the project area.
Pediomelum aromaticum (aromatic Indian breadroot)	K	Open pinyon-juniper woodlands, in sandy soils or adobe hills, 4800'-5700'.	Y	No known occurrences in the project area.
Physaria pulvinata (cushion bladderpod)	K	Grayish, argillaceous shale outcrops. Often dominant plant in openings between low shrubs of *Artemisia, Chrysopsis,* and *Tetraneuris.*	N	No known occurrences in the project area.

Table 4. Flowering and fruiting times of BLM sensitive plant species.

Species	*Flowering/fruiting Time*
Amsonia jonesii	*April/May*
Astragalus naturitensis	*April-early June/late May-June*
Astragalus ripleyi	*Late June-July/July-early August*
Astragalus sesquiflorus	*Flowers May-August*
Cryptantha gypsophila	*Flowers in May and June.*
Cryptogramma stelleri	*Dies back by late summer*
Erigeron kachinensis	*Flowers May-July*
Eriogonum clavellatum	
Guitierrezia elegans	*July-August*
Ipomopsis polyantha var. polyantha	*Late May-early August*
Lesquerella pruinosa	*May-August/June-August*
Lygodesmia doloresensis	*Late May-June*
Mimulus eastwoodiae	*Flowers late July-early September*
Pediomelum aromaticum	*May-June/June*
Physaria pulvinata	*Flowers May-June*

SPECIALIST: Cara MacMillan
Date: 3/31/11