Rare Lichen Survey
of BLM Lands in the Kremmling Area
August 31, 2014

Circinaria rogeri

Xanthoparmelia idahoensis

Prepared for:

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1.0 Introduction

The Kremmling area is home to two of Colorado's rarest lichens: *Circinaria rogeri* and *Xanthoparmelia idahoensis.* Both species were first discovered in Colorado by Roger Rosentretter in 1995. No new occurrences were discovered until 2013 when new sites were found by Brian Elliott and Mike Kirkpatrick of Elliott Environmental Consulting during a vascular plant survey of Western Area Power Administration facilities near Kremmling. These new discoveries rekindled interest in the distribution and abundance of these two rare lichens as well as interest in the conservation of vagrant lichens.

In 2014 Elliott Environmental Consulting entered into a service agreement with the Bureau of Land Management (BLM) Colorado State Office to perform surveys for *Circinaria rogeri* and *Xanthoparmelia idahoensis* on BLM-managed lands near Kremmling. As a result of these surveys thirteen new *Circinaria rogeri* sites and fourteen new *Xanthoparmelia idahoensis* sites were located and documented.

2.0 Target Species

Target species of the survey were the two vagrant lichens *Circinaria rogeri* and *Xanthoparmelia idahoensis.* These species are described below in sections 2.1 and 2.2.

2.1 *Circinaria rogeri*

Circinaria rogeri is a vagrant lichen originally placed within *Aspicilia fruticulosa*. In a taxonomic revision of the group (Sohrabi et al. 2011) the North American members of the group were recognized as distinct from their Old World counterparts. *Aspicilia fruticulosa* was transferred to the genus *Circinaria* and given the epithet *rogeri* in honor of Roger Rosentreter, recognizing his work with soil crust lichens and valuable lichen collections.

Life History:
Circinaria rogeri is a vagrant lichen with a subfruticose, dichotomously to irregularly branched body, forming shrubby, more or less spherical to elongated lumps. Branches are compact, cylindrical, and short to relatively elongated. The surface color ranges from yellowish green to olive or dark green. The pycnidia are usually on top of branchelets, but are rarely located on other parts of the thallus.

Circinaria rogeri is a rare species, usually found at elevations ranging from 3,300–7,900 feet. It is an obligatory vagrant species usually found on calcareous soils in shrub steppe. The species grows in open habitats that are ephemerally moist in winter or spring but dry most of the year. It inhabits black sagebrush, (*Artemisia nova*) or other *Artemisia* habitats. Associated plant species include *Artemisia arbuscula, A. frigida, A. longiloba, A. tridentata* subsp. *wyomingensis, Achnatherum hymenoides, Atriplex confertifolia, A. nuttallii, Elymus* spp., *Eriogonum caespitosa, Haplopappus acaulis, Phlox hoodii, Petrophytum caespitosum, Poa secunda, Pseudoroegneria spicata, Stipa* spp. and *Tanacetum nuttallii*. *Circinaria hispida* and *Circinaria elmorei* are often found with *Circinaria rogeri*.

Distribution and Abundance:
Circinaria rogeri is known from southeast Utah, central and western Colorado, western Wyoming, southern Idaho and eastern Oregon. Sites are generally small and disjunct, although the lichen may be locally common.

Prior to the recent Colorado discoveries *Circinaria rogeri* was known from less than 20 sites in North America. The species is currently known from southeast Utah, central and western Colorado, western Wyoming, southern Idaho and eastern Oregon. Prior to 2013 the species was known from a single site in Colorado located approximately six miles northwest of Kremmling. Five additional sites were found by Brian Elliott and Mike Kirkpatrick in 2013. Fourteen additional sites were discovered by Brian Elliott and Scott Smith in 2014, giving a total of 20 sites now known from Colorado. *Circinaria rogeri* is tracked by the Colorado Natural Heritage Program (under the misapplied name *Aspicilia fruticulosa*) and given a conservation rank of G3S1.

Threats:
According to Rosentreter (1997) the primary threats facing vagrant lichens, including *Circinaria rogeri,* include wide scale land disturbance, livestock overgrazing, altered fire frequencies, and habitat fragmentation. Given the location of many *Circinaria rogeri* sites in the vicinity of Wolford Mountain Reservoir, water developments may also pose a threat. Finally, a lack of awareness about vagrant lichens results in these lichens not being considered in land management decisions.

Figure 1: *Circinaria rogeri*

Figure 2: Typical *Circinaria rogeri* habitat

2.2 *Xanthoparmelia idahoensis*

Xanthoparmelia is the largest genus of vagrant lichens (Rosentreter 1993), and *Xanthoparmelia idahoensis* is a globally rare member of the genus.

Life History:
Xanthoparmelia idahoensis is a vagrant lichen with the thallus usually wholly free, but rarely fused with substrate. The thallus is canaliculate below with the lobes convoluted and twisted. The upper surface is maculate with lower surface pale yellowish-green, browning only at tips.

Xanthoparmelia idahoensis is a globally rare species. In Idaho it ranges from 3,900–4,500 feet while in Colorado it is known from 7,060–8,050 feet. It is an obligatory vagrant species usually found on calcareous soils in cold badlands with low vegetative cover. It inhabits low sage habitats with *Artemisia nova* or *Artemisia arbuscula.* Associated plant species include *Artemisia frigida, Stipa hymenoides, Phlox hoodii, Machaeranthera grindelioides, Gutierrezia sarothrae,* and *Kraschennikovia lanata.* Associated lichen species include *Xanthoparmelia chlorochroa* and *Circinaria hispida.*

Distribution and Abundance:
Xanthoparmelia idahoensis is known from Saskatchewan, Idaho, and Colorado. One element occurrence (EO) is known from Saskatchewan, six are known from Idaho, and due to recent intensive field surveys eighteen sites are known from Colorado. These eighteen sites probably represent fourteen EOs.

Prior to 2013 *Xanthoparmelia idahoensis* was known from four sites worldwide, including one in Saskatchewan, Canada (Rosentreter 2001), two in Idaho, and three closely adjacent sites in Colorado near Kremmling. In Colorado, two additional sites were found in 2013 by Brian Elliott and Mike Kirkpatrick, and thirteen new sites were located by Brian Elliott and Scott Smith in 2014. Thus, eighteen sites are now known from Colorado. *Xanthoparmelia idahoensis* is tracked by the Colorado Natural Heritage Program and given a conservation rank of G1S1.

Threats:
According to Rosentreter (1997) the primary threats facing vagrant lichens, including *Circinaria rogeri* include wide scale land disturbance, livestock overgrazing, altered fire frequencies, and habitat fragmentation. Given the location of many *Xanthoparmelia idahoensis* sites in the vicinity of Wolford Mountain Reservoir, water developments may also pose a threat. Sites in Idaho are currently being threatened by OHV use and a proposed landfill (Rosentreter personal communication). Finally, a lack of awareness about vagrant lichens results in these lichens not being considered in land management decisions.

Figure 3: Typical *Xanthoparmelia idahoensis*

Figure 4: *Xanthoparmelia idahoensis* habitat

3.0 Methods

Four field survey days were funded by this project (one field day was performed at no charge). Due to the number of acres and distribution of potential habitat the goal of the survey was to locate as many new occurrences as possible that were widely dispersed in the Kremmling area. Additional surveys performed in western Colorado by Scott Smith used a similar methodolgy.

For these directed surveys an intuitive-controlled survey methodology was used. Rare lichen surveys were focused on likely substrates (ancient marine sediments) in the Kremmling area and in western Colorado. Areas of sagebrush were accessed and then searched by binoculars. Within the mountain sagebrush (*Artemisia vaseyana*) barren areas or areas of low sagebrush, primarily *Artemisia arbuscula* or *Artemisia nova,* were targeted for survey. Pedestrian transects were then walked within the areas of low sagebrush.

4.0 History of our Knowledge

4.1 *Circinaria rogeri*

In 1995 *Circinaria rogeri* was first discovered in Colorado by Roger Rosentreter. No additional sites were discovered until 2013 when five new sites were discovered by Brian Elliott and Mike Kirkpatrick of Elliott Environmental Consulting during a vascular plant survey of Western Area Power Administration's transmission lines in Middle Park, Colorado. These new sites kindled additional interest in the abundance, distribution, and conservation of the species and in 2014 the BLM funded directed surveys for the species on BLM lands near Kremmling. As a result of these surveys (performed by Brian Elliott and Scott Smith) fourteen new sites were discovered, leading to a total of twenty known sites in Colorado. The new discoveries include sites near both Montrose and Dinosaur National Park in western Colorado. Thus, the species is not restricted to the Kremmling area as previously believed. It should be noted that some occurrences are closely adjacent and thus the total number of element occurrences will be less than twenty.

Figure 5: *Circinaria rogeri* in Middle Park, Colorado

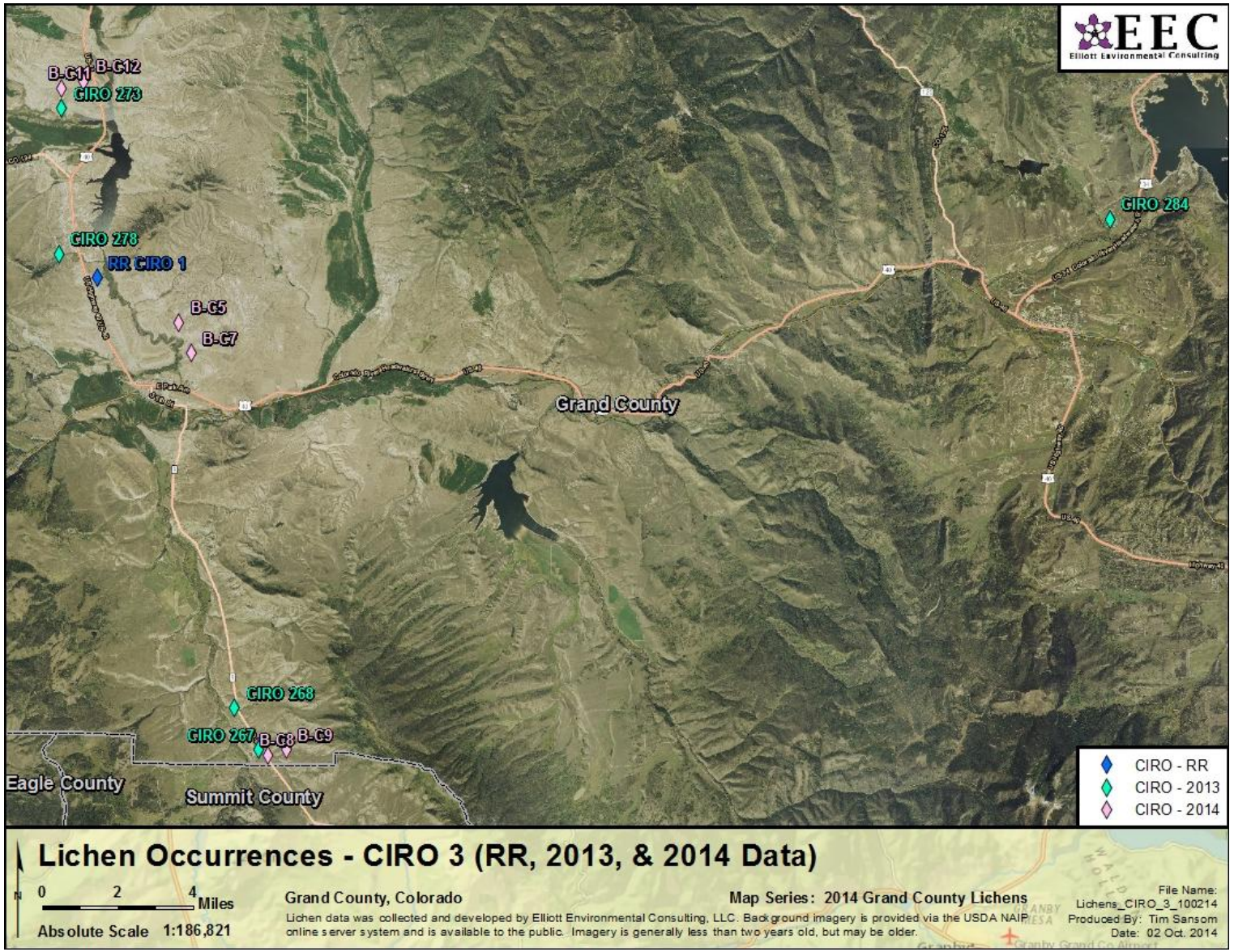
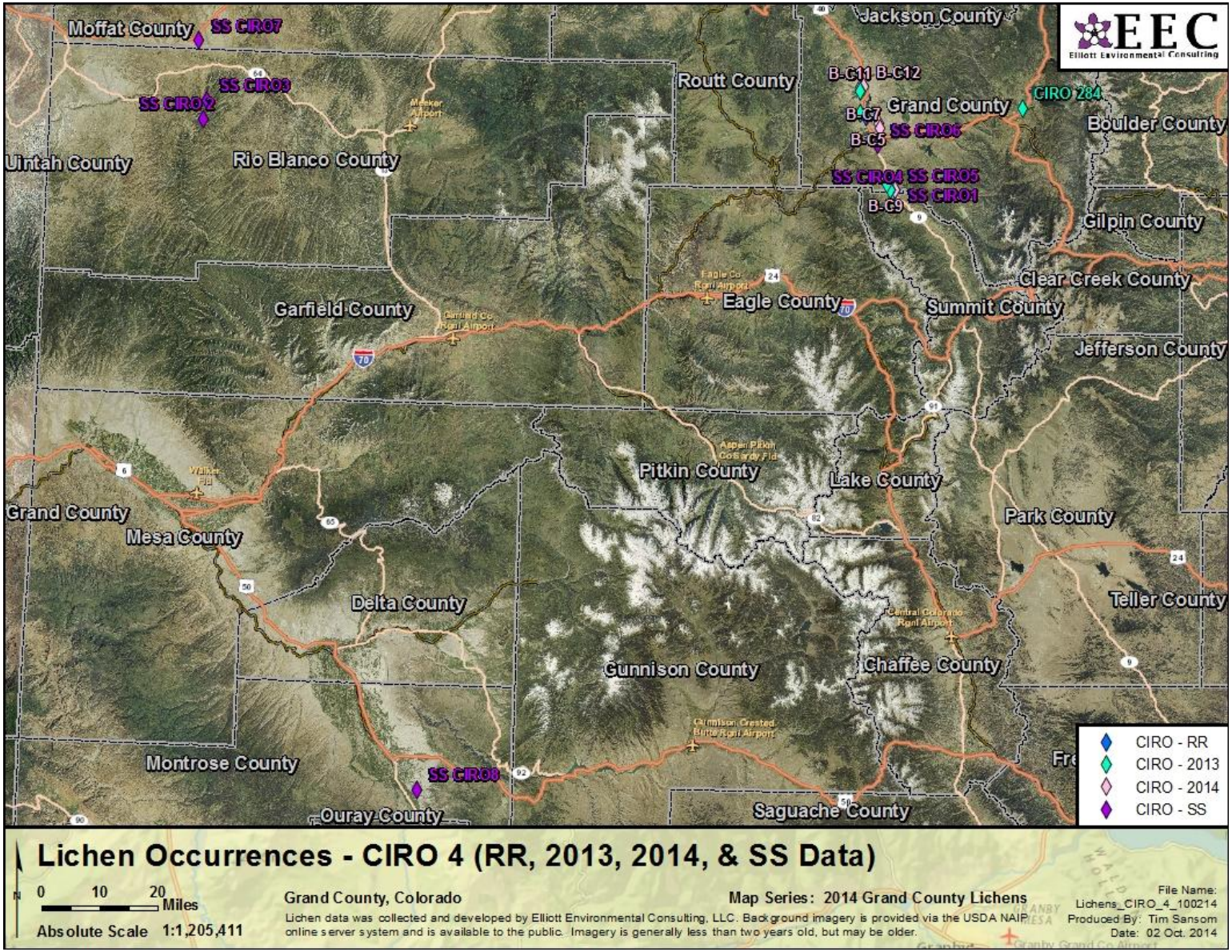


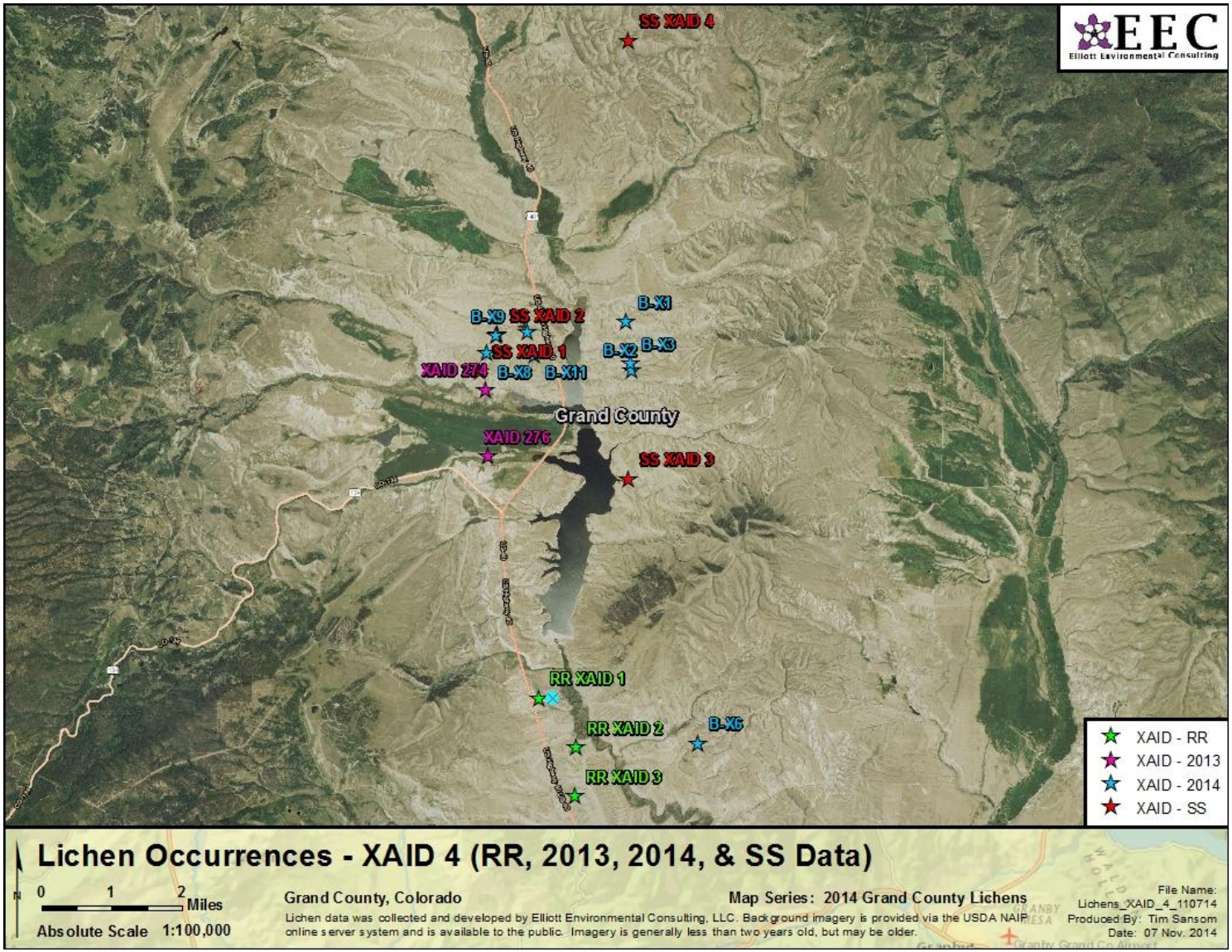
Figure 6: All Known Colorado *Circinaria rogeri* Occurrences



4.2 *Xanthoparmelia idahoensis*

In 1995 *Xanthoparmelia idahoensis* was first discovered at three closely adjacent sites in Colorado by Roger Rosentreter. No additional sites were discovered until 2013 when two new sites were discovered by Brian Elliott and Mike Kirkpatrick of Elliott Environmental Consulting during a vascular plant survey of Western Area Power Administration's transmission lines in Middle Park, Colorado. These new sites kindled additional interest in the abundance, distribution, and conservation of the species and in 2014 the BLM funded directed surveys for the species on BLM lands near Kremmling. As a result of these surveys (performed by Brian Elliott and Scott Smith) thirteen new sites were discovered, leading to a total of eighteen known sites in Colorado. All of the new discoveries were in Middle Park, Colorado. To date no occurrences have been found outside of Middle Park. It should be noted that some occurrences are closely adjacent and thus the total number of element occurrences will be less than eighteen

Figure 7: *Xanthoparmelia idahoensis* in Middle Park, Colorado



5.0 Results

The following discoveries were made during the course of this survey:

- Thirteen new *Xanthoparmelia idahoensis* sites were located.
- Fourteen new *Circinaria rogeri* sites were found.

The occurrences are described in more detail in the element occurrence forms included as Appendix One of this document.

All of the *Xanthoparmelia idahoensis* were found in Middle Park in the vicinity of Kremmling. Ten of the new *Circinaria rogeri* sites were found in Middle Park in the vicinity of Kremmling, one site was found near Montrose, and three sites were found near Dinosaur National Park in northwestern Colorado. In the Kremmling area nearly all of the sites for both species were found on Pierre Formation with one site of each species found on Coalmont Formation. In western Colorado *Circinaria rogeri* was found on either Mancos shale or Green River (Parachute Creek Member) Formation.

To date, *Xanthoparmelia idahoensis* has been found on Pierre and Coalmont Formations while *Circinaria rogeri* has been found on Pierre and Coalmont Formations, Mancos shale, and Green River (Parachute Creek Member) Formation. *Circinaria rogeri* has thus been found on barren substrates derived from several geologic formations and is not restricted to any geologic substrate. To date *Xanthoparmelia idahoensis* has been found almost entirely on Pierre Formation with one site found on closely adjacent Coalmont Formation. Additional survey is needed to determine whether this species is primarily found on Pierre Formation.

Two federally listed plant species, *Astragalus osterhoutii* and *Penstemon penlandii,* are known from Middle Park. Both species have received been the object of extensive study and survey, while rare lichen species *Xanthoparmelia idahoensis* and *Circinaria rogeri* have received comparatively little study. A GIS analysis was performed showing geologic formation and occurrences of both the federally listed plant species (*Astragalus osterhoutii* and *Penstemon penlandii*) as well as the rare lichens *Xanthoparmelia idahoensis* and *Circinaria rogeri.* If the lichens inhabited the same geologic formation as the federally listed plants then the studies performed on the plants might be applied to the rare lichen species. However, GIS analysis shows that the federally listed plants occur mostly on Troublesome Formation while the rare lichens are known from barren clay-shale substrates including Pierre and Coalmont Formations, Mancos shale, and Green River (Parachute Creek Member) Formation. To date none of the rare lichens have been found on Troublesome Formation.

Brian Elliott's survey tracks as well as geologic formation maps are included in the figures below.

Figure 8: Overview of Kremmling Area Survey Tracks

Figure 9: August 29, 2014 Survey Track

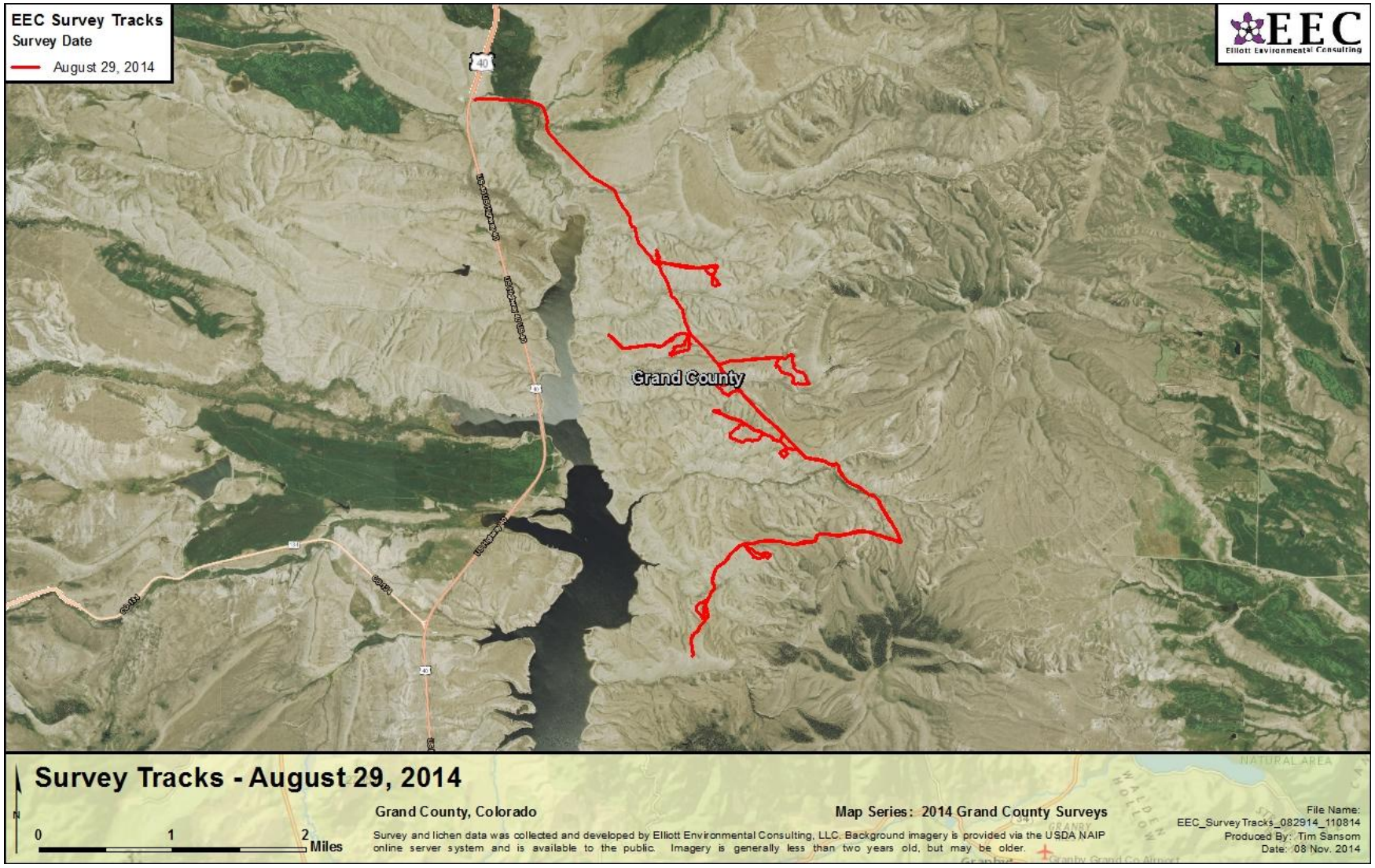


Figure 10: August 30, 2014 Survey Track

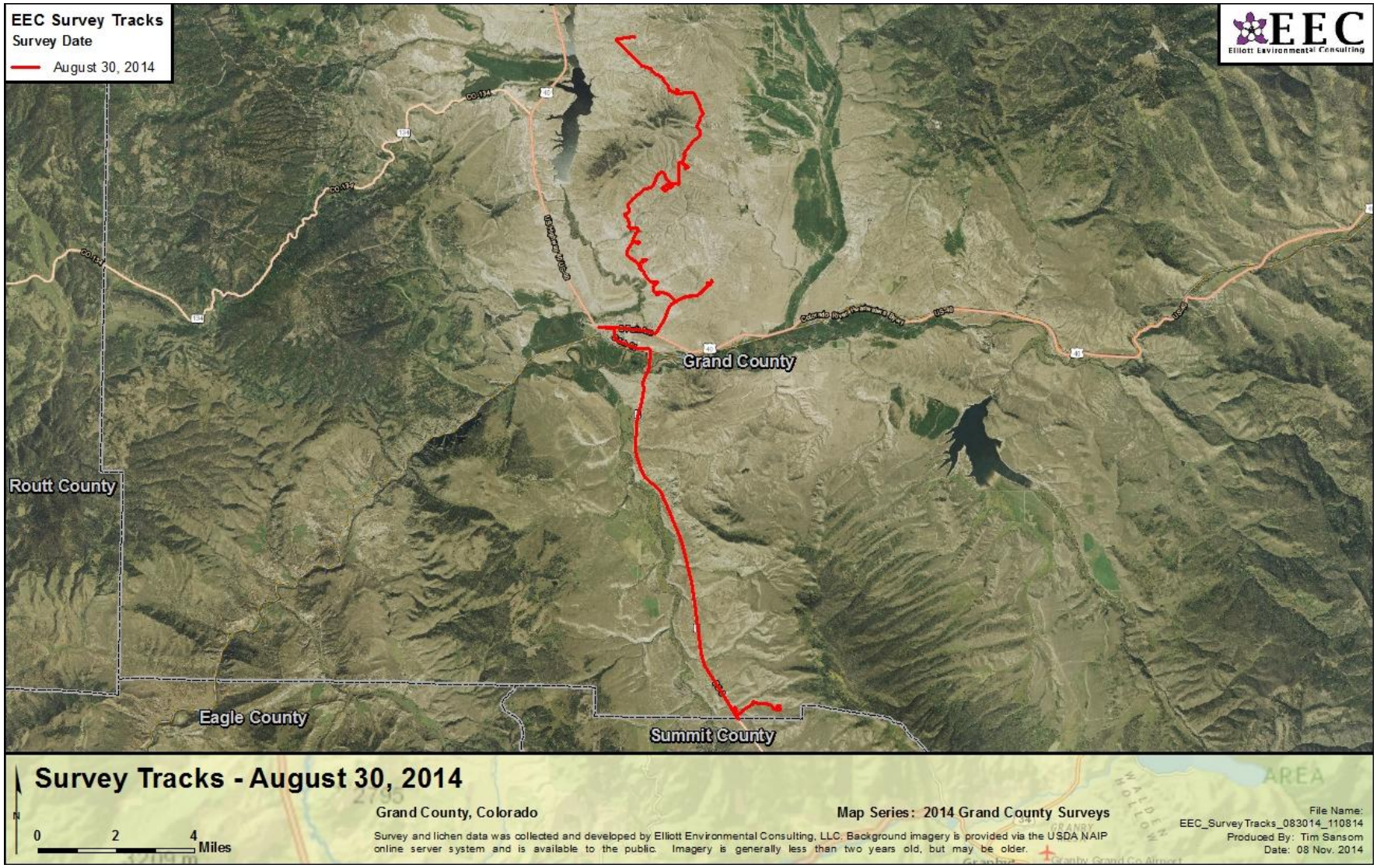


Figure 11: August 31, 2014 Survey Track

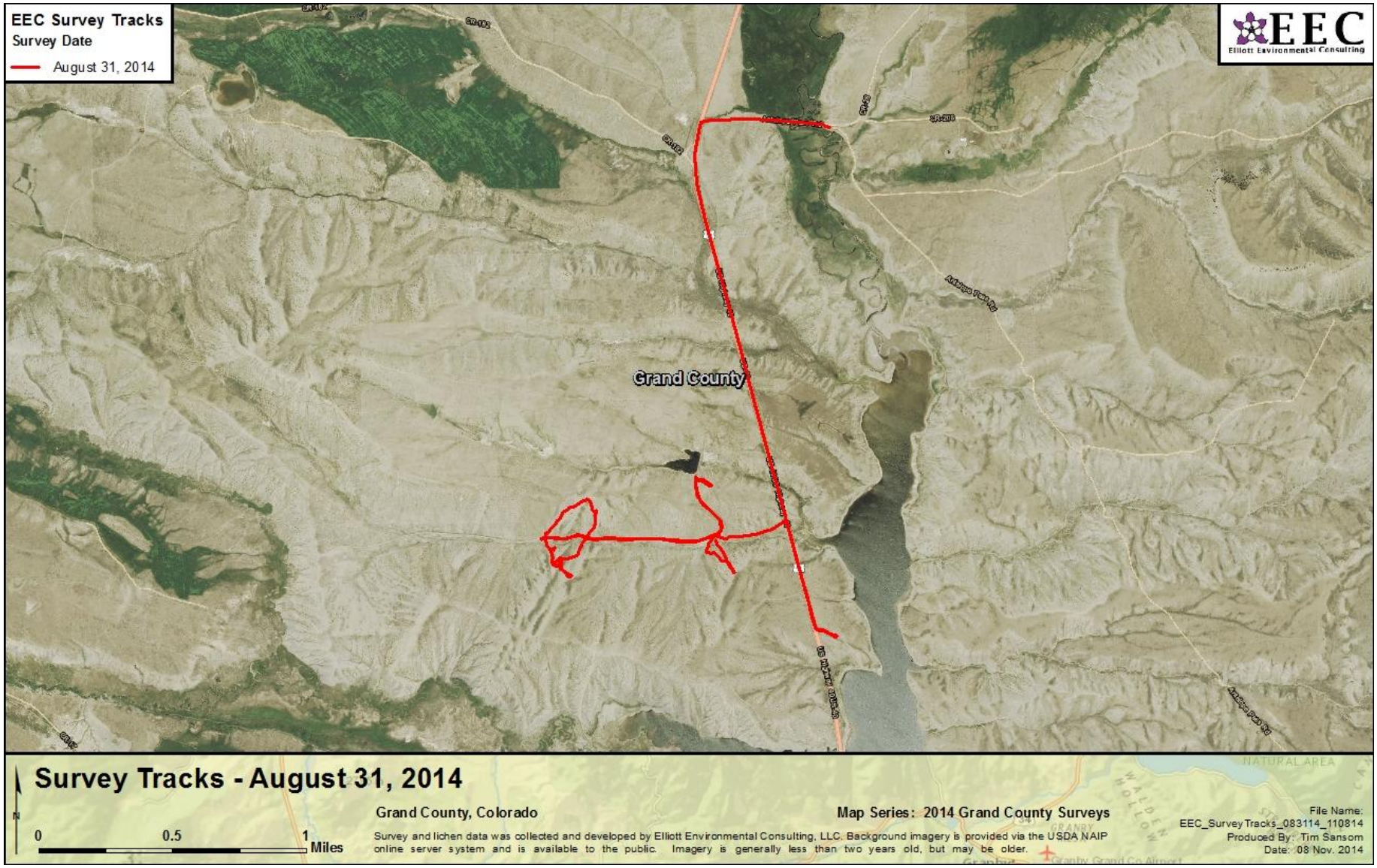


Figure 12: Kremmling Area Geologic Formation and Occurrence Data

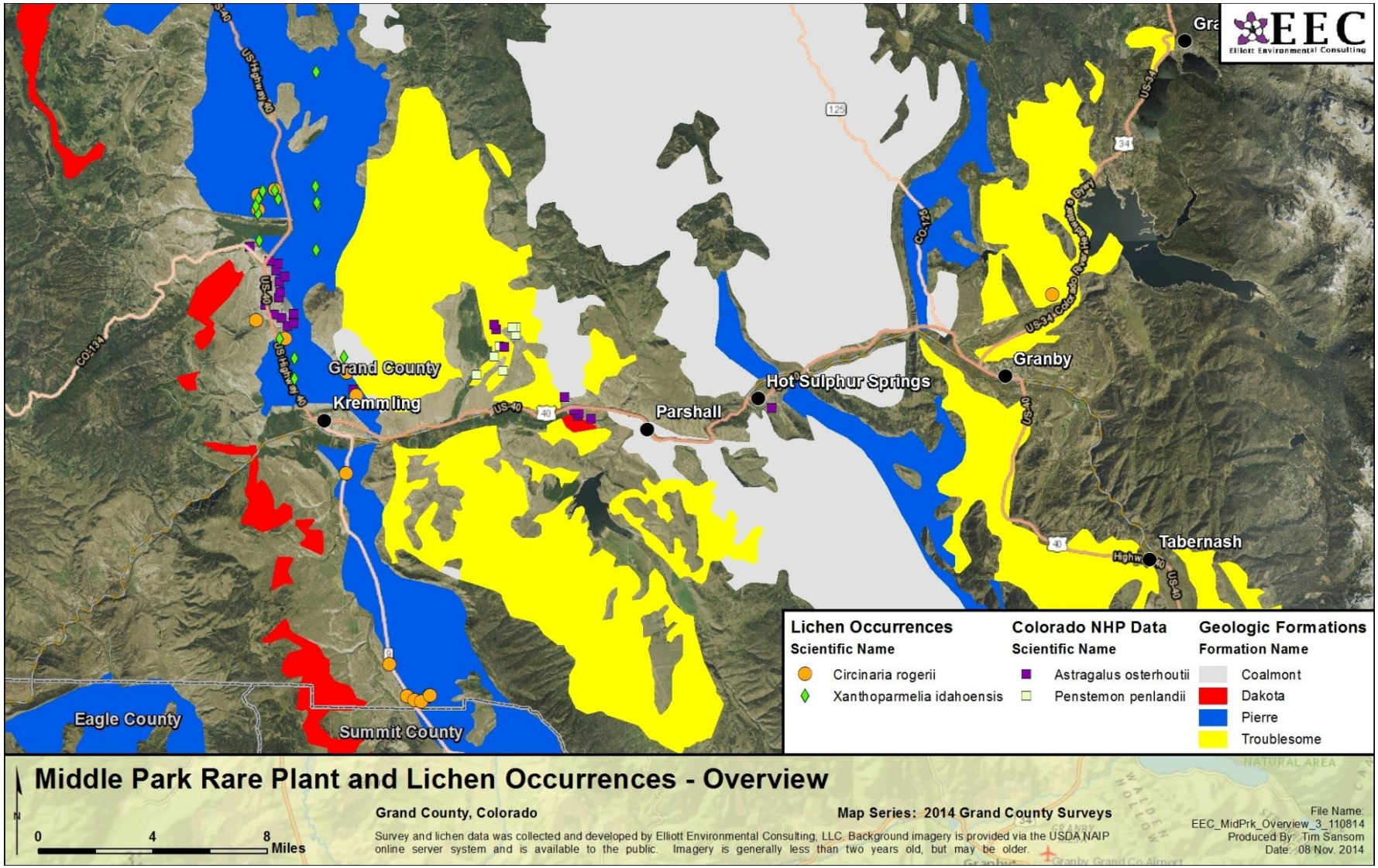


Figure 13: Moffat County Area Geologic Formation and Occurrence Data

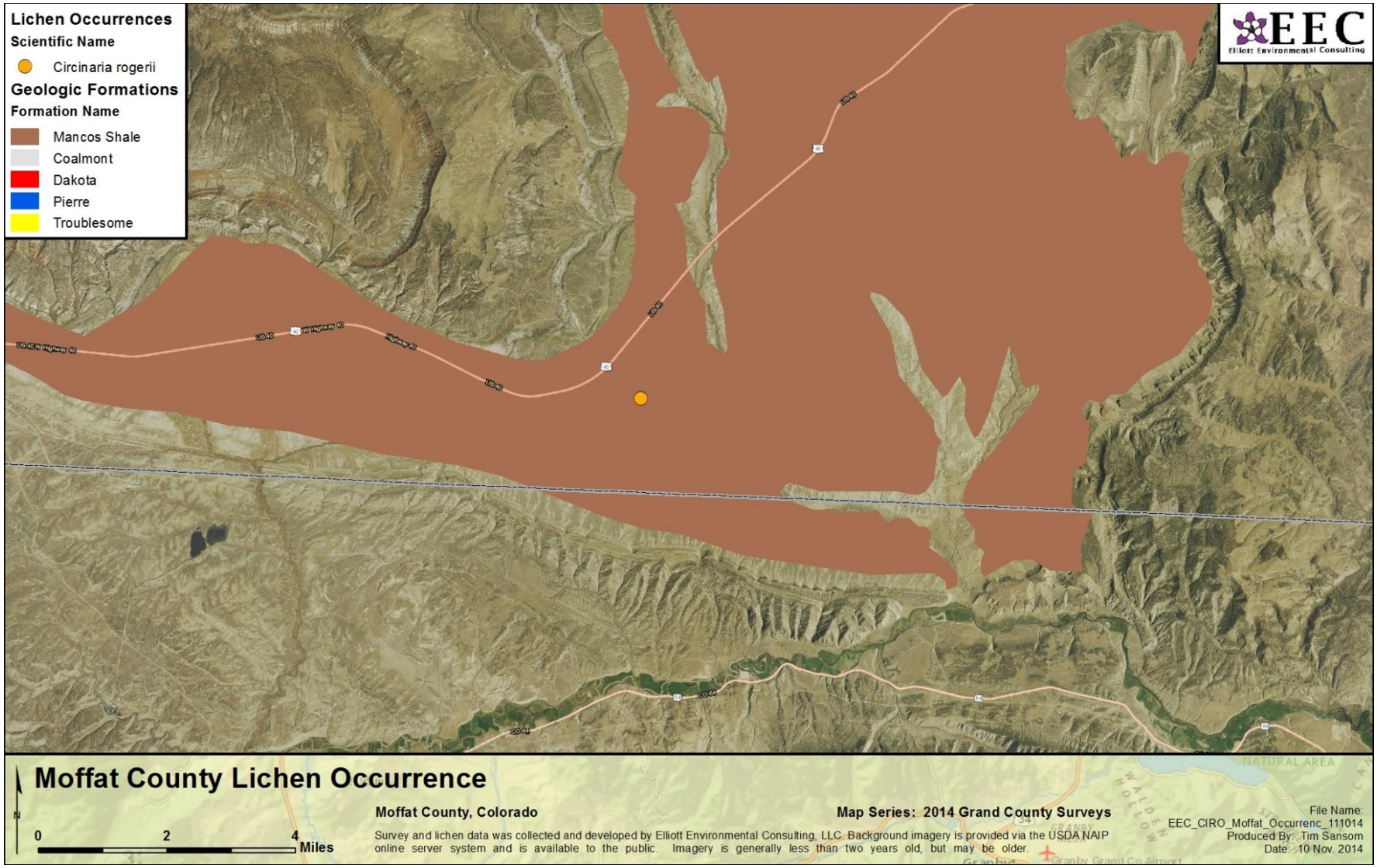


Figure 14: Montrose County Area Geologic Formation and Occurrence Data

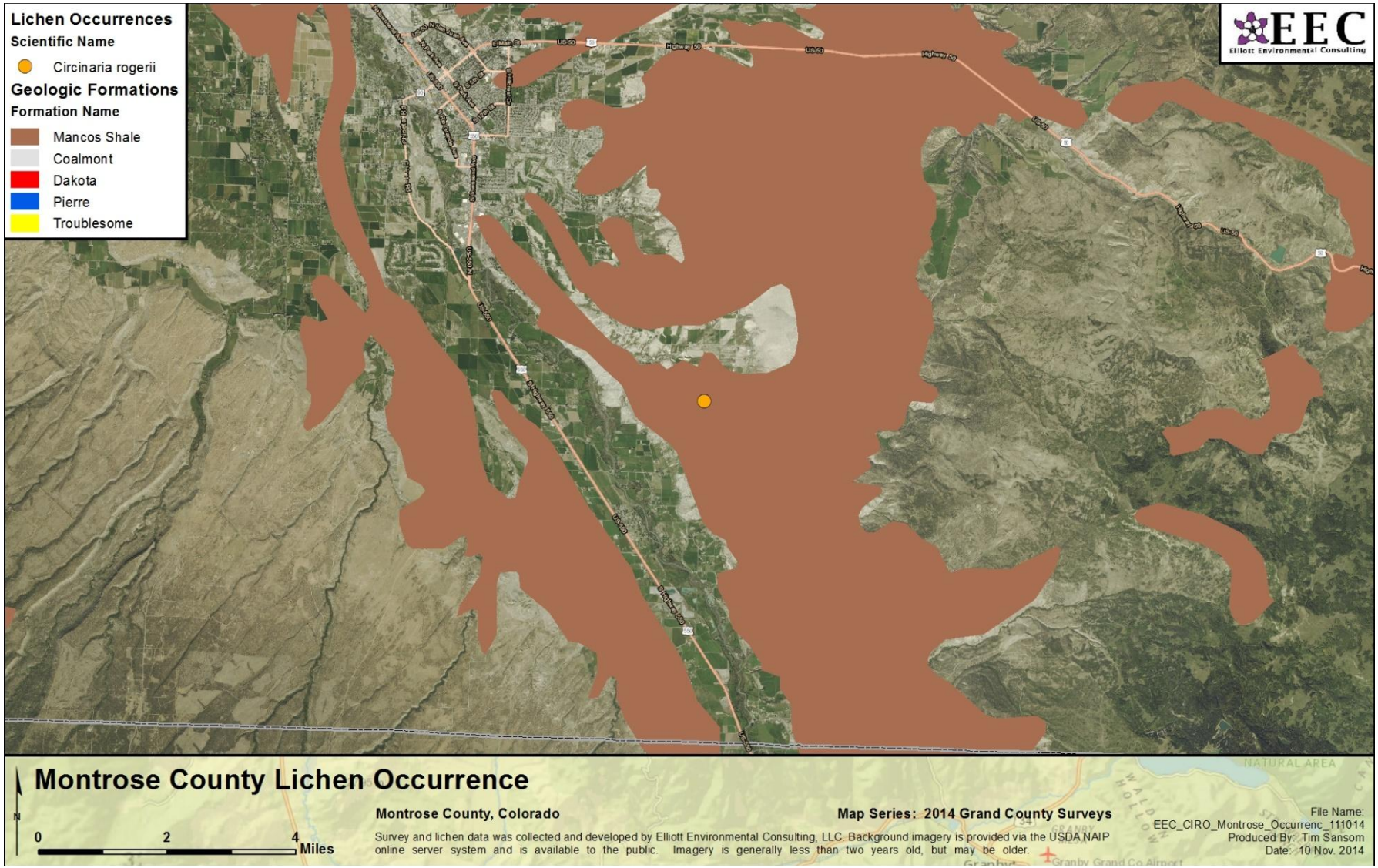
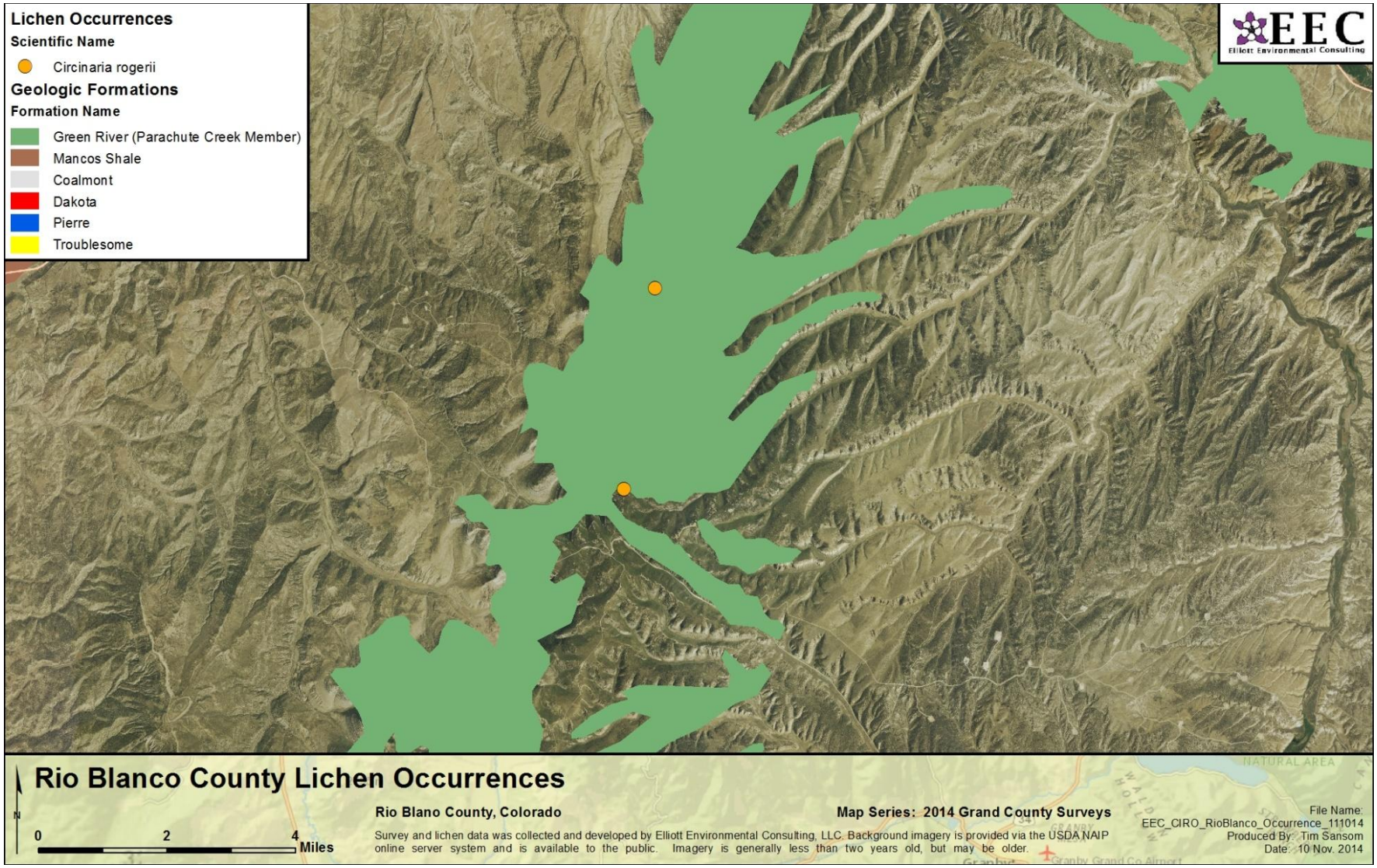


Figure 15: Rio Blanco County Area Geologic Formation and Occurrence Data



6.0 Conclusions and Recommendations

Several conclusions can be drawn from the 2013–2014 rare lichen survey efforts. First, both rare lichens are more common than previously believed, although both are still considered rare. Second, based on our current knowledge *Xanthoparmelia idahoensis* is restricted to Middle Park in Colorado while *Circinaria rogeri* is more widespread in Colorado with known sites in the western portion of the state as well as Middle Park. *Circinaria rogeri* is also more widespread and abundant in western North America than *Xanthoparmelia idahoensis.* Finally, abundant un-surveyed habitat for both species is found in Middle Park as will as in other areas with appropriate substrate.

To date, *Xanthoparmelia idahoensis* has been found on Pierre and Coalmont Formations while *Circinaria rogeri* has been found on Pierre and Coalmont Formations, Mancos shale, and Green River (Parachute Creek Member) Formation. *Circinaria rogeri* has thus been found on barren substrates derived from several geologic formations and is not restricted to any gelologic substrate. To date *Xanthoparmelia idahoensis* has been found almost entirely on Pierre Formation with one site found on closely adjacent Coalmont Formation. Additional survey is needed to determine whether this species is primarily found on Pierre Formation.

Based on our improved knowledge two recommendations can be made. First, additional survey work is recommended to shed additional light on the distribution and abundance as well as habitat and substrate preferences of both *Xanthoparmelia idahoensis* and *Circinaria rogeri.* Plentiful un-surveyed habitat is found in Middle Park and additional occurrences could almost certainly be located by further survey efforts. North Park has not received any survey effort and habitat for both species appears to be present there. Finally, local land managers are mostly unaware of the presence and conservation status of either *Xanthoparmelia idahoensis* or *Circinaria rogeri.* It is recommended that information on the two species be distributed to local land mangers with known occurrences in their area so that these rare species may be considered in land management decisions. In particular, areas where clusters of occurrences are found be conserved.

7.0 Contact Information

Additional information regarding this survey effort may be obtained from:

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8.0 References

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Sohrabi, M., Stenroos, S., Myllys, L., Søchting, U., Ahti, T., and J. Hyvönen. 2013. Phylogeny and taxonomy of the 'manna lichens'. Mycol Progress 12:231–269

U.S. Fish and Wildlife Service (FWS). 2013a. DRAFT Guidance for Section 7 Consultations that

Appendix 1: Element Occurrence Forms

COLORADO NATURAL HERITAGE PROGRAM
T&E PLANT ELEMENT OCCURRENCE FIELD FORM
COLORADO STATE UNIVERSITY-WARNER COLLEGE OF NATURAL RESOURCES

Please submit copies of personal/agency field data forms, digital data (GIS or spreadsheet), or this field form to:
CNHP, 1475 Campus Delivery, Fort Collins, CO 80523 or Jill.Handwerk@colostate.edu (970) 491-5857
(For a list of elements tracked by CNHP, refer tohttp://www.cnhp.colostate.edu/download/list.asp)

Element Scientific Name: *Xanthoparmelia idahoensis*
Survey Date: 2014-08-29–31 (yyyy-mm-dd)
Observer(s) Name & Affiliation: Brian Elliott, Elliott Environmental Consulting, and Scott Smith.
Observer(s) Address & Phone Number: P.O. Box 1582, Laramie, WY 82073. 505-307-9046. brianelliott.eec@gmail.com.

Land Ownership
Owner Type: ☐ Private ☐ USFS ☒ BLM ☐ State ☐ Military ☐ Indian ☐ BuRec ☐ NPS ☐ Other:____
Owner Name (or National Forest, BLM District, etc.): Kremmling Field Office
Owner Comments (special requests, permissions, circumstances): ____
Data Sensitive Element Occurrence: ☐ Y ☒ N
If yes, list reason (i.e., landowner requests confidentiality): ____

Locational Information
(Provide a photocopy of map with location of the occurrence marked or outlined, or a shapefile)

Surveysite Name (from 7.5' quad): Hinman Reservoir and Kremmling
County: Grand Elevation (range if applicable): 7,600–8,040 ☒ feet ☐ meters **NOTE: The elevation range was remarkably consistent. The sites ranged over 10 miles and with the exception of one site at 8,040 feet, the rest were between 7,600–7,690 feet.**

Legal Description: Township: ____ Range: ____ Section: ____ ¼ Sec: ____
Additional T/R/S, Sections or ¼ Secs: ____

GPS Coordinates: UTM Zone: ☐ 12 ☒ 13
Note: Sites with a B-X format are from collections made by Brian Elliott; sites with a SSXAID format are from collections made by Scott Smith.

B-X1: E380951; N4448410
B-X10: E378701; N4448180
B-X11: E378856; N4447653
B-X2: E381082; N4447309
B-X3: E381039; N4447462
B-X6: E382583; N4438785
B-X8: E377763; N4447712
B-X9: E377976; N4448092
SS XAID: E377608; N,4447282
SS XAID: E378014; N4448120
SS XAID: E380992; N4444827
SS XAID: E380992; N4454827

Datum: ☐ NAD27 ☒ NAD83 ☐ WGS84 ☐ Other: ____
GPS accuracy (if known): submeter ☒ autonomous(uncorrected) ☒ differentially corrected ☐ Other: ____
GPS make/model: Trimble Geo XT for Elliott sites, recreational grade Garmin gps unit for Smith sites.

Directions
Driving and hiking directions and prominent topographical features:
All sites are north of Kremmling.

One cluster of sites is west of Highway 40 on a small patch of BLM land about 2.8 miles north of the junction of Highways 40 and 134. A small road accesses the sites but it is un-numbered on the map. I recall that the road is marked by a carsonite sign with a number.

A second cluster of sites is along County Road 25 east of Wolford Mountain Reservoir.

A solo site near Kremmling can be accessed by taking the Troublesome Road (County Road 22) north of Kremmling for about 1 mile, then turning left on Road #224 and travelling for about 2.2 miles to Cow Gulch.

The northernmost site, also a solo site, can be accessed by turning off Highway 40 on to County Road 25, the turning on to County Road 26 and travelling northeast for about 2.8 miles, then turning left on a small BLM road. The road is not numbered on the map.

Element Occurrence Data

Number of Individuals (exact count, if feasible or check range below; if plants are spreading vegetatively, indicate number of aerial stems): Not applicable.

1-10 ☐ 11-50 ☐ 51-100 ☐ 101-500 ☐ 501-1000 ☐ 1001-5000 ☐ 5001-10,000 ☐ 10,000+ ☐

NOTE: I know of no good manner to estimate population size in this vagrant lichen. The species reproduces by fragmentation, so one individual can become several in an instant. Probably the best way to estimate population size is to map the population boundary and then estimate the cover for the site. This was well beyond the scope of our contract; our goal was to find as many new sites as possible. Revisiting the sites for mapping and cover estimation would be a terrific future project.

Estimated Population Size: _____

Size of Area Covered by Population: _____ acres _____ sq ft _____ sq m

NOTE: We located 12 new sites. The sites ranged in size from about 0.5 acre to three or four acres. Thus, I would estimate a total population area of approximately 10 to 15 acres. Revisiting and mnapping the sites would provide a much more accurate estimate of population size.

Full extent of occurrence visited/mapped: No: ☒ Yes: ☐ Comments: _____

Additional EO Data Comments: _____

Phenology (What percent of the observed individuals are vegetative, dormant, or in flower and fruit, note that you may have plants that are in both flower and fruit, and therefore the total % may be more than 100%. Ex. - Vegetative: 20%, Flower, 70%, Fruit: 80%, Dormant: 5%): Vegetative (leaf or bud): **NOT APPLICABLE** _____% Flower: _____% Fruit: _____% Dormant: _____%

Reproductive Success: (evidence of seed dispersal and establishment): _____

Age Classes Present: **UNCERTAIN** Seedling: _____% Immature: _____%Mature: _____% Senescent: _____%

Vigor: Feeble ☐ Normal ☐ Vigorous ☐ **Difficult to estimate vigor in these lichens, but they certainly appeared vigorous.**

Pollinators (e.g number, types, etc.): **NOT APPLICABLE** _____

Evidence of Disease, Predation, Herbivory or Injury (estimate % of individuals affected): I did not see any evidence of herbivory and little evidence of trampling. Livestock and deer/elk had trailed through some of the sites but apparently do not linger due to lack of available forage.

Look alikes present: No: ☐ Yes: ☒ Comments on identification: *Xanthoparmelia idahoensis* differs from other more common species of *Xanthoparmelia* in several ways:

It is a slightly different shade of green,

The underside of most *Xanthoparmelia* is primarily black, while *Xanthoparmelia idahoensis* is mostly green beneath with a small patch of brown or green at the tips.

The tips of *Xanthoparmelia idahoensis* tend to be broader. All of these characters are subtle and need to be studied prior to field surveys.

Additional Site/Plant Condition Comments (details on productivity [vigor], health of population, degree of anthropogenic disturbance, naturalness of hydrology, and other ecological processes **within** the occurrence, not addressed above. Please provide % of occurrence affected, if known, following values for threats listed in Management Comments section): Several sites had small 2-track roads going within or adjacent to the occurrence. The plants are often found in barren areas on hilltops or ridgelines and these are popular places for roads. I did not see any ATV or other recreational vehicle tracks within the sites. Livestock often trailed through sites but did not linger.

Landscape Context Comments (biological structure, species composition, degree of fragmentation or connectivity, and condition **of the surrounding landscape**. Please provide % of the surrounding landscape affected, if known, following values for threats listed in Management Comments section): The surrounding area is used extensively for recreation and livestock grazing. Wolford Mountain Reservoir inundated a great number of acres in the vicinity of the known sites.

Element Occurrence Habitat Description

Habitat in the immediate area (ex. shale barren): Generally the plants were found in clay-shale sites with low shrubs and abundant bare ground.

Dominant Plant Community (list dominant species currently present, include age structure, and % cover if known): Sites are characerized by low shrubs (e.g. *Artemisia nova* and *Artemisia arbuscula*) and western wheatgrass with low canopy cover and a large percentage of bare soil.
Additional Associated Plant Species *(five most commonly seen with this species)*: *Artemisia frigida, Stipa hymenoides, Phlox hoodii, Machaeranthera grindelioides, Gutierrezia sarothrae, Kraschennikovia lanata.*

Topographic Position:
☒ Ridge Top/Interfluve ☒ Upper/High Slope ☐ Mesa or Plateau top ☐ Midslope ☐ Cliff Face/Back Slope
☐ Shelf on Cliff Face ☐ Low Slope ☐ Toe Slope ☐ Valley/Basin Floor
☐ Channel Wall ☐ Channel Bed

Aspect:
☒ Flat ☒ Variable ☐ N (338-22 degrees) ☐ NE (23-67 degrees) ☐ E (68-112 degrees)
☐ SE (113-157 degrees) ☐ S (158-202 degrees) ☐ SW (203-247 degrees) ☐ W (248-292 degrees) ☐ NW (293-337 degrees)

Slope:
☒ Flat 0% (0 degrees) ☒ Gentle 1-6% (1-5 degrees)
☒ Moderate 6-33% (5-30 degrees) ☐ Steep 33-50% (30- 45 degrees)
☐ Very steep 50-67% (45-60 degrees) ☐ Cliff 67-100% (60-90 degrees)
☐ Overhanging/sheltered (>90 degrees)

Slope Shape: ☐ Concave ☐ Convex ☐ Straight ☐ Other Slope shape varied and includes all three categories listed.
Light Exposure: ☒ Open ☐ Shaded ☐ Partial shade ☐ Other _____
Moisture: ☒ Dry ☐ Moist ☐ Saturated ☐ Inundated ☐ Seasonal Seepage ☐ Streambank ☐ Other _____
Proximity to Moisture: (for alpine sites is species influenced by snowmelt, on snow free sites or snow covered sites): _____
Soil Texture: Silt ☐ Clay ☒ Loam ☐ Sand ☐ Gravel ☐ Cobble ☐ Cobble Size: _____Other ☐
Geomorphic Landform (e.g., glaciated mountain slopes and ridges, alpine glacial valley, cirque, rolling uplands, breaklands, floodplain, cutbank, hogback, cliff, gully, canyon, etc.): Extensive basin (Middle Park) with eroded slopes and ancient marine sediments.

Protection Comments (Comments on any legal protection, special land designations, or strategies needed or in place.): None known.

Management Comments
Threat and Management comments apply to: Entire occurrence ☒ Area surveyed ☐

Management Comments (This could include special fencing, signage and other concerns.): Uncertain. Sites should be periodically monitored for impacts and signs or fencing used as needed.

Evidence of Threats and Disturbance (e.g. effects on population viability due to mining, recreation, grazing, exotic species; past/present/future recommendations): The occurrences are not currently being impacted; however, should OHV riders begin to use a site as a play area the site could be decimated quickly. Livestock do not currently appear to be a threat, but should salt or a water development be placed within an occurrence the site could be decimated quickly. Oil and gas development within an occurrence would certainly lead to extirpation of the site, No non-native invasive plant species were noted within the occurrences.

Predominant Land Uses (recreation, grazing, open space, etc.): Recreation (mostly OHV riding) and livestock grazing.

Domain values for Scope of Threat (adapted from NatureServe Biotics):

High = > 60% of occurrence or area surveyed
Moderate = 20-60% of occurrence or area surveyed
Low = 5-20% of occurrence or area surveyed
Very Low = < 5% of occurrence or area surveyed
Trace + < 1% of occurrence or area surveyed
None = none observed in occurrence or area surveyed
Unknown = proportion of occurrence, or area surveyed is unknown
Null = Rank factor not assessed

Threat Categories (adapted from the Colorado Rare Plant SWAP):

Collection or other Direct Mortality Uses: High ☐ Moderate ☐ Low ☐ Very Low ☐ Trace ☒ None ☐ Unknown ☐

Comments: _____

Grazing: High ☐ Moderate ☐ Low ☒ Very Low ☐ Trace ☐ None ☐ Unknown ☐
Comments: _____

Recreational disturbance (motorized and non-motorized recreation): High ☐ Moderate ☐ Low ☒ Very Low ☐ Trace ☐ None ☐ Unknown ☐ Comments on type of recreational disturbance: _____

Resource Extraction (mining, oil & gas drilling): High ☐ Moderate ☐ Low ☐ Very Low ☐ Trace ☐ None ☒ Unknown ☐ Comments on type of resource extraction: _____

Habitat Degradation (fragmentation, trail development, utility lines, hydrologic alteration, etc.): High ☐ Moderate ☒ Low ☐ Very Low ☐ Trace ☐ None ☐ Unknown ☐ Comments on type of habitat degradation: _____

Habitat Conversion (urban, industrial, agricultural development, etc): High ☐ Moderate ☐ Low ☐ Very Low ☐ Trace ☐ None ☒ Unknown ☐ Comments on type of habitat conversion: _____

Invasive or Exotic Species (plants, pathogens): High ☐ Moderate ☐ Low ☐ Very Low ☐ Trace ☐ None ☒ Unknown ☐ Comments on quantity (names of invasive or exotic species present , estimate % cover of each invasive species and/or , dominance of species at site): _____

Pollution (chemical run-off, dust, air pollution): High ☐ Moderate ☐ Low ☐ Very Low ☒ Trace ☐ None ☐ Unknown ☐ Comments on type of pollution at site: _____

Documentation
Photographs Taken: ☒ Y ☐ N Photographer: Brian Elliott Photo Number(s): many Repository: Currently in my project files.
Specimens Taken: ☒ Y ☐ N Collector: Brian Elliott Collection Number(s): 16,342, 16,344, 16,345, 16,351, 16,363, 16,364, 16,372, and 16,373. Scott Smith collections are not numbered. Repository: Currently, one set is with Roger Rosentreter at the Boise State University Lichen Herbarium, and a duplicate set is awaiting final disposition.

Survey Effort
People hours: 45
Number of surveyors: two
Survey time at site: varied
Extent of area surveyed: patchy

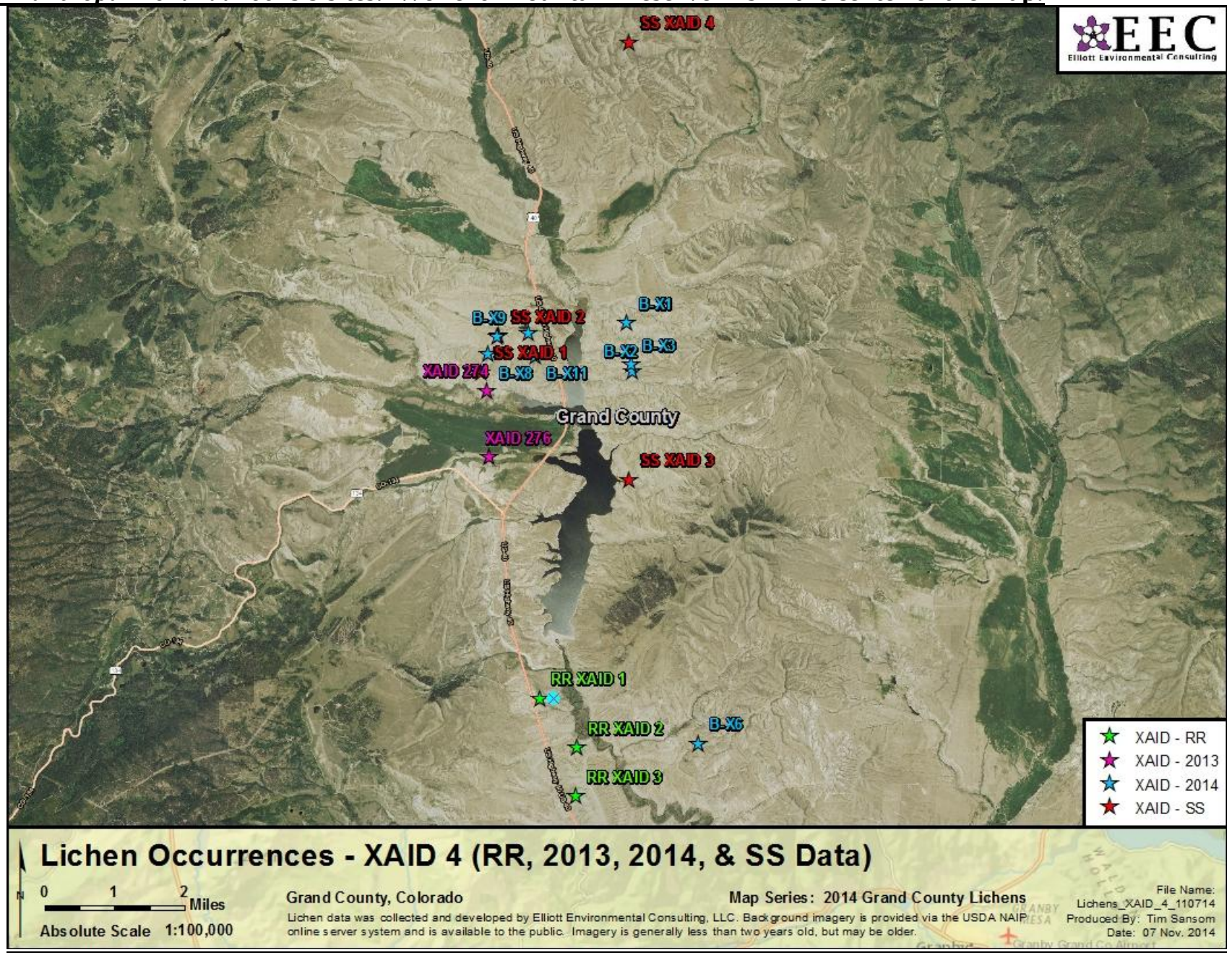
Survey Method
Transect ☐ with a _____ meter separation distance
Ocular estimation ☐
Quadrat ☐ Size and number: _____
Other, describe**:** surveys focused in potential habitat

Comments (areas needing additional surveys, how was suitable habitat identified, etc.): Additional habitat in the Wolford Mountain Reservoir area is in need of survey. Funding and survey time was extremely limited on this project. See the transect maps within the survey report for a visual representation of where surveys were conducted and where additional survey is needed.

General Comments (for information not captured above):

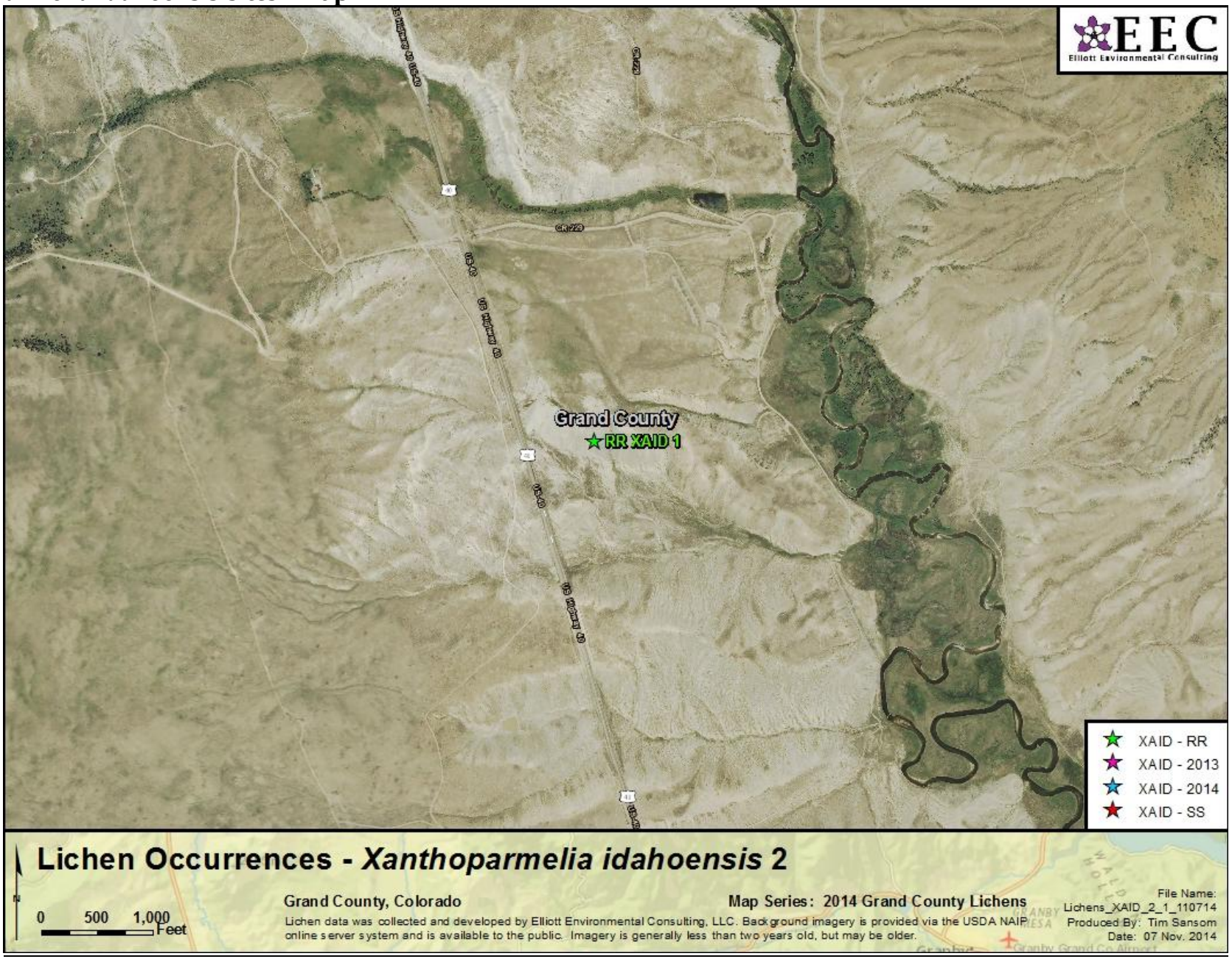
_____

Map of *Xanthoparmelia idahoensis* sites. Wolford Mountain Reservoir is in the center of the map.

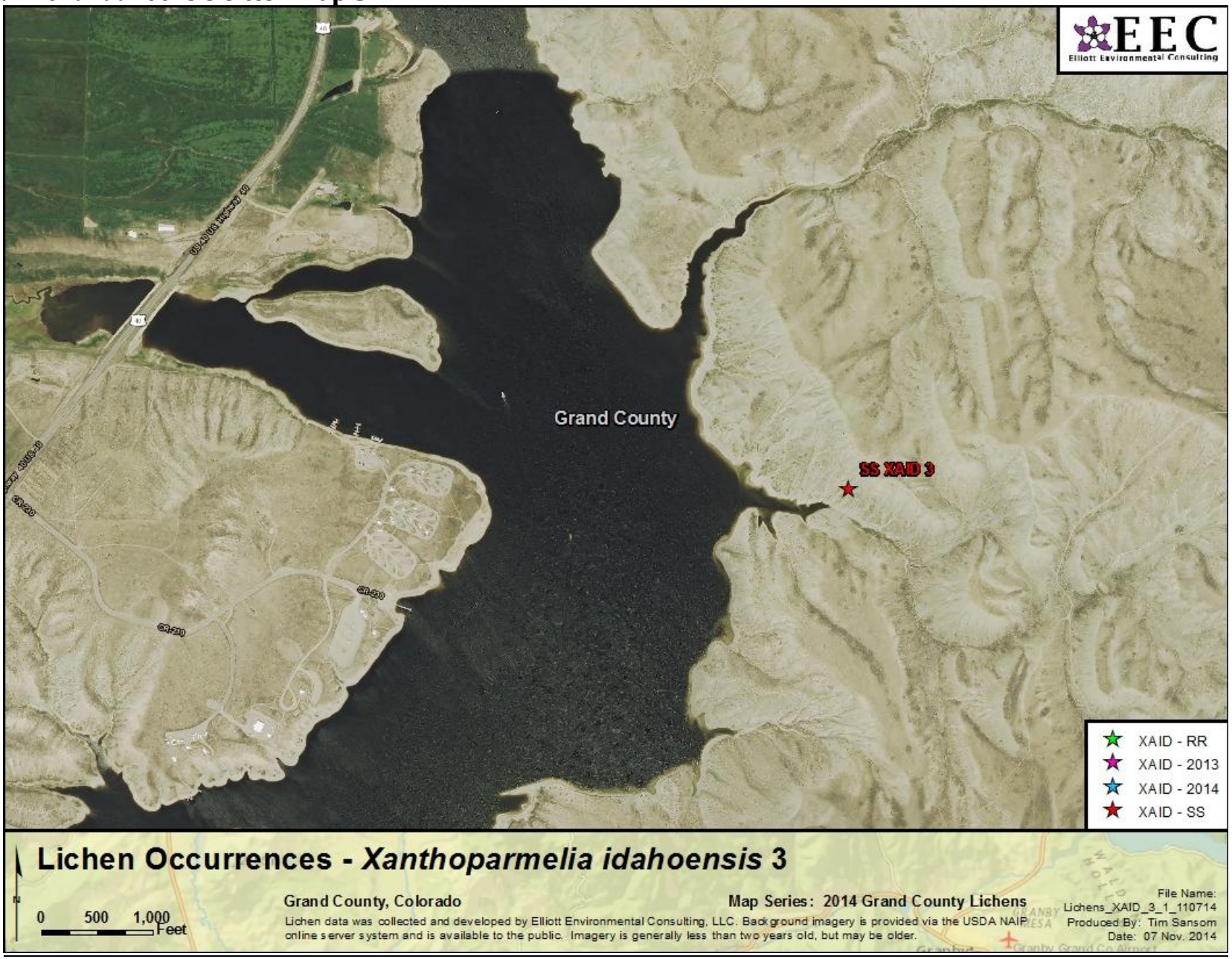


Xanthoparmelia idahoensis sites- Map 1

Xanthoparmelia idahoensis sites- Map 2

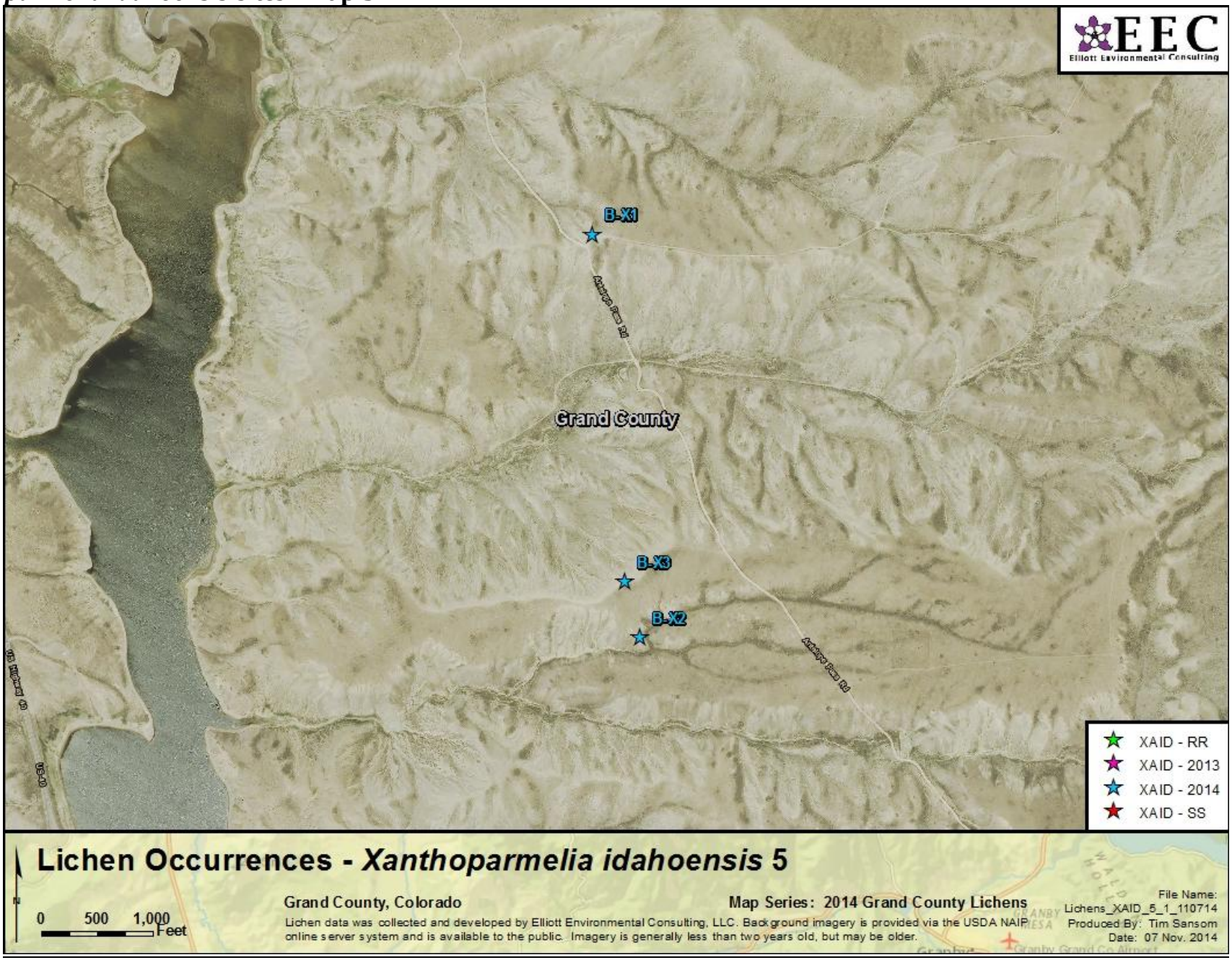


Xanthoparmelia idahoensis sites- Map 3

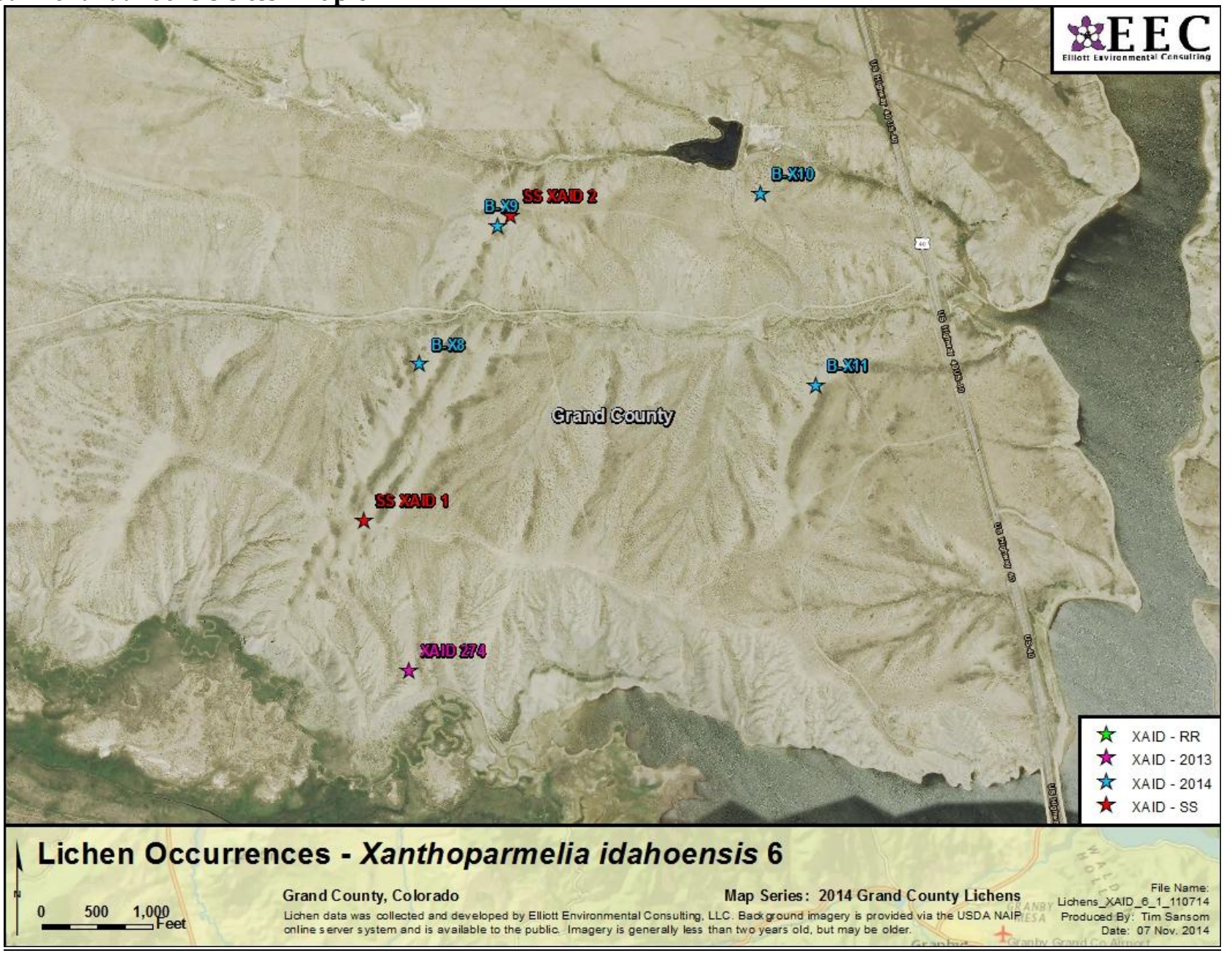


Xanthoparmelia idahoensis sites- Map 4

***Xanthoparmelia idahoensis* sites- Map 5**



***Xanthoparmelia idahoensis* sites- Map 6**



Xanthoparmelia idahoensis sites- Map 7

***Xanthoparmelia idahoensis* habitat**

***Xanthoparmelia idahoensis* habitat (foreground)**

Xanthoparmelia idahoensis

COLORADO NATURAL HERITAGE PROGRAM
T&E PLANT ELEMENT OCCURRENCE FIELD FORM
COLORADO STATE UNIVERSITY-WARNER COLLEGE OF NATURAL RESOURCES

Please submit copies of personal/agency field data forms, digital data (GIS or spreadsheet), or this field form to:
CNHP, 1475 Campus Delivery, Fort Collins, CO 80523 or Jill.Handwerk@colostate.edu (970) 491-5857
(For a list of elements tracked by CNHP, refer to http://www.cnhp.colostate.edu/download/list.asp)

Element Scientific Name: *Circinaria rogeri*
Survey Date: 2014-08-29–31 (yyyy-mm-dd)
Observer(s) Name & Affiliation: Brian Elliott, Elliott Environmental Consulting, and Scott Smith.
Observer(s) Address & Phone Number: P.O. Box 1582, Laramie, WY 82073. 505-307-9046. brianelliott.eec@gmail.com.

Land Ownership
Owner Type: ☐ Private ☐ USFS ☒ BLM ☐ State ☐ Military ☐ Indian ☐ BuRec ☐ NPS ☐ Other:____
Owner Name (or National Forest, BLM District, etc.): Kremmling Field Office
Owner Comments (special requests, permissions, circumstances): ____
Data Sensitive Element Occurrence: ☐ Y ☒ N
If yes, list reason (i.e., landowner requests confidentiality): ____

Locational Information (REQUIRED)
(Provide a photocopy of map with location of the occurrence marked or outlined, or a shapefile)

Surveysite Name (from 7.5' quad): Hinman Reservoir, Kremmling, Junction Butte, and King Creek.
County: Grand Elevation (range if applicable): 7,430–7,920 ☒ feet ☐ meters **NOTE: The elevation range was remarkably consistent given the distribution of the sites.**

Legal Description: Township: ____ Range: ____ Section: ____ ¼ Sec: ____
Additional T/R/S, Sections or ¼ Secs: ____

GPS Coordinates: UTM Zone: ☐ 12 ☒ 13
Note: Sites with a B-X format are from collections made by Brian Elliott; sites with a SSXAID format are from collections made by Scott Smith.

B-C11: E377726; N4447888
B-C12: E378668; N4448200
B-C5: E382736; N4437919
B-C7: E383265; N4436613
B-C8: E386546; N4419485
B-C9: E387315; N4419709
SS CIRO1: E387403; N4419762
SS CIRO4: E386898; N4419408
SS CIRO5: E387403; N4419762
SS CIRO6: E382671; N4432236

Datum: ☐ NAD27 ☒ NAD83 ☐ WGS84 ☐ Other: ____
GPS accuracy (if known): submeter ☒ autonomous(uncorrected) ☒ differentially corrected ☐ Other: ____
GPS make/model: Trimble Geo XT for Elliott sites, recreational grade Garmin gps unit for Smith sites.

Directions
Driving and hiking directions and prominent topographical features:
All sites are in the vicinity of Kremmling.

One cluster of sites is west of Highway 40 on a small patch of BLM land about 2.8 miles north of the junction of Highways 40 and 134. A small road accesses the sites but it is un-numbered on the map. I recall that the road is marked by a carsonite sign with a number.

A second cluster of sites near Kremmling can be accessed by taking the Troublesome Road (County Road 22) north of Kremmling for about 1 mile, then turning left on Road #224. Two sites, in Horse and Cow Gulches, can be accessed from this road.

A southern cluster of sites can be found about 10 miles south of Kremmling at the junction of Highway 9 and BLM Road #381, about 1.7 miles north of the turnoff to Green Mountain Reservoir.

Element Occurrence Data

Number of Individuals (exact count, if feasible or check range below; if plants are spreading vegetatively, indicate number of aerial stems): Not applicable.

1-10 ☐ 11-50 ☐ 51-100 ☐ 101-500 ☐ 501-1000 ☐ 1001-5000 ☐ 5001-10,000 ☐ 10,000+ ☐

NOTE: This lichen is quite small and inconspicuous. It is exceptionally difficult to estimate population size.

Estimated Population Size: _____

Size of Area Covered by Population: _____ acres _____ sq ft _____ sq m

NOTE: We located 10 new sites. The sites ranged in size from about 0.1 acre to three or four acres. Thus, I would estimate a total population area of approximately 5 to 10 acres. Revisiting and mapping the sites would provide a much more accurate estimate of population area.

Full extent of occurrence visited/mapped: No: ☒ Yes: ☐ Comments: _____

Additional EO Data Comments: _____

Phenology (What percent of the observed individuals are vegetative, dormant, or in flower and fruit, note that you may have plants that are in both flower and fruit, and therefore the total % may be more than 100%. Ex. - Vegetative: 20%, Flower, 70%, Fruit: 80%, Dormant: 5%): Vegetative (leaf or bud): **NOT APPLICABLE** _____% Flower: _____% Fruit: _____% Dormant: _____%

Reproductive Success: (evidence of seed dispersal and establishment): _____

Age Classes Present: **UNCERTAIN** Seedling: _____% Immature: _____%Mature: _____% Senescent: _____%

Vigor: Feeble ☐ Normal ☐ Vigorous ☐ **Difficult to estimate vigor in these lichens, but they certainly appeared vigorous.**

Pollinators (e.g number, types, etc.): **NOT APPLICABLE** _____

Evidence of Disease, Predation, Herbivory or Injury (estimate % of individuals affected): I did not see any evidence of herbivory and little evidence of trampling. Livestock and deer/elk had trailed through some of the sites but apparently do not linger due to lack of available forage.

Look alikes present: No: ☐ Yes: ☒ Comments on identification: *Circinaria rogeri* closely resembles *Circinaria hispida. C. rogeri* bears broad and blunt branch tips while *C. hispida* bears finer, branched branch tips.

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Additional Site/Plant Condition Comments (details on productivity [vigor], health of population, degree of anthropogenic disturbance, naturalness of hydrology, and other ecological processes **within** the occurrence, not addressed above. Please provide % of occurrence affected, if known, following values for threats listed in Management Comments section): Several sites had small 2-track roads going within or adjacent to the occurrence. The plants are often found in barren areas on hilltops or ridgelines and these are popular places for roads. I did not see any ATV or other recreational vehicle tracks within the sites. Livestock often trailed through sites but did not linger.

Landscape Context Comments (biological structure, species composition, degree of fragmentation or connectivity, and condition **of the surrounding landscape**. Please provide % of the surrounding landscape affected, if known, following values for threats listed in Management Comments section): The surrounding area is used extensively for recreation and livestock grazing. Wolford Mountain Reservoir inundated a great number of acres in the vicinity of the known sites.

Element Occurrence Habitat Description

Habitat in the immediate area (ex. shale barren): Generally the plants were found in clay-shale sites with low shrubs and abundant bare ground.

Dominant Plant Community (list dominant species currently present, include age structure, and % cover if known): Sites are characterized by shrubs (e.g. *Artemnisia nova, Artemisia wyomingensis, Artemisia arbuscula,* and sometimes *Sarcobatus vermivulatus.*) and western wheatgrass with low canopy cover and a large percentage of bare soil. One site with abundant *Circinaria rogeri* was dominated by *Krascheninikovia lanata.*

Additional Associated Plant Species *(five most commonly seen with this species)*: *Artemisia frigida*, *Chrysothamnus* sp., *Stipa hymenoides, Phlox hoodii, Elymus smithii, Elymus elymoides.*

Topographic Position:

☐ Ridge Top/Interfluve ☒ Upper/High Slope ☐ Mesa or Plateau top ☒ Midslope ☐ Cliff Face/Back Slope
☐ Shelf on Cliff Face ☒ Low Slope ☒ Toe Slope ☒ Valley/Basin Floor
☐ Channel Wall ☐ Channel Bed

Aspect:
☒ Flat ☒ Variable ☐ N (338-22 degrees) ☐ NE (23-67 degrees) ☐ E (68-112 degrees)
☐ SE (113-157 degrees) ☐ S (158-202 degrees) ☐ SW (203-247 degrees) ☐ W (248-292 degrees) ☐ NW (293-337 degrees)

Slope:
☒ Flat 0% (0 degrees) ☒ Gentle 1-6% (1-5 degrees)
☒ Moderate 6-33% (5-30 degrees) ☐ Steep 33-50% (30- 45 degrees)
☐ Very steep 50-67% (45-60 degrees) ☐ Cliff 67-100% (60-90 degrees)
☐ Overhanging/sheltered (>90 degrees)

Slope Shape: ☐ Concave ☐ Convex ☐ Straight ☐ Other Slope shape varied and includes all three categories listed.
Light Exposure: ☒ Open ☐ Shaded ☐ Partial shade ☐ Other _____
Moisture: ☒ Dry ☐ Moist ☐ Saturated ☐ Inundated ☐ Seasonal Seepage ☐ Streambank ☐ Other _____
Proximity to Moisture: (for alpine sites is species influenced by snowmelt, on snow free sites or snow covered sites): _____
Soil Texture: Silt ☐ Clay ☒ Loam ☐ Sand ☐ Gravel ☐ Cobble ☐ Cobble Size: _____Other ☐
Geomorphic Landform (e.g., glaciated mountain slopes and ridges, alpine glacial valley, cirque, rolling uplands, breaklands, floodplain, cutbank, hogback, cliff, gully, canyon, etc.): Extensive basin (Middle Park) with eroded slopes and ancient marine sediments.

Protection Comments (Comments on any legal protection, special land designations, or strategies needed or in place.):
None known.

Management Comments
Threat and Management comments apply to: Entire occurrence ☒ Area surveyed ☐

Management Comments (This could include special fencing, signage and other concerns.): Uncertain. Sites should be periodically monitored for impacts and signs or fencing used as needed.

Evidence of Threats and Disturbance (e.g. effects on population viability due to mining, recreation, grazing, exotic species; past/present/future recommendations): The occurrences are not currently being impacted; however, should OHV riders begin to use a site as a play area the site could be decimated quickly. Livestock do not currently appear to be a threat, but should salt or a water development be placed within an occurrence the site could be decimated quickly. Oil and gas development within an occurrence would certainly lead to extirpation of the site. No non-native invasive plant species were noted within the occurrences.

Predominant Land Uses (recreation, grazing, open space, etc.): Recreation (mostly OHV riding) and livestock grazing.

Domain values for Scope of Threat (adapted from NatureServe Biotics):

High = > 60% of occurrence or area surveyed
Moderate = 20-60% of occurrence or area surveyed
Low = 5-20% of occurrence or area surveyed
Very Low = < 5% of occurrence or area surveyed
Trace + < 1% of occurrence or area surveyed
None = none observed in occurrence or area surveyed
Unknown = proportion of occurrence, or area surveyed is unknown
Null = Rank factor not assessed

Threat Categories (adapted from the Colorado Rare Plant SWAP):

Collection or other Direct Mortality Uses: High ☐ Moderate ☐ Low ☐ Very Low ☐ Trace ☒ None ☐ Unknown ☐
Comments: _____

Grazing: High ☐ Moderate ☐ Low ☒ Very Low ☐ Trace ☐ None ☐ Unknown ☐
Comments: _____

Recreational disturbance (motorized and non-motorized recreation): High ☐ Moderate ☐ Low ☒ Very Low ☐ Trace ☐ None ☐ Unknown ☐ Comments on type of recreational disturbance: _____

Resource Extraction (mining, oil & gas drilling): High ☐ Moderate ☐ Low ☐ Very Low ☐ Trace ☐ None ☒ Unknown ☐ Comments on type of resource extraction: _____

Habitat Degradation (fragmentation, trail development, utility lines, hydrologic alteration, etc.): High ☐ Moderate ☒ Low ☐ Very Low ☐ Trace ☐ None ☐ Unknown ☐ Comments on type of habitat degradation: _____

Habitat Conversion (urban, industrial, agricultural development, etc): High ☐ Moderate ☐ Low ☐ Very Low ☐ Trace ☐ None ☒ Unknown ☐ Comments on type of habitat conversion: _____

Invasive or Exotic Species (plants, pathogens): High ☐ Moderate ☐ Low ☐ Very Low ☐ Trace ☐ None ☒ Unknown ☐ Comments on quantity (names of invasive or exotic species present , estimate % cover of each invasive species and/or , dominance of species at site): _____

Pollution (chemical run-off, dust, air pollution): High ☐ Moderate ☐ Low ☐ Very Low ☒ Trace ☐ None ☐ Unknown ☐ Comments on type of pollution at site: _____

Documentation

Photographs Taken: ☒ Y ☐ N Photographer: Brian Elliott Photo Number(s): many Repository: Currently in my project files.

Specimens Taken: ☒ Y ☐ N Collector: Brian Elliott Collection Number(s): 16,354, 16,356, 16,359, 16,362, 16,367, and 16,370. Scott Smith collections are not numbered. Repository: Currently, one set is with Roger Rosentreter at the Boise State University Lichen Herbarium, and a duplicate set is awaiting final disposition.

Survey Effort

People hours: 45
Number of surveyors: two
Survey time at site: varied
Extent of area surveyed: patchy

Survey Method

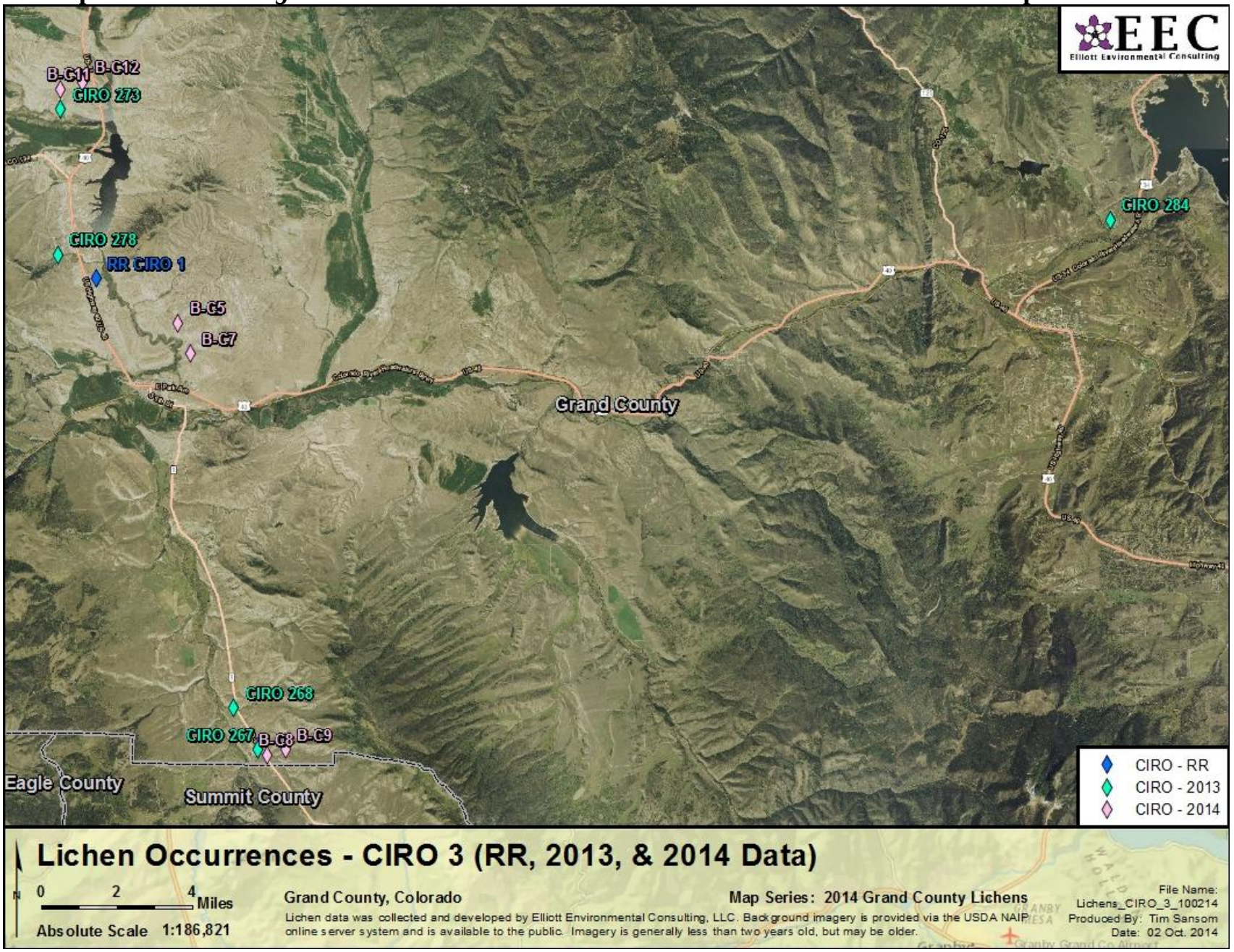
Transect ☐ with a _____ meter separation distance
Ocular estimation ☐
Quadrat ☐ Size and number: _____
Other, describe**:** surveys focused in potential habitat

Comments (areas needing additional surveys, how was suitable habitat identified, etc.): Additional habitat in the Wolford Mountain Reservoir area is in need of survey. Funding and survey time was extremely limited on this project. See the transect maps within the survey report for a visual representation of where surveys were conducted and where additional survey is needed.

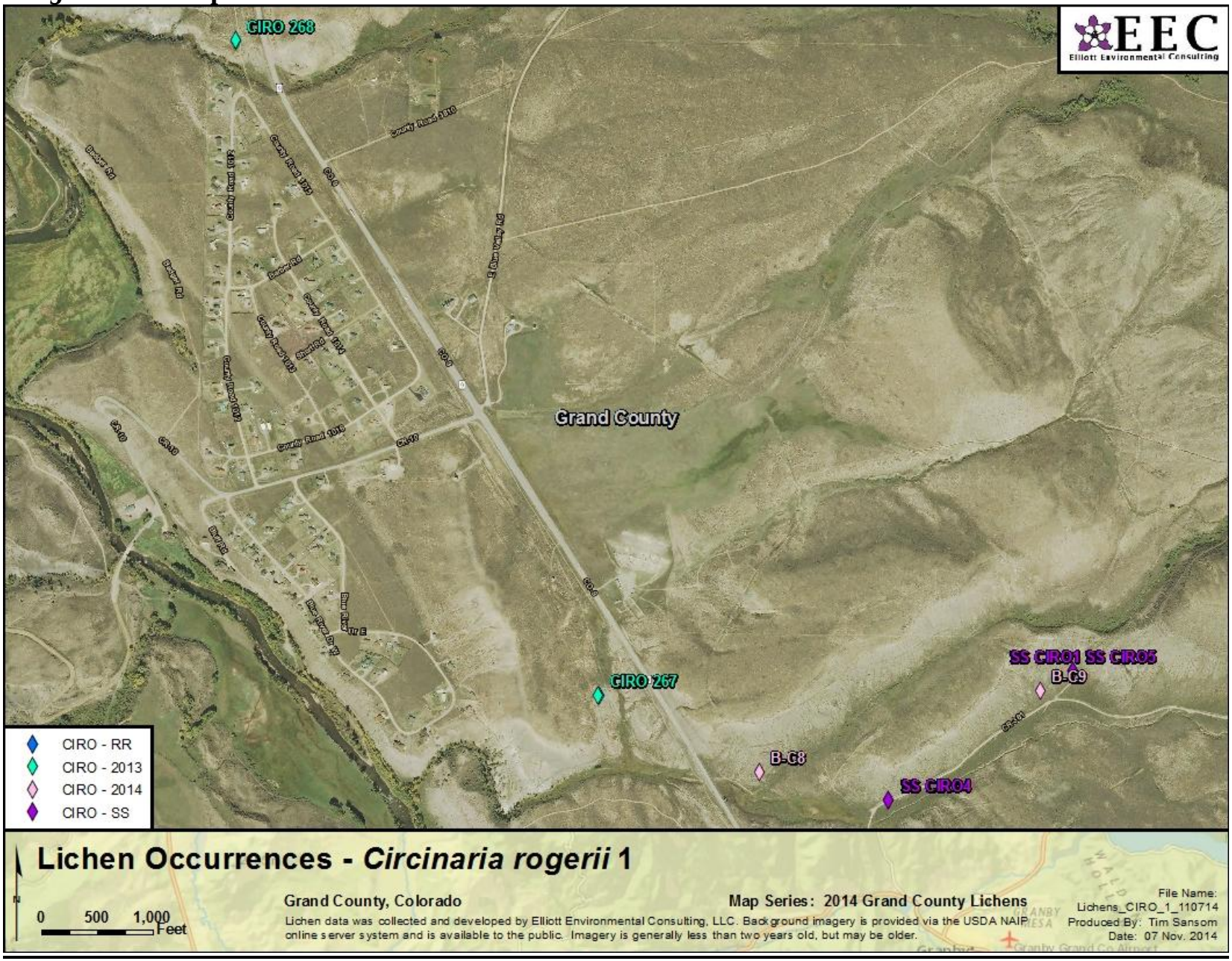
General Comments (for information not captured above):

_____

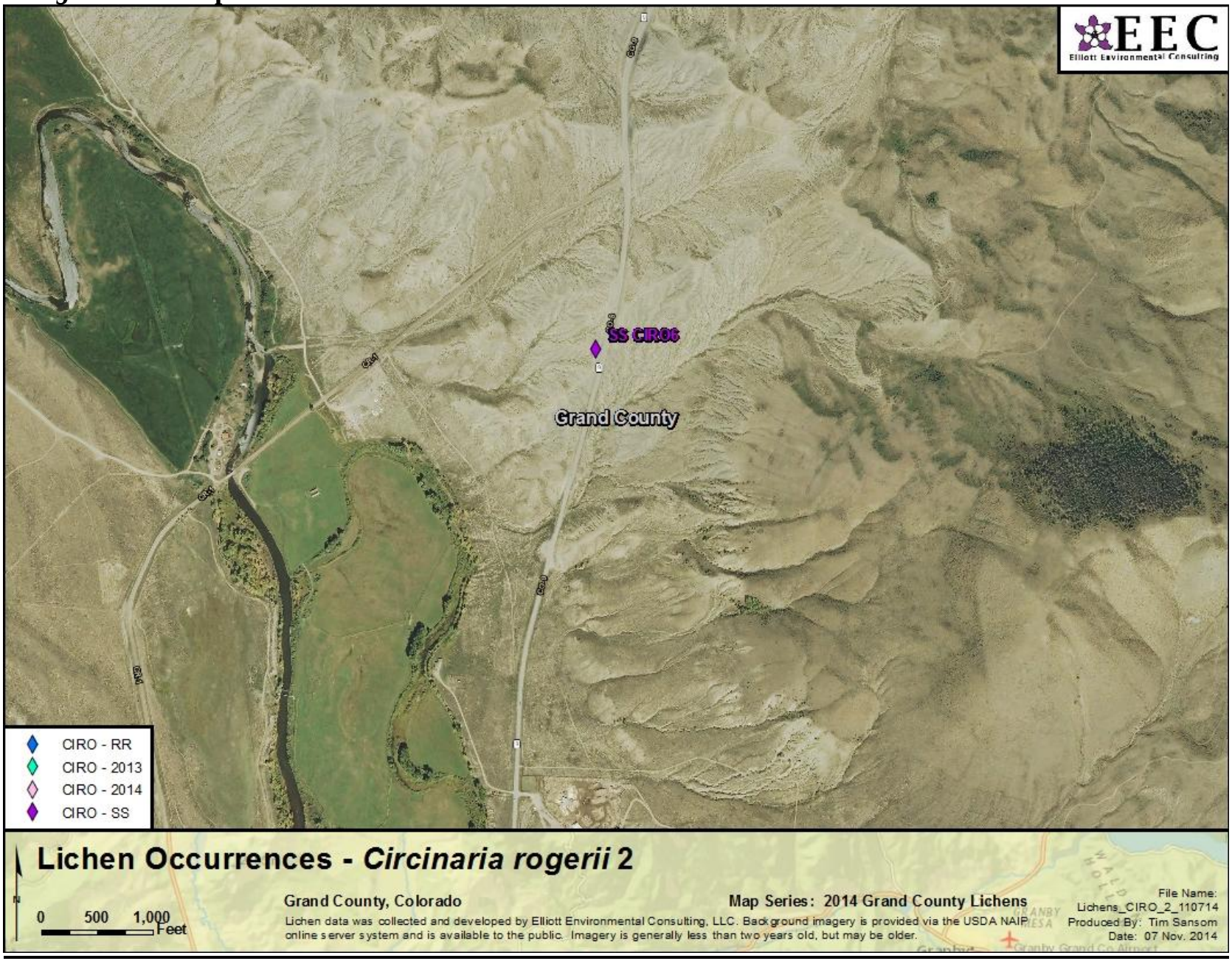
Overview Map of *Circinaria rogeri* sites. Wolford Mountain Reservoir is in the center of the map.



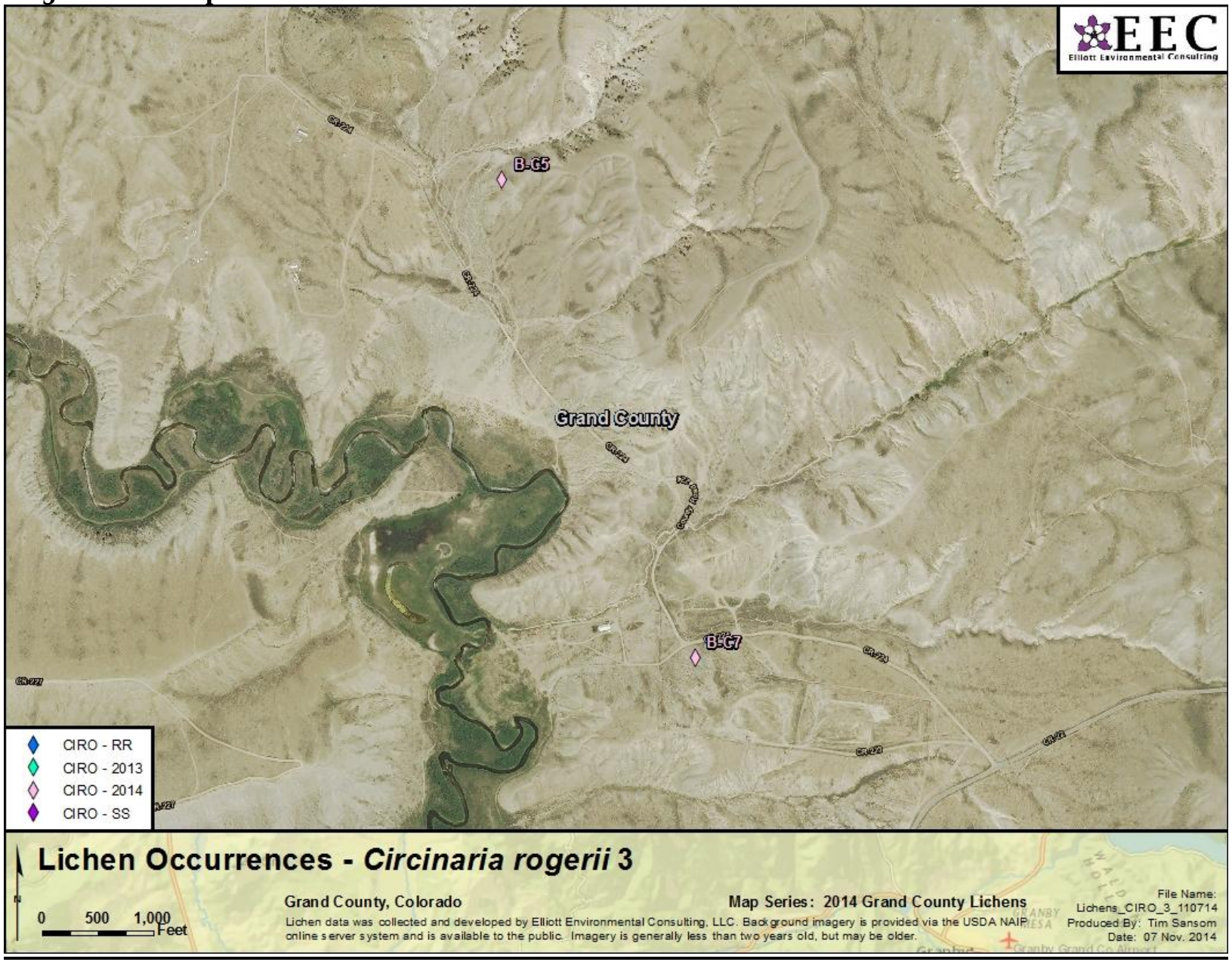
Circinaria rogeri sites- Map 1



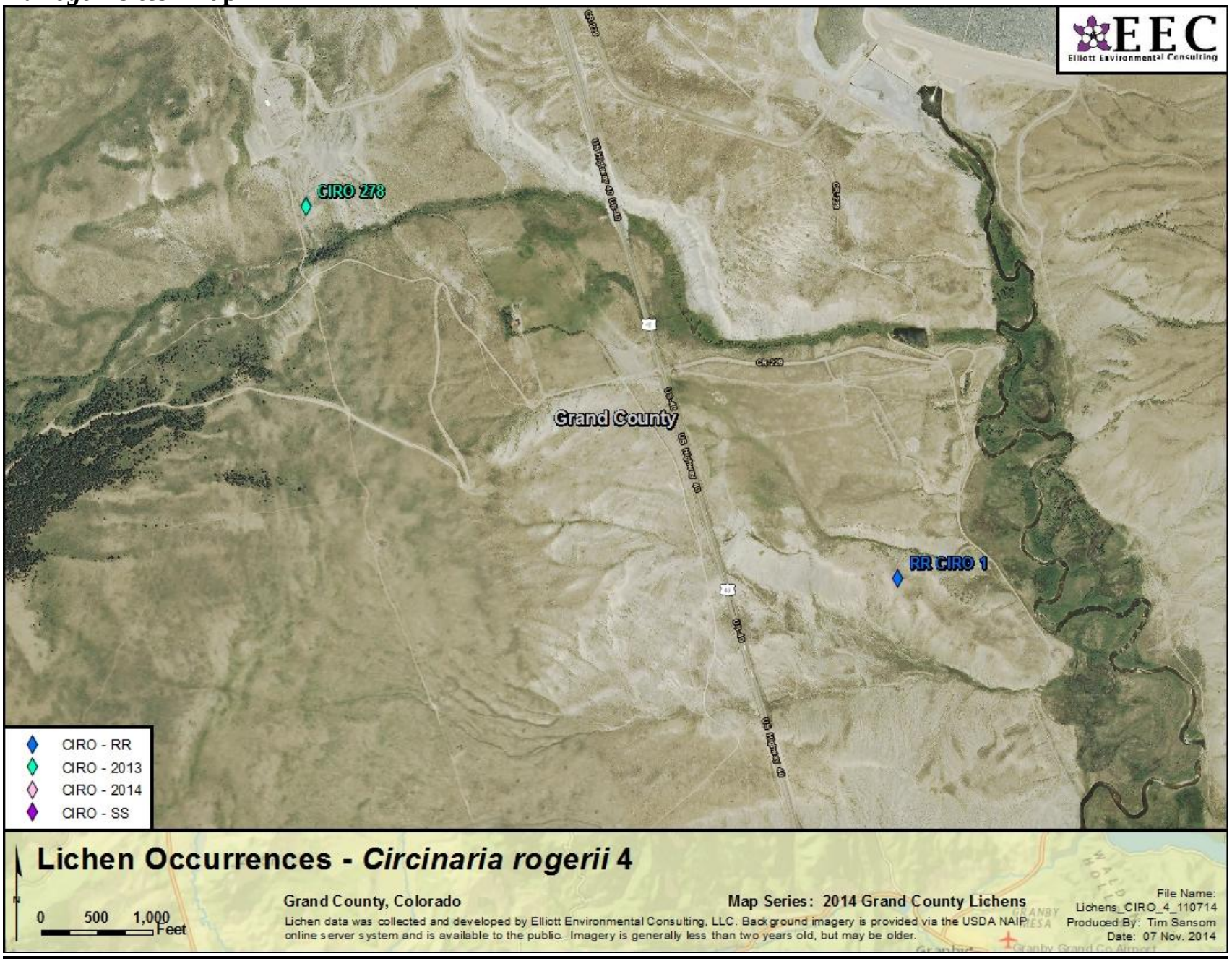
Circinaria rogeri sites- Map 2



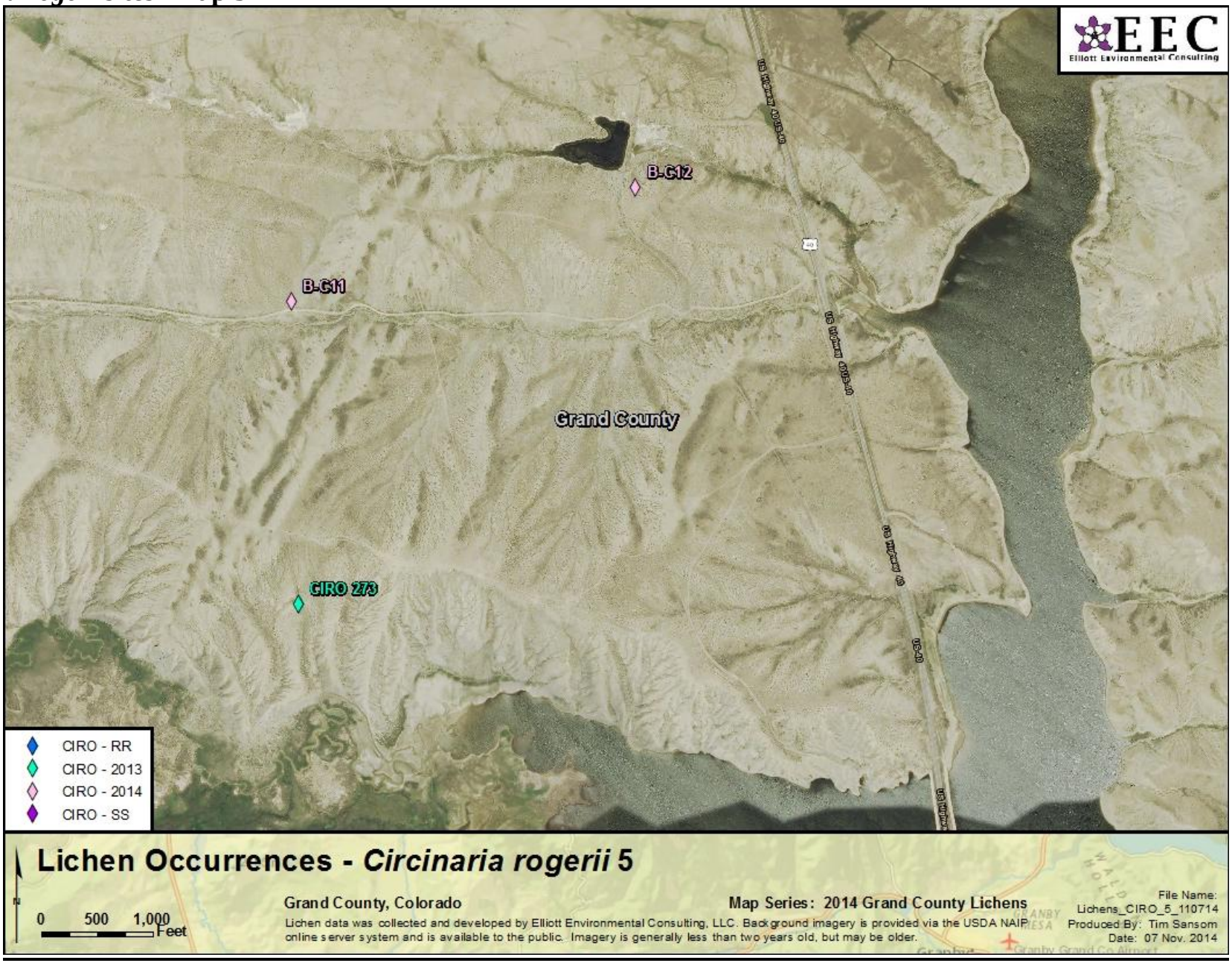
Circinaria rogeri sites- Map 3



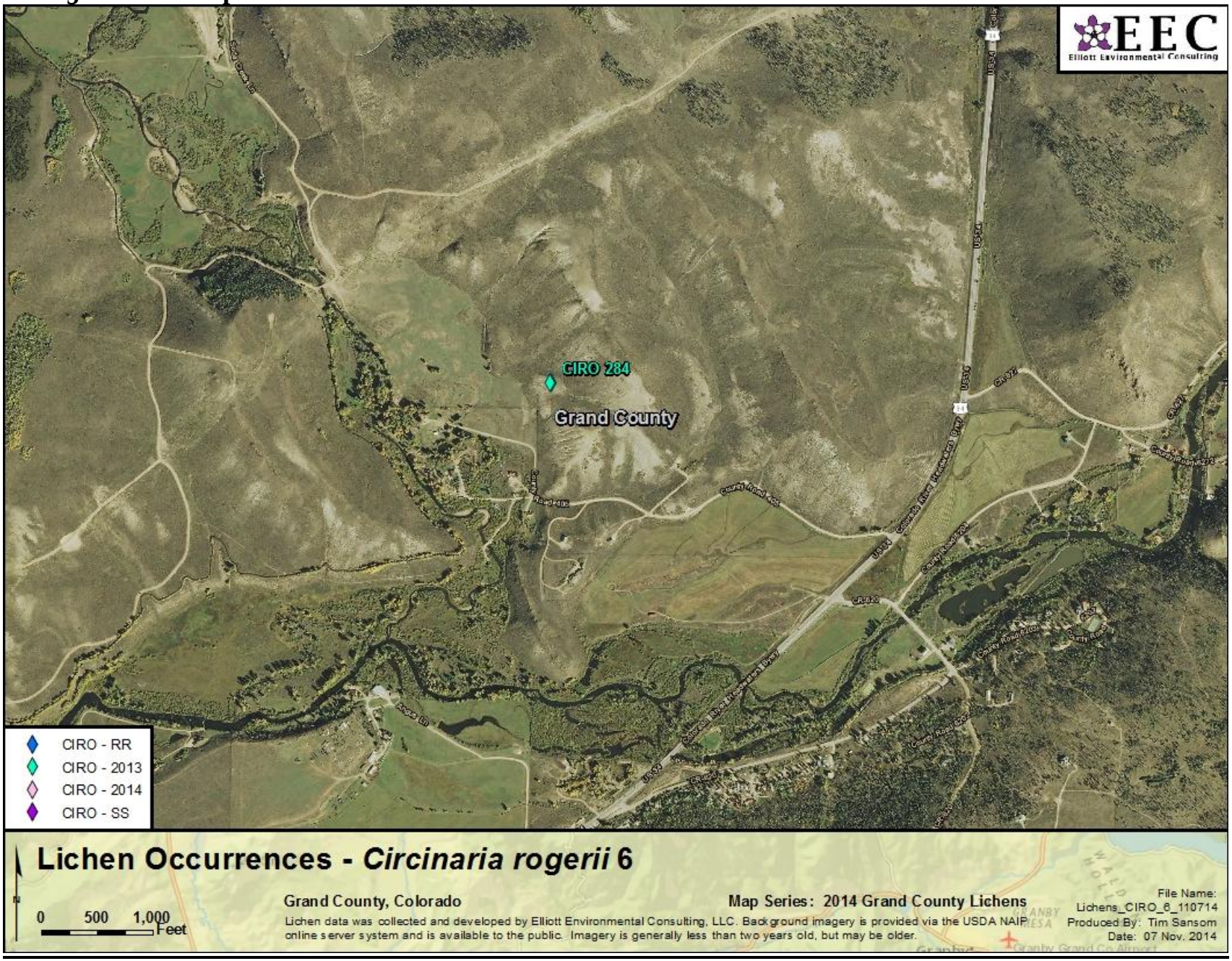
Circinaria rogeri sites- Map 4



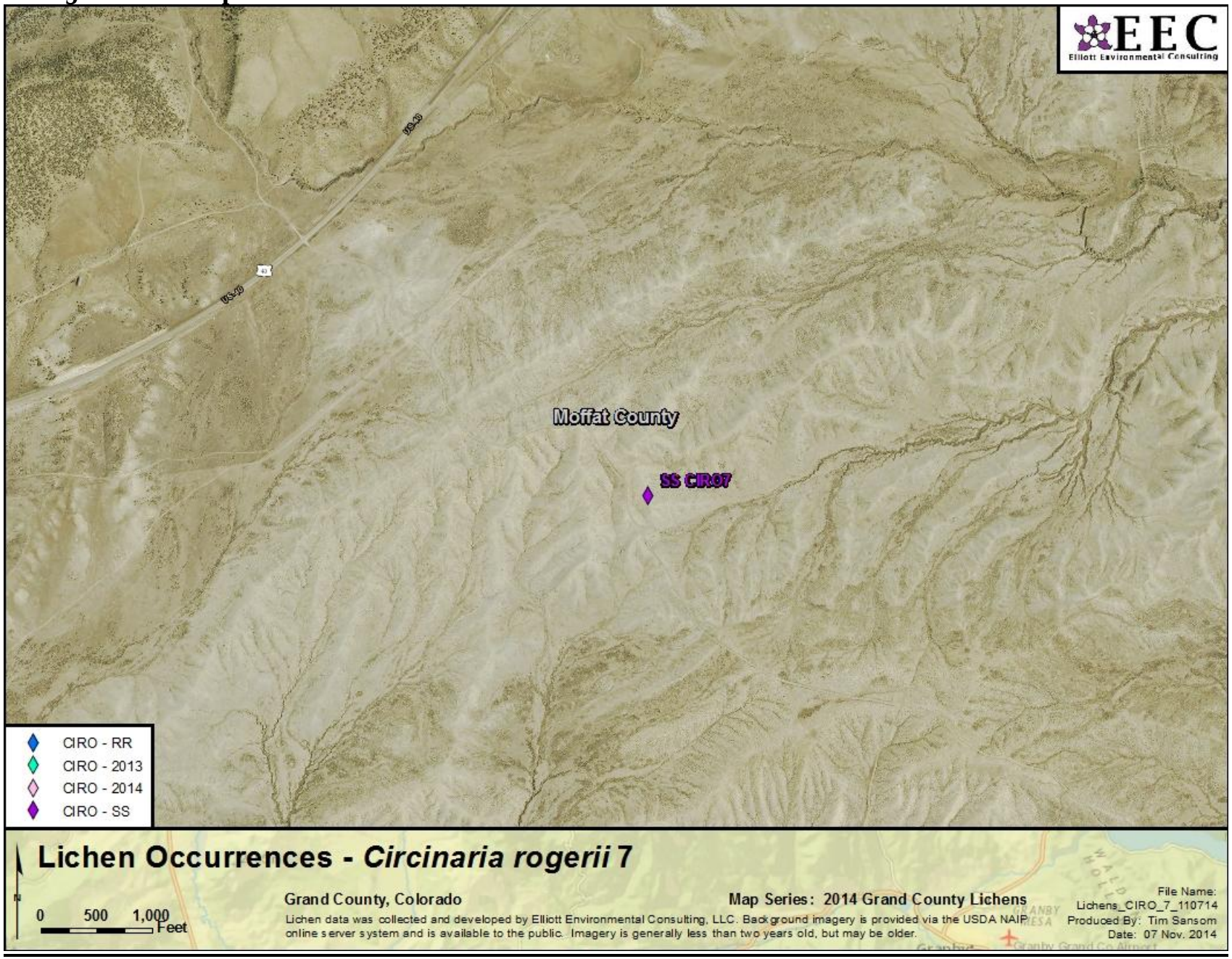
Circinaria rogeri sites- Map 5



Circinaria rogeri sites- Map 6



Circinaria rogeri sites- Map 7



***Circinaria rogeri* habitat**

***Circinaria rogeri* habitat**

Circinaria rogeri

COLORADO NATURAL HERITAGE PROGRAM
T&E PLANT ELEMENT OCCURRENCE FIELD FORM
COLORADO STATE UNIVERSITY-WARNER COLLEGE OF NATURAL RESOURCES

Please submit copies of personal/agency field data forms, digital data (GIS or spreadsheet), or this field form to:
CNHP, 1475 Campus Delivery, Fort Collins, CO 80523 or Jill.Handwerk@colostate.edu (970) 491-5857
(For a list of elements tracked by CNHP, refer tohttp://www.cnhp.colostate.edu/download/list.asp)

Element Scientific Name: *Circinaria rogeri*
Survey Date: 2014-06-11 (yyyy-mm-dd)
Observer(s) Name & Affiliation: Scott Smith, Elliott Environmental Consulting.
Observer(s) Address & Phone Number: P.O. Box 1582, Laramie, WY 82073. 505-307-9046. brianelliott.eec@gmail.com.

Land Ownership
Owner Type: ☐ Private ☐ USFS ☒ BLM ☐ State ☐ Military ☐ Indian ☐ BuRec ☐ NPS ☐ Other:_____
Owner Name (or National Forest, BLM District, etc.): Uncompahgre Field Office
Owner Comments (special requests, permissions, circumstances): _____
Data Sensitive Element Occurrence: ☐ Y ☒ N
If yes, list reason (i.e., landowner requests confidentiality): _____

Locational Information
(Provide a photocopy of map with location of the occurrence marked or outlined, or a shapefile)

Surveysite Name (from 7.5' quad): Calamity Ridge.
County: Rio Blanco Elevation (range if applicable): 7,900–8,100 ☒ feet ☐ meters

Legal Description: Township: 1N Range: 99W Section: 18 ¼ Sec:
Additional T/R/S, Sections or ¼ Secs: T2N R99W Section 31

GPS Coordinates: UTM Zone: ☒ 12 ☐ 13
E0709015 N4436289 and E0709447 N4441353

Datum: ☐ NAD27 ☐ NAD83 ☒ WGS84 ☐ Other: _____
GPS accuracy (if known): submeter ☒ autonomous(uncorrected) ☒ differentially corrected ☐ Other: _____
GPS make/model: Recreational grade Garmin gps unit.

Directions
Driving and hiking directions and prominent topographical features:
Both sites can be accessed by driving east from Rangely CO to the Cathedral Bluffs Road. Continue to the southeast on Cathedral Bluffs Road until you get to the crest. At crest drive north.

Element Occurrence Data
Number of Individuals (exact count, if feasible or check range below; if plants are spreading vegetatively, indicate number of aerial stems): Not applicable.
1-10 ☐ 11-50 ☐ 51-100 ☐ 101-500 ☐ 501-1000 ☐ 1001-5000 ☐ 5001-10,000 ☐ 10,000+ ☐

NOTE: This lichen is quite small and inconspicuous. It is exceptionally difficult to estimate population size.

Estimated Population Size: _____
Size of Area Covered by Population: _____ acres _____ sq ft _____ sq m
The full extent of the population is not known.

Full extent of occurrence visited/mapped: No: ☒ Yes: ☐ Comments: _____
Additional EO Data Comments: _____

Phenology (What percent of the observed individuals are vegetative, dormant, or in flower and fruit, note that you may have plants that are in both flower and fruit, and therefore the total % may be more than 100%. Ex. - Vegetative: 20%, Flower, 70%, Fruit: 80%, Dormant: 5%): Vegetative (leaf or bud): **NOT APPLICABLE** _____% Flower: _____% Fruit: _____% Dormant: _____%
Reproductive Success: (evidence of seed dispersal and establishment): _____
Age Classes Present: **UNCERTAIN** Seedling: _____% Immature: _____%Mature: _____% Senescent: _____%

Vigor: Feeble ☐ Normal ☐ Vigorous ☐ **Difficult to estimate vigor in these lichens, but they certainly appeared vigorous.**
Pollinators (e.g number, types, etc.): **NOT APPLICABLE** _____
Evidence of Disease, Predation, Herbivory or Injury (estimate % of individuals affected): No evidence of herbivory and little evidence of trampling was seen.

Look alikes present: No: ☐ Yes: ☒ Comments on identification: *Circinaria rogeri* closely resembles *Circinaria hispida. C. rogeri* bears broad and blunt branch tips while *C. hispida* bears finer, branched branch tips.

Additional Site/Plant Condition Comments (details on productivity [vigor], health of population, degree of anthropogenic disturbance, naturalness of hydrology, and other ecological processes **within** the occurrence, not addressed above. Please provide % of occurrence affected, if known, following values for threats listed in Management Comments section):

Landscape Context Comments (biological structure, species composition, degree of fragmentation or connectivity, and condition **of the surrounding landscape**. Please provide % of the surrounding landscape affected, if known, following values for threats listed in Management Comments section): The surrounding area is used extensively for livestock grazing.

Element Occurrence Habitat Description
Habitat in the immediate area (ex. shale barren): Generally the plants were found in clay-shale sites with low shrubs and abundant bare ground.

Dominant Plant Community (list dominant species currently present, include age structure, and % cover if known): Site was a Rolling hill top heavily vegetated with *Artemisia tridentata* and *Quercus gambellii*. *Circinaria rogeri* was less common with denser vegetation, and mostly found in more open areas between oak and sagebrush.
Additional Associated Plant Species *(five most commonly seen with this species)*: Associated species included *Physaria*, *Penstemon*, *Oenothera*, *Astragalus*, *Castilleja*, *Allium*, *Asters*, *Hedysarum*, and several graminoids.

Topographic Position:
☐ Ridge Top/Interfluve ☐ Upper/High Slope ☐ Mesa or Plateau top ☒ Midslope ☐ Cliff Face/Back Slope
☐ Shelf on Cliff Face ☐ Low Slope ☐ Toe Slope ☐ Valley/Basin Floor
☐ Channel Wall ☐ Channel Bed

Aspect:
☐ Flat ☒ Variable ☐ N (338-22 degrees) ☐ NE (23-67 degrees) ☐ E (68-112 degrees)
☐ SE (113-157 degrees) ☐ S (158-202 degrees) ☐ SW (203-247 degrees) ☐ W (248-292 degrees) ☐ NW (293-337 degrees)

Slope:
☐ Flat 0% (0 degrees) ☒ Gentle 1-6% (1-5 degrees)
☒ Moderate 6-33% (5-30 degrees) ☐ Steep 33-50% (30- 45 degrees)
☐ Very steep 50-67% (45-60 degrees) ☐ Cliff 67-100% (60-90 degrees)
☐ Overhanging/sheltered (>90 degrees)

Slope Shape: ☐ Concave ☒ Convex ☐ Straight ☐ Other

Light Exposure: ☒ Open ☐ Shaded ☐ Partial shade ☐ Other _____
Moisture: ☒ Dry ☐ Moist ☐ Saturated ☐ Inundated ☐ Seasonal Seepage ☐ Streambank ☐ Other _____
Proximity to Moisture: (for alpine sites is species influenced by snowmelt, on snow free sites or snow covered sites): _____
Soil Texture: Silt ☐ Clay ☒ Loam ☐ Sand ☐ Gravel ☐ Cobble ☐ Cobble Size: _____Other ☐
Geomorphic Landform (e.g., glaciated mountain slopes and ridges, alpine glacial valley, cirque, rolling uplands, breaklands, floodplain, cutbank, hogback, cliff, gully, canyon, etc.): Rolling hills.

Protection Comments (Comments on any legal protection, special land designations, or strategies needed or in place.):
None known.

Management Comments
Threat and Management comments apply to: Entire occurrence ☒ Area surveyed ☐

Management Comments (This could include special fencing, signage and other concerns.): Uncertain. Sites should be periodically monitored for impacts and signs or fencing used as needed.

Evidence of Threats and Disturbance (e.g. effects on population viability due to mining, recreation, grazing, exotic species; past/present/future recommendations): The occurrences are not currently being impacted; however, should OHV riders begin to

use a site as a play area the site could be decimated quickly. Livestock do not currently appear to be a threat, but should salt or a water development be placed within an occurrence the site could be decimated quickly. Oil and gas development within an occurrence would certainly lead to extirpation of the site. No non-native invasive plant species were noted within the occurrences.

Predominant Land Uses (recreation, grazing, open space, etc.): Recreation (mostly OHV riding) and livestock grazing.

Domain values for Scope of Threat (adapted from NatureServe Biotics):

High = > 60% of occurrence or area surveyed
Moderate = 20-60% of occurrence or area surveyed
Low = 5-20% of occurrence or area surveyed
Very Low = < 5% of occurrence or area surveyed
Trace + < 1% of occurrence or area surveyed
None = none observed in occurrence or area surveyed
Unknown = proportion of occurrence, or area surveyed is unknown
Null = Rank factor not assessed

Threat Categories (adapted from the Colorado Rare Plant SWAP):

Collection or other Direct Mortality Uses: High ☐ Moderate ☐ Low ☐ Very Low ☐ Trace ☒ None ☐ Unknown ☐
Comments: _____

Grazing: High ☐ Moderate ☐ Low ☒ Very Low ☐ Trace ☐ None ☐ Unknown ☐
Comments: _____

Recreational disturbance (motorized and non-motorized recreation): High ☐ Moderate ☐ Low ☒ Very Low ☐ Trace ☐ None ☐ Unknown ☐ Comments on type of recreational disturbance: _____

Resource Extraction (mining, oil & gas drilling): High ☐ Moderate ☐ Low ☐ Very Low ☐ Trace ☐ None ☒ Unknown ☐ Comments on type of resource extraction: _____

Habitat Degradation (fragmentation, trail development, utility lines, hydrologic alteration, etc.): High ☐ Moderate ☐ Low ☒ Very Low ☐ Trace ☐ None ☐ Unknown ☐ Comments on type of habitat degradation: _____

Habitat Conversion (urban, industrial, agricultural development, etc): High ☐ Moderate ☐ Low ☐ Very Low ☒ Trace ☐ None ☐ Unknown ☐ Comments on type of habitat conversion: _____

Invasive or Exotic Species (plants, pathogens): High ☐ Moderate ☐ Low ☐ Very Low ☐ Trace ☐ None ☒ Unknown ☐
Comments on quantity (names of invasive or exotic species present , estimate % cover of each invasive species and/or , dominance of species at site): _____

Pollution (chemical run-off, dust, air pollution): High ☐ Moderate ☐ Low ☐ Very Low ☒ Trace ☐ None ☐ Unknown ☐
Comments on type of pollution at site: _____

Documentation
Photographs Taken: ☒ Y ☐ N Photographer: Scott Smith Photo Number(s): many Repository: Currently in my project files.
Specimens Taken: ☒ Y ☐ N Collector: Scott Smith Collection Number(s): un-numbered. Repository: Currently, one set is with Roger Rosentreter at the Boise State University Lichen Herbarium, and a duplicate set is awaiting final disposition.

Survey Effort
People hours: 5
Number of surveyors: one
Survey time at site: 2 hours
Extent of area surveyed: patchy

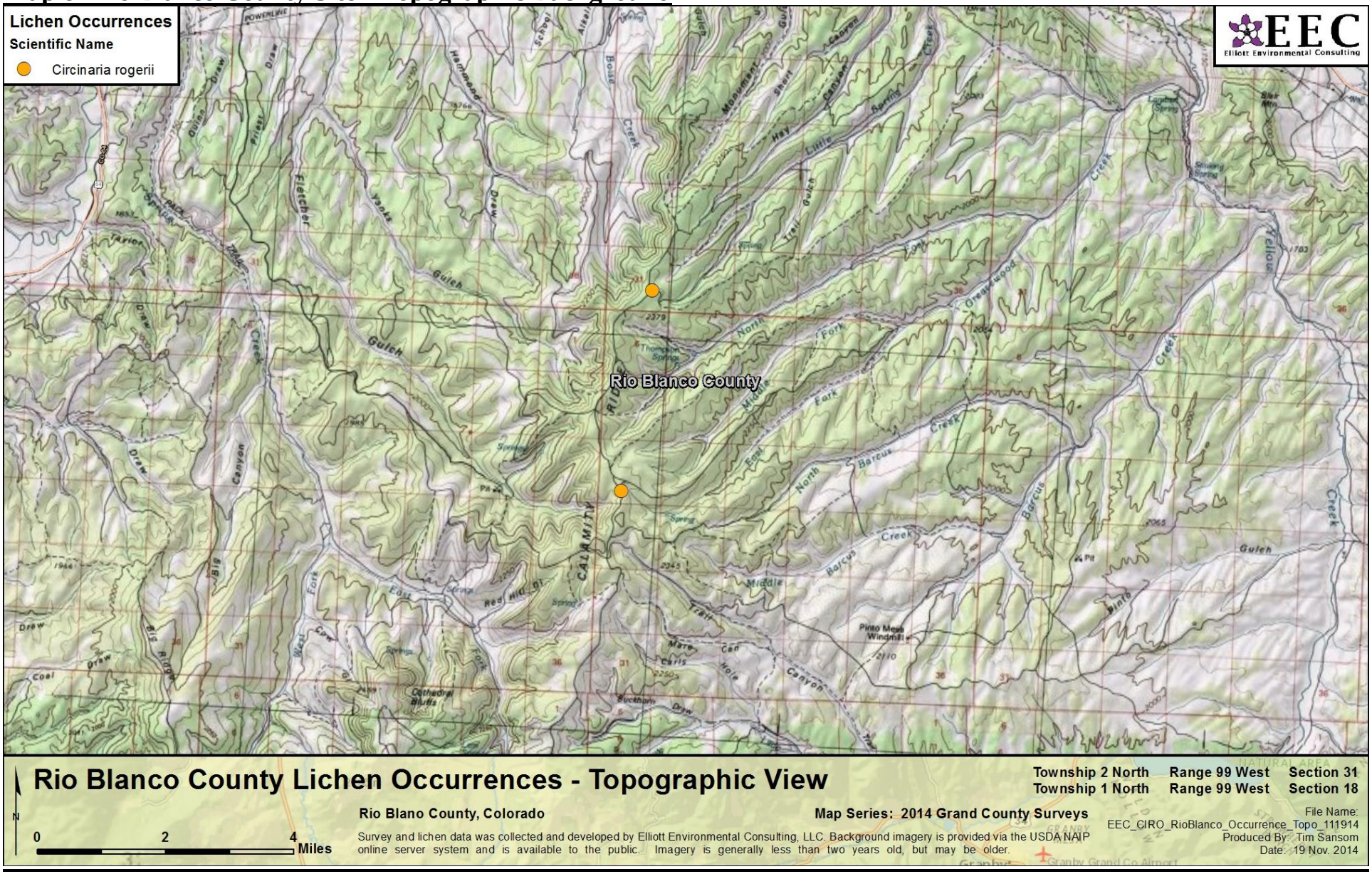
Survey Method
Transect ☐ with a _____ meter separation distance
Ocular estimation ☐
Quadrat ☐ Size and number: _____
Other, describe**:** surveys focused in potential habitat

Comments (areas needing additional surveys, how was suitable habitat identified, etc.): Abundant habitat exists in the area and no previous surveys have been performed. Thus, additional survey work would undoubtedly lead to the discovery of new sites..

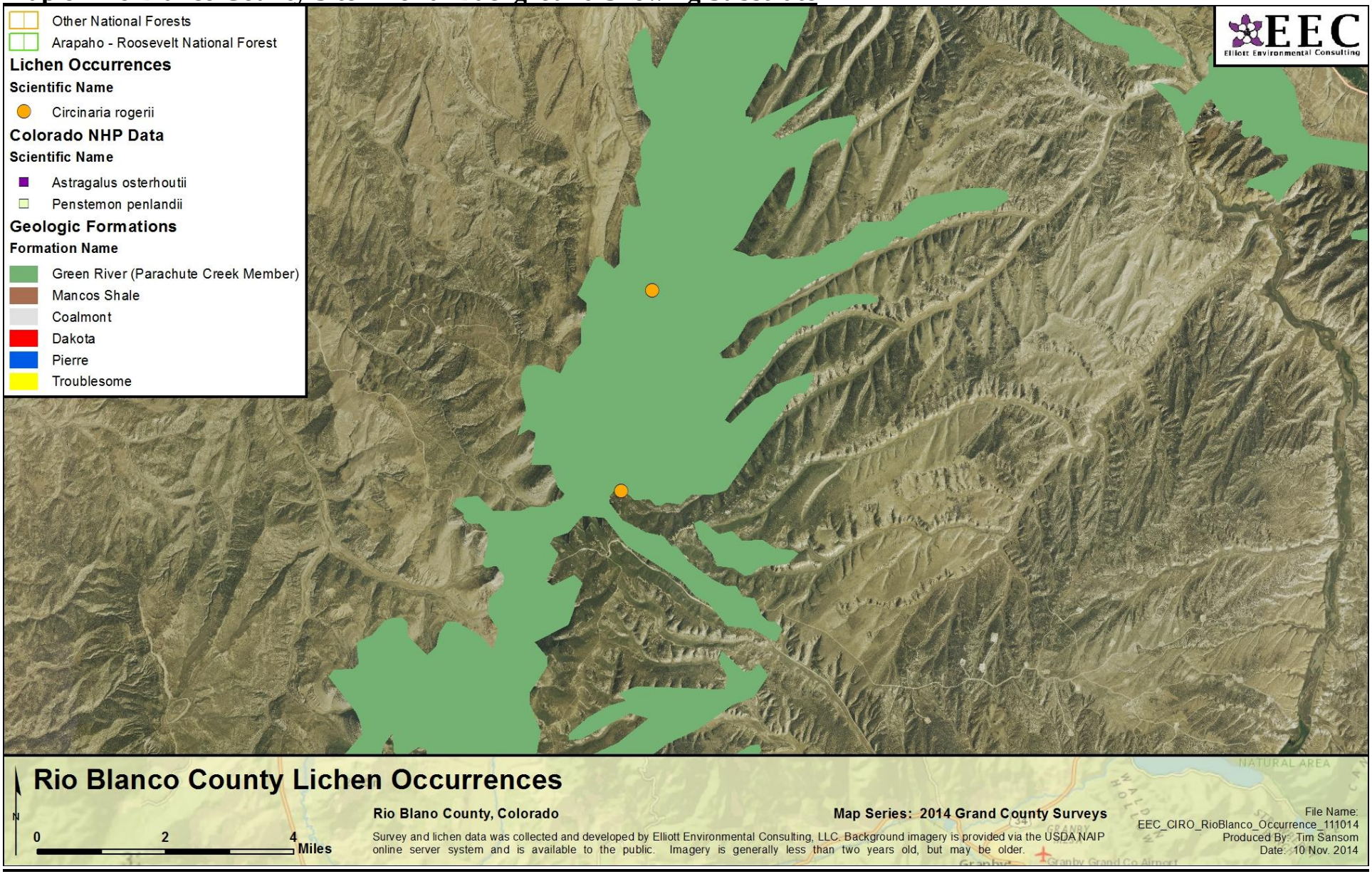
General Comments (for information not captured above):

_____

Map of Rio Blanco County Site - Topographic Background



Map of Rio Blanco County Site - Aerial Background Showing Substrate



Circinaria rogeri habitat

Circinaria rogeri

COLORADO NATURAL HERITAGE PROGRAM
T&E PLANT ELEMENT OCCURRENCE FIELD FORM
COLORADO STATE UNIVERSITY-WARNER COLLEGE OF NATURAL RESOURCES

Please submit copies of personal/agency field data forms, digital data (GIS or spreadsheet), or this field form to:
CNHP, 1475 Campus Delivery, Fort Collins, CO 80523 or Jill.Handwerk@colostate.edu (970) 491-5857
(For a list of elements tracked by CNHP, refer tohttp://www.cnhp.colostate.edu/download/list.asp)

Element Scientific Name: *Circinaria rogeri*
Survey Date: 2014-06-06 (yyyy-mm-dd)
Observer(s) Name & Affiliation: Scott Smith, Elliott Environmental Consulting.
Observer(s) Address & Phone Number: P.O. Box 1582, Laramie, WY 82073. 505-307-9046. brianelliott.eec@gmail.com.

Land Ownership
Owner Type: ☐ Private ☐ USFS ☒ BLM ☐ State ☐ Military ☐ Indian ☐ BuRec ☐ NPS ☐ Other:_____
Owner Name (or National Forest, BLM District, etc.): Meeker Field Office
Owner Comments (special requests, permissions, circumstances): _____
Data Sensitive Element Occurrence: ☐ Y ☒ N
If yes, list reason (i.e., landowner requests confidentiality): _____

Locational Information
(Provide a photocopy of map with location of the occurrence marked or outlined, or a shapefile)

Surveysite Name (from 7.5' quad): Divide Creek.
County: Moffat Elevation (range if applicable): 5,780 ☒ feet ☐ meters

Legal Description: Township: 3N Range: 100W Section: 11 ¼ Sec: NE1/4 of SE1/4
Additional T/R/S, Sections or ¼ Secs: _____

GPS Coordinates: UTM Zone: ☒ 12 ☐ 13
E0706092 N4457590

Datum: ☐ NAD27 ☐ NAD83 ☒ WGS84 ☐ Other: _____
GPS accuracy (if known): submeter ☒ autonomous(uncorrected) ☒ differentially corrected ☐ Other: _____
GPS make/model: Recreational grade Garmin gps unit.

Directions
Driving and hiking directions and prominent topographical features:
Drive east from Dinosaur National Monument. About 3 miles east of Massadona, Colorado turn south on dirt road to the Divide Creek Wildlife Viewing Area. About 1-2 miles south of the Highway is an old 2 acre enclosure with fence in disrepair. Enclosure is on small hightop, on East side of Divide Creek Reservoir Road.

Element Occurrence Data
Number of Individuals (exact count, if feasible or check range below; if plants are spreading vegetatively, indicate number of aerial stems): Not applicable.
1-10 ☐ 11-50 ☐ 51-100 ☐ 101-500 ☐ 501-1000 ☐ 1001-5000 ☐ 5001-10,000 ☐ 10,000+ ☐

NOTE: This lichen is quite small and inconspicuous. It is exceptionally difficult to estimate population size.

Estimated Population Size: _____
Size of Area Covered by Population: _____ acres _____ sq ft _____ sq m
The full extent of the population is not known.

Full extent of occurrence visited/mapped: No: ☒ Yes: ☐ Comments: _____
Additional EO Data Comments: _____

Phenology (What percent of the observed individuals are vegetative, dormant, or in flower and fruit, note that you may have plants that are in both flower and fruit, and therefore the total % may be more than 100%. Ex. - Vegetative: 20%, Flower, 70%, Fruit: 80%, Dormant: 5%): Vegetative (leaf or bud): **NOT APPLICABLE** _____% Flower: _____% Fruit: _____% Dormant: _____%
Reproductive Success: (evidence of seed dispersal and establishment): _____
Age Classes Present: **UNCERTAIN** Seedling: _____% Immature: _____%Mature: _____% Senescent: _____%

Vigor: Feeble ☐ Normal ☐ Vigorous ☐ **Difficult to estimate vigor in these lichens, but they certainly appeared vigorous.**
Pollinators (e.g number, types, etc.): **NOT APPLICABLE** _____
Evidence of Disease, Predation, Herbivory or Injury (estimate % of individuals affected): No evidence of herbivory and little evidence of trampling was seen.

Look alikes present: No: ☐ Yes: ☒ Comments on identification: *Circinaria rogeri* closely resembles *Circinaria hispida. C. rogeri* bears broad and blunt branch tips while *C. hispida* bears finer, branched branch tips.

Additional Site/Plant Condition Comments (details on productivity [vigor], health of population, degree of anthropogenic disturbance, naturalness of hydrology, and other ecological processes **within** the occurrence, not addressed above. Please provide % of occurrence affected, if known, following values for threats listed in Management Comments section):

Landscape Context Comments (biological structure, species composition, degree of fragmentation or connectivity, and condition **of the surrounding landscape**. Please provide % of the surrounding landscape affected, if known, following values for threats listed in Management Comments section): The surrounding area is used extensively for livestock grazing.

Element Occurrence Habitat Description
Habitat in the immediate area (ex. shale barren): Generally the plants were found in clay-shale sites with low shrubs and abundant bare ground.

Dominant Plant Community (list dominant species currently present, include age structure, and % cover if known): Site was a Rolling hill top sparsely vegetated with *Artemisia tridentata*. *Circinaria rogeri* was less common with denser vegetation. Physaria, Astragalus, Castilleja, Stephanomeria, Alium, Asters, Hedysarum, some Graminoids.
Additional Associated Plant Species *(five most commonly seen with this species)*: Associated species included *Physaria*, *Astragalus*, *Castilleja*, *Stephanomeria*, *Allium*, *Asters*, *Hedysarum*, and several graminoids.

Information on these attributes was not collected in the field.
Topographic Position:
☐ Ridge Top/Interfluve ☐ Upper/High Slope ☐ Mesa or Plateau top ☐ Midslope ☐ Cliff Face/Back Slope
☐ Shelf on Cliff Face ☐ Low Slope ☐ Toe Slope ☐ Valley/Basin Floor
☐ Channel Wall ☐ Channel Bed

Aspect:
☐ Flat ☐ Variable ☐ N (338-22 degrees) ☐ NE (23-67 degrees) ☐ E (68-112 degrees)
☐ SE (113-157 degrees) ☐ S (158-202 degrees) ☐ SW (203-247 degrees) ☐ W (248-292 degrees) ☐ NW (293-337 degrees)

Slope:
☐ Flat 0% (0 degrees) ☐ Gentle 1-6% (1-5 degrees)
☐ Moderate 6-33% (5-30 degrees) ☐ Steep 33-50% (30- 45 degrees)
☐ Very steep 50-67% (45-60 degrees) ☐ Cliff 67-100% (60-90 degrees)
☐ Overhanging/sheltered (>90 degrees)

Slope Shape: ☐ Concave ☐ Convex ☐ Straight ☐ Other

Light Exposure: ☒ Open ☐ Shaded ☐ Partial shade ☐ Other _____
Moisture: ☒ Dry ☐ Moist ☐ Saturated ☐ Inundated ☐ Seasonal Seepage ☐ Streambank ☐ Other _____
Proximity to Moisture: (for alpine sites is species influenced by snowmelt, on snow free sites or snow covered sites): _____
Soil Texture: Silt ☐ Clay ☒ Loam ☐ Sand ☐ Gravel ☐ Cobble ☐ Cobble Size: _____Other ☐
Geomorphic Landform (e.g., glaciated mountain slopes and ridges, alpine glacial valley, cirque, rolling uplands, breaklands, floodplain, cutbank, hogback, cliff, gully, canyon, etc.):

Protection Comments (Comments on any legal protection, special land designations, or strategies needed or in place.): None known.

Management Comments
Threat and Management comments apply to: Entire occurrence ☒ Area surveyed ☐

Management Comments (This could include special fencing, signage and other concerns.): Uncertain. Sites should be periodically monitored for impacts and signs or fencing used as needed.

Evidence of Threats and Disturbance (e.g. effects on population viability due to mining, recreation, grazing, exotic species; past/present/future recommendations): The occurrences are not currently being impacted; however, should OHV riders begin to use a site as a play area the site could be decimated quickly. Livestock do not currently appear to be a threat, but should salt or a water development be placed within an occurrence the site could be decimated quickly. Oil and gas development within an occurrence would certainly lead to extirpation of the site. No non-native invasive plant species were noted within the occurrences.

Predominant Land Uses (recreation, grazing, open space, etc.): Recreation (mostly OHV riding) and livestock grazing.

Domain values for Scope of Threat (adapted from NatureServe Biotics):

High = > 60% of occurrence or area surveyed
Moderate = 20-60% of occurrence or area surveyed
Low = 5-20% of occurrence or area surveyed
Very Low = < 5% of occurrence or area surveyed
Trace + < 1% of occurrence or area surveyed
None = none observed in occurrence or area surveyed
Unknown = proportion of occurrence, or area surveyed is unknown
Null = Rank factor not assessed

Threat Categories (adapted from the Colorado Rare Plant SWAP):

Collection or other Direct Mortality Uses: High ☐ Moderate ☐ Low ☐ Very Low ☐ Trace ☒ None ☐ Unknown ☐
Comments: _____

Grazing: High ☐ Moderate ☐ Low ☒ Very Low ☐ Trace ☐ None ☐ Unknown ☐
Comments: _____

Recreational disturbance (motorized and non-motorized recreation): High ☐ Moderate ☐ Low ☒ Very Low ☐ Trace ☐ None ☐ Unknown ☐ Comments on type of recreational disturbance: _____

Resource Extraction (mining, oil & gas drilling): High ☐ Moderate ☐ Low ☐ Very Low ☐ Trace ☐ None ☒ Unknown ☐ Comments on type of resource extraction: _____

Habitat Degradation (fragmentation, trail development, utility lines, hydrologic alteration, etc.): High ☐ Moderate ☐ Low ☒ Very Low ☐ Trace ☐ None ☐ Unknown ☐ Comments on type of habitat degradation: _____

Habitat Conversion (urban, industrial, agricultural development, etc): High ☐ Moderate ☐ Low ☐ Very Low ☒ Trace ☐ None ☐ Unknown ☐ Comments on type of habitat conversion: _____

Invasive or Exotic Species (plants, pathogens): High ☐ Moderate ☐ Low ☐ Very Low ☐ Trace ☐ None ☒ Unknown ☐ Comments on quantity (names of invasive or exotic species present , estimate % cover of each invasive species and/or , dominance of species at site): _____

Pollution (chemical run-off, dust, air pollution): High ☐ Moderate ☐ Low ☐ Very Low ☒ Trace ☐ None ☐ Unknown ☐ Comments on type of pollution at site: _____

Documentation
Photographs Taken: ☒ Y ☐ N Photographer: Scott Smith Photo Number(s): many Repository: Currently in my project files.
Specimens Taken: ☒ Y ☐ N Collector: Scott Smith Collection Number(s): 0558. Repository: Currently, one set is with Roger Rosentreter at the Boise State University Lichen Herbarium, and a duplicate set is awaiting final disposition.

Survey Effort
People hours: 5
Number of surveyors: one
Survey time at site: 2 hours
Extent of area surveyed: patchy

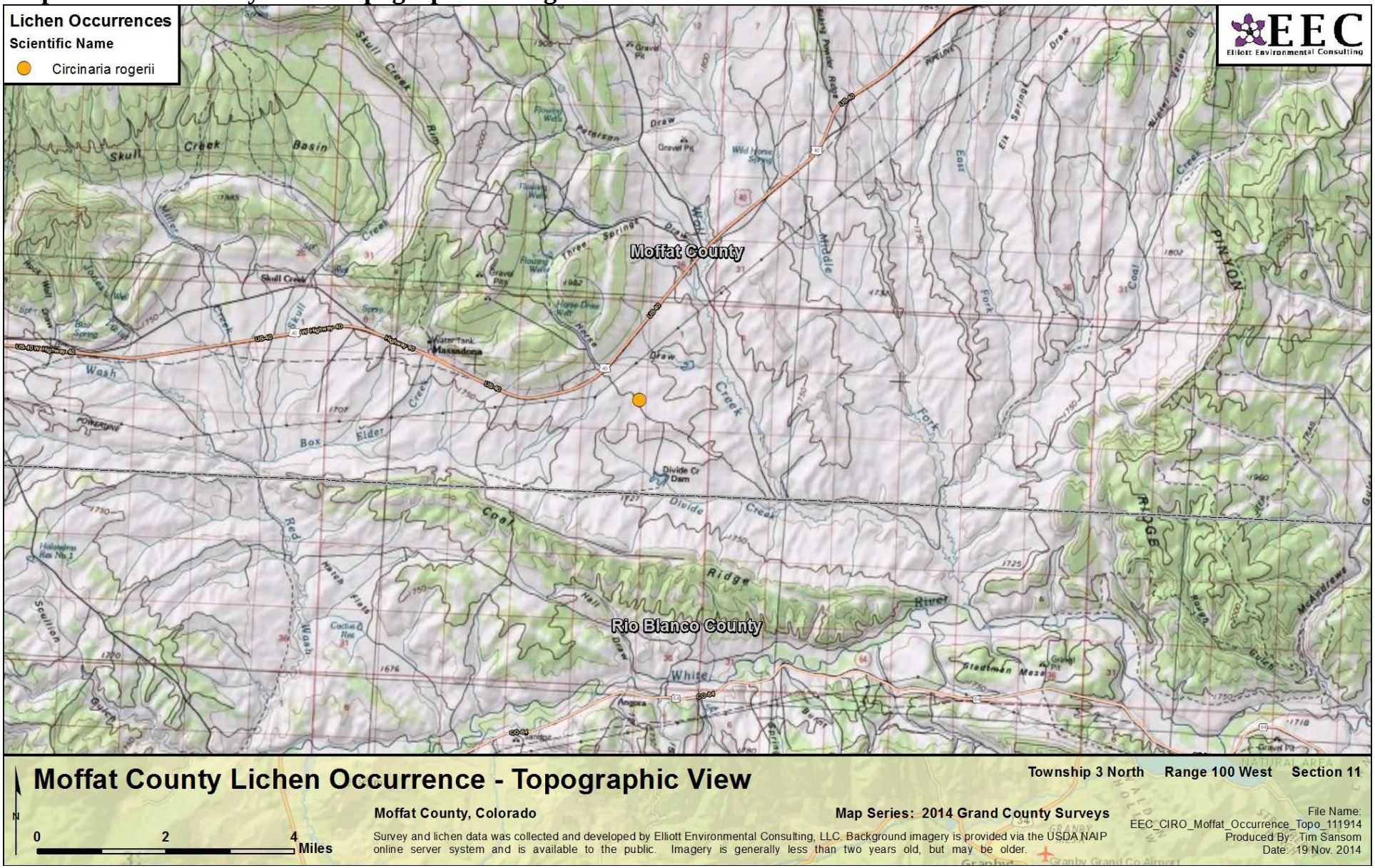
Survey Method
Transect ☐ with a _____ meter separation distance
Ocular estimation ☐
Quadrat ☐ Size and number: _____
Other, describe**:** surveys focused in potential habitat

Comments (areas needing additional surveys, how was suitable habitat identified, etc.): Abundant habitat exists in the area and no previous surveys have been performed. Thus, additional survey work would undoubtedly lead to the discovery of new sites.

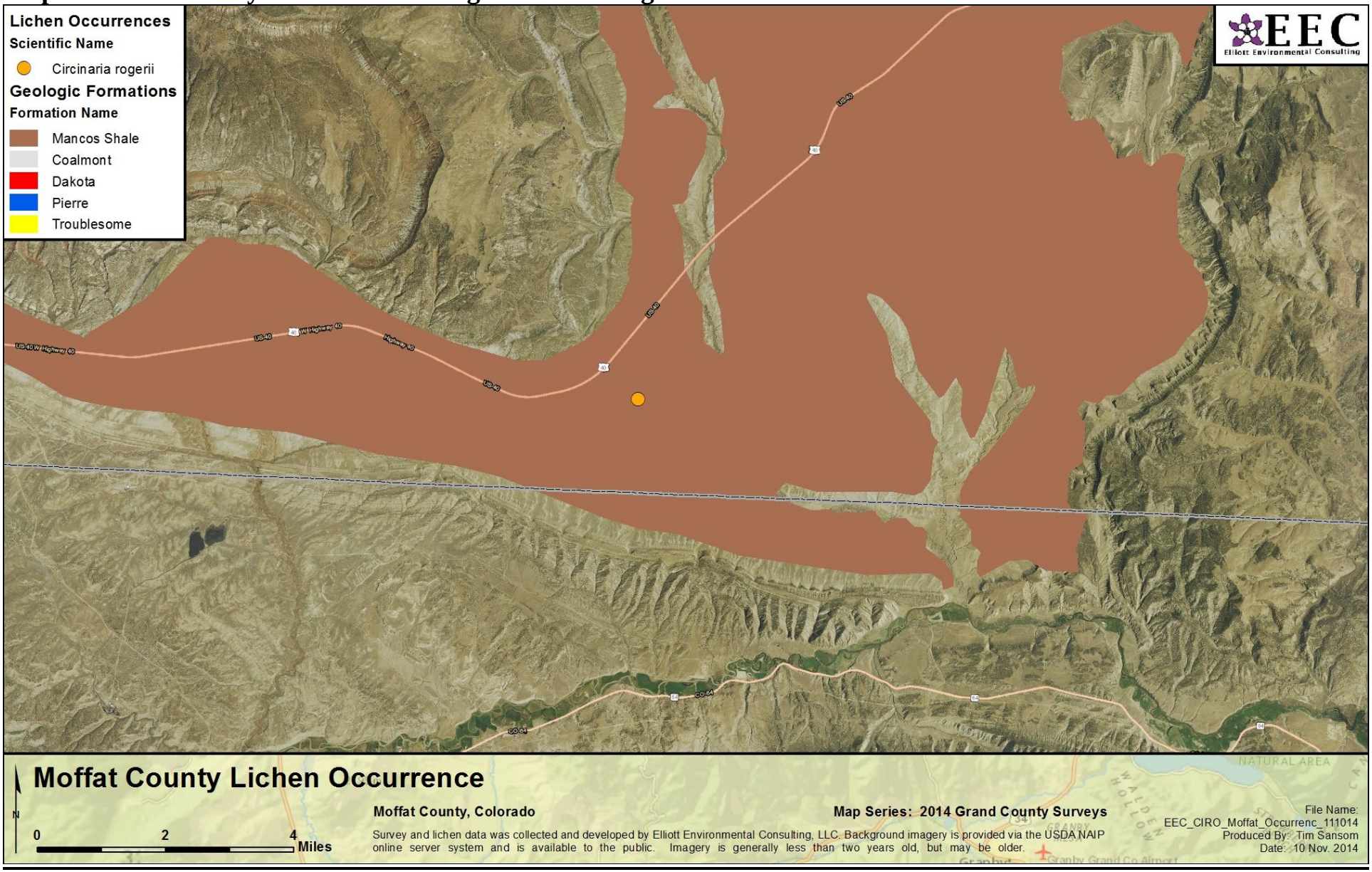
General Comments (for information not captured above):

_____

Map of Moffat County Site - Topographic Background



Map of Moffat County Site - Aerial Background Showing Substrate



Circinaria rogeri

COLORADO NATURAL HERITAGE PROGRAM
T&E PLANT ELEMENT OCCURRENCE FIELD FORM
COLORADO STATE UNIVERSITY-WARNER COLLEGE OF NATURAL RESOURCES

Please submit copies of personal/agency field data forms, digital data (GIS or spreadsheet), or this field form to:
CNHP, 1475 Campus Delivery, Fort Collins, CO 80523 or Jill.Handwerk@colostate.edu (970) 491-5857
(For a list of elements tracked by CNHP, refer tohttp://www.cnhp.colostate.edu/download/list.asp)

Element Scientific Name: *Circinaria rogeri*
Survey Date: 2014-08-18 (yyyy-mm-dd)
Observer(s) Name & Affiliation: Scott Smith, Elliott Environmental Consulting.
Observer(s) Address & Phone Number: P.O. Box 1582, Laramie, WY 82073. 505-307-9046. brianelliott.eec@gmail.com.

Land Ownership
Owner Type: ☐ Private ☐ USFS ☒ BLM ☐ State ☐ Military ☐ Indian ☐ BuRec ☐ NPS ☐ Other:_____
Owner Name (or National Forest, BLM District, etc.): Uncompahgre Field Office
Owner Comments (special requests, permissions, circumstances): _____
Data Sensitive Element Occurrence: ☐ Y ☒ N
If yes, list reason (i.e., landowner requests confidentiality): _____

Locational Information
(Provide a photocopy of map with location of the occurrence marked or outlined, or a shapefile)

Surveysite Name (from 7.5' quad): Montrose East.
County: Montrose Elevation (range if applicable): 6,240 ☒ feet ☐ meters **NOTE: The elevation range was remarkably consistent given the distribution of the sites.**

Legal Description: Township: 48N Range: 8W Section: 18 ¼ Sec: _____
Additional T/R/S, Sections or ¼ Secs: _____

GPS Coordinates: UTM Zone: ☐ 12 ☒ 13
E0255671 N4254898

Datum: ☐ NAD27 ☐ NAD83 ☒ WGS84 ☐ Other: _____
GPS accuracy (if known): submeter ☒ autonomous(uncorrected) ☒ differentially corrected ☐ Other: _____
GPS make/model: Recreational grade Garmin gps unit.

Directions
Driving and hiking directions and prominent topographical features:
Drive south on Highway 550 in Montrose. At the southern edge of town take the Woodgate Road. Travel generally southeastward for about 5.5 miles until the road crosses the South Canal. The site is in the vicinity of the junction of the Woodgate Road, South Canal, and Western Area Power Administration transmission line. It is along Kinikin Road between Trout-Paghre Road and just past South Canal Road.

Element Occurrence Data
Number of Individuals (exact count, if feasible or check range below; if plants are spreading vegetatively, indicate number of aerial stems): Not applicable.
1-10 ☐ 11-50 ☐ 51-100 ☐ 101-500 ☐ 501-1000 ☐ 1001-5000 ☐ 5001-10,000 ☐ 10,000+ ☐

NOTE: This lichen is quite small and inconspicuous. It is exceptionally difficult to estimate population size.

Estimated Population Size: _____
Size of Area Covered by Population: _____ acres _____ sq ft _____ sq m
The full extent of the population is not known.

Full extent of occurrence visited/mapped: No: ☒ Yes: ☐ Comments: _____
Additional EO Data Comments: _____

Phenology (What percent of the observed individuals are vegetative, dormant, or in flower and fruit, note that you may have plants that are in both flower and fruit, and therefore the total % may be more than 100%. Ex. - Vegetative: 20%, Flower, 70%, Fruit: 80%, Dormant: 5%): Vegetative (leaf or bud): **NOT APPLICABLE** _____% Flower: _____% Fruit: _____% Dormant: _____%
Reproductive Success: (evidence of seed dispersal and establishment): _____

Age Classes Present: **UNCERTAIN** Seedling: _____% Immature: _____%Mature: _____% Senescent: _____%
Vigor: Feeble ☐ Normal ☐ Vigorous ☐ **Difficult to estimate vigor in these lichens, but they certainly appeared vigorous.**
Pollinators (e.g number, types, etc.): **NOT APPLICABLE** _____
Evidence of Disease, Predation, Herbivory or Injury (estimate % of individuals affected): No evidence of herbivory and little evidence of trampling was seen.

Look alikes present: No: ☐ Yes: ☒ Comments on identification: *Circinaria rogeri* closely resembles *Circinaria hispida. C. rogeri* bears broad and blunt branch tips while *C. hispida* bears finer, branched branch tips.

Additional Site/Plant Condition Comments (details on productivity [vigor], health of population, degree of anthropogenic disturbance, naturalness of hydrology, and other ecological processes **within** the occurrence, not addressed above. Please provide % of occurrence affected, if known, following values for threats listed in Management Comments section):

Landscape Context Comments (biological structure, species composition, degree of fragmentation or connectivity, and condition **of the surrounding landscape**. Please provide % of the surrounding landscape affected, if known, following values for threats listed in Management Comments section): The surrounding area is used extensively for livestock grazing and residential development.

Element Occurrence Habitat Description
Habitat in the immediate area (ex. shale barren): Generally the plants were found in clay-shale sites with low shrubs and abundant bare ground.

Dominant Plant Community (list dominant species currently present, include age structure, and % cover if known): Site was a flat area with small rocky surfaces on the Adobe Hills with sparsely vegetated with *Artemisia tridentata. Circinaria* was less common amongst taller vegetation.
Additional Associated Plant Species *(five most commonly seen with this species)*: *Associated species included Physaria*, *Astragalus*, *Asters*, *Eriogonum*, *Ephedra*, *Opuntia*, *Echinocereus*, and several graminoids.

Topographic Position:
☐ Ridge Top/Interfluve ☐ Upper/High Slope ☐ Mesa or Plateau top ☐ Midslope ☐ Cliff Face/Back Slope
☐ Shelf on Cliff Face ☐ Low Slope ☒ Toe Slope ☐ Valley/Basin Floor
☐ Channel Wall ☐ Channel Bed

Aspect:
☐ Flat ☒ Variable ☐ N (338-22 degrees) ☐ NE (23-67 degrees) ☐ E (68-112 degrees)
☐ SE (113-157 degrees) ☐ S (158-202 degrees) ☐ SW (203-247 degrees) ☐ W (248-292 degrees) ☐ NW (293-337 degrees)

Slope:
☒ Flat 0% (0 degrees) ☒ Gentle 1-6% (1-5 degrees)
☐ Moderate 6-33% (5-30 degrees) ☐ Steep 33-50% (30- 45 degrees)
☐ Very steep 50-67% (45-60 degrees) ☐ Cliff 67-100% (60-90 degrees)
☐ Overhanging/sheltered (>90 degrees)

Slope Shape: ☐ Concave ☒ Convex ☐ Straight ☐ Other

Light Exposure: ☒ Open ☐ Shaded ☐ Partial shade ☐ Other _____
Moisture: ☒ Dry ☐ Moist ☐ Saturated ☐ Inundated ☐ Seasonal Seepage ☐ Streambank ☐ Other _____
Proximity to Moisture: (for alpine sites is species influenced by snowmelt, on snow free sites or snow covered sites): _____
Soil Texture: Silt ☐ Clay ☒ Loam ☐ Sand ☐ Gravel ☐ Cobble ☐ Cobble Size: _____Other ☐
Geomorphic Landform (e.g., glaciated mountain slopes and ridges, alpine glacial valley, cirque, rolling uplands, breaklands, floodplain, cutbank, hogback, cliff, gully, canyon, etc.): Rolling hills just above the valley floor.

Protection Comments (Comments on any legal protection, special land designations, or strategies needed or in place.): None known.

Management Comments
Threat and Management comments apply to: Entire occurrence ☒ Area surveyed ☐

Management Comments (This could include special fencing, signage and other concerns.): Uncertain. Sites should be periodically monitored for impacts and signs or fencing used as needed.

Evidence of Threats and Disturbance (e.g. effects on population viability due to mining, recreation, grazing, exotic species; past/present/future recommendations): The occurrences are not currently being impacted; however, should OHV riders begin to use a site as a play area the site could be decimated quickly. Livestock do not currently appear to be a threat, but should salt or a water development be placed within an occurrence the site could be decimated quickly. Oil and gas development within an occurrence would certainly lead to extirpation of the site. No non-native invasive plant species were noted within the occurrences.

Predominant Land Uses (recreation, grazing, open space, etc.): Recreation (mostly OHV riding) and livestock grazing.

Domain values for Scope of Threat (adapted from NatureServe Biotics):

High = > 60% of occurrence or area surveyed
Moderate = 20-60% of occurrence or area surveyed
Low = 5-20% of occurrence or area surveyed
Very Low = < 5% of occurrence or area surveyed
Trace + < 1% of occurrence or area surveyed
None = none observed in occurrence or area surveyed
Unknown = proportion of occurrence, or area surveyed is unknown
Null = Rank factor not assessed

Threat Categories (adapted from the Colorado Rare Plant SWAP):

Collection or other Direct Mortality Uses: High ☐ Moderate ☐ Low ☐ Very Low ☐ Trace ☒ None ☐ Unknown ☐
Comments: _____

Grazing: High ☐ Moderate ☐ Low ☒ Very Low ☐ Trace ☐ None ☐ Unknown ☐
Comments: _____

Recreational disturbance (motorized and non-motorized recreation): High ☐ Moderate ☐ Low ☒ Very Low ☐ Trace ☐ None ☐ Unknown ☐ Comments on type of recreational disturbance: _____

Resource Extraction (mining, oil & gas drilling): High ☐ Moderate ☐ Low ☐ Very Low ☐ Trace ☐ None ☒ Unknown ☐ Comments on type of resource extraction: _____

Habitat Degradation (fragmentation, trail development, utility lines, hydrologic alteration, etc.): High ☒ Moderate ☐ Low ☐ Very Low ☐ Trace ☐ None ☐ Unknown ☐ Comments on type of habitat degradation: _____

Habitat Conversion (urban, industrial, agricultural development, etc): High ☐ Moderate ☒ Low ☐ Very Low ☐ Trace ☐ None ☐ Unknown ☐ Comments on type of habitat conversion: _____

Invasive or Exotic Species (plants, pathogens): High ☐ Moderate ☐ Low ☐ Very Low ☐ Trace ☐ None ☒ Unknown ☐
Comments on quantity (names of invasive or exotic species present , estimate % cover of each invasive species and/or , dominance of species at site): _____

Pollution (chemical run-off, dust, air pollution): High ☐ Moderate ☐ Low ☐ Very Low ☒ Trace ☐ None ☐ Unknown ☐
Comments on type of pollution at site: _____

Documentation
Photographs Taken: ☒ Y ☐ N Photographer: Scott Smith Photo Number(s): many Repository: Currently in my project files.
Specimens Taken: ☒ Y ☐ N Collector: Scott Smith Collection Number(s): 0569. Repository: Currently, one set is with Roger Rosentreter at the Boise State University Lichen Herbarium, and a duplicate set is awaiting final disposition.

Survey Effort
People hours: 5
Number of surveyors: one
Survey time at site: 2 hours
Extent of area surveyed: patchy

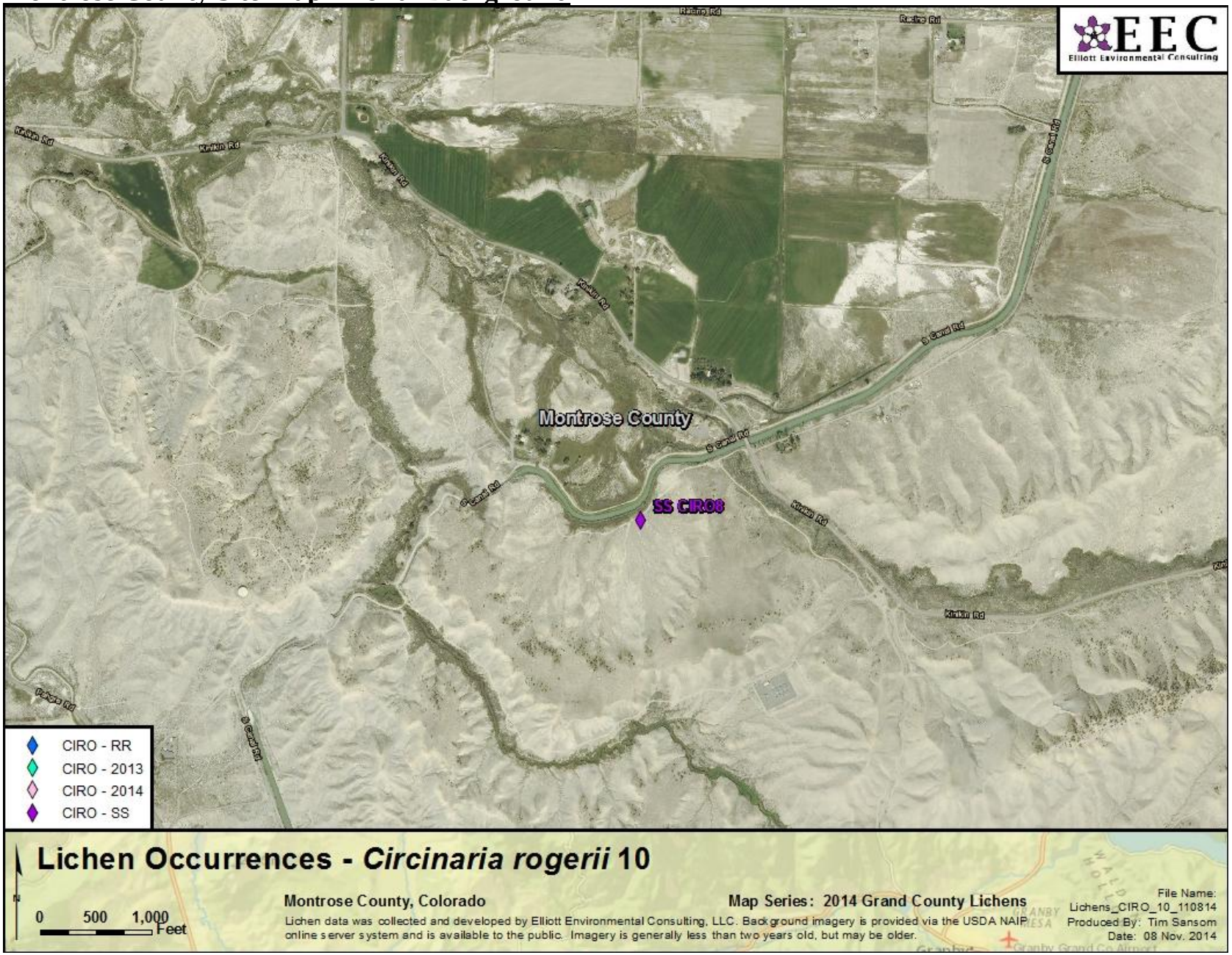
Survey Method
Transect ☐ with a _____ meter separation distance
Ocular estimation ☐
Quadrat ☐ Size and number: _____
Other, describe**:** surveys focused in potential habitat

Comments (areas needing additional surveys, how was suitable habitat identified, etc.): Abundant habitat exists in the area and no previous surveys have been performed. Thus, additional survey work would undoubtedly lead to the discovery of new sites.

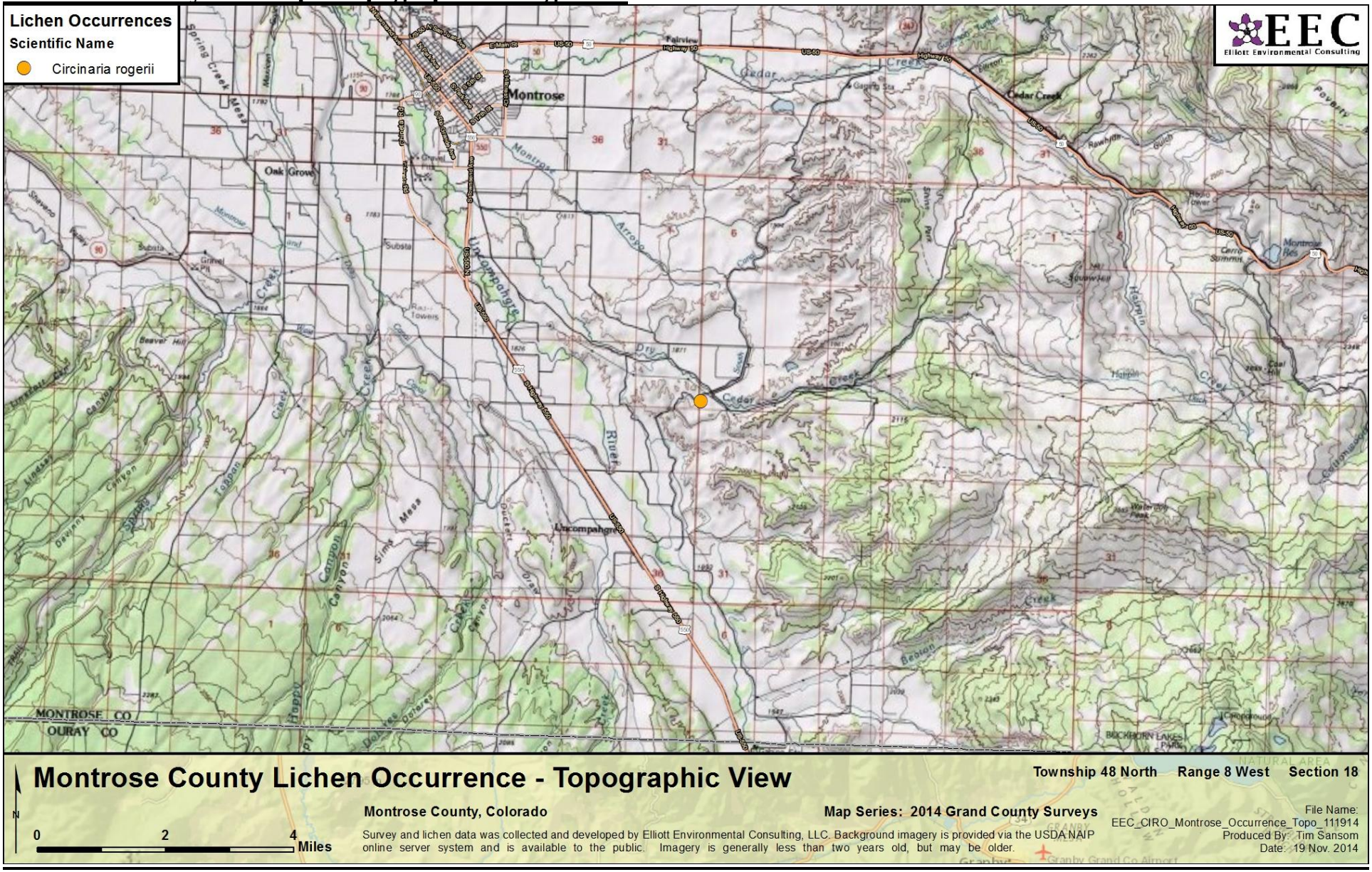
General Comments (for information not captured above):

_____

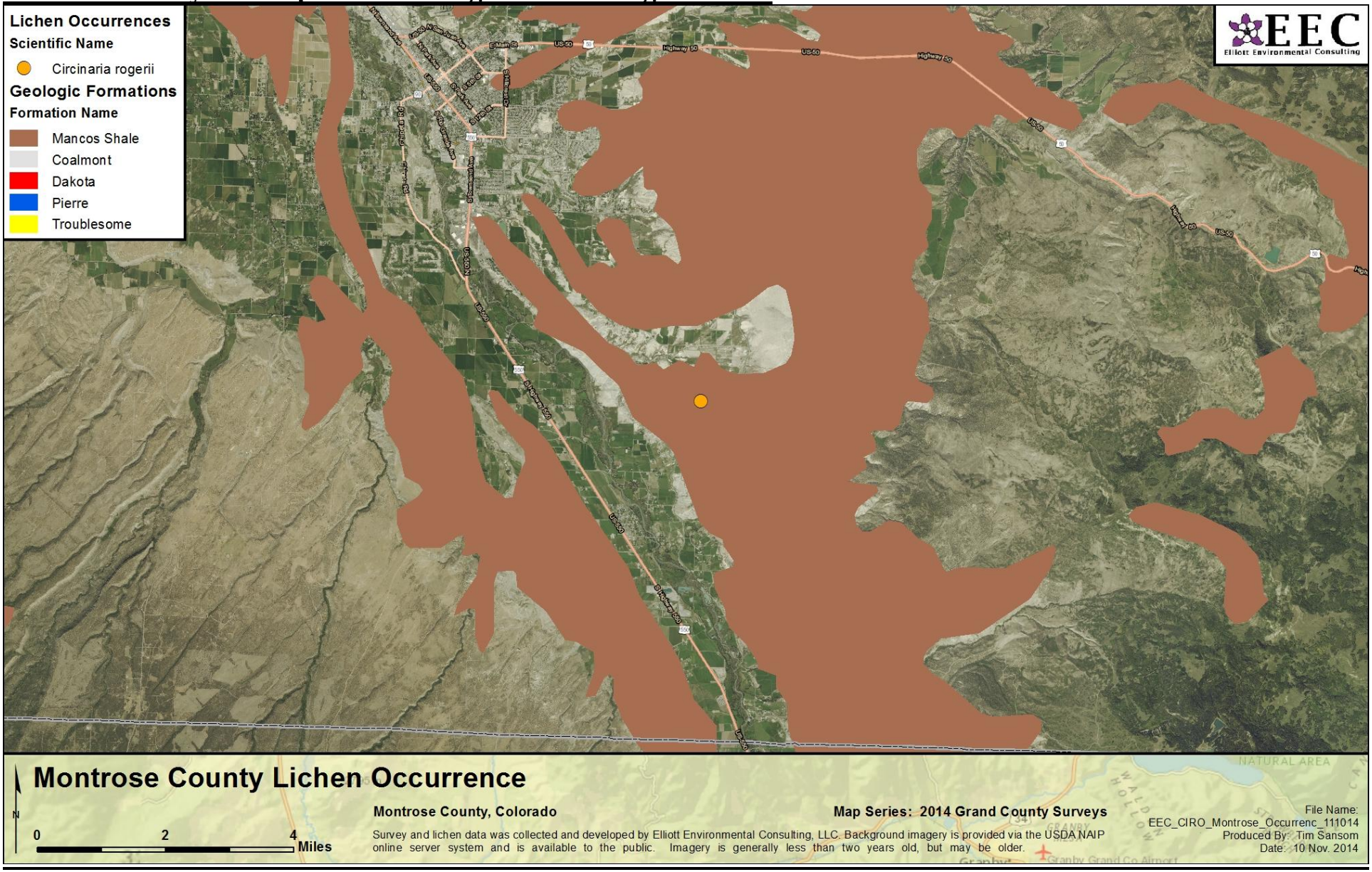
Montrose County Site Map - Aerial Background



Montrose County Site Map - Topographic Background



Montrose County Site Map - Aerial Background Showing Substrate



***Circinaria rogeri* habitat**

Circinaria rogeri