Appendix E: Botany Survey and Analysis for Rio Grande, Conejos River, and Saguache Creek Stream Management Plans

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Appendix E

1.0 INTRODUCTION

Wendy McBride, M.S. and Kyle Christie, Ph.D. were contracted in 2018 by the Colorado Rio Grande Restoration Foundation to complete a botany survey and analysis for the Rio Grande, Conejos River, and Saguache Creek Stream Management Plans (SMPs). The botany survey was performed to assess the current ecological integrity of selected assessment areas (AAs) along the Rio Grande, Conejos River, and Saguache Creek riparian areas from a botanical standpoint. Additionally, a general inventory of the Physiognomic Plant Groups along each of these riparian corridors was completed. Field surveys were conducted between July 13 – August 3, 2018 by Wendy McBride and Kyle Christie.

The sampling methodology for this botany survey and analysis was based on the Ecological Integrity Assessment (EIA) for Colorado Wetlands (Lemly, Gilligan, and Wiechmann 2016). This protocol has itself been adapted from the Environmental Protection Agency's National Wetlands Condition Assessment (NWCA) flexible-plot method (U.S. EPA 2011). In its entirety, the EIA for Colorado Wetlands method combines quantitative vegetation metrics in addition to broad qualitative ecological data to evaluate the overall condition of the wetland. This botany survey however, focused on collecting quantitative and qualitative vegetation data without an emphasis on evaluating hydrology, soils, or water quality. According to Lemly, Gilligan, and Wiechmann (2016), the EIA method provides land and resource managers the ability to measure the ecological integrity of wetlands and target sites for future restoration and protection efforts. Plant species composition and structure are key indicators of the overall health and disturbance occurring within a wetland area. The EIA method includes commonly accepted and intensively tested sampling techniques that can be duplicated by project partners in future monitoring efforts so that data is comparable over time.

2.0 BACKGROUND

2.1 The Ecological Integrity Assessment

The Ecological Integrity Assessment (EIA) framework was designed in response to the need to assess the effectiveness of biological and functional indicators of wetlands nationwide. The U.S. Environmental Protection Agency (EPA) and NatureServe collaborated to establish a set of wetland mitigation performance standards. This framework was designed to evaluate the overall integrity of individual wetlands based on a series of metrics and, and in its current form, includes four Major Ecological Categories: 1) Landscape Context, 2) Biotic Condition, 3) Hydrologic Condition, and 4) Physiochemical Condition. The ratings for each category are collectively applied to produce an overall Ecological Integrity Score (EIS) for each site.

Each metric is rated according to deviation from its natural state, or the best current understanding of how the particular ecological system is expected to look and function under reference conditions (Lemly and Rocchio 2009a). The further a metric moves away from its natural range of structure and function, the lower the rating it receives. General definitions for each rating are seen below in Table 1.

Table 1. Definition of Ecological Integrity Assessment ratings (Lemly, Gilligan, and Wiechmann 2016).

Rank Value	Description
A	**Reference Condition (No or Minimal Human Impact):** Wetland functions within the bounds of natural disturbance regimes. The surrounding landscape contains natural habitats that are essentially unfragmented with little to no stressors; vegetation structure and composition are within the natural range of variation, nonnative species are essentially absent, and a comprehensive set of key species are present; soil properties and hydrological functions are intact. Management should focus on preservation and protection.
B	**Slight Deviation from Reference:** Wetland predominantly functions within the bounds of natural disturbance regimes. The surrounding landscape contains largely natural habitats that are minimally fragmented with few stressors; vegetation structure and composition deviate slightly from the natural range of variation, nonnative species and noxious weeds are present in minor amounts, and most key species are present; soils properties and hydrology are only slightly altered. Management should focus on the prevention of further alteration.
C	**Moderate Deviation from Reference:** Wetland has a number of unfavorable characteristics. The surrounding landscape is moderately fragmented with several stressors; the vegetation structure and composition is somewhat outside the natural range of variation, nonnative species and noxious weeds may have a sizeable presence or moderately negative impacts, and many key species are absent; soil properties and hydrology are altered. Management would be needed to maintain or restore certain ecological attributes.
D	**Significant Deviation from Reference:** Wetland has severely altered characteristics. The surrounding landscape contains little natural habitat and is very fragmented; the vegetation structure and composition are well beyond their natural range of variation, nonnative species and noxious weeds exert a strong negative impact, and most key species are absent; soil properties and hydrology are severely altered. There may be little long term conservation value without restoration, and such restoration may be difficult or uncertain.

According to Lemly and Rocchio (2009a) there are two important thresholds within the assigned ranks. These thresholds indicate degradation to the point where action is needed. These thresholds are described as follows:

- The B-C threshold (i.e. transition from a rating of B to a rating of C) indicates the level below which conditions are not considered acceptable for sustaining ecological integrity.

- The C-D threshold indicates a level below which system integrity has been drastically compromised and is unlikely to be restorable.

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EIA metrics and associated ratings are specific to the particular ecological system being sampled. The Ecological System definitions and descriptions are components of the International Vegetation Classification System and have been developed by NatureServe and the Natural Heritage Network (Lemly, Gilligan, and Wiechmann 2016). The EIA for an assessment area helps clarify the minimum performance standards for a wetland system, identifies the current ecological integrity of a system, and specifies the particular ecological components that must be repaired in order to restore a wetland to a desired level of ecological integrity (Lemly and Rocchio 2009a).

NatureServe has begun development of descriptions for specific wetland and riparian ecological systems found in the Southern Rocky Mountain Ecoregion (Lemly and Rocchio 2009a):

- Subalpine-Montane Riparian Shrublands
- Subalpine-Montane Riparian Woodlands
- Lower Montane Riparian Woodlands and Shrublands
- Subalpine-Montane Fen
- Alpine-Montane Wet Meadow
- North American Arid Freshwater Marsh
- Intermountain Basin Playas

While not all of these descriptions have been completed, additional information can be found online at: https://cnhp.colostate.edu/cwic/wetlandtypes/ecological-systems/

According to CNHP (2019):

> "Ecological systems represent recurring groups of biological communities that are found in similar physical environments and are influenced by similar dynamic ecological processes, such as fire or flooding. They are intended to provide a classification unit that is readily mapable, often from remote imagery, and readily identifiable by conservation and resource managers in the field. Ecological systems include both native, natural vegetation and non-native, human influenced vegetation.
>
> As a mid-scale classification system, ecological systems are ideal for conservation assessment, inventory and mapping, land management, ecological monitoring, and species habitat modeling. Wetland condition assessment methods developed by CNHP are based on the ecological systems classification, with metrics specific to certain systems."

2.2 Comparison of EIA Scores Across Observers

In 2009, CNHP compared EIA scoring results from five observers across 12 sites during field testing of the subalpine-montane riparian shrubland ecological system. Results tested both user variability and sensitivity of each metric to condition class. This analysis revealed that the most easily interpreted metrics included 1) average buffer width, 2) percent unfragmented landscape, and 3) onsite land use (Lemly and Rocchio 2009a). The scores of these metrics showed consistency across CNHP observers. Additionally, the entire Biotic Condition metric category had the most robust and reliable measures of wetland condition regardless of plot method employed. The rating of the degree of regeneration by native woody species, however, had only 78% overall agreement and there was little consistency in ratings when observers assigned scores lower than an "A" for this metric. Final overall Ecological Integrity scores varied by only 15% across all 12 plots and five observers. Further, the overall EIA scores for high integrity sites had far less variability than lower integrity sites (Lemly and Rocchio 2009a). This field testing effort also led to adaptation of the scorecard to improve usability across observers.

2.3 Comments on Naturalized Plant Species

It is worth briefly exploring the difference between nonnative invasive (including noxious) plant species and nonnative naturalized species. Native plant species are thought to have occurred in the U.S. before European settlement, while a nonnative species is thought to have been introduced as a result of European settlement. An invasive plant is nonnative, able to establish itself at a variety of sites, grows quickly, and spreads to the point of disrupting the local plant community and associated ecosystem. A naturalized plant species is also nonnative, but doesn't take over the existing native plant community or associated ecosystem dynamics (USDA NRCS 2019).

Dense stands of invasive species can negatively affect hydrologic processes and ecological functioning of an area, particularly in riparian zones (Gebauer 2013). A key trait of invasive plant species is that they begin to dominate the plant community, sometimes establishing a monoculture. The presence of naturalized species, however, may have minimal impacts on the native biological integrity, species or functional group diversity, or productivity of a given site (Spyreas et al. 2010).

Buffer width is one important factor in riparian health. A buffer or sufficient size and quality improves water quality by trapping sediments and filtering pollutants before they reach the river or stream. When the buffer includes a variety of canopy layers, it also provides stream shading and helps control water temperature. Finally, the presence of woody debris helps shape the riparian channel and provides habitat for a variety of species (Gebauer 2013). These pivotal ecosystem services provided by a diverse and structurally complex plant community are

often diminished when invasive species take hold. Naturalized species however, have been observed to exist within a community without having strong adverse impacts to these ecological functions. Therefore, while the presence of naturalized plant species may not be as desirable as that of native diagnostic plants, these naturalized species should not be managed in the same aggressive manner used to control the populations of invasive species.

For the purpose of this project, the following plant species encountered during surveys were considered to be naturalized rather than invasive: *Dactylis gomerata* (Orchardgrass), *Phleum pratense* (Timothy grass), *Poa compressa* (Canada bluegrass), *Poa pratensis* (Kentucky bluegrass), *Taraxacum officinale* (Dandelion), *Trifolium pratense* (Red clover), and *Trifolium repens* (White clover). It is important to note that these species may be considered to be invasive in some locations and under certain ecological conditions. However, during surveys for this project, these species were neither observed to establish monocultures, nor to have obvious harmful impacts on the biological integrity of any given assessment area.

For the purpose of this project, all noxious plants encountered in addition to the species, *Phalaris arundinaea* (Reed canarygrass), were considered to be invasive. Noxious plants were identified using the state of Colorado's Noxious Weed List (CDA 2018). While not classified as a noxious species, *P. arundinacea* is thought to have both native and nonnative types within the U.S. It has been promoted and intentionally spread in the past as a forage grass for livestock. For the purpose of the Colorado EIA Scorecard, this species is considered to be an increaser species with a '0' rating for its C-value (C-value interpretations, see Table 59). Spyreas et al. (2008) suggested that when *P. arundinacea* becomes invasive, it decreases community level diversity and biological integrity of sampled sites across Illinois. This species has also been implicated in contributing to low stream flow during the growing season in semi-arid riparian zones in eastern Washington. The recommendation for assessment areas with a presence by noxious plant species is to actively control these populations to minimize spread and prevent further disruption to the site's ecological integrity.

3.0 METHODS

3.1 Colorado Ecological Integrity Assessment (EIA) Protocol

These botany surveys for the SMP were based on the Colorado EIA method using a modified protocol described in the Ecological Integrity Assessment for Colorado Wetlands Field Manual, Version 2.1 (Lemly, Gilligan, and Wiechmann 2016).

In its entirety, this method collects data to evaluate the following range of Major Ecological Factors for each assessment area (AA): 1) Landscape, 2) Buffer, 3) Vegetation, 4) Hydrology, 5) Physiochemistry, and 6) Size (Table 2). Because the focus of this survey was botany, field data collection only included Major Ecological Factors 1 – 3.

The Field Manual describes the original field sampling and data analysis protocol, while any modifications made for this SMP project are described below.

Table 2. Hierarchical structure of the Colorado EIA method (Lemly, Gilligan, and Wiechmann 2016).

Rank Factor	*Major Ecological Factor*	*Metrics*[1]	*Metric Variants*
Landscape Context	Landscape	L1. Contiguous Natural Land Cover L2. Land Use Index	
	Buffer	B1. Perimeter with Natural Buffer B2. Width of Natural Buffer B3. Condition of Natural Buffer	
Condition	Vegetation	V1. Native Plant Species Cover V2. Invasive Nonnative Plant Species Cover V3. Native Plant Species Composition V4. Vegetation Structure V5. Regeneration of Native Woody Species **[opt.]** V6. Coarse and Fine Woody Debris **[opt.]**	V3 and V4 vary by wetland type. V5 and V6 are for woody systems.
	Hydrology	H1. Water Source H2. Hydroperiod H3. Hydrologic Connectivity	H1, H2, and H3 vary by wetland type.
	Physiochemistry	S1. Soil Condition S2. Surface Water Turbidity / Pollutants **[opt.]** S3. Algal Growth **[opt.]**	S2 and S3 are for sites with surface water.
Size	Size	Z1. Comparative Size **[opt.]** Z2. Change in Size **[opt.]**	Z1 and Z2 are for assessments of entire wetlands.

[1] Optional metrics noted as **[opt.]** can be used depending on study design and wetland type.

3.2 Site Selection

Targeted AAs were selected prior to fieldwork using available GIS data (e.g., CNHP Colorado Wetland Inventory Mapping Tool), aerial imagery, and other existing information synthesized by the Rio Grande Headwaters Restoration Project. The surveyors collaborated with the SMP Project Coordinator to identify AAs that met the criteria for this project. For each AA selected, an alternate site was also identified in case the original AA was determined to be unsuitable during field inspections. The SMP Coordinator worked with landowners and land managers to facilitate access to each of the AAs. Descriptions of the final locations for the botany AAs can be found in Table 3.

3.3 Defining an Assessment Area and Plot Layout

According to the Ecological Integrity Assessment for Colorado Wetlands Field Manual (Lemly, Gilligan, and Wiechmann 2016), the recommended standard layout of an AA is a 40-meter radius circle; however, the field manual also notes that there is considerable flexibility in establishing the AA according to wetland size and shape. Based on the specific goals for the Conejos River, Rio Grande, and Saguache Creek SMPs, the layout of the AA was modified for this project. The intention of this modified layout was to 1) inventory the range of ecological systems, physiognomic group, and plant associations occurring along each of the three riparian corridors (Conejos River, Rio Grande, and Saguache Creek) and 2) to assess the ecological integrity of each AA based on its landscape and vegetation context.

The modified AA layout was as follows:

1) Surveyors navigated to the original site coordinates determined during the Site Selection step.

2) Surveyors scouted the area to determine an appropriate origin point for the AA according to terrain, land ownership, and current land use (e.g., if active livestock grazing was occurring, the origin was moved to a nearby location where the vegetation within the AA was less impacted by grazing, and therefore individual plants were more easily identifiable to the species level). This point was always located immediately adjacent to the riverbank.

3) Once an origin point was located, the latitude and longitude were recorded in decimal degrees.

4) Next, a 70 m transect was laid out along the riverbank in the downstream direction.

5) Flags were placed along the transect at the following increments: 0, 20, 40, and 60 m. At each 20 m increment, a 100 m^2 (10m x 10m) Level 3 Vegetation Sampling plot was laid out.

6) Whenever possible, Plot 1 was situated at a distance of 2 m inland from the 0 m mark along the original transect. A second measuring tape was laid out perpendicularly to the original transect to a distance of 2 m.

7) At this point, the surveyor anchored the end of a measuring tape into place using a chaining pin. This point served as one corner of the vegetation plot. S/he then faced the

downstream direction and identified a cardinal direction (N, S, E, or W) in which s/he could walk 10 m, and as close as possible to a downstream direction, without colliding with the river itself. The surveyor used a handheld compass to navigate in the appropriate cardinal direction while trailing a meter tape behind until a distance of 10 m was reached from the original corner (while pulling the meter tape taut). Then, a chaining pin was used to anchor the tape at this second corner. The surveyor would turn 90° to the right and walk another 10 m before placing a third chaining pin anchor and turned another 90° to the right and walked another 10 m to return to the original plot corner, creating a 10m x 10m square plot.

8) To assess the full breadth and variability of the riparian vegetation, Plots 2, 3, and 4 were laid out at successively further distances inland from the original transect whenever possible. Exceptions occurred when 1) the riparian plant community did not extend very far inland from the river corridor, 2) private property prevented access, 3) another type of boundary was encountered that fragmented the landscape (e.g., railroad tracks), or 4) the shape of the river prevented standard layout. The following example shows a possible plot layout for a particular AA:

Plot #	Distance along original transect	Perpendicular distance inland from original transect
1	0 m	2 m
2	20 m	10 m
3	40 m	20 m
4	60 m	30 m

9) A drawing of the plot layout for each AA was included in the AA Description and Drawing portion of the data sheet. Any additional modifications to plot layout were noted here. (See digital site sketches for specific plot layouts).

10) The size of a standard AA was considered to be 70 m (the length of the original transect) x (10 m + the perpendicular distance of the farthest plot from the transect). For the example above, the dimensions of the AA would be 70 m x (10 + 30 m) = 70 m x 40 m.

The final plot layout location data for each AA can be found in Tables 4-6.

3.4 Location and General Information

General information was recorded for each AA, including the following:

- Site ID (e.g., Rio Grande Site 1)
- GPS Coordinates (in decimal degree) of the transect origin (Datum: NAD 83)
- GPS Error Distance
- Date of field sampling
- Surveyors names (first initial and last name of surveyors)
- General Land Ownership: A general description of the land ownership:
    - USFS = U.S. Forest Service
    - BLM = Bureau of Land Management
    - SLB = State Land Board
    - Private = Privately owned lands
- Dimensions of AA
- Elevation (in meters)

3.5 Photos of the Assessment Area

The purpose of the photos is to complement the quantitative assessment with visual representation. Photo locations for each site were as follows and were included on AA site sketches:

- Photo 1: Taken at 0 m of original transect (adjacent to riparian corridor), facing the AA. This photo was taken from the lat/lon coordinates recorded for each site.
- Photo 2: Taken from the plot boundary and facing into Plot 1.
- Photo 3: Taken from the same location at Photo 2, but faces the opposite direction (away from the plot).
- Photo 4: Taken from the plot boundary and facing into Plot 2.
- Photo 5: Taken from the same location at Photo 4, but faces the opposite direction (away from the plot).
- Photo 6: Taken from the plot boundary and facing into Plot 3.
- Photo 7: Taken from the same location at Photo 6, but faces the opposite direction (away from the plot).
- Photo 8: Taken from the plot boundary and facing into Plot 4.
- Photo 9: Taken from the same location at Photo 8, but faces the opposite direction (away from the plot).
- Photo 10: Taken at the farthest outward corner of plot 4 facing back toward the AA.

- Photo 11+: Optional photos giving additional perspective of the AA and/or documenting notable features.

3.6 Major Zones within the Assessment Area

To the best of the surveyor's ability, the major vegetation zones were described and, if possible, identified. The physiognomy of the dominant stratum was noted, including dominant species and the percent of the AA that the zone occupies. This descriptive data, in addition to the AA drawing and plant cover data were used later to help assign the Ecological System, Physiognomic Group(s), and Plant Association(s) for each AA during data analysis.

The Ecological Integrity Assessment for Colorado Wetlands Field Manual, Version 2.1 (Lemly, Gilligan, and Wiechmann 2016) was used in the office to assign the ecological system and physiognomic groups for each plot and AA. The Field Guide to the Wetland and Riparian Plant Associations of Colorado (Carsey et al. 2003) was used to determine riparian plant associations for each plot (e.g., *Potentilla fruticosa / Juncus balticus* Shrubland). Plant association determinations were based on corresponding cover values and field drawings. The fidelity value (high, medium, or low) denotes how well each assigned plant association fits the key. It is worth noting that there are several plant associations that are not described in this text, and others with incomplete descriptions. Further, some plant associations described in this text were based on only a limited data set. These plant associations can be a valuable guide for managers seeking input on restoration and reclamation effort; however, this resource is best utilized with the understanding that ecological plant associations are complex and the development of these guidelines is ongoing. For further clarification and updates on Colorado's plant associations, the best contact is the Colorado Natural Heritage Program.

3.7 Assessment Area Drawing and Description

A drawing of the AA was completed to illustrate the plot layout, major vegetation zones, direction of the river course, photo placements, and any other notable information.

3.8 Vegetation Sampling Protocol

The Vegetation Sampling Protocol was based on the Level 3 Assessments as described in the Ecological Integrity Assessment for Colorado Wetlands Field Manual (Lemly, Gilligan, and Wiechmann 2016). Detailed vegetation data was collected for each plot, as described below.

First, all species within each plot were identified. Once a species list was recorded, the cover for each species was visually estimated using the following cover classes:

1 = trace (one or two individuals)	6 = > 10-25%
2 = 0-1%	7 = > 25-50%
3 = > 1-2%	8 = > 50-75%
4 = > 2-5%	9 = > 75-95%
5 = > 5-10%	10 = > 95%

Visual aids from the field manual were used to help determine the appropriate cover class for each species. The median value of the percent cover range for each cover class was used in quantitative data analyses. For example, if a cover class of "4" was recorded in the field, this data would be entered as 3.5% total cover for subsequent data analysis.

3.9 The Colorado Ecological Integrity Assessment Scorecard

A modified version of the CNHP (2015) Colorado Ecological Integrity Assessment (EIA) Scorecard was used to determine individual metric and overall ratings for each AA. The original scorecard includes metrics and rating weights for the following categories:

<u>Original EIA Scorecard</u>

- Rank Factor: Landscape Context (overall rating weight of 0.3)
  - 1) Landscape metrics (rating sub-weight 0.33)
  - 2) Buffer metrics (rating sub-weight 0.67)
- Rank Factor: Condition (overall rating weight of 0.7)
  - 3) Vegetation metrics (rating sub-weight 0.55)
  - 4) Hydrology metrics (rating sub-weight 0.35)
  - 5) Physiochemistry metrics (rating sub-weight 0.10)
- Rank Factor: Size (overall rating weight of n/a - optional)
  - 6) Size metrics (rating sub-weight 1)

For the purpose of this botany survey, only metrics 1) Landscape metrics, 2) Buffer metrics, and 3) Vegetation metrics were assessed. The modified scorecard includes the following rating weights:

Modified EIA Scorecard

- Rank Factor: Landscape Context (overall rating weight of 0.3)
  - 1) Landscape metrics (rating sub-weight 0.33)
  - 2) Buffer metrics (rating sub-weight 0.67)
- Rank Factor: Condition (overall rating weight of 0.7)
  - 3) Vegetation metrics (rating sub-weight 1)

3.10 Comparison of EIA Scores Across Observers

To compare repeatability of EIA scoring, four AAs were selected and independently scored by both surveyors who were present during data collection. These scorecards were compared to assess fidelity of scores between observers. These AAs represent sites include the following:

- Rio Grande – RGVeg02, RGVeg09, RGVeg13, and RGVeg17

4.0 RESULTS

4.1 Ecological Integrity Scores

4.1.1 All Assessment Areas

In total, 26 riparian AAs were surveyed between July 13 and August 3, 2018. Of the total AAs, 11 were surveyed along the Conejos River, 10 along the Rio Grande, and five along Saguache Creek. All of the AAs were riparian areas located immediately adjacent to the river or creek.

In general, the highest elevation sites received the highest ratings while the lowest elevation sites reflected more intensive disturbance with overall lower ratings (Tables 8, 27 and 45).

A total of 280 taxa were observed, however some plants were unidentifiable because they were sterile or otherwise lacked features enabling determination to the species level. A total of 255 plants were identified to species level (Appendix A). Of the total species encountered, 216 are native, 34 are nonnative, and five are listed on the 2018 Colorado Noxious Weed List (*Cirsium arvense, Cardaria draba, Elymus repens, Verbascum thapsus,* and *Convolvulus arvensis)*.

4.1.2 Conejos River Summary

There were a total of 11 AAs along the Conejos river, which all occurred within Conejos County. The highest elevation site was CRVeg01 at 2,982 meters (9,639 feet) while the lowest elevation location was CRVeg11b at 2,306 meters (7,565 feet). Seven sites were located on federally

managed lands (BLM or U.S. Forest Service), two sites occurred on Colorado Parks and Wildlife state managed parcels, and two sites were located on privately owned properties (Table 3).

Ten of the 11 total sites sampled along the Conejos River received an overall B rating for their overall Ecological Integrity Assessment score. Conejos sites CRVeg03, CRVeg04, CRVeg05a, and CRVeg05b received the highest rating of B+. This score suggests that these sites have slight deviation from reference conditions. These wetlands predominantly function within the bounds of natural disturbance regimes. According to Lemly, Gilligan, and Wiechmann (2016), management should focus on preventing further alteration (Table 1). Sites 01, 06, 08, 09, 10, and 11a all received an overall score of B-. While these sites are still considered to be in good condition, their score suggests that they are near the threshold of potentially degrading to an ecological condition requiring more intensive management if further alteration from natural conditions occurs. Site 11b, the lowest elevation surveyed, received the lowest rating with a score of C+. Recommendations for sites with this score are to focus management on the most impacted ecological attributes, which can be identified by the individual metric ratings for the site (Tables 7 and 8).

A total of 190 plant taxa were encountered, including 175 unique species. The total number of plant taxa encountered at an individual site ranged from 25 to 58, with an average of 44 plant taxa per site. CRVeg04 had the highest diversity with 58 taxa, while CRVeg09 had the lowest diversity with 25 total taxa encountered. There was no obvious trend observed in species diversity and elevation along Conejos sample sites (Table 9). The most common species encountered (observed in 10+ plots) across all AAs can be seen in Table 10.

Average relative cover of native species ranged from 45% at Site 6 Alternate to 90% at Site CRVeg11a. Noxious species were present in the following locations: CRVeg08 (1.8% average cover), CRVeg09 (7.1% average cover), CRVeg10 (26.1% average cover), CRVeg11a (5.1% average cover), and CRVeg11b (5.2% average cover) (Tables 11 and 12). Average mean C-values for native species ranged from 4.6 (CRVeg11b) to 5.5 (CRVeg04). Average cover weighted mean C-values for native species ranged from 4.4 (CRVeg11b) to 5.7 (CRVeg10) (Table 13; Figures 1 and 2).

The highest elevation site (CRVeg01) was identified as Rocky Mountain Subalpine-Montane Riparian Shrubland Ecological System. Sites CRVeg03 through CRVeg06 were identified as Rocky Mountain Subalpine-Montane Riparian Woodland Ecological System. The lower elevation Sites (CRVeg08, CRVeg09, CRVeg10, CRVeg11a, and CRVeg11b) were identified as Rocky Mountain Lower Montane-Foothill Riparian Woodland and Shrubland Ecological System (Table 14).

The following Physiognomic Groups represented all sites surveyed along the Conejos River: Deciduous Dominated Forest/Woodland (54.5% of plots), Tall Willow Shrubland (34.1% of plots), Evergreen Riparian Forest (4.5% of plots), Herbaceous vegetation (4.5% of plots), and Non-Willow Shrubland (2.3% of plots) (Table 14).

4.1.3 CRVeg01 (USFS – Rio Grande National Forest)

Overall this site appears to be in good condition with an overall EIA rating of B- (2.99). The lowest individual metric ratings it received were for Contiguous Natural Land Cover (C), Width of Natural Buffer (C), Condition of Natural Buffer – Vegetation (C), and Native Plant Species Cover (C-) (Table 15).

Both Contiguous Natural Land Cover and Width of Natural Buffer were disrupted by Forest Service Road 250 that runs generally parallel to the river to the north. Without re-routing this road, these metric scores cannot be easily improved as they are currently assessed.

The Condition of the Natural Buffer – Vegetation and Native Plant Species cover were both impacted by an average relative native plant cover of only 60%. The nonnative species with the highest absolute cover include the following species with cover values for plots 1, 2, 3, and 4, respectively: *Poa pratensis* (37.5%, 62.5%, 7.5%, and 17.5%), and *Bromus inermis* (17.5%, 1.5%, 0%, and 0%), *Taraxacum officinale* (7.5%, 1.5%, 17.5%, and 0%), and *Trifolium repens* (7.5%, 0.5%, 17.5%, and 0%) (Tables 11 and 12). While it is desirable to have higher cover by native species, the most common nonnative species at this site are essentially naturalized in this region. Further, these nonnatives did not result in monocultures and there were no noxious species observed at this site.

The average mean C-value for native species was 5.3, while the average cover-weighted mean C-value was only 5.3 (Table 13). This suggests that most native species at this site are equally likely to be found in natural and non-natural areas. However, they are not typical of high disturbance areas.

Current land uses observed and their approximate cover within the 500 m buffer include light grazing on rangeland (92%), moderate recreation (5%), unpaved roads (2%), and domestic and commercial buildings (1%). This site likely sees moderate to occasionally high recreational use due to its proximity to the town of Platoro, which lies only 0.3 miles to the west.

4.1.4 CRVeg03 (USFS – Rio Grande National Forest)

Overall this site appears to be in very good condition with an overall EIA rating of B+ (3.32). The lowest individual metric ratings it received were for Width of Natural Buffer (C), and Native Plant Species Cover (C-) (Table 16).

The Width of the Natural buffer was impacted by the proximity of Forest Service Road 250 to the east. This road roughly parallels the river and occurs within the 100 m buffer zone of the AA.

The average relative cover of native species for this site was 79%. The nonnative species with the highest absolute cover include the following species with cover values for plots 1, 2, 3, and 4, respectively: *Poa pratensis* (0%, 7.5%, 37.5%, and 37.5%), and *Taraxacum officinale* (0.5%, 0.5%, 7.5%, and 7.5%) (Tables 11 and 12). While it is desirable to have higher cover by native species, the most common nonnative species at this site are essentially naturalized in this region. Further, these nonnatives did not result in monocultures and there were no noxious species observed at this site.

The average mean C-value for native species was 5.1, while the average cover-weighted mean C-value was only 5.1. This suggests that most native species at this site are equally likely to be found in natural and non-natural areas. However, they are not typical of high disturbance areas (Table 13).

Current land uses observed and their approximate cover within the 500 m buffer include management for native vegetation (63%), moderate grazing on rangeland (30%), light recreation (5%), and unpaved roads (2%).

4.1.5 CRVeg04 (USFS – Rio Grande National Forest)

Overall, this site appears to be in very good condition, receiving an overall EIA rating of B+ (3.33). The lowest individual metric rating was for Condition of Natural Buffer – Vegetation and Native Plant Species Cover (C-) (Table 17).

The scores of both Condition of Natural Buffer – Vegetation and Native Plant Species Cover metrics were impacted by the average relative cover of native species for this site, which was 74%. The nonnative species with the highest absolute cover include the following species with cover values for plots 1, 2, 3, and 4, respectively: *Poa pratensis* (37.5%, 3.5%, 0%, and 37.5%), *Taraxacum officinale* (7.5%, 1.5%, 3.5%, and 7.5%), *Phleum pretense* (0%, 0%, 17.5%, and 7.5%), and *Trifolium repens* (0%, 0%, 3.5%, and 7.5%) (Tables 11 and 12). These nonnatives did not

result in monocultures and overall plant species diversity was relatively high compared to the other Conejos River AAs. Further, no noxious species were observed at this site.

The average mean C-value for native species was 5.4, while the average cover-weighted mean C-value was only 5.5 (Table 13). This suggests that most native species at this site are equally likely to be found in natural and non-natural areas. However, they are not typical of high disturbance areas.

Current land uses observed and their approximate cover within the 500 m buffer include light grazing on rangeland (68%), management for native vegetation (15%), moderate grazing on rangeland (10%), moderate recreation (5%), and unpaved roads (2%). Dispersed campsites occur within 200 m of the river to the east and several anglers were encountered during fieldwork. It is likely this area sees moderate to high recreational activity (especially across the dispersed campsite areas) throughout the summer.

4.1.6 CRVeg05a (USFS – Rio Grande National Forest)

Overall, this site appears to be in very good condition with an overall EIA rating of B+ (3.34). The lowest individual metric ratings it received were for Condition of Natural Buffer – Vegetation (C), and Native Plant Species Cover (C-) (Table 18).

The average relative cover of native species for this site (70%) impacted both of the low scoring individual metrics above. The nonnative species with the highest absolute cover include the following species with cover values for plots 1, 2, 3, and 4, respectively: *Poa pratensis* (3.5%, 7.5%, 37.5%, and 37.5%), *Taraxacum officinale* (7.5%, 7.5%, 17.5%, and 7.5%), *Phleum pratense* (0%, 0%, 37.5%, and 17.5%), and *Trifolium repens* (7.5%, 7.5%, 0%, and 17.5%) (Tables 11 and 12). The nonnative species at this site are essentially naturalized in this region. Further, these nonnatives did not result in monocultures and there were no noxious species observed at this site.

The average mean C-value for native species was 5.2, while the average cover-weighted mean C-value was only 5.1 (Table 13). This suggests that most native species at this site are equally likely to be found in natural and non-natural areas. However, they are not typical of high disturbance areas.

Current land uses observed and approximate cover within the 500 m buffer include light grazing on rangeland (53%), management for native vegetation (30%), moderate grazing on rangeland (10%), moderate recreation (5%), and unpaved roads (2%). The Conejos Campground is located

immediately adjacent to this AA. Recreational activity via camping, fishing, and hiking access appeared to be at moderate levels during fieldwork. Livestock (cows) were also observed actively grazing nearby, with access to the AA. The overall ecological integrity of this site can likely be maintained by limiting the amount of access livestock have to this section of the riparian corridor, or ensuring sufficient grazing area so that cattle can disperse themselves across a large area while grazing this allotment.

4.1.7 CRVeg05b (USFS – Rio Grande National Forest)

Overall, this site appears to be in very good condition, receiving an overall EIA rating of B+ (3.27). The lowest individual metric ratings it received were for Condition of Natural Buffer – Vegetation (C), and Native Plant Species Cover (C-) (Table 19).

The average relative cover of native species for this site (65%) impacted both of the low scoring individual metrics above. The nonnative species with the highest absolute cover include the following species with cover values for plots 1, 2, 3, and 4, respectively: *Poa pratensis* (7.5%, 37.5%, 37.5%, and 62.5%), *Taraxacum officinale* (7.5%, 0.5%, 3.5%, and 1.5%), and *Phleum pretense* (3.5%, 0%, 7.5%, and 0%) (Tables 11 and 12). The nonnative species at this site are essentially naturalized in this region. Further, these nonnatives did not result in monocultures and there were no noxious species observed at this site.

The average mean C-value for native species was 5.3, while the average cover-weighted mean C-value was only 4.9 (Table 13). This suggests that most native species at this site are equally likely to be found in natural and non-natural areas. However, they are not typical of high disturbance areas.

Current land uses observed and approximate cover within the 500 m buffer include light grazing (68%), moderate grazing along riparian corridor (20%), light recreation (fishing access) (10%), and unpaved roads (2%). There is a private property located just south and east of this site, which occurs within the 500 m buffer of the AA. There are no domestic structures located within the buffer, but there appears to be livestock grazing activity of unknown intensity (based on aerial imagery). It also appears that grazing access on the private property may connect to the national forest access that includes the AA. General observations of plots 1-3 were that the majority of willows observed were seedlings, with more mature individuals lacking. This may be the result of moderate to occasionally heavy grazing and browsing pressure.

4.1.8 CRVeg06 (USFS – Rio Grande National Forest)

Overall, this site appears to be in good condition with an overall EIA rating of B- (2.73). The lowest individual metric ratings it received were for Condition of Natural Buffer – Soils (C) and Condition of Natural Buffer - Vegetation (C), Native Plant Species Cover (D), Vegetation Structure (C), and Regeneration of Native Woody Species (C) (Table 20).

The Condition of Natural Buffer – Vegetation and Native Plant Species Cover were most impacted by an average relative native plant cover of only 45%. The nonnative species with the highest absolute cover include the following species with cover values for plots 1, 2, 3, and 4, respectively: *Poa pratensis* (37.5%, 62.5%, 62.5%, and 62.5%), *Trifolium repens* (37.5%, 3.5%, 3.5%, 37.5%), *Agrostis stolonifera* (7.5%, 17.5%, 17.5%, and 17.5%), and *Taraxacum officinale* (0%, 7.5%, 7.5%, and 7.5). No noxious species were observed (Tables 11 and 12).

The average mean C-value for native species was 5.5, while the average cover-weighted mean C-value was only 5.5 (Table 13). This suggests that most native species at this site are equally likely to be found in natural and non-natural areas. However, they are not typical of high disturbance areas.

Condition of Natural Buffer – Soils, Regeneration of Native Woody Species, and Vegetation Structure were most impacted by moderate to heavy livestock grazing and trampling at this site. Active grazing was occurring during field sampling, and significant “mowing” of willows (*Salix* spp.), alder (*Alnus incana*), and narrowleaf cottonwood (*Populus angustifolia*) was observed throughout the site. The height of these native woody species had been browsed to make them appear uniformly dwarfed. Both mature and seedling age groups of native woody species were lacking in addition to a lack of litter cover, suggesting that this site may not have sufficient recovery time between grazing periods.

Current land uses observed and approximate cover within the 500 m buffer include light grazing (73%), moderate grazing adjacent to the riparian corridor (20%), moderate recreation (fishing access and associated trails) (5%), and paved roads (2%). Overall, this site appears to be more heavily impacted by grazing and recreation than Conejos sample sites upstream of this location that are also grazed.

4.1.9 CRVeg08 (USFS – Rio Grande National Forest)

Overall this site appears to be in good condition, receiving an overall EIA rating of B- (2.70). The lowest individual metric ratings were for Land Use Index (C), Native Plant Species Cover (C-), and Regeneration of Native Woody Species (C) (Table 21).

Regarding Native Plant Species Cover, the average relative native species cover was 83%. The nonnative species with the highest absolute cover include the following species with cover values for plots 1, 2, 3, and 4, respectively: *Poa pratensis* (37.5%, 37.5%, 0%, and 0%), and *Phleum pratense* (3.5%, 17.5%, 0%, and 0%). The noxious species *Cirsium arvense* and *Verbascum thapsus* were present with average covers of 1.5% and 2%, respectively (Tables 11 and 12).

The average mean C-value for native species was 5.0, while the average cover-weighted mean C-value was only 5.3 (Table 13). This suggests that most native species at this site are equally likely to be found in natural and non-natural areas. However, they are not typical of high disturbance areas.

Regeneration of Native Woody Species was impacted by dense stands of *Populus angustifolia* saplings which appear to be choking out other vegetation. This may be the result of a change in the course of the channel over time. The river splits into multiple braiding channels along this stretch, and the plant cover suggests a high water table in between the channels at this location. The AA may be located where the channels have shifted in recent years. Flood events likely helped the *P. angustifolia* seedlings establish. Since this event, the soil appears to have built up, enabling an early seral plant community to develop. If soil stability persists, this early seral community will have an opportunity to develop into a mature stand of native woody species dominated by *P. angustifolia.*

Old beaver sign was observed near plot 4, approximately 30 meters north of the main river corridor. Gnawed stumps of old trees were observed, however no signs of recent activity were noted.

Current land uses observed and approximate cover within the 500 m buffer include moderate livestock grazing (60%), non-tilled hayfields (22.5%), light grazing (15%), unpaved roads (2%), and paved roads (0.5%).

4.1.10 CRVeg09 (Private)

Overall, this site appears to be in good condition, receiving an overall EIA rating of B- (2.59). The lowest individual metric ratings include Land Use Index (C), Width of Natural Buffer (C), Condition of Natural Buffer – Vegetation (C), Native Plant Species Cover (C-), Invasive Nonnative Plant Species Cover (C), and Coarse and Fine Woody Debris (C) (Table 22).

The Land Use Index was mainly impacted by signs of light to moderate grazing and an active access road leading from Highway 285 to a diversion dam located adjacent to the AA. The Width of the Natural Buffer was interrupted by the access road, which runs roughly parallel to the southern boundary of the AA and within approximately 15 meters of the boundary.

Both Condition of Natural Buffer – Vegetation and Native Plant Species Cover were affected by the presence of nonnative species. The average relative cover of native species for this site was 73%. The nonnative species with the highest absolute cover include the following species with cover values for plots 1, 2, 3, and 4, respectively: *Poa pratensis* (7.5%, 37.5%, 7.5%, and 37.5%), *Agrostis stolonifera* (0%, 17.5%, 17.5%, and 7.5%), *Cirsium arvense* (0%, 3.5%, 7.5%, and 17.5%), and *Bromus inermis* (0%, 0%, 0%, and 17.5%) (Tables 11 and 12). This site had one of the highest covers for noxious weed species. Although *C. arvense* was the only noxious species encountered within the plots, *Verbascum thapsus* was seen scattered throughout the AA with an estimated overall cover of 2%.

The average mean C-value for native species was 5.0, while the average cover-weighted mean C-value was only 5.0 (Table 11). This suggests that most native species at this site are equally likely to be found in natural and non-natural areas. However, they are not typical of high disturbance areas.

Woody debris appeared to be somewhat excessive at this site leading to a low score for Coarse and Fine Woody debris. Concurrently, there were minimal *Salix* seedlings and saplings encountered across this site. While mature *Salix* species and *Populus angustifolia* were observed throughout the site, the younger age classes occurred infrequently. This could be the result of competition from dense patches of nonnative herbaceous species (see previous paragraph).

Current land uses observed and approximate cover within the 500 m buffer include non-tilled hayfields (40%), moderate grazing (30%), light grazing (25%), unpaved roads (2%), paved roads (2%), and diversion dam site (1%).

4.1.11 CRVeg10 (Private)

Overall, this site appears to be in good condition, receiving an overall EIA rating of B- (2.68). The lowest individual metric ratings were for Condition of Natural Buffer – Vegetation (C), Native Plant Species Cover (C-), and Invasive Nonnative Plant Species Cover (C-) (Table 23).

Both Condition of Natural Buffer – Vegetation, Native Plant Species Cover, and Invasive Nonnative Plant Species Cover were affected by the presence of nonnative species. The average relative cover of native species for this site was 66%. The nonnative species with the highest absolute cover include the following species with cover values for plots 1, 2, 3, and 4, respectively: *Elymus repens* (37.5%, 37.5%, 0%, 7.5%), *Poa pratensis* (37.5%, 17.5%, 17.5%, and 17.5%), and *Cirsium arvense* (3.5%, 3.5%, 7.5%, and 7.5%). Average cover of the noxious species *C. arvense* across all plots was 5.5%, while the average cover of *E. repens* was 20.6% (Tables 11 and 12).

The average mean C-value for native species was 5.3, while the average cover-weighted mean C-value was only 5.7 (Table 13). This suggests that most native species at this site are equally likely to be found in natural and non-natural areas. However, they are not typical of high disturbance areas.

Current land uses observed and approximate cover within the 500 m buffer include non-tilled hayfields (80%), management for natural vegetation (18%), and unpaved roads (2%). Old beaver sign from gnaw marks on felled *P. angustifolia* were observed near the AA, but no recent sign was seen.

4.1.12 CRVeg11a (State of Colorado)

Overall, this site appears to be in good condition, receiving an overall EIA rating of B- (2.69). The lowest individual metric ratings it received were for Native Plant Species Cover (C), Invasive Nonnative Plant Species Cover (C), and Vegetation Structure (C) (Table 24).

The average relative cover of native species for this site was 90%. The nonnative species with the highest absolute cover was *Poa pratensis* with cover values for plots 1, 2, 3, and 4 of 3.5%, 17.5%, 3.5%, and 0%, respectively. Total average cover for noxious species was 5.1%. Cover values across each plot for the noxious species encountred were: *Cirsium arvense* (3.5%, 7.5%, 7.5%, and 7.5%) and *Verbascum thapsus* (0.5%, 0%, 1.5%, and 0%) (Tables 11 and 12).

Regarding Native Plant Species Composition, the average mean C-value for native species at this site was 4.9, and the average cover-weighted mean C-value for native species was 4.8 (Table 13). This suggests that the native plant species composition reflects moderately disturbed conditions with significant cover by species that are indicative of anthropogenic disturbance.

Vegetation Structure was affected by dense stands of *Salix* and *P. angustifolia* where it is difficult to impossible to travel through without mechanical assistance. While livestock grazing occurs in the AA, the cattle are largely restricted to grazing along scattered trampled paths through these woody stands.

Current land uses observed and approximate cover within the 500 m buffer non-tilled hayfields (30%), light grazing (27%), moderate grazing (25%), moderate recreation (10%), light recreation (5%), and unpaved roads (3%). Old beaver sign from gnaw marks on felled woody shrubs and trees were observed within the AA, but no recent sign was seen.

4.1.13 CRVeg11b (Bureau of Land Management)

Overall, this site appears to be in fair condition, receiving an overall EIA rating of C+ (2.47). The lowest individual metric ratings it received were for Land Use Index (C), Condition of Natural Buffer – Soils (C), Native Plant Species Cover (C), Invasive Nonnative Plant Species Cover (C), Native Plant Species Composition (C), Vegetation Structure (C), and Coarse and Fine Woody Debris (C) (Table 25).

Livestock grazing of moderate intensity across a large portion of this site impacted Land Use Index and Condition of Natural Buffer – Soils scores. The plant community reflected exposure to disturbance over an extended time period. Signs of livestock grazing at a moderate intensity were observed across the site. Additionally, there was erosion and incutting of the north bank of the main river channel.

Regarding Native Plant Species Cover and Invasive Nonnative Plant Species Cover, the average relative native species cover was 88%. *Poa pratensis* was the nonnative species with the highest absolute cover with cover values of 3.5%, 17.5%, 3.5%, and 0% for plots 1, 2, 3, and 4, respectively. Noxious species had an average total cover of 5.2%. *Cirsium arvense* had cover values of 3.5%, 7.5%, 7.5%, and 0%, while *Verbascum thapsus* had cover values of 0.5%, 0%, 1.5%, and 0% (Tables 11 and 12). Although *Cardaria draba* was not encountered within the individual sample plots, it commonly occurred within the AA and within the 500 meter buffer. *Cirsium arvense* and *Cardaria draba* formed near monocultures in scattered patches across the site, particularly adjacent to the dry river channel to the north and the access road running parallel to it.

Regarding Native Plant Species Composition, the average mean C-value for native species at this site was 4.6, and the average cover-weighted mean C-value for native species was 4.4 (Table 13). This suggests that the native plant species composition reflects moderately

disturbed conditions with significant cover by species that are indicative of anthropogenic disturbance.

Vegetation Structure and Coarse and Fine Woody Debris received low marks as a result of dense stands of *Salix exigua*. These stands were difficult to impossible to navigate through without the aid of a mechanical device or cutting tool. Further the amount of fine woody debris on the ground appeared to be lacking given the high shrub cover across the vegetation plots.

Current land uses observed and approximate cover within the 500 m buffer include heavy to moderate grazing (60%), light grazing (38%), and unpaved roads (2%).

4.1.14 Rio Grande Summary

In total, 10 AAs were surveyed along the Rio Grande, which spanned five counties: Hinsdale, Mineral, Rio Grande, Alamosa, and Costilla. The highest elevation location was RGVeg02 at 3,030 meters (9,940 ft) to the lowest elevation location at RGVeg17 at 2,280 meters (7,480 ft). Seven of the sites were located on federally managed land (BLM, U.S. Fish & Wildlife Service, and U.S. Forest Service), one site occurred on a Colorado Parks and Wildlife parcel, and three sites were located on privately owned properties (Table 3).

Generally, the highest elevation AAs received the highest overall Ecological Integrity Assessment ratings while the lowest elevation sites reflected more intensive disturbance with overall lower overall ratings. The two highest elevation sites (RGVeg02 and RGVeg04) along the Rio Grande received a B+ for their overall EIA ratings. Seven of the sites sampled received a B- rating (RGVeg07 – RGVeg16). The lowest rating was a C+ for the lowest elevation location, RGVeg17 (Tables 26 and 27).

According to Lemly, Gilligan, and Wiechmann (2016), the ecological integrity for a riparian area with an overall EIA score of B is considered to be a slight deviation from reference conditions. The wetland is expected to generally function within the range of natural disturbance regimes. While management to improve these conditions is desirable, a central focus should at least be to maintain these conditions. Special attention should be given to areas with a B- rating, which implies that the ecological integrity occurs near the threshold of degrading to less desirable (or functional) conditions. Management of riparian areas receiving an overall EIA rating of C should focus on improving the ecological integrity and preventing further alteration from reference conditions (Table 1). For these areas, adapted management is necessary to restore the ecological attributes that have been significantly altered from natural conditions.

A total of 181 plant taxa were encountered, including 170 unique species. The total number of plant taxa encountered at each site ranged from 28 to 48, with an average of 38 plant taxa per site. The most taxa were observed at the highest elevation sites (RGVeg02 and RGVeg04). The fewest taxa were encountered at RGVeg12 and RGVeg15. There was no obvious elevation trend in the number of taxa found at each site (Table 28). The most common species encountered (observed in 10+ plots) across all AAs can be seen in Table 29.

Average relative cover of native species ranged from 62% at RGVeg17 to 98.8% at RGVeg07. Noxious species were present in the following locations: RGVeg07 (0.1% average cover), RGVeg11 (0.1% average cover), RGVeg12 (2.9% average cover), RGVeg13 (2.5% average cover), RGVeg15 (3.1% average cover), RGVeg16 (1.4% average cover), and RGVeg17 (1.6% average cover) (Tables 30 and 31). Average mean C-values for native species ranged from 3.8 (RGVeg17) to 5.3 (RGVeg02, RGVeg04, and RGVeg07). Average cover weighted mean C-values for native species ranged from 3.3 (RGVeg17) to 5.7 (RGVeg02) (Table 32; Figures 3 and 4).

The highest elevation sites (RGVeg02 and RGVeg04) were identified as Rocky Mountain Subalpine-Montane Riparian Shrubland Ecological System. RGVeg07 was the only Rocky Mountain Subalpine-Montane Riparian Woodland Ecological System surveyed. RGVeg09, RGVeg11, RGVeg12, RGVeg13, RGVeg15, RGVeg16, RGVeg17 were all identified as Rocky Mountain Lower Montane-Foothill Riparian Woodland and Shrubland Ecological System (Table 33).

The following Physiognomic Groups represented all sites surveyed along the Rio Grande: Tall Willow Shrubland (57.5% of plots), Deciduous Dominated Forest/Woodland (17.5% of plots), Evergreen Riparian Forest (10% of plots), Herbaceous Vegetation (10% of plots), and Non-Willow Shrubland (5% of plots) (Table 33).

4.1.15 RGVeg02 (USFS – Rio Grande National Forest)

Overall, this site appears to be in very good condition, receiving an overall EIA rating of B+ (3.36). The lowest individual metric ratings it received were for Natural Buffer Width (C) and Native Plant Species Cover (C) (Table 34).

Both Contiguous Natural Land Cover and Natural Buffer Width were disrupted by Forest Service Road 520 that runs parallel to the river to the north. According to Lemly, Gilligan, and Wiechmann (2016), fragmentation of natural land cover can be detrimental to natural ecological processes such as seed dispersal, animal movement, and genetic diversity. Without

re-routing FS Road 520, these metric scores cannot be easily improved as they are currently assessed.

Regarding Native Plant Species cover, the average relative cover of native species for this site was 85%. The nonnative species with the highest absolute cover included *Poa compressa* with 17%, 7.5%, 3.5%, and 0% cover in plots 1, 2, 3, and 4, respectively. *Poa pratensis* and *Taraxacum officinale* also occurred consistently across plots, but neither had greater than 3.5% absolute cover in any one plot (Tables 30 and 31). While it is desirable to have higher cover of native species, the most common nonnative species at this site are essentially naturalized in this region. These nonnatives did not result in monocultures and overall plant species diversity was relatively high compared to the other Rio Grande AAs. Further, no noxious species were observed at this site.

The averaged mean C-value for native species was 5.3 and the averaged cover-weighted mean C-value for native species was 5.7 (Table 32). This suggests that the majority of native species present are equally found in natural and non-natural areas.

Current land uses observed and approximate cover within the 500 m buffer include livestock grazing at light intensity (33%), management for native vegetation (66%), and unpaved roads (1%). Recent sign from deer and elk were also observed.

4.1.16 RGVeg04 (USFS – Rio Grande National Forest)

Overall, this site appears to be in very good condition, receiving an overall EIA rating of B+ (3.15). The lowest individual metric ratings it received were for Native Plant Species Cover (C-) (Table 35).

Regarding Native Plant Species Cover, average relative cover of native species for this site was 82%. The nonnative species with the highest absolute cover include the following species with cover values for plots 1, 2, 3, and 4, respectively: *Poa pratensis* (1.5%, 17.5%, 3.5%, and 7.5%), *Poa compressa* (3.5%, 1.5%, 3.5%, and 7.5%), and *Taraxacum officinale* (0.5%, 7.5%, 17.5%, and 3.5%) (Tables 30 and 31). While it is desirable to have higher cover of native species, the most common nonnative species at this site are essentially naturalized in this region. These nonnatives did not result in monocultures and overall plant species diversity was relatively high compared to the other Rio Grande AAs. Further, no noxious species were observed at this site.

The averaged mean C-value for native species was 5.3 and the averaged cover-weighted mean C-value for native species was 5.1 (Table 32). This suggests that the majority of native species present are equally found in natural and non-natural areas.

Current land uses observed and approximate cover within the 500 m buffer include management for native vegetation (83%), light fishing recreation (10%), unpaved roads (5%), and commercial structures as powerlines (2%). Traffic along the unpaved roads for recreation and power line access appear to be the main sources of disturbance. There is a private property located to the east of the AA; however based on aerial imagery, much of the area within the buffer appears to be in an overall natural state with relatively intact ecosystem processes.

4.1.17 RGVeg07 (USFS – Rio Grande National Forest)

Overall, this site appears to be in good condition, receiving an overall EIA rating of B- (2.88). However, this score suggests that this site has the potential to degrade to a rating of C if further alteration from natural conditions occurs. The lowest individual metric ratings it received were for Contiguous Natural Land Cover (C), Perimeter with Natural Buffer (C), and Width of Natural Buffer (C) (Table 36).

Both Contiguous Natural Land Cover, Perimeter with Natural Buffer, and Width of Natural Buffer were disrupted by a combination of railroad tracks and State Highway 149 that runs parallel to the river to the northeast. Due to the location of these semi-permanent structures, these metric scores cannot be easily improved as they are currently assessed.

Average relative cover of native species for this site was 99%. The averaged mean C-value for native species was 5.3 and the averaged cover-weighted mean C-value for native species was 5.2 (Table 32). This suggests that the majority of native species present are equally found in natural and non-natural areas. The only noxious species encountered was *Verbascum thapsus* in plot 3 with a cover of 0.2% (average noxious cover across all plots was 0.05%) (Tables 30 and 31).

Current land uses observed and approximate cover within the 500 m buffer include management for native vegetation (83%), light grazing (10%), light recreation via fishing (2%), paved roads (2%), railroad tracks (2%), and commercial buildings (1%). Traffic along the highway and recreational use at the nearby campground likely cause the highest disturbance impacts at this site.

4.1.18 RGVeg09 (Private)

Overall, this site appears to be in good condition, receiving an overall EIA rating of B- (2.71). However, this score suggests that this site has the potential to degrade to a C rating if further alteration from natural conditions occurs. The lowest individual metric ratings it received were for Contiguous Natural Land Cover (C), Land Use Index (C), Perimeter with Natural Buffer (C), Width of Natural Buffer (C), Native Plant Species Cover (C), and Vegetation Structure (C) (Table 37).

Contiguous Natural Land Cover, Land Use Index, Perimeter with Natural Buffer, and Width of Natural Buffer were all impacted by livestock grazing. Moderate to heavy grazing activity was the central factor that impacted the ratings for these metrics. Grazing pressure often results in reduced species diversity in combination with an increase in both native and nonnative plant species that are more tolerant of stressors such as higher intensity grazing pressure. As the plant community becomes stressed, there is also greater chance for noxious species to invade and thrive, which further disrupts the ecological processes. A reduction in grazing pressure within a minimum of 100 m from both sides of the river corridor would improve the condition of the buffer by reducing the potential for invasion by nonnative species and pollutant loading.

Regarding Native Plant Species Cover, the average relative native species cover was 86%. The nonnative species with the highest absolute cover include the following species with cover values for plots 1, 2, 3, and 4, respectively: *Phalaris arundinacea* (1.5%, 17.5%, 0%, and 0%), and *Poa pratensis* (0.5%, 1.5%, 7.5%, and 17.5%). There were no noxious species observed within the AA (Tables 30 and 31).

Regarding Native Plant Species Composition, the average mean C-value for native species at this site was 5.4, and the average cover-weighted mean C-value for native species was 4.5 (Table 32). These values suggest that most native species present are equally likely to be found in natural and non-natural areas. The impacts from anthropogenic disturbance are sub-optimal for the occurrence of species sensitive to habitat degradation and/or disturbance.

Current land uses observed and approximate cover within the 500 m buffer include heavy livestock grazing (30%), moderate grazing (30%), management for native vegetation (26%), light recreation (10%), unpaved roads (2%), and paved roads (2%). A reduction of grazing pressure and minimizing the use of two-tracks within 100 m of the river would alleviate stressors adjacent to this riparian area.

4.1.19 RGVeg11 (Private)

Overall, this site appears to be in good condition, receiving an overall EIA rating of B- (2.71). However, this score suggests that this site has the potential to degrade to a C rating if further alteration from natural conditions occurs. The lowest individual metric ratings it received were for Contiguous Natural Land Cover (C), Land Use Index (C), Native Plant Species Cover (C), and Coarse and Fine Woody Debris (C) (Table 38).

Contiguous Natural Land Cover within a 500 m buffer was disrupted by two-tracks located both north and south of the river that appear to be well traveled. These access routes fragment the natural landscape, leaving less than 60% of the buffered area around the AA within a contiguous natural landscape. These metrics could be improved by consolidating the main access traffic to routes located a minimum of 100 m from the river.

The average relative cover of native plants was 94%. While no single nonnative species was clearly dominant across plots, there were several nonnative species with low to moderate cover occurring in the highest diversity plots (1 and 2). While plots 3 and 4 included few to no nonnative species, there was relatively low overall plot diversity with only 12 and 6 total plant species recorded, respectively. The noxious species *Cirsium arvense* (Canada thistle) was only found in plot 1 with a total cover of 0.2% (Tables 30 and 31).

According to the landowner (Pers. Comm.), the riparian area on the south side of the river has been closed to grazing for about 10 years. Previously, there were no *Salix* individuals present, but since excluding cattle, the willow community has returned. A portion of the riparian area on the north side of the river, which includes part of the AA, has recently been excluded from grazing. A fence now parallels the riparian corridor approximately 20 m from the north edge of the riverbank. Plots 1-3 were placed within the grazing exclosure, while plot 4 was situated outside the exclosure. There was a noticeable difference in plant diversity between plots inside and outside of the exclosure, with an average of 16 species per plot for those located inside the exclosure and only six species encountered in plot 4. Given more time to recover, the condition of the plant community within the exclosure has potential to improve. Extending the distance of the exclosure fence line further outward from the riparian corridor (up to 100 m) would further enhance restoration potential.

Regarding Native Plant Species Composition, the average mean C-value for native species was 4.5, while the average cover-weighted mean C-value for native species was 4.6 (Table 32). These values suggest that most native species present are equally likely to be found in natural and non-natural areas. However, with continued relief from grazing pressure it is possible that plant species more sensitive to disturbance will eventually reestablish and overall species diversity will increase.

Outside of the grazing exclosure there was little woody debris distributed throughout the area. There were slash piles scattered across the terrain from recent management activities. Inside the exclosure, woody debris was also limited, however was beginning to accumulate. The presence of both coarse and fine woody debris plays a critical role in riparian systems by enhancing habitat, retaining organic matter and nutrients, and contributing to stream channel architecture (Lemly, Gilligan, and Wiechmann 2016). Given additional time, the area within the exclosure will continue to develop its woody debris.

Current land uses observed and approximate cover within the 500 m buffer include moderate grazing (76%), management for native vegetation (20%), and unpaved roads (4%). There was evidence at this site of past beaver activity, however no recent sign was observed.

4.1.20 RGVeg12 (State)

Overall, this site appears to be in good condition, receiving an overall EIA rating of B- (2.62). However, this score suggests that this site has the potential to degrade to a C rating if further alteration from natural conditions occurs. The lowest individual metric ratings it received were for Condition of Natural Buffer – Vegetation (C), Native Plant Species Cover (C-), Native Plant Species Composition (C), and Vegetation Structure (C) (Table 39).

Condition of Natural Buffer – Vegetation and Native Plant Species Cover were both impacted by the low average relative cover of native species at this site (60%). The nonnative species with the highest absolute cover include the following species with cover values for plots 1, 2, 3, and 4, respectively: *Bromus inermis* (17.5%, 1.5%, 1.5%, and 17.5%), *Elymus repens* (7.5%, 17.5%, 17.5%, and 3.5%), and *Poa pratensis* (7.5%, 0.5%, 3.5%, and 3.5%). The noxious species *Cirsium arvense* was encountered in all four plots (0.2%, 3.5%, 7.5%, and 0.5% cover) and had an average cover of 3% (Tables 30 and 31).

Regarding Native Plant Species Composition, the average mean C-value for native species was 4.7, while the average cover-weighted mean C-value for native species was 4.3 (Table 32). These values suggest that most native species present are equally likely to be found in natural and non-natural areas.

This site received a C-rank for Vegetation Structure because the vertical strata and presence of woody debris were moderately less complex than natural conditions. Simultaneously, herbaceous litter cover appeared to be excessive relative to expected natural conditions. The plant associations at this site are *Salix exigua/*Mesic Graminoid Shrubland (Carsey et al 2003)

and mature *Populus* angustifolia with an herbaceous understory (undescribed) reflect plant communities of early seral stages. While *Salix exigua* is an excellent soil stabilizer, this species can dominate a stand and reduce overall diversity. This site may benefit from weed removal and introduction of additional native species (via seed, cuttings, and/or transplants) to facilitate transition to a more mature seral state.

Current land uses observed and approximate cover within the 500 m buffer include light recreation (75%), non-tilled hayfields (22%), and unpaved roads (3%). The two tracks primarily occur > 100 m from the river, however a prominent two-track running east/west on the south side of the river approaches the riparian corridor to within a few meters. It would be beneficial to re-route this track further from the river, if possible. There was evidence at this site of past beaver activity, however no recent sign was observed.

4.1.21 RGVeg13 (Private)

Overall, this site appears to be in good condition, receiving an overall EIA rating of B- (2.70). However, this score suggests that this site has the potential to degrade to a C rating if further alteration from natural conditions occurs. The lowest individual metric ratings it received were for Land Use Index (C), Width of Natural Buffer (C), Native Plant Species Cover (C), and Native Plant Species Composition (C) (Table 40).

The Land Use Index and Width of Natural Buffer were both impacted by moderate grazing occurring south of the river. Grazing at this level of intensity fragments the cover or natural land use surrounding the AA. The grazing pasture covers an estimated 50% of the 500 m buffer and occurs within the 100 m buffer area immediately adjacent to the AA.

The average relative cover of native species was 92%, which ranks as a C for Native Plant Species Composition. *Phalaris arundinacea* was the nonnative species with the highest absolute cover, however it only occurred in plot 1 (7.5%). On average, there were 21 species per plot, seven of which were classified as nonnative. *Cirsium arvense* was present in all plots (3.5%, 3.5%, 1.5%, and 1.5% cover per plot) with an average cover of 2.5% (Tables 30 and 31).

Regarding Native Plant Species Composition, the average mean C-value for native species was 4.0, while the average cover-weighted mean C-value for native species was 3.4 (Table 32). This suggests high cover by increaser native species that are tolerant of disturbance and habitat degradation. These species are commonly found in non-natural areas significantly impacted by anthropogenic disturbance.

Current land uses observed and approximate cover within the 500 m buffer include moderate grazing (50% cover of the buffered area), non-tilled hay fields (40%), management for native vegetation (9%) and two-track access roads (1%).

4.1.22 RGVeg15 (U.S. Fish & Wildlife Service)

Overall, this site appears to be in good condition, receiving an overall EIA rating of B- (2.69). However, this score suggests that this site has the potential to degrade to a C rating if further alteration from natural conditions occurs. The lowest individual metric ratings it received were for Native Plant Species Cover (C) and Native Plant Species Composition (C) (Table 41).

The average relative cover of native species was 91%, which ranks as a C for Native Plant Species Composition. No single nonnative species was clearly dominant across sampled plots, however multiple nonnative species with low to moderate cover occurred in all plots. Additionally, *Phalaris arundinacea* is considered to be an increaser species by CNHP and had consistently high cover across plots 1, 2, 3, and 4 with values of 62.5%, 37.5%, 17.5%, and 17.5%, respectively. The noxious species *Cirsium arvense* was present in plots 1, 2, 3, and 4 with cover values of 0.5%, 0.5%, 3.5%, and 7.5%, respectively (average cover 3%). *Cardaria draba* occurred in plot 4 only with a cover of 0.5% (Tables 30 and 31).

The average mean C-value for native species was 4.5, while the average cover-weighted mean C-value was only 3.8 (Table 32).

Current land uses observed and approximate cover within the 500 m buffer include non-tilled hayfields (60%), management for native vegetation (20%), light recreation (e.g. birding) (15%), and unpaved roads (5%). A few willows showed evidence of having been recently browsed by beaver.

4.1.23 RGVeg16 (Private)

Overall, this site appears to be in good condition, receiving an overall EIA rating of B- (2.63). This score suggests that this site has the potential to degrade to a C rating if further alteration from natural conditions occurs. The lowest individual metric ratings it received were for Land Use Index (C), Condition of Natural Buffer – Soils (C), Native Plant Species Cover (C), Vegetation Structure (C), and Regeneration of Native Woody Species (C) (Table 42).

Signs of moderate grazing occur north of the confluence of the Conejos and Rio Grandes. This level of grazing intensity disrupts the extent of continuous natural land cover within the 500 m buffer zone of the AA. Perhaps due to its proximity to County Road Z, this site also shows a range of light to moderate signs of recreational activity, which includes fishing access along the riparian corridor.

The average relative cover of native species was 92%, which ranks as a C for Native Plant Species Composition. No single nonnative species was clearly dominant across sampled plots, however multiple nonnative species with low to moderate cover occurred in all plots. The noxious species *Cirsium arvense* and *Cardaria draba* were observed at this site. *Cirsium arvense* occurred in all four plots (0.5%, 1.5%, 3.5%, and 0.2%) and had an average cover of 1.4%. *Cardaria draba* occurred in three plots (0.5%, 0.5%, 1.5%, and 0%), with an average cover of 0.8% (Tables 30 and 31).

The average mean C-value for native species was 4.6, while the average cover-weighted mean C-value was only 4.3 (Table 32). These C-values suggest plants that are tolerant of disturbance and are as likely to occur in non-natural areas as they are in natural areas.

The Condition of Natural Buffer – Soils rank reflects a combination of signs of moderate intensity of human use at the site and erosion observed along the north river bank.

The Vegetation Structure was impacted by patches of vegetation that appeared to be denser than expected of natural conditions. These patches were mainly comprised of *Salix exigua* and other native increaser species.

Regeneration of Native Woody Species was impacted by the lack of mature *Populus angustifolia* individuals at the site. There were several seedlings scattered throughout the AA, but the only mature individuals observed occurred in a small stand south of the AA.

Current land uses observed and approximate cover within the 500 m buffer include moderate grazing (50%), light recreation (28%), non-tilled hay fields (20%), unpaved roads (1%), and paved roads/parking lots (1%). Both *Populus angustifolia* and *Salix exigua* individuals within the AA showed evidence of having been recently felled by beaver.

4.1.24 RGVeg17 (BLM – Rio Grande Natural Area)

Overall, this site appears to be in fair condition, receiving an overall EIA rating of C+ (2.15). A C rating suggests the riparian area has several unfavorable characteristics and management is

required to maintain or restore certain ecological attributes. At the time of sampling, the site was being actively grazed at moderate to high intensity. The lowest individual metric ratings it received were for Contiguous Natural Land Cover (C), Land Use Index (C), Width of Natural Buffer (C), Condition of Natural Buffer – Vegetation (C), Native Plant Species Cover (C-), Native Plant Species Composition (D), Vegetation Structure (C), and Coarse and Fine Woody Debris (C) (Table 43).

Contiguous Natural Land Cover and Width of the Natural Buffer were both impacted by two-tracks that bound the river on both sides. This leaves only approximately 30% of the total 500 m buffer area that is considered to be both natural land cover and contiguous with the AA itself. The active grazing at moderate to heavy intensity on both sides of the AA impacted the Land Use Index rank. The areas immediately adjacent to the riverbanks on both sides were heavily impacted, while rangelands approximately 50 m away from the banks were moderately grazed.

The average relative cover of native species was only 62%, leading to low scores for both Condition of Natural Buffer – Vegetation and Native Plant Species Cover. The nonnative species *Plantago major* had consistently high cover with values of 37.5%, 3.5%, 17.5%, and 7.5% cover for plots 1, 2, 3, and 4, respectively. While no other single nonnative species had consistently high cover, each plot had between 29% to 64% relative cover by nonnative species. The noxious species *Cirsium arvense* was present in plots 2, 3, and 4 (1.5%, 1.5%, and 3.5% cover) with an average cover of 1.6% (Tables 30 and 31).

The average mean C-value for native species was 3.8, while the average cover-weighted mean C-value was only 3.3 (Table 32). This reveals overall dominance by native species that are highly tolerant of disturbance and commonly found in non-natural areas.

Finally, although *Salix exigua* was present with relatively high cover across three of the plots, the expected cover of fine woody debris was lacking from this site. This appears to be the result of heavy browsing by livestock and native wildlife. Signs of heavy beaver activity was also observed in the area, with a beaver lodge situated approximately 50 m downstream of the AA along the west bank.

Current land uses observed and approximate cover within the 500 m buffer include moderate livestock grazing (83%), heavy livestock grazing (15%), and unpaved roads (2%). A beaver lodge was observed just downstream of the AA. No active beaver were observed, but the lodge appears to be in good condition.

4.1.25 Saguache Creek Summary

There were a total of five AAs along Saguache Creek, which all occurred within Saguache County. The highest elevation location was SCVeg01 at 2,845 meters (9,333 feet), while the lowest elevation location was SCVeg05 at 2,363 meters (7,752 feet). Only SCVeg01 was located on federally managed land (U.S. Forest Service), while SCVeg02, SCVeg03, SCVeg04, and SCVeg05 were located on private properties (Table 3).

Saguache SCVeg01 received an A- rating for its overall Ecological Integrity Assessment score. This rating implies an ecological integrity that reflects little human impact and ecological functioning within the bounds of natural disturbance regimes. Management for this site should focus on maintenance of current conditions. SCVeg02, SCVeg04, and SCVeg05 received an overall rating of B for their Ecological Integrity Assessment score, which suggests that these riparian areas have a slight deviation from reference conditions and they predominantly function within the bounds of natural disturbance regimes. According to Lemly, Gilligan, and Wiechmann (2016), management should focus on preventing further alteration (Table 1). SCVeg03 received the lowest score of C+ (Tables 44 and 45). Recommendations for sites with this score are to focus management on the most impacted ecological attributes, which can be identified by the individual metric ratings.

A total of 104 plant taxa were encountered, including 98 unique species. The total number of plant taxa encountered at an individual AA ranged from 19 to 46, with an average of 34 plant taxa per site. SCVeg03 had the highest diversity with 46 taxa, while SCVeg04 had the lowest diversity with 19 total taxa encountered (Table 46). There was a weak trend observed in species diversity and elevation along Saguache sample sites. The most common species encountered (observed in 5+ plots) across all AAs can be seen in Table 47.

Average relative cover of native species ranged from 72% at Site 2 to 99% at SCVeg01. Noxious species were present at SCVeg03 (6.4% average cover), SCVeg04 (1.3% average cover), and SCVeg05 (1.1% average cover) (Tables 48 and 49). Average mean C-values for native species ranged from 4.4 (SCVeg04) to 6.1 (SCVeg01). Average cover weighted mean C-values for native species ranged from 3.8 (SCVeg04) to 5.4 (SCVeg01) (Table 50; Figures 5 and 6).

The highest elevation sites (SCVeg01, SCVeg02, and SCVeg03) were identified as Rocky Mountain Subalpine-Montane Riparian Shrubland. SCVeg04 and SCVeg05 were identified as Rocky Mountain Lower Montane-Foothill Riparian Woodland and Shrubland (Table 51).

The following Physiognomic Groups represented all sites surveyed along Saguache Creek: Tall Willow Shrubland (60% of plots), Herbaceous Vegetation (30% of plots), and Non-Willow Shrubland (10% of plots) (Table 51).

4.1.26 SCVeg01 (USFS – Rio Grande National Forest)

This site appears to be in very good condition with an overall EIA rating of A- (3.66). There were no individual metric ratings scoring lower than a B (Table 52).

The average relative cover of native plants was 99% (Tables 48 and 49). The nonnative species encountered generally had minimal absolute cover across all plots. No noxious species were observed within the AA.

Regarding Native Plant Species Composition, the average mean C-value for native species at this site was 6.1, and the average cover-weighted mean C-value for native species was 5.4 (Table 50). The majority of native species encountered are equally found in natural and non-natural areas.

Current land uses observed and approximate cover within the 500 meter buffer include light grazing (80%) and light recreation (20%). Both livestock and elk scat were observed at the site in addition to bedding sites for wild ungulates.

4.1.27 SCVeg02 (Private)

Overall this site appears to be in very good condition with an overall EIA rating of B+ (3.34). The only individual metric rating scoring lower than a B were for Condition of Natural Buffer – Vegetation (C), and Native Plant Species Cover (C-) (Table 53).

The average relative cover of native plants was 72%. The nonnative species with the highest absolute cover include the following species with cover values for plots 1, 2, 3, and 4, respectively: *Poa pratensis* (37.5%, 37.5%, 62.5%, and 17.5%), and *Phleum pratense* (7.5%, 7.5%, 0%, and 0%) (Tables 48 and 49). The other nonnative species encountered had significantly lower absolute cover across all plots. No noxious species were observed.

The average mean C-value for native species was 5.0, while the average cover-weighted mean C-value was only 5.1 (Table 50). This suggests that most native species at this site are equally likely to be found in natural and non-natural areas. However, they are not typical of high disturbance areas.

Current land uses observed and approximate cover within the 500 meter buffer include management for natural vegetation (50%), light grazing (39%), moderate grazing (10%), and unpaved roads (1%). This site is inaccessible to the general public for recreation and there are few signs of human use. According to the landowner, grazing occurs here infrequently and in moderation (Ed Nielson Pers. Comm.). The landowner also noted that wild ungulates such as moose, elk, deer, and antelope are commonly encountered within the AA.

4.1.28 SCVeg03 (Private)

This site appears to be in fair condition, receiving an overall EIA rating of C+ (2.28). A rating of C suggests the riparian area has several unfavorable characteristics and management is required to maintain or restore certain ecological attributes. In this case, the rating reflects active management for both grazing and non-tilled hayfields. The lowest individual metric ratings it received were for Contiguous Natural Land Cover (C), Land Use Index (C), Condition of Natural Buffer – Soils (C), Native Plant Species Cover (C-), Invasive Nonnative Species Cover (C), and Vegetation Structure (C) (Table 54).

Contiguous Natural Land Cover was fragmented by a dirt access road running across the southern and western portion of the buffer. This road is the main access route to the hayfields and pastures adjacent to the river on this portion of the property. This metric score could be improved by moving the access road further away from the creek, if possible. The Land Use Index metric was impacted by management around the creek for both hay production and livestock grazing. The plant community includes several species that are more tolerant of these types of disturbances over a long-term period. The Condition of Natural Buffer – Soils metric also reflects a score driven by moderate intensity of human use.

The average relative cover of native species was only 75%, leading to low scores for both Native Plant Species Cover and Invasive Nonnative Species Cover. The nonnative species with the highest absolute cover include the following species with cover values for plots 1, 2, 3, and 4, respectively: *Poa pratensis* (0%, 37.5%, 7.5%, and 0%), *Agrostis stolonifera* (17.5%, 0%, 0%, and 0%), *Taraxacum officinale* (0%, 7.5%, 0%, and 7.5%). Total average cover by noxious species was 6.4%. *Cirsium arvense* was encountered in plots 1-3 with cover values of 0.5%, 17.5%, and 7.5%, respectively (Tables 48 and 49).

The average mean C-value for native species was 4.9, while the average cover-weighted mean C-value was only 4.9 (Table 50). This suggests that most native species at this site are equally

likely to be found in natural and non-natural areas. However, they are not typical of high disturbance areas.

Although litter was present across all plots, the depth was consistently minimal across plots which led to a low score for Vegetation Structure. The combination of haying and grazing are likely to cause the lack of litter layering in this system. Further, while three of the four plots were characterized as herbaceous rather than woody (e.g. shrubland) plant associations, it may also be a consequence of current management practices that shrubland communities are reduced along this corridor. Google Earth imagery from 2015 reveals shrubland communities occurring nearby in non-hayed sections of the creek, often where the landscape is not conducive for large machinery to operate.

Current land uses observed and approximate cover within the 500 m buffer include non-tilled hayfields (36%), light grazing (30%), moderate grazing (30%), unpaved roads (2%), and domestic buildings (1%). The overall EIA score of this site is expected given the intensity and type of management activities. The local plant community appears to be somewhat resilient, however, due in part to the high quality condition of the less intensively managed riparian corridor upstream of this location. If portions of the riparian area adjacent to Site 2 Alternate were rested, it's likely that a mosaic of willows and other native species would reestablish themselves.

4.1.29 SCVeg04 (Private)

Overall, this AA is in good condition with an overall EIA rating of B- (2.76). However, this score suggests that this site has the potential to degrade to a C rating if further alteration from natural conditions occurs. The lowest individual metric ratings it received were for Contiguous Natural Land Cover (C), Land Use Index (C), Native Plant Species Composition (C), and Vegetation Structure (C) (Table 55).

The Contiguous Natural Land Cover and Land Use Index metrics were impacted by the dual management use of the pasture immediately south of the AA. This pasture appears to be used for both grazing at moderate intensity and non-tilled hayfields. Consequently, when scored, the pasture was categorized as having "intensive use", excluding it from being classified as an unfragmented area of natural buffer.

While average relative cover of native species was 97%, the average mean C-value for native species was 4.4, and the average cover-weighted mean C-value for native species was 3.8

(Table 50). These values suggest that the majority of native species present are commonly found in non-natural areas.

A greater diversity of *Salix* species would be expected if this region weren't as intensively managed for agricultural purposes. Additionally, many mature *Populus angustifolia* were dead with minimal regeneration observed. This may be the result of fewer floods and a lower water table than experienced historically. Further, overall diversity across sampled plots (19 taxa) was significantly lower than the average diversity of 33 taxa across all AAs sampled along Saguache Creek. All of these attributes led to a low score for Vegetation Structure.

Current land uses observed and approximate cover within the 500 m buffer include non-tilled hayfields (60%), moderate to heavy grazing (38%), and paved roads (2%). In addition to livestock grazing, these pastures also see a fair amount of use by native ungulate based on the quantity of elk scat observed.

4.1.30 SCVeg05 (Private)

Overall, this site appears to be in good condition, receiving an overall EIA rating of B- (2.76). However, this score suggests that this site has the potential to degrade to a C rating if further alteration from natural conditions occurs. The lowest individual metric ratings it received were for Contiguous Natural Land Cover (C), Land Use Index (C), Condition of Natural Buffer – Vegetation (C), Native Plant Species Cover (C-), and Vegetation Structure (C) (Table 56).

The Contiguous Natural Land Cover and Land Use Index metrics were impacted by the dual management use of the pastures immediately adjacent to the AA (on both sides of the creek). This pasture appears to be used for both grazing at moderate intensity and non-tilled hayfields. Consequently, when scored, the pasture was categorized as having "intensive use", excluding it from being classified as an unfragmented area of natural buffer.

Condition of Natural Buffer – Vegetation and Native Plant Species Cover scores were the result of an average relative cover of native species of 74%. The nonnative species with the highest absolute cover include the following species with cover values for plots 1, 2, 3, and 4, respectively: *Poa pratensis* was the nonnative species with the highest average cover across plots with cover values of 17.5%, 3.5%, 1.5%, and 17.5% for plots 1, 2, 3, and 4, respectively. Several other nonnative species with low to moderate cover occurred in all plots. The noxious species *Cirsium arvense* was present in all four plots (3.5%, 0.2%, 0.5%, and 0.2% cover), with an average cover of 1.1% (Table 48 and 49).

The average mean C-value for native species was 4.6, while the average cover-weighted mean C-value was only 4.5 (Table 50). This suggests that most native species at this site are equally likely to be found in natural and non-natural areas. However, they are not typical of high disturbance areas.

Vegetation Structure was affected by dense *Salix exigua* stands. This willow is tolerant of regular disturbance and when it becomes a woody monoculture can choke out understory diversity. If less grazing and mowing pressure were present, it's possible these *S. exigua* stands would transition to a larger mosaic of woody and herbaceous species.

Current land uses observed and approximate cover within the 500 m buffer include exclusively non-tilled hayfields (35%), and pastures with a management combination of moderate to heavy grazing and non-tilled hayfields (65%).

4.2 Coarse Vegetation Mapping Along the Rio Grande

During fieldwork, surveyors took notes to coarsely inventory the changing plant community along the Rio Grande from RGVeg02, near the river's headwaters, to the boundary of Colorado and New Mexico. The transition of plant community across a landscape is generally quite dynamic and depends on a variety of interwoven ecological factors, including slope, aspect, elevation, moisture regime, geology, and soil quality. The variation in plant communities along the river corridor varies more extensively than is detailed by this coarse inventory. Therefore, this information should only serve as a very broad outline of the observed dominant plant communities along the extent of the Rio Grande in Colorado (Table 57). In reality, each of the dominant plant communities included in this table are each part of a larger mosaic.

4.3 Comparison Of EIA Scores Across Observers

Comparison of EIA scores across two independent observers for four sites along the Rio Grande revealed that some individual metrics appear to be more objective and consistent than others. In this limited comparison, only four individual metrics (out of 12 total) were scored with 100% precision across observers and potentially reflect high objectivity in scoring parameters. These metrics were: Land Use Index, Width of Natural Buffer, Native Plant Species Cover, and Invasive Nonnative Species Cover (Table 58).

An additional three metrics were assigned different scores on only one occasion each. In other words, both observers assigned the same score for these metrics three out of four times. These metrics were: Perimeter With Natural Buffer, Condition of Natural Buffer – Vegetation, and

Condition of Natural Buffer – Soils. For each of the scoring inconsistencies, the difference in score assigned differed by only one letter grade.

The metrics with the highest variability in scoring were Vegetation Structure, Native Plant Species Composition, and Regeneration of Native Woody Species. The scores across observers for both of these metrics differed three out of four times. This implies that these metrics are much more subjective and scoring is based more strongly on qualitative judgment. Again, however, the inconsistent scores differed by only one letter grade. The scoring discrepancy could also be the result of the surveyors' inexperience in using this particular assessment technique; with additional the fidelity of these scores may improve.

Overall EIA letter rating for each AA was the same for both observers in all cases. This implies that the EIA Scorecard is robust to minor variations in scoring across individual metrics. However, to acquire the most repeatable and precise results, the quality of experience and/or training in wetland ecology and botany is of importance when using this method.

5.0 DISCUSSION

5.1 General Recommendations Based on 2018 SMP Botany Surveys

General recommendations based on the results include the following:

1) Prioritize maintaining or improving the ecological integrity of areas with the following traits:

- Higher elevation sites that experience relatively low anthropogenic disturbance with high ecological integrity.
    - Strong efforts should be made to keep representative areas, with high ecological integrity, free from degradation and invasive species. It has been suggested that management may be more effectively directed toward maintaining ecosystems capable of delivering key ecosystem services than attempting to return degraded ecosystems with ongoing anthropogenic disturbance back to some historic and pristine condition, which may be futile (Pysek 2010).
    - These high integrity sites also serve as seed sources for riparian areas occurring downstream.

- Sites where invasive (noxious) species are present.
    - Riparian areas are more susceptible to weedy invasions when there is:
        - A steady source of propagules,
        - Ongoing disturbance that stresses the existing plant community,

        - Slow recovery rate of existing vegetation,
        - Nutrient enrichment that exceeds what the existing plant community can utilize,
        - Fragmentation of successionally advanced communities (Maarel 2005).
        - Proactively managing an area in a way that addresses the scenarios above supports the development of an established plant community that is more resistant to invasion.
    - Although it's nearly impossible to eradicate invasive plant species from a riparian corridor, their populations can be controlled.
    - The cost of clearing invasive plants is small compared to the value of the services provided by the surrounding ecosystem (Maarel 2005).

- Sites with an overall EIA rating of C.
    - Review the individual metrics for these sites. Focus management on improving the conditions behind individual metrics that received C or D and focus management on these metrics.

- Sites with an overall EIA rating of B-.
    - These sites have the potential to degrade beyond the threshold to a lower rating where the quality of the site's ecological conditions is beyond the natural range of variation.

2) Incentivize early detection and control efforts for noxious species along each riparian corridor.

- Early detection of the presence of invasive taxa can make the difference between being capable of successfully eradicating a population and being limited to a defensive control strategy of simply controlling the population and possibly an infinite financial commitment (Maarel 2005).

3) When possible, increase the width of natural buffers along riparian corridors. Especially for those sites receiving a rating at or below C for the Buffer Width metric.

- Buffer width is one important factor in riparian health. A buffer of sufficient size (minimum of 100 m) and structure improves water quality by trapping sediments and filtering pollutants before they reach the river or stream. When the buffer includes a variety of canopy layers, it also provides stream shading and helps control water temperature. Finally, the presence of woody debris (in the appropriate Ecological Systems, such as woodlands or shrublands) helps shape the riparian channel and provides habitat for a variety of species (Gebauer 2013).

6.0 LIST OF ABBREVIATIONS

AA: Assessment Area
BLM: Bureau of Land Management
C-value: Coefficient of Conservatism (see Rocchio 2007)
CNHP: Colorado Natural Heritage Program
EIA: Ecological Integrity Assessment
EIS: Ecological Integrity Score
EPA: U.S. Environmental Protection Agency
FQA: Floristic Quality Assessment (see Fink 2012; Rocchio 2007)
FQI: Floristic Quality Index (see Fink 2012)
LUI: Land Use Index
SMP: The Rio Grande, Conejos River, and Saguache Creek Stream Management Plans
SWA: State Wildlife Area
USFS: U.S. Forest Service

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APPENDIX A

Species List for SMP Assessment Areas:

Conejos River, Rio Grande, and Saguache Creek

Scientific Name	Synonym(s)	Common Name	Native Status[1]	Duration[2]	Lifeform[3]	C:Value[4]	Rio Grande	Conejos River	Saguache Creek
Achillea millefolium	*Achillea lanulosa*	Common yarrow	N	P	F	4	X	X	X
Achnatherum pinetorum	*Stipa pinetorum*	Pine needlegrass	N	P	G	6		X	
Aconitum columbianum		Columbian monkshood	N	P	F	8		X	
Agoseris glauca		Pale agoseris	N	P	F	8	X		X
Agrostis gigantea		Redtop	I	P	G	*	X		X
Agrostis scabra		Rough bentgrass	N	P	G	4	X	X	X
Agrostis stolonifera		Creeping bentgrass	I	P	G	*	X	X	X
Allium geyeri		Geyer's onion	N	P	F	5	X	X	X
Alnus incana		Gray alder	N	P	T	6	X	X	X
Alopecurus aequalis		Shortawn foxtail	N	P	G	4	X	X	X
Alopecurus geniculatus		Water foxtail	I	P	G	*			X
Ambrosia tomentosa		Skeletonleaf bur ragweed	N	P	F	3		X	
Androsace septentrionalis		Pygmyflower rockjasmine	N	A	F	6		X	
Antennaria microphylla		Littleleaf pussytoes	N	P	F	5	X		X
Antennaria parvifolia		Smallleaf pussytoes	N	P	F	5	X		
Antennaria rosulata		Kaibab pussytoes	N	P	F	5		X	
Apocynum cannabinum		Indian hemp	N	P	F	2	X	X	
Arctostaphylos uva9ursi		Kinnickinnick	N	P	SS	6		X	
Artemisia biennis		Biennial wormwood	I	B	F	*	X		
Artemisia campestris		Field sagewort	N	B	F	5			X
Artemisia dracunculus		Tarragon	N	P	F	3	X	X	X
Artemisia franserioides		Ragweed sagebrush	N	P	F	4		X	
Artemisia frigida		Prairie sagewort	N	P	SS	4	X		X
Artemisia ludoviciana		White sagebrush	N	P	F	4	X	X	X
Asclepias speciosa		Showy milkweed	N	P	F	3	X	X	
Asparagus officinalis		Asparagus	I	P	F	*	X	X	
Astragalus agrestis		Purple milkvetch	N	P	F	6		X	
Astragalus alpinus		Alpine milkvetch	N	P	F	6	X		
Bahia dissecta		Ragleaf bahia	N	P	F	5	X		
Beckmannia syzigachne		American sloughgrass	N	A	G	4	X	X	
Bidens cernua		Nodding beggartick	N	A	F	Q	X		
Bistorta vivipara	*Polygonum viviparum*	Alpine bistort	N	P	F	8		X	X
Boechera stricta	*Arabis drummondii*	Drummond's rockcress	N	B	F	5		X	
Bouteloua gracilis	*Chondrosum gracile*	Blue grama	N	P	G	4	X		X
Bromus inermis	*Bromopsis inermis*	Smooth brome	I	P	G	*	X	X	
Bromus lanatipes	*Bromopsis lanatipes*	Woolly brome	N	P	G	6	X	X	X
Bromus porteri	*Bromopsis porteri*	Porter brome	N	P	G	5	X		
Calamagrostis canadensis		Bluejoint	N	P	G	6	X	X	X
Campanula parryi		Parry's bellflower	N	P	F	7	X	X	X
Cardaria draba		Whitetop	X	P	F	*	X	X	
Carex aquatilis		Water sedge	N	P	G	6		X	X
Carex aurea		Golden sedge	N	P	G	7	X	X	
Carex bebbii		Bebb's sedge	N	P	G	7	X		
Carex canescens		Silvery sedge	N	P	G	8			X
Carex duriuscula	*Carex stenopylla* ssp. *eleocharis*	Needleleaf sedge	N	P	G	7	X		
Carex microptera	*Carex festivella, Carex limnophila*	Smallwing sedge	N	P	G	5		X	X
Carex obtusata		Obtuse sedge	N	P	G	8		X	
Carex occidentalis		Western sedge	N	P	G	7		X	X
Carex pellita	*Carex laguniosa*	Woolly sedge	N	P	G	6	X	X	X
Carex praegracilis		Clustered field sedge	N	P	G	5		X	X
Carex rossii	*Carex brevipes*	Ross' sedge	N	P	G	6		X	
Carex siccata	*Carex foenea*	Dryspike sedge	N	P	G	6	X	X	
Carex stevenii	*Carex norvegica* ssp. *stevenii*	Steven's sedge	N	P	G	8		X	
Carex utriculata		Northwest territory sedge	N	P	G	5	X	X	X
Castilleja sulphurea		Sulphur Indian paintbrush	N	P	F	7	X	X	X
Cerastium fontanum		Common mouseQear chickw	I	B	F	*		X	
Chamaesyce serpyllifolia		Thymeleaf sandmat	N	A	F	Q		X	
Chamerion angustifolium	*Chamerion danielsii*	Fireweed	N	P	F	4	X	X	X
Chenopodium album		Lambsquarters	N	A	F	Q	X	X	

Appendix E

Chrysothamnus nauseosus	Ericameria nauseosa	Rubber rabbitbrush	N	P	S	3	X		X
Cirsium arvense		Canada thistle	X	P	F	Q	X	X	X
Cirsium clavatum	Cirsium scapanolepis	Fish Lake thistle	N	P	F	Q	X		
Cirsium parryi		Parry's thistle	N	P	F	5	X		
Cirsium scariosum		Meadow thistle	N	P	F	6	X		X
Clematis ligusticifolia		Western white clematis	N	P	V	4		X	
Collomia linearis		Tiny trumpet	N	A	F	4	X		
Conioselinum scopulorum		Rocky Mountain hemlockpa	N	P	F	7			X
Convolvulus arvensis		Field bindweed	X	P	F	*	X	X	
Conyza canadensis		Canadian horseweed	I	B	F	*	X	X	
Cornus sericea	Swida sericea	Redosier dogwood	N	P	T	7		X	
Dactylis glomerata		Orchardgrass	I	P	G	*		X	
Deschampsia cespitosa		Tufted hairgrass	N	P	G	4	X	X	X
Descurainia californica		Sierra tansymustard	N	A	F	3	X		
Descurainia sophia		Herb sophia	I	B	F	*	X		
Dieteria canescens	Machaeranthera canescens	Hoary tansyaster	N	P	F	4	X	X	
Dodecatheon pulchellum		Darkthroat shootingstar	N	P	F	8			X
Elaeagnus commutata		Silverberry	N	P	S	Q		X	
Eleocharis acicularis		Needle spikerush	N	P	G	5		X	
Eleocharis palustris		Common spikerush	N	P	G	3	X	X	X
Elymus elymoides		Squirreltail	N	P	G	4	X	X	
Elymus glaucus		Blue wildrye	N	P	G	7		X	X
Elymus repens	Elytrigia repens	Quackgrass	X	P	G	*		X	
Elymus trachycaulus		Slender wheatgrass	N	P	G	4	X	X	X
Epilobium ciliatum	Epilobium brevistylum	Finged willowherb	N	P	F	4	X	X	X
Equisetum arvense		Field horsetail	N	P	F	4	X	X	X
Equisetum hyemale	Hippochaete hyemalis	Scouringrush horsetail	N	P	F	4		X	
Equisetum laevigatum	Hippochaete laevigata	Smooth horsetail	N	P	F	4	X	X	X
Erigeron divergens		Spreading fleabane	N	B	F	4	X	X	
Erigeron flagellaris		Trailing fleabane	N	B	F	3	X	X	X
Erigeron formosissimus		Beautiful fleabane	N	P	F	6	X	X	X
Erigeron glabellus		Streamside fleabane	N	P	F	6	X	X	X
Erigeron speciosus		Aspen fleabane	N	P	F	5		X	X
Erysimum repandum		Spreading wallflower	I	A	F	*	X		
Festuca arizonica		Arizona fescue	N	P	G	6	X	X	
Festuca thurberi		Thurber's fescue	N	P	G	8	X		X
Fragaria vesca		Woodland strawberry	N	P	F	5	X	X	
Fragaria virginiana		Virginia strawberry	N	P	F	5		X	
Galium boreale	Galium septentrionale	Northern bedstraw	N	P	F	6	X		
Galium trifidum		Threepetal bedstraw	N	P	F	7		X	X
Gayophytum diffusum		Spreading groundsmoke	N	A	F	4	X		
Gentiana parryi	Pneomonanthe parryi	Parry's gentian	N	P	F	9		X	
Geranium caespitosum		Pineywoods geranium	N	P	F	6		X	
Geranium richardsonii		Richardson's geranium	N	P	F	6	X	X	X
Geum aleppicum		Yellow avens	N	P	F	6	X	X	
Geum macrophyllum		Largeleaf avens	N	P	F	6		X	
Glyceria grandis		American mannagrass	N	P	G	6		X	
Glycyrrhiza lepidota		American licorice	N	P	F	3	X	X	
Gnaphalium palustre		Western marsh cudweed	N	A	F	5	X	X	
Grindelia squarrosa		Curlycup gumweed	N	B	F	1	X		
Hackelia floribunda		Manyflower stickseed	N	P	F	3	X		X
Hedysarum occidentale		Western sweetvetch	N	P	F	5		X	
Helianthus annuus		Common sunflower	N	A	F	1		X	
Heliomeris multiflora		Showy goldeneye	N	P	F	4		X	
Heracleum maximum	Heracleum	Common cowparsnip	N	P	F	6	X	X	X
Hesperostipa comata	Stipa comata	Needle and thread	N	P	G	6	X		
Heterotheca villosa		Hairy false goldenaster	N	P	SS	3	X	X	
Hippuris vulgaris		Common mare's tail	N	P	F	6	X		
Hordeum brachyantherum	Critesion brachyantherum	Meadow barley	N	P	G	Q		X	
Hordeum jubatum	Critesion jubatum	Foxtail barley	N	P	G	2	X		
Humulus neomexicanus	Humulus lupulus var. neomexicanus	Common hop	N	P	F	5	X		X
Hymenoxys hoopesii	Dugaldia hoopesii	Owl's claws	N	P	F	5	X		
Hymenoxys richardsonii	Picradenia richardsonii	Pingue rubberweed	N	P	SS	4		X	X
Hypericum scouleri	Hypericum formosum	Scouler's St. Johnswort	N	P	F	7		X	
Ipomopsis aggregata		Scarlet gilia	N	B	F	5	X	X	X
Iris missouriensis		Rocky Mountain Iris	N	P	F	4	X	X	X

Appendix E

Juncus arcticus	Juncus balticus, Juncus arcticus ssp. ater	Arctic rush	N	P	G	4	X	X	X
Juncus bufonius		Toad rush	N	A	G	3	X		
Juncus ensifolius		Swordleaf rush	N	P	G	6	X	X	
Juncus hallii		Hall's rush	N	P	G	Q			X
Juncus longistylis		Longstyle rush	N	P	G	6		X	
Juniperus communis		Common juniper	N	P	S	6	X	X	
Juniperus scopulorum	Sabina scopulorum	Rocky Mountain Juniper	N	P	T	5	X		
Koeleria macrantha		Prairie junegrass	N	P	G	6	X	X	
Lactuca serriola		Prickly lettuce	I	B	F	*	X	X	
Lacuca pulchella	Lactuca tatarica ssp. pulchella	Blue lettuce	N	P	F	3		X	
Lemna minor		Common duckweed	N	P	F	2			X
Lepidium densiflorum		Common pepperweed	I	B	F	Q	X	X	
Lepidium virginicum		Virginia pepperweed	N	B	F	2	X		
Linum lewisii	Adenolinum lewisii	Lewis flax	N	P	F	4	X		
Lonicera involucrata	Distegia involucrata	Twinberry honeysuckle	N	P	S	7	X	X	
Lupinus argenteus		Silvery lupine	N	P	F	5	X	X	
Maianthemum stellatum		Starry false lily of the valley	N	P	F	7	X	X	X
Medicago lupulina		Black medic	I	P	F	*	X		
Melilotus albus		White sweetclover	I	B	F	*	X		
Melilotus officinalis		Yellow sweetclover	I	B	F	*	X	X	
Mentha arvensis		Wild mint	N	P	F	4	X	X	X
Mertensia franciscana		Franciscan blue bells	N	P	F	8	X	X	
Muhlenbergia asperifolia		Scratchgrass	N	P	G	3	X		
Muhlenbergia filiformis		Pullup muhly	N	A	G	8	X	X	X
Muhlenbergia minutissima		Annual muhly	N	A	G	8	X		
Muhlenbergia montana		Mountain muhly	N	P	G	7	X	X	
Muhlenbergia racemosa		Marsh muhly	N	P	G	5		X	
Muhlenbergia richardsonis		Mat muhly	N	P	G	8		X	
Muhlenbergia torreyi		Ring muhly	N	P	G	5	X		
Muhlenbergia tricholepis	Blepharoneuron tricholepis	Pine dropseed	N	P	G	8		X	
Oenothera elata		Hooker's evening primrose	N	B	F	5	X		
Orthocarpus luteus		Yellow owl's clover	N	A	F	6		X	
Oxypolis fendleri		Fendler's cowbane	N	P	F	7		X	
Oxytropis deflexa		Nodding locoweed	N	P	F	Q	X	X	X
Pascopyrum smithii	Agropyron smithii	Western wheatgrass	N	P	G	5	X		
Pedicularis groenlandica		Elephanthead lousewort	N	P	F	8	X	X	
Penstemon strictus		Rocky Mountain penstemon	N	P	F	5	X		
Persicaria hydropiper	Polygonum hydropiper	Marshpepper knotweed	I	A	F	*		X	
Persicaria pensylvanica	Polygonum pensylvanicum	Pennsylvania smartweed	N	A	F	4	X		
Phalaris arundinacea	Phalaroides arundinacea	Reed canarygrass	N	P	G	*	X		X
Phleum pratense		Timothy grass	I	P	G	*	X	X	X
Picea engelmannii		Engelmann spruce	N	P	T	5	X	X	
Picea pungens		Blue spruce	N	P	T	6	X	X	X
Pinus aristata		Bristlecone pine	N	P	T	9		X	
Pinus ponderosa		Ponderosa pine	N	P	T	5		X	
Plantago major		Common plantain	I	P	F	*	X	X	
Platanthera huronensis	Platanthera hyperborea var. hyperborea	Huron green orchid	N	P	F	7	X	X	X
Poa compressa		Canada bluegrass	I	P	G	*	X	X	
Poa interior	Poa nemoralis ssp. interior	Inland bluegrass	N	P	G	6			X
Poa palustris		Fowl bluegrass	N	P	G	6	X	X	X
Poa pratensis		Kentucky bluegrass	I	P	G	*	X	X	X
Polygonum aviculare		Prostrate knotweed	I	P	F	*	X		
Polygonum persicaria		Spotted ladysthumb	I	P	F	*	X	X	
Polypogon monspeliensis		Rabbitsfoot grass	I	A	G	*	X		
Populus angustifolia		Narrowleaf cottonwood	N	P	T	5	X	X	
Populus tremuloides		Quaking aspen	N	P	T	5		X	
Potentilla anserina	Argentina anserina	Silverweed cinquefoil	N	P	F	3	X	X	X
Potentilla biennis		Biennial cinquefoil	N	B	F	4	X	X	X

Appendix E

Potentilla fruticosa	*Dasiphora floribunda, Pentaphylloides fruticosa*	Shrubby cinquefoil	N	P	S	4	X	X	X
Potentilla gracilis		Slender cinquefoil	N	P	F	5		X	
Potentilla hippiana		Woolly cinquefoil	N	P	F	5	X	X	
Potentilla plattensis		Platte River cinquefoil	N	P	F	7			X
Potentilla pulcherrima		Beautiful cinquefoil	N	P	F	5	X		
Prunella vulgaris		Selfheal	N	P	F	4		X	
Pseudocymopterus montanus	*Cymopterus lemmonii*	False springparsley	N	P	F	6	X	X	X
Pseudostellaria jamesiana		Tuber starwort	N	P	F	6			X
Ranunculus aquatilis		White water crowfoot	N	P	F	⍰	X		
Ranunculus macounii		Macoun's buttercup	N	P	F	7	X	X	
Ranunculus pensylvanicus		Pennsylvania buttercup	N	P	F	⍰	X		
Rhodiola rhodantha	*Sedum rhodanthum, Clementsia rhodantha*	Redpod stonecrop	N	P	F	8		X	
Ribes aureum		Golden currant	N	P	S	6	X		
Ribes cereum		Wax currant	N	P	S	6			X
Ribes inerme		Whitestem gooseberry	N	P	S	5	X	X	X
Rorippa curvipes		Bluntleaf yellowcress	N	P	F	5			X
Rorippa sphaerocarpa		Roundfruit yellowcress	N	A	F	4	X		
Rosa woodsii		Woods' rose	N	P	SS	5	X	X	X
Rubus idaeus		American red raspberry	N	P	SS	5	X	X	
Rudbeckia laciniata	*Rudbeckia ampla*	Cutleaf coneflower	N	P	F	6		X	
Rumex crispus		Curly dock	I	P	F	*		X	X
Rumex triangulivalvis	*Rumex salicifolius* ssp. *triangulivalvis*	Mexican dock	N	P	F	4	X		
Salix amygdaloides	*Salix nigra* var. *wrightii, Salix wrightii*	Peachleaf willow	N	P	S	5	X	X	X
Salix bebbiana		Bebb willow	N	P	S	6	X	X	X
Salix boothii		Booth's willow	N	P	S	7			X
Salix drummondiana		Drummond's willow	N	P	S	6		X	
Salix eriocephala	*Salix ligulifolia, Salix lutea* var. *ligulifolia*	Stapleaf willow	N	P	S	6	X	X	X
Salix exigua		Narrowleaf willow	N	P	S	3	X	X	X
Salix geyeriana		Geyer willow	N	P	S	6	X	X	X
Salix glauca		Grayleaf willow	N	P	S	8			X
Salix lasiandra	*Salix lucida* ssp. *lasiandra*	Pacific willow	N	P	S	7	X	X	
Salix melanopsis	*Salix exigua* ssp. *melanopsis*	Dusky willow	N	P	S	⍰	X		
Salix monticola		Park willow	N	P	S	6	X	X	X
Salix planifolia		Diamondleaf willow	N	P	S	7			X
Salix wolfii		Wolf's willow	N	P	S	8	X	X	
Schoenoplectus americanus	*Scirpus americanus*	Chairmaker's bulrush	N	P	G	⍰	X		X
Schoenoplectus taebermontani	*Scirpus lacustris, Scirpus tabernaemontani*	Softstem bulrush	N	P	G	3	X	X	
Scirpus microcarpus		Panicled bulrush	N	P	G	5	X		
Scutellaria galericulata		Marsh skullcap	N	P	F	7	X		
Sedum lanceolatum	*Amerosedum lanceolatum*	Spearleaf stonecrop	N	P	F	5	X	X	
Senecio bigelovii		Nodding ragwort	N	P	F	7		X	X
Senecio eremophilus		King's ragwort	N	P	F	4	X	X	
Shepherdia canadensis		Russet buffaloberry	N	P	S	7		X	
Silene scouleri		Simple campion	N	P	F	5		X	
Sisyrinchium montanum		Strict blue⍰eyed grass	N	P	F	6		X	
Solidago canadensis		Canada goldenrod	N	P	F	5	X		
Solidago multiradiata		Rocky Mountain goldenrod	N	P	F	5	X		
Solidago simplex		Mt. Albert goldenrod	N	P	F	6		X	
Solidago velutina		Threenerve goldenrod	N	P	F	6		X	
Sonchus asper		Spiny sowthistle	I	A	F	*	X		
Sparganium angustifolium		Narrowleaf bur⍰reed	N	P	F	7		X	
Spiranthes romanzoffiana		Hooded lady's tresses	N	P	F	7			X
Sporobolus cryptandrus		Sand dropseed	N	P	F	2	X		
Stachys palustris	*Stachys palustris* var. *pilosa*	Marsh hedgenettle	N	P	F	⍰	X	X	X
Taraxacum officinale		Dandelion	I	P	F	*	X	X	X
Thalictrum alpinum		Alpine meadow⍰rue	N	P	F	8			X

Appendix E

Thalictrum fendleri		Fendler's meadowQrue	N	P	F	6	X	X	
Thermopsis rhombifolia		Prairie thermopsis	N	P	F	5	X	X	X
Thlaspi arvense		Field pennycress	I	A	F	*	X		X
Tragopogon dubius		Yellow salsify	I	B	F	*	X	X	
Trifolium attenuatum		Rocky Mountain clover	N	P	F	8	X		
Trifolium longipes		Longstalk clover	N	P	F	7		X	X
Trifolium pratense		Red clover	I	P	F	*		X	
Trifolium repens		White clover	I	P	F	*	X	X	
Trisetum spicatum	Trisetum montanum	Spike trisetum	N	P	G	7		X	
Typha latifolia		Broadleaf cattail	N	P	F	2		X	
Urtica dioica		Stinging nettle	N	P	F	3	X	X	X
Valeriana edulis		Tobacco root	N	P	F	7	X	X	
Verbascum thapsus		Common mullein	X	B	F	*	X	X	
Veronica anagallis9aquatica		Water speedwell	I	P	F	*	X	X	
Vicia americana		American vetch	N	P	F	6	X	X	X
Xanthium strumarium		Rough cocklebur	N	A	F	Q	X	X	

[1] I = nonnative, N = native, X = Colorado noxious weed list

[2] A = annual, B = biennial, P = perennial

[3] F = forb, G = graminoid, S = shrub, SS = subshrub, T = tree, V = vine

[4] * = nonnative species or increaser native species (assumes a C‰value of 0), **:** = no C‰value assigned

This table only includes plants identified to species level.

Table 3. Assessment area general location descriptions

Riparian Corridor	Assessment Area	Latitude	Longitude	Elevation (m)	Elevation (ft)	Land Ownership	County
Conejos River	CRVeg01	37.35352	-106.52289	2982	9783	USFS - Rio Grande NF	Conejos
Conejos River	CRVeg03	37.32604	-106.47373	2938	9639	USFS - Rio Grande NF	Conejos
Conejos River	CRVeg04	37.26103	-106.47053	2792	9160	USFS - Rio Grande NF	Conejos
Conejos River	CRVeg05a	37.16956	-106.44321	2689	8822	USFS - Rio Grande NF	Conejos
Conejos River	CRVeg05b	37.13089	-106.39034	2660	8727	USFS - Rio Grande NF	Conejos
Conejos River	CRVeg06	37.09851	-106.30952	2629	8625	USFS - Rio Grande NF	Conejos
Conejos River	CRVeg08	37.05071	-106.15265	2501	8205	State of Colorado	Conejos
Conejos River	CRVeg09	37.10175	-106.00956	2411	7910	Private	Conejos
Conejos River	CRVeg10	37.13413	-105.92334	2357	7732	Private	Conejos
Conejos River	CRVeg11a	37.19423	-105.88564	2332	7650	State of Colorado	Conejos
Conejos River	CRVeg11b	37.29747	-105.79805	2306	7565	Bureau of Land Management	Conejos
Rio Grande	RGVeg02	37.75525	-107.4136	3030	9940	US Forest Service - Rio Grande NF	Hinsdale
Rio Grande	RGVeg04	37.72684	-107.02007	2700	8858	US Forest Service - Rio Grande NF	Mineral
Rio Grande	RGVeg07	37.75339	-106.76817	2552	8372	US Forest Service - Rio Grande NF	Mineral
Rio Grande	RGVeg09	37.6895	-106.45648	2440	8005	Private	Rio Grande
Rio Grande	RGVeg11	37.62864	-106.21722	2357	7732	Private	Rio Grande
Rio Grande	RGVeg12	37.58086	-106.08038	2330	7644	State of Colorado	Rio Grande
Rio Grande	RGVeg13	37.52547	-105.93912	2310	7578	Private	Alamosa
Rio Grande	RGVeg15	37.42973	-105.78988	2300	7545	US Fish and Wildlife Service	Alamosa
Rio Grande	RGVeg16	37.3035	-105.73594	2290	7513	Bureau of Land Management	Costilla
Rio Grande	RGVeg17	37.14368	-105.74426	2280	7480	Bureau of Land Management	Costilla
Saguache Creek	SCVeg01	38.0165	-106.64751	2845	9333	USFS - Rio Grande NF	Saguache
Saguache Creek	SCVeg02	38.07072	-106.5241	2663	8736	Private	Saguache
Saguache Creek	SCVeg03	38.10498	-106.49014	2610	8562	Private	Saguache
Saguache Creek	SCVeg04	38.11002	-106.22832	2393	7851	Private	Saguache
Saguache Creek	SCVeg05	38.07474	-106.15339	2363	7752	Private	Saguache
Source: USFWS Wolorado Wetlands Inventory (2018)							

Table 4. Plot layout details for Conejos River Assessment Areas

Assessment Area	Latitude	Longitude	GPS Error (ft)	Plot	Transect Distance (m)	Perpendicular Distance Inland from River (m)	Cardinal direction to next plot corner (deg)
CRVeg01	37.35352	-106.52289	9	1	0	2	0
				2	20	5	
				3	40	10	
				4	60	20	
CRVeg03	37.32604	-106.47373	11	1	0	2	90
				2	20	10	
				3	40	20	
				4	60	40	
CRVeg04	37.26103	-106.47053	9	1	0	2	0
				2	20	5	
				3	40	10	
				4	60	20	
CRVeg05a	37.16956	-106.44321	9	1	0	2	0
				2	20	10	
				3	40	20	
				4	60	40	
CRVeg05b	37.13089	-106.39034	12	1	0	2	0
				2	20	10	
				3	40	20	
				4	60	40	
CRVeg06	37.09851	-106.30952	9	1	0	2	0
				2	20	5	
				3	40	5	
				4	60	2	
CRVeg08	37.05071	-106.15265	9	1	0	2	270
				2	20	5	
				3	40	15	
				4	60	30	
CRVeg09	37.10175	-106.00956	12	1	0	2	270
				2	20	10	
				3	40	20	
				4	60	40	
CRVeg10	37.13413	-105.92334	9	1	0	2	90
				2	20	10	
				3	40	20	
				4	60	40	
CRVeg11a	37.19423	-105.88564	9	1	0	2	90
				2	20	10	
				3	40	20	
				4	60	40	
CRVeg11b	37.29747	-105.79805	9	1	0	2	0
				2	20	10	
				3	40	20	
				4	60	40	

Table 5. Plot layout details for Rio Grande River Assessment Areas

Assessment Area	Latitude	Longitude	GPS Error (ft)	Plot	Transect Distance (m)	Perpendicular Distance Inland from River (m)	Cardinal direction to next plot corner (deg)
RGVeg02	37.75525	-107.4136	9	1	0	2	90
				2	20	10	
				3	40	20	
				4	60	30	
RGVeg04	37.72684	-107.02007	9	1	0	2	270
				2	20	2	
				3	40	2	
				4	60	15	
RGVeg07	37.75339	-106.76817	9	1	0	2	0
				2	20	2	
				3	40	2	
				4	60	2	
RGVeg09	37.6895	-106.45648	9	1	0	2	90
				2	20	10	
				3	40	20	
				4	60	30	
RGVeg11	37.62864	-106.21722	9	1	0	2	0
				2	20	10	
				3	40	10	
				4	60	20	
RGVeg12	37.58086	-106.08038	9	1	0	2	90
				2	20	10	
				3	40	20	
				4	60	40	
RGVeg13	37.52547	-105.93912	9	1	0	2	90
				2	20	10	
				3	40	20	
				4	60	30	
RGVeg15	37.42973	-105.78988	9	1	0	2	0
				2	20	10	
				3	40	20	
				4	60	30	
RGVeg16	37.3035	-105.73594	9	1	0	2	90
				2	20	5	
				3	40	10	
				4	60	20	
RGVeg17	37.14368	-105.74426	9	1	0	2	270
				2	20	5	
				3	40	10	
				4	60	20	

Table 6. Plot layout details for Saguache Creek Assessment Areas

Assessment Area	Latitude	Longitude	GPS Error (ft)	Plot	Transect Distance (m)	Perpendicular Distance Inland from River (m)	Cardinal direction to next plot corner (deg)
SCVeg01	38.0165	-106.64751	9	1	0	2	90
				2	20	10	
				3	40	20	
				4	60	30	
SCVeg02	38.07072	-106.5241	9	1	0	2	90
				2	20	10	
				3	40	20	
				4	60	40	
SCVeg03	38.10498	-106.49014	9	1	0	2	270
				2	20	10	
				3	40	20	
				4	60	40	
SCVeg04	38.11002	-106.22832	9	1	0	2	90
				2	20	10	
				3	40	2	
				4	60	20	
SCVeg05	38.07474	-106.15339	9	1	0	2	0
				2	20	10	
				3	40	20	
				4	60	40	

Table 7. EIA – Overall scores for all AAs – Conejos River

Assessment Area	Calc Points	Calc Rating
CRVeg01	2.99	B-
CRVeg03	3.32	B+
CRVeg04	3.33	B+
CRVeg05a	3.34	B+
CRVeg05b	3.27	B+
CRVeg06	2.73	B-
CRVeg08	2.7	B-
CRVeg09	2.59	B-
CRVeg10	2.68	B-
CRVeg11a	2.69	B-
CRVeg11b	2.47	C+

Table 8. EIA – Individual metric scores for all AAs – Conejos River

	CRVeg01	CRVeg03	CRVeg04	CRVeg05a	CRVeg05b	CRVeg06	CRVeg08	CRVeg09	CRVeg10	CRVeg11a	CRVeg11b
Overall Ecological Integrity Points	**2.99**	**3.32**	**3.33**	**3.34**	**3.27**	**2.73**	**2.70**	**2.59**	**2.68**	**2.69**	**2.47**
Overall Ecological Integrity Rank	**B-**	**B+**	**B+**	**B+**	**B+**	**B-**	**B-**	**B-**	**B-**	**B-**	**C+**
LANDSCAPE METRICS											
L1. Contiguous Natural Land Cover	C	B	A	B	B	B	B	B	B	B	B
L2. Land Use Index	B	B	B	B	B	B	C	C	B	C	C
BUFFER METRICS											
B1. Perimeter with Natural Buffer	A	A	A	A	A	A	A	A	A	A	A
B2. Width of Natural Buffer	C	C	B	B	A	A	B	C	A	A	B
B3.1. Condition of Natural Buffer - Veg	C	B	C	C	C	C	B	C	C	B	B
B3.2. Condition of Natural Buffer - Soils	A	A	B	A	A	C	B	B	B	B	C
VEGETATION METRICS											
V1. Native Plant Species Cover	C-	C-	C-	C-	C-	D	C-	C-	C-	C	C
V2. Invasive Nonnative Plant Species Cover	A	A	A	A	A	A	B	C	C-	C	C
V3. Native Plant Species Composition	B	B	B	B	B	B	B	B	B	B	B
V4. Vegetation Structure	B	A	A	A	A	C	B	A	B	C	C
V5. Regen. of Native Woody Species **(opt.)**	B	A	A	A	B	C	C	B	B	B	B
V65. Coarse and Fine Woody Debris **(opt.)**	A	A	A	A	A	A	B	C	B	B	C

Table 9. Total taxa encountered by AA – Conejos River

Assessment Area	# Taxa Observed
CRVeg01	42
CRVeg03	56
CRVeg04	58
CRVeg05a	55
CRVeg05b	43
CRVeg06	35
CRVeg08	49
CRVeg09	25
CRVeg10	35
CRVeg11a	51
CRVeg11b	42
Average	**45**

Table 10. Most common species encountered – Conejos River

Scientific Name	# Plot Occurrences	Native Status[1]	C-Value[2]
Poa pratensis	36	I	*
Achillea millefolium	31	N	4
Populus angustifolia	30	N	5
Taraxacum officinale	27	I	*
Juncus arcticus	26	N	4
Potentilla fruticosa	23	N	4
Salix exigua	21	N	3
Maianthemum stellatum	20	N	7
Thermopsis rhombifolia	20	N	5
Vicia americana	20	N	6
Phleum pratense	18	I	*
Rosa woodsii	18	N	5
Fragaria virginiana	17	N	5
Potentilla gracilis	17	N	5
Trifolium repens	17	I	*
Cirsium arvense	16	X	*
Equisetum arvense	16	N	4
Alnus incana	15	N	6
Thalictrum fendleri	14	N	6
Antennaria rosulata	13	N	5
Erigeron flagellaris	13	N	3
Artemisia ludoviciana	12	N	4
Erigeron speciosus	12	N	5
Picea pungens	12	N	6
Stachys palustris	12	N	-
Agrostis stolonifera	11	I	*
Potentilla hippiana	11	N	5
Salix bebbiana	11	N	6
Solidago simplex	11	N	6
Bromus lanatipes	10	N	6
Elymus trachycaulus	10	N	4
Poa palustris	10	N	6
Salix eriocephala	10	N	6

[1] I = nonnative, N = native, X = Colorado noxious weed list

[2] * = nonnative species (assumes a C-value of 0), - = no C-value assigned

Table 11. Average total cover by AA – Conejos River

	Total Plant Cover	Total Native Cover	Total Introduced Cover	Total Noxious Cover	Total Nonnative Cover (excluding noxious)	Total Annual Cover	Total Biennial Cover	Total Perennial Cover	Total Forb Cover	Total Graminoid Cover	Total Sub-shrub Cover	Total Shrub Cover	Total Tree Cover
CR01_1	150.0%	78.5%	71.5%	0.0%	71.5%	0.0%	0.0%	149.0%	38.0%	72.5%	0.0%	39.0%	0.5%
CR01_2	102.5%	36.5%	66.0%	0.0%	66.0%	0.0%	0.5%	101.5%	24.5%	73.0%	0.0%	5.0%	0.0%
CR01_3	160.0%	114.0%	46.0%	0.0%	46.0%	0.0%	0.0%	159.5%	57.5%	42.5%	0.0%	60.0%	0.0%
CR01_4	100.5%	83.0%	17.5%	0.0%	17.5%	0.0%	7.5%	93.0%	53.0%	30.0%	0.0%	17.5%	0.0%
Average	**128.3%**	**78.0%**	**50.3%**	**0.0%**	**50.3%**	**0.0%**	**2.0%**	**125.8%**	**43.3%**	**54.5%**	**0.0%**	**30.4%**	**0.1%**
CR03_1	79.4%	78.7%	0.7%	0.0%	0.7%	0.0%	1.9%	77.5%	34.9%	14.5%	1.5%	21.0%	7.5%
CR03_2	128.7%	120.5%	8.2%	0.0%	8.2%	0.0%	1.7%	127.0%	30.7%	38.5%	0.0%	20.5%	39.0%
CR03_3	163.9%	118.9%	45.0%	0.0%	45.0%	0.0%	3.5%	160.4%	38.7%	65.5%	0.2%	11.5%	48.0%
CR03_4	116.7%	61.2%	55.5%	0.0%	55.5%	0.0%	4.0%	112.7%	39.5%	60.0%	0.2%	10.5%	6.5%
Average	**122.2%**	**94.8%**	**27.4%**	**0.0%**	**27.4%**	**0.0%**	**2.8%**	**119.4%**	**36.0%**	**44.6%**	**0.5%**	**15.9%**	**25.3%**
CR04_1	154.0%	109.0%	45.0%	0.0%	45.0%	0.0%	3.5%	150.5%	70.5%	50.0%	0.0%	25.0%	8.5%
CR04_2	57.0%	50.5%	6.5%	0.0%	6.5%	0.0%	0.0%	57.0%	20.0%	13.5%	0.5%	4.0%	19.0%
CR04_3	117.0%	92.5%	24.5%	0.0%	24.5%	0.0%	0.0%	117.0%	13.5%	76.5%	0.0%	4.5%	22.5%
CR04_3	145.5%	85.5%	60.0%	0.0%	60.0%	0.0%	0.0%	145.5%	56.0%	51.0%	0.0%	12.0%	26.5%
Average	**118.4%**	**84.4%**	**34.0%**	**0.0%**	**34.0%**	**0.0%**	**0.9%**	**117.5%**	**40.0%**	**47.8%**	**0.1%**	**11.4%**	**19.1%**
CR05a_1	100.2%	79.7%	20.5%	0.0%	20.5%	0.0%	2.0%	98.2%	46.2%	23.0%	0.0%	8.5%	22.5%
CR05a_2	144.5%	122.0%	22.5%	0.0%	22.5%	0.0%	7.0%	137.0%	54.5%	23.0%	0.0%	18.5%	48.5%
CR05a_3	273.2%	180.7%	92.5%	0.0%	92.5%	0.0%	0.0%	273.2%	98.7%	78.5%	0.0%	85.0%	11.0%
CR05a_4	164.0%	84.0%	80.0%	0.0%	80.0%	0.0%	0.0%	162.5%	48.0%	65.5%	0.0%	32.0%	18.5%
Average	**170.5%**	**116.6%**	**53.9%**	**0.0%**	**53.9%**	**0.0%**	**2.3%**	**167.7%**	**61.9%**	**47.5%**	**0.0%**	**36.0%**	**25.1%**
CR05b_1	102.2%	82.2%	20.0%	0.0%	20.0%	0.0%	2.5%	98.2%	80.0%	14.2%	0.0%	8.0%	0.0%
CR05b_2	153.5%	108.5%	45.0%	0.0%	45.0%	0.0%	1.0%	147.5%	65.0%	58.5%	0.0%	5.0%	25.0%
CR05b_3	170.0%	114.5%	55.5%	0.0%	55.5%	0.0%	4.0%	164.5%	55.5%	71.5%	0.0%	18.0%	25.0%
CR05b_4	115.5%	48.0%	67.5%	0.0%	67.5%	0.5%	2.0%	113.0%	22.5%	81.5%	0.0%	7.5%	4.0%
Average	**135.3%**	**88.3%**	**47.0%**	**0.0%**	**47.0%**	**0.1%**	**2.4%**	**130.8%**	**55.8%**	**56.4%**	**0.0%**	**9.6%**	**13.5%**
CR06_1	185.5%	102.5%	83.0%	0.0%	83.0%	0.0%	0.5%	185.0%	45.5%	68.0%	3.5%	36.5%	32.0%
CR06_2	212.7%	121.2%	91.5%	0.0%	91.5%	0.0%	0.0%	212.7%	26.0%	114.0%	1.5%	62.0%	9.2%
CR06_3	150.5%	55.5%	95.0%	0.0%	95.0%	0.0%	0.5%	150.0%	15.5%	109.0%	7.5%	15.0%	3.5%
CR06_4	191.5%	61.5%	130.0%	0.0%	130.0%	0.0%	1.5%	190.0%	52.5%	91.5%	0.0%	36.5%	11.0%
Average	**185.1%**	**85.2%**	**99.9%**	**0.0%**	**99.9%**	**0.0%**	**0.6%**	**184.4%**	**34.9%**	**95.6%**	**3.1%**	**37.5%**	**13.9%**
CR07_1	138.0%	93.5%	41.0%	3.5%	44.5%	7.5%	5.0%	125.5%	22.5%	59.5%	7.5%	11.0%	37.5%
CR07_2	188.0%	128.0%	58.5%	1.5%	60.0%	7.5%	7.5%	173.0%	36.5%	91.0%	0.5%	15.0%	45.0%
CR07_3	258.0%	256.0%	0.5%	1.5%	2.0%	90.0%	0.0%	168.0%	15.0%	180.5%	7.5%	50.0%	5.0%
CR07_4	132.5%	131.5%	0.5%	0.5%	1.0%	1.5%	1.5%	129.5%	63.0%	12.5%	5.0%	14.5%	37.5%
Average	**179.1%**	**152.3%**	**25.1%**	**1.8%**	**26.9%**	**26.6%**	**3.5%**	**149.0%**	**34.3%**	**85.9%**	**5.1%**	**22.6%**	**31.3%**
CR09_1	166.5%	159.0%	7.5%	0.0%	7.5%	0.0%	0.0%	166.5%	64.0%	7.5%	0.0%	32.5%	62.5%
CR09_2	159.5%	90.0%	66.0%	3.5%	69.5%	0.0%	0.0%	159.5%	61.5%	69.5%	17.5%	3.5%	7.5%
CR09_3	228.0%	177.0%	43.5%	7.5%	51.0%	0.0%	0.0%	228.0%	100.5%	40.0%	62.5%	25.0%	0.0%
CR09_4	228.5%	145.0%	66.0%	17.5%	83.5%	0.0%	0.0%	228.5%	114.0%	62.5%	0.0%	14.5%	37.5%
Average	**195.6%**	**142.8%**	**45.8%**	**7.1%**	**52.9%**	**0.0%**	**0.0%**	**195.6%**	**85.0%**	**44.9%**	**20.0%**	**18.9%**	**26.9%**
CR10_1	140.5%	62.0%	37.5%	41.0%	78.5%	0.0%	0.0%	140.5%	12.5%	86.0%	17.5%	21.0%	3.5%
CR10_2	179.0%	117.0%	21.0%	41.0%	62.0%	0.0%	0.0%	179.0%	47.0%	76.0%	7.5%	45.0%	3.5%
CR10_3	143.0%	114.0%	21.5%	7.5%	29.0%	0.0%	0.0%	143.0%	49.0%	39.0%	37.5%	0.0%	17.5%
CR10_4	162.0%	120.5%	26.5%	15.0%	41.5%	2.0%	2.5%	157.0%	36.0%	127.5%	0.0%	0.0%	0.0%
Average	**156.1%**	**103.4%**	**26.6%**	**26.1%**	**52.8%**	**0.5%**	**0.6%**	**154.9%**	**36.1%**	**82.1%**	**15.6%**	**16.5%**	**6.1%**
CR11a_1	166.0%	153.5%	8.5%	4.0%	12.5%	13.0%	5.0%	148.0%	25.0%	73.5%	3.5%	62.5%	1.5%
CR11a_2	169.5%	141.0%	21.0%	7.5%	28.5%	1.5%	0.0%	168.0%	58.0%	22.5%	0.0%	55.0%	37.5%
CR11a_3	139.5%	125.5%	5.0%	9.0%	14.0%	3.5%	1.5%	134.5%	35.5%	18.0%	9.0%	41.0%	37.5%
CR11a_4	119.0%	114.0%	5.0%	0.0%	5.0%	5.0%	1.5%	112.5%	35.5%	83.5%	0.0%	0.0%	0.0%
Average	**148.5%**	**133.5%**	**9.9%**	**5.1%**	**15.0%**	**5.8%**	**2.0%**	**140.8%**	**38.5%**	**49.4%**	**3.1%**	**39.6%**	**19.1%**
CR11b_1	110.2%	76.5%	33.2%	0.5%	33.7%	0.0%	2.2%	108.0%	25.7%	78.0%	1.5%	1.5%	3.5%
CR11b_2	155.5%	152.0%	0.0%	3.5%	3.5%	0.5%	0.0%	155.0%	58.0%	37.5%	17.5%	25.0%	17.5%
CR11b_3	175.2%	162.0%	4.0%	9.2%	13.2%	0.0%	0.5%	173.2%	68.2%	11.0%	17.5%	80.0%	0.0%
CR11b_4	161.0%	148.5%	5.0%	7.5%	12.5%	0.0%	0.0%	159.5%	46.5%	7.0%	17.5%	90.0%	3.5%
Average	**150.5%**	**134.8%**	**10.6%**	**5.2%**	**15.7%**	**0.1%**	**0.7%**	**148.9%**	**49.6%**	**33.4%**	**13.5%**	**49.1%**	**6.1%**

Table 12. Average relative cover by AA – Conejos River

	Relative Native Cover	Relative Introduced Cover	Relative Noxious Cover	Relative Nonnative Cover (excluding noxious)	Relative Annual Cover	Relative Biennial Cover	Relative Perennial Cover	Relative Forb Cover	Relative Graminoid Cover	Relative Sub-shrub Cover	Relative Shrub Cover	Relative Tree Cover
CR01_1	52.3%	47.7%	0.0%	47.7%	0.0%	0.0%	99.3%	25.3%	48.3%	0.0%	26.0%	0.3%
CR01_2	35.6%	64.4%	0.0%	64.4%	0.0%	0.5%	99.0%	23.9%	71.2%	0.0%	4.9%	0.0%
CR01_3	71.3%	28.8%	0.0%	28.8%	0.0%	0.0%	99.7%	35.9%	26.6%	0.0%	37.5%	0.0%
CR01_4	82.6%	17.4%	0.0%	17.4%	0.0%	7.5%	92.5%	52.7%	29.9%	0.0%	17.4%	0.0%
Average	**60.4%**	**39.6%**	**0.0%**	**39.6%**	**0.0%**	**2.0%**	**97.6%**	**34.5%**	**44.0%**	**0.0%**	**21.4%**	**0.1%**
CR03_1	99.1%	0.9%	0.0%	0.9%	0.0%	2.4%	97.6%	44.0%	18.3%	1.9%	26.4%	9.4%
CR03_2	93.6%	6.4%	0.0%	6.4%	0.0%	1.3%	98.7%	23.9%	29.9%	0.0%	15.9%	30.3%
CR03_3	72.5%	27.5%	0.0%	27.5%	0.0%	2.1%	97.9%	23.6%	40.0%	0.1%	7.0%	29.3%
CR03_4	52.4%	47.6%	0.0%	47.6%	0.0%	3.4%	96.6%	33.8%	51.4%	0.2%	9.0%	5.6%
Average	**79.4%**	**20.6%**	**0.0%**	**20.6%**	**0.0%**	**2.3%**	**97.7%**	**31.3%**	**34.9%**	**0.5%**	**14.6%**	**18.7%**
CR04_1	70.8%	29.2%	0.0%	29.2%	0.0%	2.3%	97.7%	45.8%	32.5%	0.0%	16.2%	5.5%
CR04_2	88.6%	11.4%	0.0%	11.4%	0.0%	0.0%	100.0%	35.1%	23.7%	0.9%	7.0%	33.3%
CR04_3	79.1%	20.9%	0.0%	20.9%	0.0%	0.0%	100.0%	11.5%	65.4%	0.0%	3.8%	19.2%
CR04_4	58.8%	41.2%	0.0%	41.2%	0.0%	0.0%	100.0%	38.5%	35.1%	0.0%	8.2%	18.2%
Average	**74.3%**	**25.7%**	**0.0%**	**25.7%**	**0.0%**	**0.6%**	**99.4%**	**32.7%**	**39.1%**	**0.2%**	**8.8%**	**19.1%**
CR05a_1	79.5%	20.5%	0.0%	20.5%	0.0%	2.0%	98.0%	46.1%	23.0%	0.0%	8.5%	22.5%
CR05a_2	84.4%	15.6%	0.0%	15.6%	0.0%	4.8%	94.8%	37.7%	15.9%	0.0%	12.8%	33.6%
CR05a_3	66.1%	33.9%	0.0%	33.9%	0.0%	0.0%	100.0%	36.1%	28.7%	0.0%	31.1%	4.0%
CR05a_4	51.2%	48.8%	0.0%	48.8%	0.0%	0.0%	99.1%	29.3%	39.9%	0.0%	19.5%	11.3%
Average	**70.3%**	**29.7%**	**0.0%**	**29.7%**	**0.0%**	**1.7%**	**98.0%**	**37.3%**	**26.9%**	**0.0%**	**18.0%**	**17.8%**
CR05b_1	80.4%	19.6%	0.0%	19.6%	0.0%	2.4%	96.1%	78.3%	13.9%	0.0%	7.8%	0.0%
CR05b_2	70.7%	29.3%	0.0%	29.3%	0.0%	0.7%	96.1%	42.3%	38.1%	0.0%	3.3%	16.3%
CR05b_3	67.4%	32.6%	0.0%	32.6%	0.0%	2.4%	96.8%	32.6%	42.1%	0.0%	10.6%	14.7%
CR05b_4	41.6%	58.4%	0.0%	58.4%	0.4%	1.7%	97.8%	19.5%	70.6%	0.0%	6.5%	3.5%
Average	**65.0%**	**35.0%**	**0.0%**	**35.0%**	**0.1%**	**1.8%**	**96.7%**	**43.2%**	**41.2%**	**0.0%**	**7.0%**	**8.6%**
CR06_1	55.3%	44.7%	0.0%	44.7%	0.0%	0.3%	99.7%	24.5%	36.7%	1.9%	19.7%	17.3%
CR06_2	57.0%	43.0%	0.0%	43.0%	0.0%	0.0%	100.0%	12.2%	53.6%	0.7%	29.1%	4.3%
CR06_3	36.9%	63.1%	0.0%	63.1%	0.0%	0.3%	99.7%	10.3%	72.4%	5.0%	10.0%	2.3%
CR06_4	32.1%	67.9%	0.0%	67.9%	0.0%	0.8%	99.2%	27.4%	47.8%	0.0%	19.1%	5.7%
Average	**45.3%**	**54.7%**	**0.0%**	**54.7%**	**0.0%**	**0.3%**	**99.7%**	**18.6%**	**52.6%**	**1.9%**	**19.5%**	**7.4%**
CR08_1	67.8%	29.7%	2.5%	32.2%	5.4%	3.6%	90.9%	16.3%	43.1%	5.4%	8.0%	27.2%
CR08_2	68.1%	31.1%	0.8%	31.9%	4.0%	4.0%	92.0%	19.4%	48.4%	0.3%	8.0%	23.9%
CR08_3	99.2%	0.2%	0.6%	0.8%	34.9%	0.0%	65.1%	5.8%	70.0%	2.9%	19.4%	1.9%
CR08_4	99.2%	0.4%	0.4%	0.8%	1.1%	1.1%	97.7%	47.5%	9.4%	3.8%	10.9%	28.3%
Average	**83.6%**	**15.3%**	**1.1%**	**16.4%**	**11.4%**	**2.2%**	**86.5%**	**22.3%**	**42.7%**	**3.1%**	**11.6%**	**20.3%**
CR09_1	95.5%	4.5%	0.0%	4.5%	0.0%	0.0%	100.0%	38.4%	4.5%	0.0%	19.5%	37.5%
CR09_2	56.4%	41.4%	2.2%	43.6%	0.0%	0.0%	100.0%	38.6%	43.6%	11.0%	2.2%	4.7%
CR09_3	77.6%	19.1%	3.3%	22.4%	0.0%	0.0%	100.0%	44.1%	17.5%	27.4%	11.0%	0.0%
CR09_4	63.5%	28.9%	7.7%	36.5%	0.0%	0.0%	100.0%	49.9%	27.4%	0.0%	6.3%	16.4%
Average	**73.3%**	**23.5%**	**3.3%**	**26.7%**	**0.0%**	**0.0%**	**100.0%**	**42.7%**	**23.2%**	**9.6%**	**9.8%**	**14.7%**
CR10_1	44.1%	26.7%	29.2%	55.9%	0.0%	0.0%	100.0%	8.9%	61.2%	12.5%	14.9%	2.5%
CR10_2	65.4%	11.7%	22.9%	34.6%	0.0%	0.0%	100.0%	26.3%	42.5%	4.2%	25.1%	2.0%
CR10_3	79.7%	15.0%	5.2%	20.3%	0.0%	0.0%	100.0%	34.3%	27.3%	26.2%	0.0%	12.2%
CR10_4	74.4%	16.4%	9.3%	25.6%	1.2%	1.5%	96.9%	22.2%	78.7%	0.0%	0.0%	0.0%
Average	**65.9%**	**17.5%**	**16.6%**	**34.1%**	**0.3%**	**0.4%**	**99.2%**	**22.9%**	**52.4%**	**10.7%**	**10.0%**	**4.2%**
CR11a_1	92.5%	5.1%	2.4%	7.5%	7.8%	3.0%	89.2%	15.1%	44.3%	2.1%	37.7%	0.9%
CR11a_2	83.2%	12.4%	4.4%	16.8%	0.9%	0.0%	99.1%	34.2%	13.3%	0.0%	32.4%	22.1%
CR11a_3	90.0%	3.6%	6.5%	10.0%	2.5%	1.1%	96.4%	25.4%	12.9%	6.5%	29.4%	26.9%
CR11a_4	95.8%	4.2%	0.0%	4.2%	4.2%	1.3%	94.5%	29.8%	70.2%	0.0%	0.0%	0.0%
Average	**90.4%**	**6.3%**	**3.3%**	**9.6%**	**3.9%**	**1.3%**	**94.8%**	**26.1%**	**35.2%**	**2.1%**	**24.9%**	**12.5%**
CR11b_1	69.4%	30.1%	0.5%	30.6%	0.0%	2.0%	98.0%	23.3%	70.8%	1.4%	1.4%	3.2%
CR11b_2	97.7%	0.0%	2.3%	2.3%	0.3%	0.0%	99.7%	37.3%	24.1%	11.3%	16.1%	11.3%
CR11b_3	92.5%	2.3%	5.3%	7.5%	0.0%	0.3%	98.9%	38.9%	6.3%	10.0%	45.7%	0.0%
CR11b_4	92.2%	3.1%	4.7%	7.8%	0.0%	0.0%	99.1%	28.9%	4.3%	10.9%	55.9%	2.2%
Average	**88.0%**	**8.9%**	**3.2%**	**12.0%**	**0.1%**	**0.6%**	**98.9%**	**32.1%**	**26.4%**	**8.4%**	**29.8%**	**4.2%**

Table 13. FQA Indices by AA – Conejos River

FQA Indices	CRVeg01	CRVeg03	CRVeg04	CRVeg05a	CRVeg05b	CRVeg06	CRVeg08	CRVeg09	CRVeg10	CRVeg11a	CRVeg11b
Mean C-Value (All species)	4.3	4.6	4.8	4.5	4.5	4.1	4.3	3.8	3.7	3.7	3.5
Mean C-Value (Native species)	5.3	5.1	5.4	5.2	5.3	5.5	5.0	5.0	5.3	4.9	4.6
Cover-weighted Mean C-Value (All species)	3.2	4.1	4.0	3.4	3.2	2.5	4.4	3.7	3.9	4.2	3.8
Cover-weighted Mean C-Value (Native species)	5.3	5.1	5.5	5.1	4.9	5.5	5.3	5.0	5.7	4.8	4.4
FQI (All species)	18.8	25.4	23.7	22.9	22.2	19.7	19.0	15.0	15.2	15.6	14.3
FQI (Native species)	20.8	26.8	25.3	24.7	24.2	22.5	20.7	17.3	18.1	18.2	16.4
Cover Weighted FQI (All species)	14.1	22.5	19.6	17.6	16.1	11.9	19.7	14.6	15.9	18.0	15.7
Cover Weighted FQI (Native species)	21.0	26.7	25.3	24.2	22.5	22.6	21.7	17.3	19.3	17.6	16.3
Adjusted FQI	48.1	48.8	50.9	48.2	48.8	47.5	46.2	43.6	44.3	42.5	40.0
Adjusted Cover Weighted FQI	48.3	48.5	51.1	47.2	45.3	47.6	48.4	43.6	47.0	41.2	38.3

Table 14. Ecological System, Physiognomic Group, and Riparian Plant Assoc. – Conejos River

Assessment Area	Riparian Ecological System[1]	Plot	Physiognomic Group[2]	Riparian Plant Association[2]	Fidelity
CRVeg01	Rocky Mtn Subalpine-Montane Riparian Shrubland	1	Tall Willow Shrubland	Salix monticola/Mesic graminoid Shrubland	Medium
		2	Tall Willow Shrubland	Salix monticola/Mesic graminoid Shrubland	Medium
		3	Tall Willow Shrubland	Salix monticola/Mesic forb Shrubland	High
		4	Tall Willow Shrubland	Potentilla fruticosa/Deschampsia cespitosa Shrubland	Medium
CRVeg03	Rocky Mtn Subalpine-Montane Riparian Woodland	1	Evergreen Riparian Forest	Abies-lasiocarpa-Picea engelmannii/Salix drummondiana Forest	Medium
		2	Evergreen Riparian Forest	Abies-lasiocarpa-Picea engelmannii/Salix drummondiana Forest	Medium
		3	Deciduous Dominated Forest/Woodland	Populus angustifolia/Salix Woodland	Low
		4	Deciduous Dominated Forest/Woodland	Populus angustifolia/Salix Woodland	Low
CRVeg04	Rocky Mtn Subalpine-Montane Riparian Woodland	1	Deciduous Dominated Forest/Woodland	Populus angustifolia-Picea pungens/Alnus incana Woodland	Medium
		2	Deciduous Dominated Forest/Woodland	Populus angustifolia-Picea pungens/Alnus incana Woodland	Medium
		3	Deciduous Dominated Forest/Woodland	Populus angustifolia-Picea pungens/Alnus incana Woodland	Medium
		4	Deciduous Dominated Forest/Woodland	Populus angustifolia-Picea pungens/Alnus incana Woodland	Medium
CRVeg05a	Rocky Mtn Subalpine-Montane Riparian Woodland	1	Deciduous Dominated Forest/Woodland	Populus angustifolia-Picea pungens/Alnus incana Woodland	Medium
		2	Deciduous Dominated Forest/Woodland	Populus angustifolia-Picea pungens/Alnus incana Woodland	Medium
		3	Deciduous Dominated Forest/Woodland	Populus angustifolia-Picea pungens/Alnus incana Woodland	Medium
		4	Deciduous Dominated Forest/Woodland	Populus angustifolia-Picea pungens/Alnus incana Woodland	Medium
CRVeg05b	Rocky Mtn Subalpine-Montane Riparian Woodland	1	Non-Willow Shrubland	Unknown	-
		2	Deciduous Dominated Forest/Woodland	Populus angustifolia-Picea pungens/Alnus incana Woodland	Medium
		3	Deciduous Dominated Forest/Woodland	Populus angustifolia-Picea pungens/Alnus incana Woodland	Medium
		4	Deciduous Dominated Forest/Woodland	Populus angustifolia-Picea pungens/Alnus incana Woodland	Low
CRVeg06	Rocky Mtn Subalpine-Montane Riparian Woodland	1	Deciduous Dominated Forest/Woodland	Populus angustifolia-Picea pungens/Alnus incana Woodland	Medium
		2	Deciduous Dominated Forest/Woodland	Populus angustifolia-Picea pungens/Alnus incana Woodland	Medium
		3	Tall Willow Shrubland	Salix ligulifolia (=S. eriocephala) Shrubland	High
		4	Tall Willow Shrubland	Salix ligulifolia (=S. eriocephala) Shrubland	Medium
CRVeg08	Rocky Mtn Lower Montane-Foothill Riparian Woodland/Shrubland	1	Deciduous Dominated Forest/Woodland	Populus angustifolia/Salix exigua Woodland	High
		2	Deciduous Dominated Forest/Woodland	Populus angustifolia/Salix exigua Woodland	High
		3	Tall Willow Shrubland	Salix exigua-Salix ligulifolia (=S. eriocephala) Shrubland	High
		4	Tall Willow Shrubland	Salix exigua-Salix ligulifolia (=S. eriocephala) Shrubland	High
CRVeg09	Rocky Mtn Lower Montane-Foothill Riparian Woodland/Shrubland	1	Deciduous Dominated Forest/Woodland	Populus angustifolia/Salix lucida (=S. lasiandra) Woodland	Medium
		2	Deciduous Dominated Forest/Woodland	Populus angustifolia/Salix lucida (=S. lasiandra) Woodland	Medium
		3	Tall Willow Shrubland	Salix lasiandra Shrubland	Low
		4	Deciduous Dominated Forest/Woodland	Populus angustifolia/Salix lasiandra Woodland	Medium
CRVeg10	Rocky Mtn Lower Montane-Foothill Riparian Woodland/Shrubland	1	Tall Willow Shrubland	Salix ligulifolia (=S. eriocephala) Shrubland	Medium
		2	Tall Willow Shrubland	Salix ligulifolia (=S. eriocephala) Shrubland	High
		3	Deciduous Dominated Forest/Woodland	Unknown	-
		4	Herbaceous Vegetation	Unknown	-
CRVeg11a	Rocky Mtn Lower Montane-Foothill Riparian Woodland/Shrubland	1	Tall Willow Shrubland	Salix exigua/Mesic graminoid Shrubland	High
		2	Deciduous Dominated Forest/Woodland	Populus angustifolia/Salix exigua Woodland	High
		3	Tall Willow Shrubland	Salix exigua/Mesic graminoid Shrubland	Medium
		4	Herbaceous Vegetation	Carex utriculata Herbaceous Vegetation	High
CRVeg11b	Rocky Mtn Lower Montane-Foothill Riparian Woodland/Shrubland	1	Deciduous Dominated Forest/Woodland	Populus angustifolia/Salix exigua Woodland	High
		2	Deciduous Dominated Forest/Woodland	Populus angustifolia/Salix exigua Woodland	High
		3	Tall Willow Shrubland	Salix exigua/Mesic graminoid Shrubland	Medium
		4	Tall Willow Shrubland	Salix exigua/Mesic graminoid Shrubland	Medium

[1] Source: Lemly et al. (2016)

[2] Source: Carsey, K. et al. (2003)

Table 15. EIA Scorecard – Conejos Site 01

CRVeg01 Observer: W. McBride	Wt	Field Rating	Field Points	Calc Points	Calc Rating
Overall Ecological Integrity Score and Rank				**2.99**	**B-**
Rank Factor: LANDSCAPE CONTEXT	0.30			**2.78**	**B-**
LANDSCAPE METRICS	0.33			**2.50**	**B-**
L1. Contiguous Natural Land Cover	1	C	2		
L2. Land Use Index	1	B	3		
BUFFER METRICS	0.67			**2.91**	**B-**
B1. Perimeter with Natural Buffer	n/a	A	4		
B2. Width of Natural Buffer	n/a	C	2		
B3.1. Condition of Natural Buffer - Veg	n/a	C	2		
B3.2. Condition of Natural Buffer - Soils	n/a	A	4		
Rank Factor: CONDITION	0.70			**3.08**	**B+**
VEGETATION METRICS	1			**3.08**	**B+**
V1. Native Plant Species Cover	1	C-	1.5		
V2. Invasive Nonnative Plant Species Cover	1	A	4		
V3. Native Plant Species Composition	1	B	3		
V4. Vegetation Structure	1	B	3		
V5. Regen. of Native Woody Species **(opt.)**	1	B	3		
V65. Coarse and Fine Woody Debris **(opt.)**	1	A	4		

Table 16. EIA Scorecard – Conejos Site 03

CRVeg03 Observer: W. McBride	Wt	Field Rating	Field Points	Calc Points	Calc Rating
Overall Ecological Integrity Score and Rank				**3.32**	**B+**
Rank Factor: LANDSCAPE CONTEXT	0.30			**3.10**	**B+**
LANDSCAPE METRICS	0.33			**3.00**	**B+**
L1. Contiguous Natural Land Cover	1	B	3		
L2. Land Use Index	1	B	3		
BUFFER METRICS	0.67			**3.15**	**B+**
B1. Perimeter with Natural Buffer	n/a	A	4		
B2. Width of Natural Buffer	n/a	C	2		
B3.1. Condition of Natural Buffer - Veg	n/a	B	3		
B3.2. Condition of Natural Buffer - Soils	n/a	A	4		
Rank Factor: CONDITION	0.70			**3.42**	**B+**
VEGETATION METRICS	1			**3.42**	**B+**
V1. Native Plant Species Cover	1	C-	1.5		
V2. Invasive Nonnative Plant Species Cover	1	A	4		
V3. Native Plant Species Composition	1	B	3		
V4. Vegetation Structure	1	A	4		
V5. Regen. of Native Woody Species **(opt.)**	1	A	4		
V65. Coarse and Fine Woody Debris **(opt.)**	1	A	4		

Table 17. EIA Scorecard – Conejos Site 04

CRVeg04 Observer: W. McBride	Wt	Field Rating	Field Points	Calc Points	Calc Rating
Overall Ecological Integrity Score and Rank				**3.33**	**B+**
Rank Factor: LANDSCAPE CONTEXT	0.30			**3.13**	**B+**
LANDSCAPE METRICS	0.33			**3.50**	**A-**
L1. Contiguous Natural Land Cover	1	A	4		
L2. Land Use Index	1	B	3		
BUFFER METRICS	0.67			**2.94**	**B-**
B1. Perimeter with Natural Buffer	n/a	A	4		
B2. Width of Natural Buffer	n/a	B	3		
B3.1. Condition of Natural Buffer - Veg	n/a	C	2		
B3.2. Condition of Natural Buffer - Soils	n/a	B	3		
Rank Factor: CONDITION	0.70			**3.42**	**B+**
VEGETATION METRICS	1			**3.42**	**B+**
V1. Native Plant Species Cover	1	C-	1.5		
V2. Invasive Nonnative Plant Species Cover	1	A	4		
V3. Native Plant Species Composition	1	B	3		
V4. Vegetation Structure	1	A	4		
V5. Regen. of Native Woody Species **(opt.)**	1	A	4		
V65. Coarse and Fine Woody Debris **(opt.)**	1	A	4		

Table 18. EIA Scorecard – Conejos Site 05a

CRVeg05a Observer: W. McBride	Wt	Field Rating	Field Points	Calc Points	Calc Rating
Overall Ecological Integrity Score and Rank				**3.34**	**B+**
Rank Factor: LANDSCAPE CONTEXT	0.30			**3.15**	**B+**
LANDSCAPE METRICS	0.33			**3.00**	**B+**
L1. Contiguous Natural Land Cover	1	B	3		
L2. Land Use Index	1	B	3		
BUFFER METRICS	0.67			**3.22**	**B+**
B1. Perimeter with Natural Buffer	n/a	A	4		
B2. Width of Natural Buffer	n/a	B	3		
B3.1. Condition of Natural Buffer - Veg	n/a	C	2		
B3.2. Condition of Natural Buffer - Soils	n/a	A	4		
Rank Factor: CONDITION	0.70			**3.42**	**B+**
VEGETATION METRICS	1			**3.42**	**B+**
V1. Native Plant Species Cover	1	C-	1.5		
V2. Invasive Nonnative Plant Species Cover	1	A	4		
V3. Native Plant Species Composition	1	B	3		
V4. Vegetation Structure	1	A	4		
V5. Regen. of Native Woody Species **(opt.)**	1	A	4		
V65. Coarse and Fine Woody Debris **(opt.)**	1	A	4		

Table 19. EIA Scorecard – Conejos Site 05b

CRVeg05b Observer: W. McBride	Wt	Field Rating	Field Points	Calc Points	Calc Rating
Overall Ecological Integrity Score and Rank				**3.27**	**B+**
Rank Factor: LANDSCAPE CONTEXT	0.30			**3.31**	**B+**
LANDSCAPE METRICS	0.33			**3.00**	**B+**
L1. Contiguous Natural Land Cover	1	B	3		
L2. Land Use Index	1	B	3		
BUFFER METRICS	0.67			**3.46**	**B+**
B1. Perimeter with Natural Buffer	n/a	A	4		
B2. Width of Natural Buffer	n/a	A	4		
B3.1. Condition of Natural Buffer - Veg	n/a	C	2		
B3.2. Condition of Natural Buffer - Soils	n/a	A	4		
Rank Factor: CONDITION	0.70			**3.25**	**B+**
VEGETATION METRICS	1			**3.25**	**B+**
V1. Native Plant Species Cover	1	C-	1.5		
V2. Invasive Nonnative Plant Species Cover	1	A	4		
V3. Native Plant Species Composition	1	B	3		
V4. Vegetation Structure	1	A	4		
V5. Regen. of Native Woody Species **(opt.)**	1	B	3		
V65. Coarse and Fine Woody Debris **(opt.)**	1	A	4		

Table 20. EIA Scorecard – Conejos Site 06

CRVeg06 Observer: W. McBride	Wt	Field Rating	Field Points	Calc Points	Calc Rating
Overall Ecological Integrity Score and Rank				**2.73**	**B-**
Rank Factor: LANDSCAPE CONTEXT	0.30			**2.89**	**B-**
LANDSCAPE METRICS	0.33			**3.00**	**B+**
L1. Contiguous Natural Land Cover	1	B	3		
L2. Land Use Index	1	B	3		
BUFFER METRICS	0.67			**2.83**	**B-**
B1. Perimeter with Natural Buffer	n/a	A	4		
B2. Width of Natural Buffer	n/a	A	4		
B3.1. Condition of Natural Buffer - Veg	n/a	C	2		
B3.2. Condition of Natural Buffer - Soils	n/a	C	2		
Rank Factor: CONDITION	0.70			**2.67**	**B-**
VEGETATION METRICS	1			**2.67**	**B-**
V1. Native Plant Species Cover	1	D	1		
V2. Invasive Nonnative Plant Species Cover	1	A	4		
V3. Native Plant Species Composition	1	B	3		
V4. Vegetation Structure	1	C	2		
V5. Regen. of Native Woody Species **(opt.)**	1	C	2		
V65. Coarse and Fine Woody Debris **(opt.)**	1	A	4		

Table 21. EIA Scorecard – Conejos Site 08

CRVeg08 Observer: W. McBride	Wt	Field Rating	Field Points	Calc Points	Calc Rating
Overall Ecological Integrity Score and Rank				**2.70**	**B-**
Rank Factor: LANDSCAPE CONTEXT	0.30			**2.98**	**B-**
LANDSCAPE METRICS	0.33			**2.50**	**B-**
L1. Contiguous Natural Land Cover	1	B	3		
L2. Land Use Index	1	C	2		
BUFFER METRICS	0.67			**3.22**	**B+**
B1. Perimeter with Natural Buffer	n/a	A	4		
B2. Width of Natural Buffer	n/a	B	3		
B3.1. Condition of Natural Buffer - Veg	n/a	B	3		
B3.2. Condition of Natural Buffer - Soils	n/a	B	3		
Rank Factor: CONDITION	0.70			**2.58**	**B-**
VEGETATION METRICS	1			**2.58**	**B-**
V1. Native Plant Species Cover	1	C-	1.5		
V2. Invasive Nonnative Plant Species Cover	1	B	3		
V3. Native Plant Species Composition	1	B	3		
V4. Vegetation Structure	1	B	3		
V5. Regen. of Native Woody Species **(opt.)**	1	C	2		
V65. Coarse and Fine Woody Debris **(opt.)**	1	B	3		

Table 22. EIA Scorecard – Conejos Site 09

CRVeg09 Observer: W. McBride	Wt	Field Rating	Field Points	Calc Points	Calc Rating
Overall Ecological Integrity Score and Rank				**2.59**	**B-**
Rank Factor: LANDSCAPE CONTEXT	0.30			**2.61**	**B-**
LANDSCAPE METRICS	0.33			**2.50**	**B-**
L1. Contiguous Natural Land Cover	1	B	3		
L2. Land Use Index	1	C	2		
BUFFER METRICS	0.67			**2.66**	**B-**
B1. Perimeter with Natural Buffer	n/a	A	4		
B2. Width of Natural Buffer	n/a	C	2		
B3.1. Condition of Natural Buffer - Veg	n/a	C	2		
B3.2. Condition of Natural Buffer - Soils	n/a	B	3		
Rank Factor: CONDITION	0.70			**2.58**	**B-**
VEGETATION METRICS	1			**2.58**	**B-**
V1. Native Plant Species Cover	1	C-	1.5		
V2. Invasive Nonnative Plant Species Cover	1	C	2		
V3. Native Plant Species Composition	1	B	3		
V4. Vegetation Structure	1	A	4		
V5. Regen. of Native Woody Species **(opt.)**	1	B	3		
V65. Coarse and Fine Woody Debris **(opt.)**	1	C	2		

Table 23. EIA Scorecard – Conejos Site 10

CRVeg10 Observer: W. McBride	Wt	Field Rating	Field Points	Calc Points	Calc Rating
Overall Ecological Integrity Score and Rank				**2.68**	**B-**
Rank Factor: LANDSCAPE CONTEXT	0.30			**3.11**	**B+**
LANDSCAPE METRICS	0.33			**3.00**	**B+**
L1. Contiguous Natural Land Cover	1	B	3		
L2. Land Use Index	1	B	3		
BUFFER METRICS	0.67			**3.16**	**B+**
B1. Perimeter with Natural Buffer	n/a	A	4		
B2. Width of Natural Buffer	n/a	A	4		
B3.1. Condition of Natural Buffer - Veg	n/a	C	2		
B3.2. Condition of Natural Buffer - Soils	n/a	B	3		
Rank Factor: CONDITION	0.70			**2.50**	**B-**
VEGETATION METRICS	1			**2.50**	**B-**
V1. Native Plant Species Cover	1	C-	1.5		
V2. Invasive Nonnative Plant Species Cover	1	C-	1.5		
V3. Native Plant Species Composition	1	B	3		
V4. Vegetation Structure	1	B	3		
V5. Regen. of Native Woody Species **(opt.)**	1	B	3		
V65. Coarse and Fine Woody Debris **(opt.)**	1	B	3		

Table 24. EIA Scorecard – Conejos Site 11a

CRVeg11a Observer: W. McBride	Wt	Field Rating	Field Points	Calc Points	Calc Rating
Overall Ecological Integrity Score and Rank				**2.69**	**B-**
Rank Factor: LANDSCAPE CONTEXT	0.30			**3.14**	**B+**
LANDSCAPE METRICS	0.33			**2.50**	**B-**
L1. Contiguous Natural Land Cover	1	B	3		
L2. Land Use Index	1	C	2		
BUFFER METRICS	0.67			**3.46**	**B+**
B1. Perimeter with Natural Buffer	n/a	A	4		
B2. Width of Natural Buffer	n/a	A	4		
B3.1. Condition of Natural Buffer - Veg	n/a	B	3		
B3.2. Condition of Natural Buffer - Soils	n/a	B	3		
Rank Factor: CONDITION	0.70		NULL	**2.50**	**B-**
VEGETATION METRICS	1			**2.50**	**B-**
V1. Native Plant Species Cover	1	C	2		
V2. Invasive Nonnative Plant Species Cover	1	C	2		
V3. Native Plant Species Composition	1	B	3		
V4. Vegetation Structure	1	C	2		
V5. Regen. of Native Woody Species **(opt.)**	1	B	3		
V65. Coarse and Fine Woody Debris **(opt.)**	1	B	3		

Table 25. EIA Scorecard – Conejos Site 11b

CRVeg11b Observer: W. McBride	Wt	Field Rating	Field Points	Calc Points	Calc Rating
Overall Ecological Integrity Score and Rank				**2.47**	**C+**
Rank Factor: LANDSCAPE CONTEXT	0.30			**2.80**	**B-**
LANDSCAPE METRICS	0.33			**2.50**	**B-**
L1. Contiguous Natural Land Cover	1	B	3		
L2. Land Use Index	1	C	2		
BUFFER METRICS	0.67			**2.94**	**B-**
B1. Perimeter with Natural Buffer	n/a	A	4		
B2. Width of Natural Buffer	n/a	B	3		
B3.1. Condition of Natural Buffer - Veg	n/a	B	3		
B3.2. Condition of Natural Buffer - Soils	n/a	C	2		
Rank Factor: CONDITION	0.70			**2.33**	**C+**
VEGETATION METRICS	1			**2.33**	**C+**
V1. Native Plant Species Cover	1	C	2		
V2. Invasive Nonnative Plant Species Cover	1	C	2		
V3. Native Plant Species Composition	1	B	3		
V4. Vegetation Structure	1	C	2		
V5. Regen. of Native Woody Species **(opt.)**	1	B	3		
V65. Coarse and Fine Woody Debris **(opt.)**	1	C	2		

Table 26. EIA – Overall scores for all AAs – Rio Grande

Assessment Area	Calc Points	Calc Rating
RGVeg02	3.36	B+
RGVeg04	3.15	B+
RGVeg07	2.88	B-
RGVeg09	2.71	B-
RGVeg11	2.71	B-
RGVeg12	2.62	B-
RGVeg13	2.70	B-
RGVeg15	2.69	B-
RGVeg16	2.63	B-
RGVeg17	2.15	C+

Table 27. EIA – Individual metric scores for all AAs – Rio Grande

	RGVeg02	RGVeg04	RGVeg07	RGVeg09	RGVeg11	RGVeg12	RGVeg13	RGVeg15	RGVeg16	RGVeg17
Overall Ecological Integrity Points	**3.36**	**3.15**	**2.88**	**2.71**	**2.71**	**2.62**	**2.70**	**2.69**	**2.63**	**2.15**
Overall Ecological Integrity Rank	**B+**	**B+**	**B-**	**B-**	**B-**	**B-**	**B-**	**B-**	**B-**	**C+**
LANDSCAPE METRICS										
L1. Contiguous Natural Land Cover	B	A	C	C	C	B	B	B	B	C
L2. Land Use Index	A	B	B	C	C	B	C	B	C	C
BUFFER METRICS										
B1. Perimeter with Natural Buffer	A	A	C	C	A	A	A	A	A	B
B2. Width of Natural Buffer	C	B	C	C	B	A	C	B	A	C
B3.1. Condition of Natural Buffer - Veg	A	B	A	B	B	C	B	B	B	C
B3.2. Condition of Natural Buffer - Soils	A	B	B	A	B	B	B	B	C	B
VEGETATION METRICS										
V1. Native Plant Species Cover	C	C-	B	C	C	C-	C	C	C	C-
V2. Invasive Nonnative Plant Species Cover	A	A	B	A	B	B	B	B	B	B
V3. Native Plant Species Composition	B	B	B	B	B	C	C	C	B	D
V4. Vegetation Structure	B	B	B	C	B	C	B	B	C	C
V5. Regen. of Native Woody Species **(opt.)**	A	A	B	B	B	B	B	N/A	C	B
V65. Coarse and Fine Woody Debris **(opt.)**	A	B	B	B	C	B	B	N/A	B	C

Table 28. Total taxa encountered by AA – Rio Grande

Assessment Area	# Taxa Observed
RGVeg02	48
RGVeg04	48
RGVeg07	35
RGVeg09	38
RGVeg11	40
RGVeg12	28
RGVeg13	47
RGVeg15	28
RGVeg16	31
RGVeg17	40
Average	**38**

Table 29. Most common species encountered – Rio Grande

Scientific Name	# Plot Occurrences	Native Status[1]	C-Value[2]
Elymus trachycaulus	25	N	4
Salix exigua	25	N	3
Poa pratensis	23	I	*
Cirsium arvense	21	X	*
Maianthemum stellatum	19	N	7
Rosa woodsii	17	N	5
Juncus arcticus	16	N	4
Equisetum arvense	15	N	4
Poa palustris	15	N	6
Taraxacum officinale	14	I	*
Sonchus asper	13	I	*
Achillea millefolium	12	N	4
Populus angustifolia	11	N	5
Agoseris glauca	10	N	8
Erigeron formosissimus	10	N	6
Mentha arvensis	10	N	4
Poa compressa	10	I	*
Ribes inerme	10	N	5
Salix lasiandra	10	N	7

[1] I = nonnative, N = native, X = Colorado noxious weed list

[2] * = nonnative species (assumes a C-value of 0), - = no C-value assigned

Table 30. Average total cover by AA – Rio Grande

	Total Plant Cover	Total Native Cover	Total Introduced Cover	Total Noxious Cover	Total Nonnative Cover (excluding noxious)	Total Annual Cover	Total Biennial Cover	Total Perennial Cover	Total Forb Cover	Total Graminoid Cover	Total Sub-shrub Cover	Total Shrub Cover	Total Tree Cover
RG02_1	90.5%	71.5%	19.0%	0.0%	19.0%	0.0%	0.0%	90.5%	20.0%	20.5%	0.5%	49.0%	0.5%
RG02_2	39.5%	31.0%	8.5%	0.0%	8.5%	0.0%	0.5%	39.0%	8.0%	21.5%	0.5%	11.0%	0.0%
RG02_3	48.0%	43.0%	5.0%	0.0%	5.0%	0.0%	1.5%	46.5%	15.0%	11.5%	1.5%	20.5%	0.0%
RG02_4	82.5%	77.5%	5.0%	0.0%	5.0%	0.2%	0.5%	82.0%	16.7%	22.0%	0.0%	44.0%	0.0%
Average	**65.1%**	**55.8%**	**9.4%**	**0.0%**	**9.4%**	**0.1%**	**0.6%**	**64.5%**	**14.9%**	**18.9%**	**0.6%**	**31.1%**	**0.1%**
RG04_1	66.7%	61.2%	5.5%	0.0%	5.5%	0.0%	0.0%	66.5%	11.7%	27.0%	2.0%	26.0%	0.0%
RG04_2	136.5%	108.5%	28.0%	0.0%	28.0%	0.0%	0.0%	136.5%	20.0%	39.5%	0.5%	76.5%	0.0%
RG04_3	122.7%	94.7%	28.0%	0.0%	28.0%	0.0%	0.0%	122.7%	31.7%	29.0%	3.5%	58.5%	0.0%
RG04_4	86.0%	67.5%	18.5%	0.0%	18.5%	0.0%	0.0%	86.0%	15.0%	29.5%	0.0%	41.5%	0.0%
Average	**103.0%**	**83.0%**	**20.0%**	**0.0%**	**20.0%**	**0.0%**	**0.0%**	**102.9%**	**19.6%**	**31.3%**	**1.5%**	**50.6%**	**0.0%**
RG07_1	43.4%	41.9%	1.5%	0.0%	1.5%	1.5%	0.2%	41.7%	4.2%	10.5%	1.7%	8.5%	18.5%
RG07_2	52.0%	52.0%	0.0%	0.0%	0.0%	0.0%	0.0%	52.0%	1.5%	20.0%	3.5%	16.0%	11.0%
RG07_3	52.2%	51.5%	0.5%	0.2%	0.7%	0.0%	0.2%	52.0%	3.7%	17.5%	1.5%	22.0%	7.5%
RG07_4	41.0%	41.0%	0.0%	0.0%	0.0%	0.0%	0.0%	41.0%	1.5%	12.0%	0.5%	18.0%	9.0%
Average	**47.2%**	**46.6%**	**0.5%**	**0.1%**	**0.6%**	**0.4%**	**0.1%**	**46.7%**	**2.7%**	**15.0%**	**1.8%**	**16.1%**	**11.5%**
RG09_1	164.5%	163.0%	1.5%	0.0%	1.5%	0.0%	0.0%	164.5%	6.5%	4.0%	62.5%	74.0%	17.5%
RG09_2	119.7%	117.7%	2.0%	0.0%	2.0%	0.0%	0.0%	119.7%	5.2%	23.0%	17.5%	66.5%	7.5%
RG09_3	65.1%	50.6%	14.5%	0.0%	14.5%	0.5%	0.5%	64.1%	46.4%	14.5%	0.5%	0.0%	3.7%
RG09_4	60.2%	42.5%	17.7%	0.0%	17.7%	1.5%	0.0%	58.7%	22.7%	19.5%	0.5%	0.0%	17.5%
Average	**102.4%**	**93.5%**	**8.9%**	**0.0%**	**8.9%**	**0.5%**	**0.1%**	**101.8%**	**20.2%**	**15.3%**	**20.3%**	**35.1%**	**11.6%**
RG11_1	62.4%	53.2%	9.0%	0.2%	9.2%	0.5%	0.7%	61.2%	6.4%	15.0%	0.0%	41.0%	0.0%
RG11_2	20.1%	18.4%	1.7%	0.0%	1.7%	0.0%	1.4%	18.7%	5.6%	5.5%	0.5%	8.5%	0.0%
RG11_3	20.4%	20.2%	0.2%	0.0%	0.2%	3.7%	0.2%	16.5%	2.9%	6.0%	0.0%	4.0%	7.5%
RG11_4	56.7%	56.7%	0.0%	0.0%	0.0%	0.0%	0.0%	56.7%	1.2%	18.0%	0.0%	0.0%	37.5%
Average	**39.9%**	**37.1%**	**2.7%**	**0.1%**	**2.8%**	**1.1%**	**0.6%**	**38.3%**	**4.0%**	**11.1%**	**0.1%**	**13.4%**	**11.3%**
RG12_1	72.2%	44.0%	28.0%	0.2%	28.2%	1.5%	0.0%	70.7%	19.7%	35.0%	0.0%	17.5%	0.0%
RG12_2	121.2%	115.0%	2.7%	3.5%	6.2%	0.0%	0.0%	121.2%	30.7%	23.5%	17.5%	42.0%	7.5%
RG12_3	74.4%	61.2%	5.7%	7.5%	13.2%	0.5%	0.0%	73.9%	18.9%	40.0%	7.5%	0.5%	7.5%
RG12_4	49.5%	28.0%	21.0%	0.5%	21.5%	0.0%	0.0%	49.5%	3.5%	24.5%	3.5%	0.5%	17.5%
Average	**79.3%**	**62.1%**	**14.4%**	**2.9%**	**17.3%**	**0.5%**	**0.0%**	**78.8%**	**18.2%**	**30.8%**	**7.1%**	**15.1%**	**8.1%**
RG13_1	100.5%	89.3%	7.7%	3.5%	11.2%	20.4%	1.0%	79.1%	29.5%	26.0%	7.5%	37.5%	0.0%
RG13_2	66.0%	59.8%	2.7%	3.5%	6.2%	2.9%	1.7%	61.4%	16.5%	12.0%	0.0%	37.5%	0.0%
RG13_3	87.7%	79.0%	7.2%	1.5%	8.7%	5.0%	1.7%	81.0%	21.7%	3.5%	0.0%	62.5%	0.0%
RG13_4	96.1%	93.7%	0.9%	1.5%	2.4%	0.5%	1.7%	93.9%	23.1%	9.0%	1.5%	62.5%	0.0%
Average	**87.6%**	**80.5%**	**4.6%**	**2.5%**	**7.1%**	**7.2%**	**1.5%**	**78.9%**	**22.7%**	**12.6%**	**2.3%**	**50.0%**	**0.0%**
RG15_1	70.3%	68.8%	1.0%	0.5%	1.5%	0.5%	0.0%	69.8%	3.8%	64.5%	0.0%	2.0%	0.0%
RG15_2	56.2%	54.2%	1.5%	0.5%	2.0%	0.5%	0.5%	55.2%	4.2%	43.5%	0.5%	8.0%	0.0%
RG15_3	73.5%	68.0%	2.0%	3.5%	5.5%	1.5%	0.5%	71.5%	10.5%	25.0%	0.0%	38.0%	0.0%
RG15_4	47.5%	36.5%	3.0%	8.0%	11.0%	3.0%	0.5%	44.0%	17.5%	21.5%	0.5%	8.0%	0.0%
Average	**61.9%**	**56.9%**	**1.9%**	**3.1%**	**5.0%**	**1.4%**	**0.4%**	**60.1%**	**9.0%**	**38.6%**	**0.3%**	**14.0%**	**0.0%**
RG16_1	73.3%	72.2%	0.6%	0.5%	1.1%	0.2%	1.4%	71.7%	3.6%	62.5%	0.0%	3.7%	3.5%
RG16_2	75.1%	70.1%	3.5%	1.5%	5.0%	3.5%	0.2%	71.4%	8.9%	0.2%	7.5%	58.5%	0.0%
RG16_3	81.9%	74.9%	3.5%	3.5%	7.0%	3.5%	0.0%	78.4%	10.9%	1.0%	0.0%	70.0%	0.0%
RG16_4	18.0%	15.6%	2.2%	0.2%	2.4%	3.7%	0.9%	13.4%	3.3%	6.7%	0.5%	7.5%	0.0%
Average	**62.1%**	**58.2%**	**2.5%**	**1.4%**	**3.9%**	**2.7%**	**0.6%**	**58.7%**	**6.7%**	**17.6%**	**2.0%**	**34.9%**	**0.9%**
RG17_1	72.3%	26.6%	45.7%	0.0%	45.7%	2.2%	2.0%	68.6%	61.3%	10.0%	0.0%	1.5%	0.0%
RG17_2	37.5%	28.1%	7.9%	1.5%	9.4%	2.2%	2.2%	33.6%	15.3%	5.2%	0.0%	17.5%	0.0%
RG17_3	110.2%	72.2%	36.5%	1.5%	38.0%	1.7%	21.0%	88.0%	47.7%	0.5%	0.0%	62.5%	0.0%
RG17_4	100.0%	71.0%	25.5%	3.5%	29.0%	0.5%	25.0%	74.5%	58.2%	1.0%	0.0%	37.5%	3.5%
Average	**80.0%**	**49.5%**	**28.9%**	**1.6%**	**30.5%**	**1.7%**	**12.6%**	**66.2%**	**45.6%**	**4.2%**	**0.0%**	**29.8%**	**0.9%**

Table 31. Average relative cover by AA – Rio Grande

	Relative Native Cover	Relative Introduced Cover	Relative Noxious Cover	Relative Nonnative Cover (excluding noxious)	Relative Annual Cover	Relative Biennial Cover	Relative Perennial Cover	Relative Forb Cover	Relative Graminoid Cover	Relative Sub-shrub Cover	Relative Shrub Cover	Relative Tree Cover
RG02_1	79.0%	21.0%	0.0%	21.0%	0.0%	0.0%	100.0%	22.1%	22.7%	0.6%	54.1%	0.6%
RG02_2	78.5%	21.5%	0.0%	21.5%	0.0%	1.3%	98.7%	20.3%	54.4%	1.3%	27.8%	0.0%
RG02_3	89.6%	10.4%	0.0%	10.4%	0.0%	3.1%	96.9%	31.3%	24.0%	3.1%	42.7%	0.0%
RG02_4	93.9%	6.1%	0.0%	6.1%	0.2%	0.6%	99.4%	20.2%	26.7%	0.0%	53.3%	0.0%
Average	**85.3%**	**14.7%**	**0.0%**	**14.7%**	**0.1%**	**1.2%**	**98.8%**	**23.5%**	**31.9%**	**1.2%**	**44.5%**	**0.1%**
RG04_1	91.8%	8.2%	0.0%	8.2%	0.0%	0.0%	99.7%	17.5%	40.5%	3.0%	39.0%	0.0%
RG04_2	79.5%	20.5%	0.0%	20.5%	0.0%	0.0%	100.0%	14.7%	28.9%	0.4%	56.0%	0.0%
RG04_3	77.2%	22.8%	0.0%	22.8%	0.0%	0.0%	100.0%	25.8%	23.6%	2.9%	47.7%	0.0%
RG04_4	78.5%	21.5%	0.0%	21.5%	0.0%	0.0%	100.0%	17.4%	34.3%	0.0%	48.3%	0.0%
Average	**81.7%**	**18.3%**	**0.0%**	**18.3%**	**0.0%**	**0.0%**	**99.9%**	**18.9%**	**31.8%**	**1.6%**	**47.7%**	**0.0%**
RG07_1	96.5%	3.5%	0.0%	3.5%	3.5%	0.5%	96.1%	9.7%	24.2%	3.9%	19.6%	42.6%
RG07_2	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	2.9%	38.5%	6.7%	30.8%	21.2%
RG07_3	98.7%	1.0%	0.4%	1.3%	0.0%	0.4%	99.6%	7.1%	33.5%	2.9%	42.1%	14.4%
RG07_4	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	3.7%	29.3%	1.2%	43.9%	22.0%
Average	**98.8%**	**1.1%**	**0.1%**	**1.2%**	**0.9%**	**0.2%**	**98.9%**	**5.8%**	**31.4%**	**3.7%**	**34.1%**	**25.0%**
RG09_1	99.1%	0.9%	0.0%	0.9%	0.0%	0.0%	100.0%	4.0%	2.4%	38.0%	45.0%	10.6%
RG09_2	98.3%	1.7%	0.0%	1.7%	0.0%	0.0%	100.0%	4.3%	19.2%	14.6%	55.6%	6.3%
RG09_3	77.7%	22.3%	0.0%	22.3%	0.8%	0.8%	98.5%	71.3%	22.3%	0.8%	0.0%	5.7%
RG09_4	70.6%	29.4%	0.0%	29.4%	2.5%	0.0%	97.5%	37.7%	32.4%	0.8%	0.0%	29.1%
Average	**86.4%**	**13.6%**	**0.0%**	**13.6%**	**0.8%**	**0.2%**	**99.0%**	**29.3%**	**19.1%**	**13.6%**	**25.1%**	**12.9%**
RG11_1	85.3%	14.4%	0.3%	14.7%	0.8%	1.1%	98.1%	10.3%	24.0%	0.0%	65.7%	0.0%
RG11_2	91.5%	8.5%	0.0%	8.5%	0.0%	7.0%	93.0%	27.9%	27.4%	2.5%	42.3%	0.0%
RG11_3	99.0%	1.0%	0.0%	1.0%	18.1%	1.0%	80.9%	14.2%	29.4%	0.0%	19.6%	36.8%
RG11_4	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	2.1%	31.7%	0.0%	0.0%	66.1%
Average	**94.0%**	**6.0%**	**0.1%**	**6.0%**	**4.7%**	**2.3%**	**93.0%**	**13.6%**	**28.1%**	**0.6%**	**31.9%**	**25.7%**
RG12_1	60.9%	38.8%	0.3%	39.1%	2.1%	0.0%	97.9%	27.3%	48.5%	0.0%	24.2%	0.0%
RG12_2	94.9%	2.2%	2.9%	5.1%	0.0%	0.0%	100.0%	25.3%	19.4%	14.4%	34.7%	6.2%
RG12_3	82.3%	7.7%	10.1%	17.7%	0.7%	0.0%	99.3%	25.4%	53.8%	10.1%	0.7%	10.1%
RG12_4	56.6%	42.4%	1.0%	43.4%	0.0%	0.0%	100.0%	7.1%	49.5%	7.1%	1.0%	35.4%
Average	**73.7%**	**22.8%**	**3.6%**	**26.3%**	**0.7%**	**0.0%**	**99.3%**	**21.3%**	**42.8%**	**7.9%**	**15.1%**	**12.9%**
RG13_1	88.9%	7.7%	3.5%	11.1%	20.3%	1.0%	78.7%	29.4%	25.9%	7.5%	37.3%	0.0%
RG13_2	90.6%	4.1%	5.3%	9.4%	4.4%	2.6%	93.0%	25.0%	18.2%	0.0%	56.8%	0.0%
RG13_3	90.1%	8.2%	1.7%	9.9%	5.7%	1.9%	92.4%	24.7%	4.0%	0.0%	71.3%	0.0%
RG13_4	97.5%	0.9%	1.6%	2.5%	0.5%	1.8%	97.7%	24.0%	9.4%	1.6%	65.0%	0.0%
Average	**91.8%**	**5.2%**	**3.0%**	**8.2%**	**7.7%**	**1.8%**	**90.5%**	**25.8%**	**14.4%**	**2.3%**	**57.6%**	**0.0%**
RG15_1	97.9%	1.4%	0.7%	2.1%	0.7%	0.0%	99.3%	5.4%	91.7%	0.0%	2.8%	0.0%
RG15_2	96.4%	2.7%	0.9%	3.6%	0.9%	0.9%	98.2%	7.5%	77.4%	0.9%	14.2%	0.0%
RG15_3	92.5%	2.7%	4.8%	7.5%	2.0%	0.7%	97.3%	14.3%	34.0%	0.0%	51.7%	0.0%
RG15_4	76.8%	6.3%	16.8%	23.2%	6.3%	1.1%	92.6%	36.8%	45.3%	1.1%	16.8%	0.0%
Average	**90.9%**	**3.3%**	**5.8%**	**9.1%**	**2.5%**	**0.7%**	**96.9%**	**16.0%**	**62.1%**	**0.5%**	**21.4%**	**0.0%**
RG16_1	98.5%	0.8%	0.7%	1.5%	0.3%	1.9%	97.8%	4.9%	85.3%	0.0%	5.0%	4.8%
RG16_2	93.3%	4.7%	2.0%	6.7%	4.7%	0.3%	95.1%	11.9%	0.3%	10.0%	77.9%	0.0%
RG16_3	91.5%	4.3%	4.3%	8.5%	4.3%	0.0%	95.7%	13.3%	1.2%	0.0%	85.5%	0.0%
RG16_4	86.7%	12.2%	1.1%	13.3%	20.6%	5.0%	74.4%	18.3%	37.2%	2.8%	41.7%	0.0%
Average	**92.5%**	**5.5%**	**2.0%**	**7.5%**	**7.4%**	**1.8%**	**90.8%**	**12.1%**	**31.0%**	**3.2%**	**52.5%**	**1.2%**
RG17_1	36.8%	63.2%	0.0%	63.2%	3.0%	2.8%	94.9%	84.8%	13.8%	0.0%	2.1%	0.0%
RG17_2	74.9%	21.1%	4.0%	25.1%	5.9%	5.9%	89.6%	40.8%	13.9%	0.0%	46.7%	0.0%
RG17_3	65.5%	33.1%	1.4%	34.5%	1.5%	19.1%	79.9%	43.3%	0.5%	0.0%	56.7%	0.0%
RG17_4	71.0%	25.5%	3.5%	29.0%	0.5%	25.0%	74.5%	58.2%	1.0%	0.0%	37.5%	3.5%
Average	**62.1%**	**35.7%**	**2.2%**	**37.9%**	**2.7%**	**13.2%**	**84.7%**	**56.8%**	**7.3%**	**0.0%**	**35.7%**	**0.9%**

Table 32. FQA Indices by AA – Rio Grande

FQA Indices	RGVeg02	RGVeg04	RGVeg07	RGVeg09	RGVeg11	RGVeg12	RGVeg13	RGVeg15	RGVeg16	RGVeg17
Mean C-Value (All species)	4.8	4.7	5.0	4.3	3.9	3.2	2.7	3.1	3.2	2.0
Mean C-Value (Native species)	5.3	5.3	5.3	5.3	4.5	4.7	4.0	4.5	4.6	3.8
Cover-weighted Mean C-Value (All species)	4.8	4.2	5.1	4.6	4.4	3.1	3.0	1.3	3.9	2.0
Cover-weighted Mean C-Value (Native species)	5.7	5.1	5.2	5.6	4.6	4.3	3.4	3.8	4.3	3.3
FQI (All species)	22.9	25.3	21.1	16.5	13.2	12.3	11.8	12.3	12.0	8.2
FQI (Native species)	24.3	27.0	21.8	18.4	14.5	14.9	14.5	14.8	14.3	11.4
Cover Weighted FQI (All species)	23.2	22.8	21.9	17.7	15.3	12.4	13.3	5.1	14.4	8.0
Cover Weighted FQI (Native species)	26.0	26.1	21.5	19.3	14.9	13.6	12.1	12.4	13.2	9.6
Adjusted FQI	50.4	49.9	51.1	47.8	41.5	38.5	33.0	37.4	38.4	27.6
Adjusted Cover Weighted FQI	54.1	48.2	50.3	50.1	42.9	35.3	27.6	31.3	35.6	23.5

Table 33. Ecological System, Phys. Group, and Riparian Plant Assoc. – Rio Grande

Assessment Area	Riparian Ecological System[1]	Plot	Physiognomic Group[2]	Riparian Plant Association[1]	Riparian Plant Association Fidelity
RGVeg02	Rocky Mtn Subalpine-Montane Riparian Shrubland	1	Tall Willow Shrubland	Salix monticola / Mesic Graminoid Shrubland	Medium
		2	Tall Willow Shrubland	Salix monticola / Mesic Graminoid Shrubland	Medium
		3	Tall Willow Shrubland	Salix monticola / Mesic Graminoid Shrubland	High
		4	Tall Willow Shrubland	Salix monticola/ Carex aquatilis Shrubland	High
RGVeg04	Rocky Mtn Subalpine-Montane Riparian Shrubland	1	Tall Willow Shrubland	Salix geyeriana/Calamagrostis canadensis Shrubland	Low
		2	Tall Willow Shrubland	Salix geyeriana/Mesic Graminoid Shrubland	High
		3	Non-Willow Shrubland	Potentilla fruticosa/Juncus balticus Shrubland	Medium
		4	Non-Willow Shrubland	Potentilla fruticosa/Juncus balticus Shrubland	Medium
RGVeg07	Rocky Mtn Subalpine-Montane Riparian Woodland	1	Evergreen Riparian Forest	Picea pungens/Alnus incana Woodland	Medium
		2	Evergreen Riparian Forest	Picea pungens/Alnus incana Woodland	Medium
		3	Evergreen Riparian Forest	Picea pungens/Alnus incana Woodland	Medium
		4	Evergreen Riparian Forest	Picea pungens/Alnus incana Woodland	Medium
RGVeg09	Rocky Mtn Lower Montane-Foothill Riparian Woodland/Shrubland	1	Tall Willow Shrubland	Alnus incana ssp. tenuifolia-Salix Shrubland	Medium
		2	Tall Willow Shrubland	Salix lucida ssp. lasiandra Shrubland	Medium
		3	Deciduous Dominated Forest/Woodland	Unknown	-
		4	Deciduous Dominated Forest/Woodland	Unknown	-
RGVeg11	Rocky Mtn Lower Montane-Foothill Riparian Woodland/Shrubland	1	Tall Willow Shrubland	Salix exigua/Barren Ground Shrubland	Medium
		2	Tall Willow Shrubland	Salix lucida ssp. lasiandra Shrubland	Medium
		3	Deciduous Dominated Forest/Woodland	Populus angustifolia/Salix exigua Woodland	Medium
		4	Deciduous Dominated Forest/Woodland	Unknown	-
RGVeg12	Rocky Mtn Lower Montane-Foothill Riparian Woodland/Shrubland	1	Tall Willow Shrubland	Salix exigua/Mesic Graminoid Shrubland	High
		2	Tall Willow Shrubland	Salix lucida ssp. lasiandra Shrubland	Medium
		3	Deciduous Dominated Forest/Woodland	Unknown	-
		4	Deciduous Dominated Forest/Woodland	Unknown	-
RGVeg13	Rocky Mtn Lower Montane-Foothill Riparian Woodland/Shrubland	1	Tall Willow Shrubland	Salix exigua/Mesic Graminoid Shrubland	Medium
		2	Tall Willow Shrubland	Salix exigua/Mesic Graminoid Shrubland	Medium
		3	Tall Willow Shrubland	Salix exigua/Barren Ground Shrubland	Medium
		4	Tall Willow Shrubland	Salix exigua/Mesic Graminoid Shrubland	Medium
RGVeg15	Rocky Mtn Lower Montane-Foothill Riparian Woodland/Shrubland	1	Herbaceous Vegetation	Phalaris arundinacea Western Herbaceous Vegetation	High
		2	Herbaceous Vegetation	Phalaris arundinacea Western Herbaceous Vegetation	High
		3	Tall Willow Shrubland	Salix exigua/Mesic Graminoid Shrubland	Medium
		4	Herbaceous Vegetation	Phalaris arundinacea Western Herbaceous Vegetation	High
RGVeg16	Rocky Mtn Lower Montane-Foothill Riparian Woodland/Shrubland	1	Deciduous Dominated Forest/Woodland	Populus angustifolia/Salix exigua Woodland	Low
		2	Tall Willow Shrubland	Salix exigua/Mesic graminoid Shrubland	High
		3	Tall Willow Shrubland	Salix exigua/Barren ground Shrubland	Medium
		4	Tall Willow Shrubland	Salix exigua/Barren ground Shrubland	High
RGVeg17	Rocky Mtn Lower Montane-Foothill Riparian Woodland/Shrubland	1	Herbaceous Vegetation	Unknown	-
		2	Tall Willow Shrubland	Salix exigua/Barren ground Shrubland	Medium
		3	Tall Willow Shrubland	Salix exigua/Mesic graminoid Shrubland	High
		4	Tall Willow Shrubland	Salix exigua/Mesic graminoid Shrubland	High

[1] Source: Lemly et al. (2016)

[2] Source: Carsey, K. et al. (2003)

Table 34. EIA Scorecard – Rio Grande Site 02

RGVeg02 Observer: W. McBride	Wt	Field Rating	Field Points	Calc Points	Calc Rating
Overall Ecological Integrity Score and Rank				**3.36**	**B+**
Rank Factor: LANDSCAPE CONTEXT	0.30			**3.41**	**B+**
LANDSCAPE METRICS	0.33			**3.50**	**A-**
L1. Contiguous Natural Land Cover	1	B	3		
L2. Land Use Index	1	A	4		
BUFFER METRICS	0.67			**3.36**	**B+**
B1. Perimeter with Natural Buffer	n/a	A	4		
B2. Width of Natural Buffer	n/a	C	2		
B3.1. Condition of Natural Buffer - Veg	n/a	A	4		
B3.2. Condition of Natural Buffer - Soils	n/a	A	4		
Rank Factor: CONDITION	0.70			**3.33**	**B+**
VEGETATION METRICS	1			**3.33**	**B+**
V1. Native Plant Species Cover	1	C	2		
V2. Invasive Nonnative Plant Species Cover	1	A	4		
V3. Native Plant Species Composition	1	B	3		
V4. Vegetation Structure	1	B	3		
V5. Regen. of Native Woody Species **(opt.)**	1	A	4		
V65. Coarse and Fine Woody Debris **(opt.)**	1	A	4		

Table 35. EIA Scorecard – Rio Grande Site 04

RGVeg04 Observer: W. McBride	Wt	Field Rating	Field Points	Calc Points	Calc Rating
Overall Ecological Integrity Score and Rank				**3.15**	**B+**
Rank Factor: LANDSCAPE CONTEXT	0.30			**3.32**	**B+**
LANDSCAPE METRICS	0.33			**3.50**	**A-**
L1. Contiguous Natural Land Cover	1	A	4		
L2. Land Use Index	1	B	3		
BUFFER METRICS	0.67			**3.22**	**B+**
B1. Perimeter with Natural Buffer	n/a	A	4		
B2. Width of Natural Buffer	n/a	B	3		
B3.1. Condition of Natural Buffer - Veg	n/a	B	3		
B3.2. Condition of Natural Buffer - Soils	n/a	B	3		
Rank Factor: CONDITION	0.70			**3.08**	**B+**
VEGETATION METRICS	1			**3.08**	**B+**
V1. Native Plant Species Cover	1	C-	1.5		
V2. Invasive Nonnative Plant Species Cover	1	A	4		
V3. Native Plant Species Composition	1	B	3		
V4. Vegetation Structure	1	B	3		
V5. Regen. of Native Woody Species **(opt.)**	1	A	4		
V65. Coarse and Fine Woody Debris **(opt.)**	1	B	3		

Table 36. EIA Scorecard – Rio Grande Site 07

RGVeg07 Observer: W. McBride	Wt	Field Rating	Field Points	Calc Points	Calc Rating
Overall Ecological Integrity Score and Rank				**2.88**	**B-**
Rank Factor: LANDSCAPE CONTEXT	0.30			**2.60**	**B-**
LANDSCAPE METRICS	0.33			**2.50**	**B-**
L1. Contiguous Natural Land Cover	1	C	2		
L2. Land Use Index	1	B	3		
BUFFER METRICS	0.67			**2.65**	**B-**
B1. Perimeter with Natural Buffer	n/a	C	2		
B2. Width of Natural Buffer	n/a	C	2		
B3.1. Condition of Natural Buffer - Veg	n/a	A	4		
B3.2. Condition of Natural Buffer - Soils	n/a	B	3		
Rank Factor: CONDITION	0.70			**3.00**	**B+**
VEGETATION METRICS	1			**3.00**	**B+**
V1. Native Plant Species Cover	1	B	3		
V2. Invasive Nonnative Plant Species Cover	1	B	3		
V3. Native Plant Species Composition	1	B	3		
V4. Vegetation Structure	1	B	3		
V5. Regen. of Native Woody Species **(opt.)**	1	B	3		
V65. Coarse and Fine Woody Debris **(opt.)**	1	B	3		

Table 37. EIA Scorecard – Rio Grande Site 09

RGVeg09 Observer: W. McBride	Wt	Field Rating	Field Points	Calc Points	Calc Rating
Overall Ecological Integrity Score and Rank				**2.71**	**B-**
Rank Factor: LANDSCAPE CONTEXT	0.30			**2.43**	**C+**
LANDSCAPE METRICS	0.33			**2.00**	**C+**
L1. Contiguous Natural Land Cover	1	C	2		
L2. Land Use Index	1	C	2		
BUFFER METRICS	0.67			**2.65**	**B-**
B1. Perimeter with Natural Buffer	n/a	C	2		
B2. Width of Natural Buffer	n/a	C	2		
B3.1. Condition of Natural Buffer - Veg	n/a	B	3		
B3.2. Condition of Natural Buffer - Soils	n/a	A	4		
Rank Factor: CONDITION	0.70			**2.83**	**B-**
VEGETATION METRICS	1			**2.83**	**B-**
V1. Native Plant Species Cover	1	C	2		
V2. Invasive Nonnative Plant Species Cover	1	A	4		
V3. Native Plant Species Composition	1	B	3		
V4. Vegetation Structure	1	C	2		
V5. Regen. of Native Woody Species **(opt.)**	1	B	3		
V65. Coarse and Fine Woody Debris **(opt.)**	1	B	3		

Table 38. EIA Scorecard – Rio Grande Site 11

RGVeg11 Observer: W. McBride	Wt	Field Rating	Field Points	Calc Points	Calc Rating
Overall Ecological Integrity Score and Rank				**2.71**	**B-**
Rank Factor: LANDSCAPE CONTEXT	0.30			**2.82**	**B-**
LANDSCAPE METRICS	0.33			**2.00**	**C+**
L1. Contiguous Natural Land Cover	1	C	2		
L2. Land Use Index	1	C	2		
BUFFER METRICS	0.67			**3.22**	**B+**
B1. Perimeter with Natural Buffer	n/a	A	4		
B2. Width of Natural Buffer	n/a	B	3		
B3.1. Condition of Natural Buffer - Veg	n/a	B	3		
B3.2. Condition of Natural Buffer - Soils	n/a	B	3		
Rank Factor: CONDITION	0.70			**2.67**	**B-**
VEGETATION METRICS	1			**2.67**	**B-**
V1. Native Plant Species Cover	1	C	2		
V2. Invasive Nonnative Plant Species Cover	1	B	3		
V3. Native Plant Species Composition	1	B	3		
V4. Vegetation Structure	1	B	3		
V5. Regen. of Native Woody Species **(opt.)**	1	B	3		
V65. Coarse and Fine Woody Debris **(opt.)**	1	C	2		

Table 39. EIA Scorecard – Rio Grande Site 12

RGVeg12 Observer: W. McBride	Wt	Field Rating	Field Points	Calc Points	Calc Rating
Overall Ecological Integrity Score and Rank				**2.62**	**B-**
Rank Factor: LANDSCAPE CONTEXT	0.30			**3.11**	**B+**
LANDSCAPE METRICS	0.33			**3.00**	**B+**
L1. Contiguous Natural Land Cover	1	B	3		
L2. Land Use Index	1	B	3		
BUFFER METRICS	0.67			**3.16**	**B+**
B1. Perimeter with Natural Buffer	n/a	A	4		
B2. Width of Natural Buffer	n/a	A	4		
B3.1. Condition of Natural Buffer - Veg	n/a	C	2		
B3.2. Condition of Natural Buffer - Soils	n/a	B	3		
Rank Factor: CONDITION	0.70			**2.42**	**C+**
VEGETATION METRICS	1			**2.42**	**C+**
V1. Native Plant Species Cover	1	C-	1.5		
V2. Invasive Nonnative Plant Species Cover	1	B	3		
V3. Native Plant Species Composition	1	C	2		
V4. Vegetation Structure	1	C	2		
V5. Regen. of Native Woody Species **(opt.)**	1	B	3		
V65. Coarse and Fine Woody Debris **(opt.)**	1	B	3		

Table 40. EIA Scorecard – Rio Grande Site 13

RGVeg13 Observer: W. McBride	Wt	Field Rating	Field Points	Calc Points	Calc Rating
Overall Ecological Integrity Score and Rank				**2.70**	**B-**
Rank Factor: LANDSCAPE CONTEXT	0.30			**2.78**	**B-**
LANDSCAPE METRICS	0.33			**2.50**	**B-**
L1. Contiguous Natural Land Cover	1	B	3		
L2. Land Use Index	1	C	2		
BUFFER METRICS	0.67			**2.91**	**B-**
B1. Perimeter with Natural Buffer	n/a	A	4		
B2. Width of Natural Buffer	n/a	C	2		
B3.1. Condition of Natural Buffer - Veg	n/a	B	3		
B3.2. Condition of Natural Buffer - Soils	n/a	B	3		
Rank Factor: CONDITION	0.70			**2.67**	**B-**
VEGETATION METRICS	1			**2.67**	**B-**
V1. Native Plant Species Cover	1	C	2		
V2. Invasive Nonnative Plant Species Cover	1	B	3		
V3. Native Plant Species Composition	1	C	2		
V4. Vegetation Structure	1	B	3		
V5. Regen. of Native Woody Species **(opt.)**	1	B	3		
V65. Coarse and Fine Woody Debris **(opt.)**	1	B	3		

Table 41. EIA Scorecard – Rio Grande Site 15

RGVeg15 Observer: W. McBride	Wt	Field Rating	Field Points	Calc Points	Calc Rating
Overall Ecological Integrity Score and Rank				**2.69**	**B-**
Rank Factor: LANDSCAPE CONTEXT	0.30			**3.15**	**B+**
LANDSCAPE METRICS	0.33			**3.00**	**B+**
L1. Contiguous Natural Land Cover	1	B	3		
L2. Land Use Index	1	B	3		
BUFFER METRICS	0.67			**3.22**	**B+**
B1. Perimeter with Natural Buffer	n/a	A	4		
B2. Width of Natural Buffer	n/a	B	3		
B3.1. Condition of Natural Buffer - Veg	n/a	B	3		
B3.2. Condition of Natural Buffer - Soils	n/a	B	3		
Rank Factor: CONDITION	0.70			**2.50**	**B-**
VEGETATION METRICS	1			**2.50**	**B-**
V1. Native Plant Species Cover	1	C	2		
V2. Invasive Nonnative Plant Species Cover	1	B	3		
V3. Native Plant Species Composition	1	C	2		
V4. Vegetation Structure	1	B	3		
V5. Regen. of Native Woody Species (opt.)	1	N/A	NULL		
V65. Coarse and Fine Woody Debris (opt.)	1	N/A	NULL		

Table 42. EIA Scorecard – Rio Grande Site 16

RGVeg16 Observer: W. McBride	Wt	Field Rating	Field Points	Calc Points	Calc Rating
Overall Ecological Integrity Score and Rank				**2.63**	**B-**
Rank Factor: LANDSCAPE CONTEXT	0.30			**2.94**	**B-**
LANDSCAPE METRICS	0.33			**2.50**	**B-**
L1. Contiguous Natural Land Cover	1	B	3		
L2. Land Use Index	1	C	2		
BUFFER METRICS	0.67			**3.16**	**B+**
B1. Perimeter with Natural Buffer	n/a	A	4		
B2. Width of Natural Buffer	n/a	A	4		
B3.1. Condition of Natural Buffer - Veg	n/a	B	3		
B3.2. Condition of Natural Buffer - Soils	n/a	C	2		
Rank Factor: CONDITION	0.70			**2.50**	**B-**
VEGETATION METRICS	1			**2.50**	**B-**
V1. Native Plant Species Cover	1	C	2		
V2. Invasive Nonnative Plant Species Cover	1	B	3		
V3. Native Plant Species Composition	1	B	3		
V4. Vegetation Structure	1	C	2		
V5. Regen. of Native Woody Species **(opt.)**	1	C	2		
V65. Coarse and Fine Woody Debris **(opt.)**	1	B	3		

Table 43. EIA Scorecard – Rio Grande Site 17

RGVeg17 Observer: W. McBride	Wt	Field Rating	Field Points	Calc Points	Calc Rating
Overall Ecological Integrity Score and Rank				**2.15**	**C+**
Rank Factor: LANDSCAPE CONTEXT	0.30			**2.32**	**C+**
LANDSCAPE METRICS	0.33			**2.00**	**C+**
L1. Contiguous Natural Land Cover	1	C	2		
L2. Land Use Index	1	C	2		
BUFFER METRICS	0.67			**2.47**	**C+**
B1. Perimeter with Natural Buffer	n/a	B	3		
B2. Width of Natural Buffer	n/a	C	2		
B3.1. Condition of Natural Buffer - Veg	n/a	C	2		
B3.2. Condition of Natural Buffer - Soils	n/a	B	3		
Rank Factor: CONDITION	0.70			**2.08**	**C+**
VEGETATION METRICS	1			**2.08**	**C+**
V1. Native Plant Species Cover	1	C-	1.5		
V2. Invasive Nonnative Plant Species Cover	1	B	3		
V3. Native Plant Species Composition	1	D	1		
V4. Vegetation Structure	1	C	2		
V5. Regen. of Native Woody Species **(opt.)**	1	B	3		
V65. Coarse and Fine Woody Debris **(opt.)**	1	C	2		

Table 44. EIA – Overall scores for all AAs – Saguache Creek

Assessment Area	Calc Points	Calc Rating
SCVeg01	3.66	A-
SCVeg02	3.34	B+
SCVeg03	2.28	C+
SCVeg04	2.76	B-
SCVeg05	2.76	B-

Table 45. EIA – Individual metric scores for all AAs – Saguache Creek

	SC01	SC02	SC03	SC04	SC05
Overall Ecological Integrity Points	3.66	3.34	2.28	2.76	2.76
Overall Ecological Integrity Rank	A-	B+	C+	B-	B-
LANDSCAPE METRICS					
L1. Contiguous Natural Land Cover	A	B	C	C	C
L2. Land Use Index	B	B	C	C	C
BUFFER METRICS					
B1. Perimeter with Natural Buffer	A	A	A	A	A
B2. Width of Natural Buffer	A	B	B	B	A
B3.1. Condition of Natural Buffer - Veg	B	C	B	A	C
B3.2. Condition of Natural Buffer - Soils	A	A	C	B	B
VEGETATION METRICS					
V1. Native Plant Species Cover	B	C-	C-	B	C-
V2. Invasive Nonnative Plant Species Cover	A	A	C	B	B
V3. Native Plant Species Composition	B	B	B	C	B
V4. Vegetation Structure	A	A	C	C	C
V5. Regen. of Native Woody Species **(opt.)**	A	A	N/A	B	A
V65. Coarse and Fine Woody Debris **(opt.)**	A	A	N/A	B	B

Table 46. Total taxa encountered by AA – Saguache Creek

Assessment Area	# Taxa Observed
SCVeg01	36
SCVeg02	46
SCVeg03	42
SCVeg04	19
SCVeg05	26
Average	**34**

Table 47. Most common species encountered – Saguache Creek

Scientific Name	# Plot Occurrences	Native Status[1]	C-Value[2]
Juncus arcticus	12	N	4
Achillea millefolium	11	N	4
Cirsium arvense	11	X	*
Equisetum arvense	11	N	4
Poa pratensis	11	I	*
Taraxacum officinale	11	I	*
Salix exigua	9	N	3
Thermopsis rhombifolia	9	N	5
Carex utriculata	8	N	5
Poa palustris	8	N	6
Potentilla fruticosa	8	N	4
Carex pellita	7	N	6
Iris missouriensis	7	N	4
Ribes inerme	7	N	5
Stachys palustris	7	N	-
Carex praegracilis	6	N	5
Elymus trachycaulus	6	N	4
Rosa woodsii	6	N	5
Elymus glaucus	5	N	7
Phalaris arundinacea	5	I	*
Potentilla anserina	5	N	3

[1] I = nonnative, N = native, X = Colorado noxious weed list

[2] * = nonnative species (assumes a C-value of 0), - = no C-value assigned

Table 48. Average total cover by AA – Saguache Creek

	Total Plant Cover	Total Native Cover	Total Introduced Cover	Total Noxious Cover	Total Nonnative Cover (excluding noxious)	Total Annual Cover	Total Biennial Cover	Total Perennial Cover	Total Forb Cover	Total Graminoid Cover	Total Sub-shrub Cover	Total Shrub Cover	Total Tree Cover
S1_1	173.0%	173.0%	0.0%	0.0%	0.0%	0.0%	0.0%	173.0%	56.5%	56.0%	0.0%	60.5%	0.0%
S1_2	207.0%	205.5%	1.5%	0.0%	1.5%	0.0%	0.0%	207.0%	67.0%	64.0%	0.0%	76.0%	0.0%
S1_3	192.7%	188.7%	4.0%	0.0%	4.0%	0.0%	0.0%	192.7%	44.7%	110.5%	0.0%	37.5%	0.0%
S1_4	270.0%	269.5%	0.5%	0.0%	0.5%	0.0%	0.0%	270.0%	124.5%	75.0%	0.0%	70.5%	0.0%
Average	**210.7%**	**209.2%**	**1.5%**	**0.0%**	**1.5%**	**0.0%**	**0.0%**	**210.7%**	**73.2%**	**76.4%**	**0.0%**	**61.1%**	**0.0%**
S2_1	181.5%	124.0%	57.5%	0.0%	57.5%	0.0%	0.0%	180.0%	31.5%	66.0%	1.5%	78.5%	4.0%
S2_2	207.5%	155.5%	52.0%	0.0%	52.0%	0.0%	0.0%	204.0%	29.0%	78.5%	17.5%	82.5%	0.0%
S2_3	168.0%	102.0%	66.0%	0.0%	66.0%	1.5%	0.0%	166.5%	24.5%	100.0%	17.5%	26.0%	0.0%
S2_4	119.0%	101.5%	17.5%	0.0%	17.5%	7.5%	4.0%	107.5%	8.5%	91.0%	18.0%	1.5%	0.0%
Average	**169.0%**	**120.8%**	**48.3%**	**0.0%**	**48.3%**	**2.3%**	**1.0%**	**164.5%**	**23.4%**	**83.9%**	**13.6%**	**47.1%**	**1.0%**
S2alt_1	89.0%	70.5%	18.0%	0.5%	18.5%	0.5%	0.0%	88.5%	22.0%	33.5%	0.0%	26.0%	7.5%
S2alt_2	130.5%	60.5%	52.5%	17.5%	70.0%	0.0%	0.0%	129.0%	54.5%	74.5%	0.0%	1.5%	0.0%
S2alt_3	96.0%	81.0%	7.5%	7.5%	15.0%	1.5%	0.5%	94.0%	42.0%	54.0%	0.0%	0.0%	0.0%
S2alt_4	94.0%	86.5%	7.5%	0.0%	7.5%	17.5%	0.0%	80.0%	31.5%	66.0%	0.0%	0.0%	0.0%
Average	**102.4%**	**74.6%**	**21.4%**	**6.4%**	**27.8%**	**4.9%**	**0.1%**	**97.9%**	**37.5%**	**57.0%**	**0.0%**	**6.9%**	**1.9%**
S4_1	138.5%	137.0%	0.0%	1.5%	1.5%	0.0%	0.0%	138.5%	3.0%	63.0%	17.5%	55.0%	0.0%
S4_2	130.5%	128.0%	1.0%	1.5%	2.5%	0.0%	0.0%	130.5%	4.0%	78.5%	7.5%	41.0%	0.0%
S4_3	181.5%	176.0%	4.0%	1.5%	5.5%	0.0%	0.0%	181.5%	4.0%	60.0%	37.5%	80.0%	0.0%
S4_4	88.0%	84.0%	3.5%	0.5%	4.0%	3.5%	0.0%	84.5%	4.0%	82.5%	0.0%	1.5%	0.0%
Average	**134.6%**	**131.3%**	**2.1%**	**1.3%**	**3.4%**	**0.9%**	**0.0%**	**133.8%**	**3.8%**	**71.0%**	**15.6%**	**44.4%**	**0.0%**
S5_1	91.5%	70.5%	17.5%	3.5%	21.0%	0.0%	0.0%	91.5%	15.0%	35.5%	3.5%	37.5%	0.0%
S5_2	100.6%	96.9%	3.5%	0.2%	3.7%	0.0%	0.2%	100.4%	2.6%	15.5%	0.0%	82.5%	0.0%
S5_3	98.4%	54.9%	43.0%	0.5%	43.5%	0.0%	0.0%	98.4%	3.4%	77.5%	0.0%	17.5%	0.0%
S5_4	125.2%	92.5%	32.5%	0.2%	32.7%	0.0%	0.0%	125.2%	10.2%	115.0%	0.0%	0.0%	0.0%
Average	**103.9%**	**78.7%**	**24.1%**	**1.1%**	**25.2%**	**0.0%**	**0.1%**	**103.9%**	**7.8%**	**60.9%**	**0.9%**	**34.4%**	**0.0%**

Table 49. Average relative cover by AA – Saguache Creek

	Relative Native Cover	Relative Introduced Cover	Relative Noxious Cover	Relative Nonnative Cover (excluding noxious)	Relative Annual Cover	Relative Biennial Cover	Relative Perennial Cover	Relative Forb Cover	Relative Graminoid Cover	Relative Sub-shrub Cover	Relative Shrub Cover	Relative Tree Cover
S1_1	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	32.7%	32.4%	0.0%	35.0%	0.0%
S1_2	99.3%	0.7%	0.0%	0.7%	0.0%	0.0%	100.0%	32.4%	30.9%	0.0%	36.7%	0.0%
S1_3	97.9%	2.1%	0.0%	2.1%	0.0%	0.0%	100.0%	23.2%	57.3%	0.0%	19.5%	0.0%
S1_4	99.8%	0.2%	0.0%	0.2%	0.0%	0.0%	100.0%	46.1%	27.8%	0.0%	26.1%	0.0%
Average	**99.3%**	**0.7%**	**0.0%**	**0.7%**	**0.0%**	**0.0%**	**100.0%**	**33.6%**	**37.1%**	**0.0%**	**29.3%**	**0.0%**
S2_1	68.3%	31.7%	0.0%	31.7%	0.0%	0.0%	99.2%	17.4%	36.4%	0.8%	43.3%	2.2%
S2_2	74.9%	25.1%	0.0%	25.1%	0.0%	0.0%	98.3%	14.0%	37.8%	8.4%	39.8%	0.0%
S2_3	60.7%	39.3%	0.0%	39.3%	0.9%	0.0%	99.1%	14.6%	59.5%	10.4%	15.5%	0.0%
S2_4	85.3%	14.7%	0.0%	14.7%	6.3%	3.4%	90.3%	7.1%	76.5%	15.1%	1.3%	0.0%
Average	**72.3%**	**27.7%**	**0.0%**	**27.7%**	**1.8%**	**0.8%**	**96.7%**	**13.3%**	**52.5%**	**8.7%**	**24.9%**	**0.6%**
S2alt_1	79.2%	20.2%	0.6%	20.8%	0.6%	0.0%	99.4%	24.7%	37.6%	0.0%	29.2%	8.4%
S2alt_2	46.4%	40.2%	13.4%	53.6%	0.0%	0.0%	98.9%	41.8%	57.1%	0.0%	1.1%	0.0%
S2alt_3	84.4%	7.8%	7.8%	15.6%	1.6%	0.5%	97.9%	43.8%	56.3%	0.0%	0.0%	0.0%
S2alt_4	92.0%	8.0%	0.0%	8.0%	18.6%	0.0%	85.1%	33.5%	70.2%	0.0%	0.0%	0.0%
Average	**75.5%**	**19.1%**	**5.4%**	**24.5%**	**5.2%**	**0.1%**	**95.3%**	**35.9%**	**55.3%**	**0.0%**	**7.6%**	**2.1%**
S4_1	98.9%	0.0%	1.1%	1.1%	0.0%	0.0%	100.0%	2.2%	45.5%	12.6%	39.7%	0.0%
S4_2	98.1%	0.8%	1.1%	1.9%	0.0%	0.0%	100.0%	3.1%	60.2%	5.7%	31.4%	0.0%
S4_3	97.0%	2.2%	0.8%	3.0%	0.0%	0.0%	100.0%	2.2%	33.1%	20.7%	44.1%	0.0%
S4_4	95.5%	4.0%	0.6%	4.5%	4.0%	0.0%	96.0%	4.5%	93.8%	0.0%	1.7%	0.0%
Average	**97.4%**	**1.7%**	**0.9%**	**2.6%**	**1.0%**	**0.0%**	**99.0%**	**3.0%**	**58.1%**	**9.8%**	**29.2%**	**0.0%**
S5_1	77.0%	19.1%	3.8%	23.0%	0.0%	0.0%	100.0%	16.4%	38.8%	3.8%	41.0%	0.0%
S5_2	96.3%	3.5%	0.2%	3.7%	0.0%	0.2%	99.8%	2.6%	15.4%	0.0%	82.0%	0.0%
S5_3	55.8%	43.7%	0.5%	44.2%	0.0%	0.0%	100.0%	3.5%	78.8%	0.0%	17.8%	0.0%
S5_4	73.9%	26.0%	0.2%	26.1%	0.0%	0.0%	100.0%	8.1%	91.9%	0.0%	0.0%	0.0%
Average	**75.8%**	**23.1%**	**1.2%**	**24.2%**	**0.0%**	**0.0%**	**100.0%**	**7.6%**	**56.2%**	**1.0%**	**35.2%**	**0.0%**

Table 50. FQA Indices by AA – Saguache Creek

FQA Indices	SCVeg01	SCVeg02	SCVeg03	SCVeg04	SCVeg05
Mean C-Value (All species)	5.8	4.4	4.0	2.7	3.4
Mean C-Value (Native species)	6.1	5.0	4.9	4.4	4.6
Cover-weighted Mean C-Value (All species)	5.3	3.7	3.7	1.8	3.7
Cover-weighted Mean C-Value (Native species)	5.4	5.1	4.9	3.8	4.5
FQI (All species)	26.2	19.9	14.6	8.7	12.0
FQI (Native species)	26.8	21.3	16.1	10.8	13.8
Cover Weighted FQI (All species)	24.0	16.6	13.0	6.1	13.0
Cover Weighted FQI (Native species)	23.6	21.8	16.1	9.0	13.3
Adjusted FQI	59.8	46.9	44.5	34.2	39.5
Adjusted Cover Weighted FQI	52.5	47.8	44.3	28.9	38.2

Table 51. Ecological System, Phys. Group, and Riparian Plant Assoc. – Saguache Creek

Assessment Area	Riparian Ecological System[1]	Plot	Physiognomic Group[2]	Riparian Plant Association[2]	Fidelity
SCVeg01	Rocky Mtn Subalpine-Montane Riparian Shrubland	1	Non-Willow Shrubland	Potentilla fruticosa/Juncus balticus Shrubland	Medium
		2	Tall Willow Shrubland	Salix monticola/Mesic Forb Shrubland	Low
		3	Tall Willow Shrubland	Salix ligulifolia Shrubland	Medium
		4	Non-Willow Shrubland	Potentilla fruticosa/Juncus balticus Shrubland	Low
SCVeg02	Rocky Mtn Subalpine-Montane Riparian Shrubland	1	Tall Willow Shrubland	Salix bebbiana Shrubland	High
		2	Tall Willow Shrubland	Salix bebbiana Shrubland	High
		3	Tall Willow Shrubland	Salix bebbiana Shrubland	High
		4	Herbaceous Vegetation	Unknown	-
SCVeg03	Rocky Mtn Subalpine-Montane Riparian Shrubland	1	Tall Willow Shrubland	Salix exigua/Mesic graminoid Shrubland	Medium
		2	Herbaceous Vegetation	Alopecurus aequalis Herbaceous Vegetation	Medium
		3	Herbaceous Vegetation	Carex praegracilis Herbaceous Vegetation	Medium
		4	Herbaceous Vegetation	Alopecurus aequalis Herbaceous Vegetation	Medium
SCVeg04	Rocky Mtn Lower Montane-Foothill Riparian Woodland/Shrubland	1	Tall Willow Shrubland	Salix exigua/Mesic graminoid Shrubland	Medium
		2	Tall Willow Shrubland	Salix exigua/Mesic graminoid Shrubland	Medium
		3	Tall Willow Shrubland	Salix exigua/Mesic graminoid Shrubland	Medium
		4	Herbaceous Vegetation	Phalaris arundinacea Herbaceous Vegetation	Medium
SCVeg05	Rocky Mtn Lower Montane-Foothill Riparian Woodland/Shrubland	1	Tall Willow Shrubland	Salix exigua/Mesic graminoid Shrubland	High
		2	Tall Willow Shrubland	Salix exigua/Mesic graminoid Shrubland	High
		3	Tall Willow Shrubland	Salix exigua/Mesic graminoid Shrubland	High
		4	Herbaceous Vegetation	Carex pellita Herbaceous Vegetation	Medium

[1] Source: Lemly et al. (2016)

[2] Source: Carsey, K. et al. (2003)

Table 52. EIA Scorecard – Saguache Site 01

SCVeg01 Observer: W. McBride	Wt	Field Rating	Field Points	Calc Points	Calc Rating
Overall Ecological Integrity Score and Rank				**3.66**	**A-**
Rank Factor: LANDSCAPE CONTEXT	0.30			**3.66**	**A-**
LANDSCAPE METRICS	0.33			**3.50**	**A-**
L1. Contiguous Natural Land Cover	1	A	4		
L2. Land Use Index	1	B	3		
BUFFER METRICS	0.67			**3.74**	**A-**
B1. Perimeter with Natural Buffer	n/a	A	4		
B2. Width of Natural Buffer	n/a	A	4		
B3.1. Condition of Natural Buffer - Veg	n/a	B	3		
B3.2. Condition of Natural Buffer - Soils	n/a	A	4		
Rank Factor: CONDITION	0.70			**3.67**	**A-**
VEGETATION METRICS	1			**3.67**	**A-**
V1. Native Plant Species Cover	1	B	3		
V2. Invasive Nonnative Plant Species Cover	1	A	4		
V3. Native Plant Species Composition	1	B	3		
V4. Vegetation Structure	1	A	4		
V5. Regen. of Native Woody Species **(opt.)**	1	A	4		
V65. Coarse and Fine Woody Debris **(opt.)**	1	A	4		

Table 53. EIA Scorecard – Saguache Site 02

SCVeg02 Observer: W. McBride	Wt	Field Rating	Field Points	Calc Points	Calc Rating
Overall Ecological Integrity Score and Rank				**3.34**	**B+**
Rank Factor: LANDSCAPE CONTEXT	0.30			**3.15**	**B+**
LANDSCAPE METRICS	0.33			**3.00**	**B+**
L1. Contiguous Natural Land Cover	1	B	3		
L2. Land Use Index	1	B	3		
BUFFER METRICS	0.67			**3.22**	**B+**
B1. Perimeter with Natural Buffer	n/a	A	4		
B2. Width of Natural Buffer	n/a	B	3		
B3.1. Condition of Natural Buffer - Veg	n/a	C	2		
B3.2. Condition of Natural Buffer - Soils	n/a	A	4		
Rank Factor: CONDITION	0.70			**3.42**	**B+**
VEGETATION METRICS	1			**3.42**	**B+**
V1. Native Plant Species Cover	1	C-	1.5		
V2. Invasive Nonnative Plant Species Cover	1	A	4		
V3. Native Plant Species Composition	1	B	3		
V4. Vegetation Structure	1	A	4		
V5. Regen. of Native Woody Species **(opt.)**	1	A	4		
V65. Coarse and Fine Woody Debris **(opt.)**	1	A	4		

Table 54. EIA Scorecard – Saguache Site 03

SCVeg03 Observer: W. McBride	Wt	Field Rating	Field Points	Calc Points	Calc Rating
Overall Ecological Integrity Score and Rank				**2.28**	**C+**
Rank Factor: LANDSCAPE CONTEXT	0.30			**2.63**	**B-**
LANDSCAPE METRICS	0.33			**2.00**	**C+**
L1. Contiguous Natural Land Cover	1	C	2		
L2. Land Use Index	1	C	2		
BUFFER METRICS	0.67			**2.94**	**B-**
B1. Perimeter with Natural Buffer	n/a	A	4		
B2. Width of Natural Buffer	n/a	B	3		
B3.1. Condition of Natural Buffer - Veg	n/a	B	3		
B3.2. Condition of Natural Buffer - Soils	n/a	C	2		
Rank Factor: CONDITION	0.70			**2.13**	**C+**
VEGETATION METRICS	1			**2.13**	**C+**
V1. Native Plant Species Cover	1	C-	1.5		
V2. Invasive Nonnative Plant Species Cover	1	C	2		
V3. Native Plant Species Composition	1	B	3		
V4. Vegetation Structure	1	C	2		
V5. Regen. of Native Woody Species **(opt.)**	1	N/A	NULL		
V65. Coarse and Fine Woody Debris **(opt.)**	1	N/A	NULL		

Table 55. EIA Scorecard – Saguache Site 04

SCVeg04 Observer: W. McBride	Wt	Field Rating	Field Points	Calc Points	Calc Rating
Overall Ecological Integrity Score and Rank				**2.76**	**B-**
Rank Factor: LANDSCAPE CONTEXT	0.30			**2.99**	**B-**
LANDSCAPE METRICS	0.33			**2.00**	**C+**
L1. Contiguous Natural Land Cover	1	C	2		
L2. Land Use Index	1	C	2		
BUFFER METRICS	0.67			**3.48**	**B+**
B1. Perimeter with Natural Buffer	n/a	A	4		
B2. Width of Natural Buffer	n/a	B	3		
B3.1. Condition of Natural Buffer - Veg	n/a	A	4		
B3.2. Condition of Natural Buffer - Soils	n/a	B	3		
Rank Factor: CONDITION	0.70			**2.67**	**B-**
VEGETATION METRICS	1			**2.67**	**B-**
V1. Native Plant Species Cover	1	B	3		
V2. Invasive Nonnative Plant Species Cover	1	B	3		
V3. Native Plant Species Composition	1	C	2		
V4. Vegetation Structure	1	C	2		
V5. Regen. of Native Woody Species **(opt.)**	1	B	3		
V65. Coarse and Fine Woody Debris **(opt.)**	1	B	3		

Table 56. EIA Scorecard – Saguache Site 05

SCVeg05 Observer: W. McBride	Wt	Field Rating	Field Points	Calc Points	Calc Rating
Overall Ecological Integrity Score and Rank				**2.76**	**B-**
Rank Factor: LANDSCAPE CONTEXT	0.30			**2.77**	**B-**
LANDSCAPE METRICS	0.33			**2.00**	**C+**
L1. Contiguous Natural Land Cover	1	C	2		
L2. Land Use Index	1	C	2		
BUFFER METRICS	0.67			**3.16**	**B+**
B1. Perimeter with Natural Buffer	n/a	A	4		
B2. Width of Natural Buffer	n/a	A	4		
B3.1. Condition of Natural Buffer - Veg	n/a	C	2		
B3.2. Condition of Natural Buffer - Soils	n/a	B	3		
Rank Factor: CONDITION	0.70			**2.75**	**B-**
VEGETATION METRICS	1			**2.75**	**B-**
V1. Native Plant Species Cover	1	C-	1.5		
V2. Invasive Nonnative Plant Species Cover	1	B	3		
V3. Native Plant Species Composition	1	B	3		
V4. Vegetation Structure	1	C	2		
V5. Regen. of Native Woody Species **(opt.)**	1	A	4		
V65. Coarse and Fine Woody Debris **(opt.)**	1	B	3		

Table 57. Coarse Vegetation Mapping – Rio Grande

Waypoint (WP)	Latitude	Longitude	River Extent	Elevation (m)	Elevation (ft)	Dominant Ecological System	Dominant Physiognomic Group	Dominant Species	Notes
8	37.75525	-107.4136	WP 7-8	2700 - 3030	8858 - 9940	Rocky Mountain Sublapine-Montane Riparian Shrubland	Tall Willow Shrubland	*Salix* spp.	Where topography creates open valley
						Rocky Mountain Sublapine-Montane Riparian Woodland	Evergreen Riparian Forest/Woodland	*Picea* spp.	Where topography creates gorge
7	37.72684	-107.02007	WP 6-7	2588 - 2700	8491 - 8858	Rocky Mountain Sublapine-Montane Riparian Shrubland	Tall Willow Shrubland	*Salix* spp.	Where topography creates open valley
						Rocky Mountain Sublapine-Montane Riparian Woodland	Evergreen Riparian Forest/Woodland	*Picea* spp.	Where topography creates gorge
6	37.792378	-106.851981	WP 5-6	2575 - 2588	8448 - 8491	Rocky Mountain Sublapine-Montane Riparian Woodland	Deciduous Dominated Forest/Woodland	*Populus angustifolia*	Wheel Gap, Cottonwood Cove
5	37.763206	-106.788047	WP 4-5	2552 - 2575	8372 - 8448	Rocky Mountain Sublapine-Montane Riparian Woodland	Mixed Conifer and Deciduous Forests/Woodlands	*Alnus incana*, *Picea* spp., *Pinus ponderosa*, *Pseudotsuga menziesii*, *Populus tremuloides*	
4	37.75339	-106.76817	WP 3-4	2527 - 2552	8292 - 8372	Rocky Mountain Sublapine-Montane Riparian Woodland	Evergreen Riparian Forest	*Picea* spp., *Alnus incana*	
3	37.725956	-106.708647	WP 2-3	2501 - 2527	8206 - 8292	Rocky Mountain Sublapine-Montane Riparian Woodland	Deciduous Dominated Forest/Woodland	*Populus angustifolia*	Mosaic
						Rocky Mountain Sublapine-Montane Riparian Shrubland	Tall Willows	*Salix* spp.	Mosaic
2	37.677158	-106.652489	WP 1-2	2300 - 2501	7545 - 8206	Rocky Mtn Lower Montane-Foothill Riparian Woodland/Shrubland	Deciduous Dominated Forest/Woodland	*Populus angustifolia*	Mosaic
							Tall Willow Shrubland	*Salix* spp.	Mosaic
1	37.42973	-105.78988	WP 0-1	2255 - 2300	7400 - 7545	Rocky Mtn Lower Montane-Foothill Riparian Woodland/Shrubland	Tall Willow Shrubland	*Salix* spp.	Mosaic; Continues to CO/NM border
							Herbaceous Vegetation	Mixed graminoid and forb	Mosaic; Continues to CO/NM border
0	36.995961	-105.718686	WP 0	2255	7400	-	-	-	CO/NM border

Table 58. Comparison of EIA Scores Across Observers – Rio Grande. Shaded cells reveal where scores differ between observers for individual metrics.

	RGVeg02		RGVeg09		RGVeg13		RGVeg17	
	Wendy	Kyle	Wendy	Kyle	Wendy	Kyle	Wendy	Kyle
Overall Ecological Integrity Points	3.36	3.43	2.71	2.83	2.70	2.88	2.15	2.36
Overall Ecological Integrity Rank	B+	B+	B-	B-	B-	B-	C+	C+
LANDSCAPE METRICS								
L1. Contiguous Natural Land Cover	B	B	C	C	B	C	C	D
L2. Land Use Index	A	A	C	C	C	C	C	C
BUFFER METRICS								
B1. Perimeter with Natural Buffer	A	A	C	C	A	A	B	C
B2. Width of Natural Buffer	C	C	C	C	C	C	C	C
B3.1. Condition of Natural Buffer - Veg	A	B	B	B	B	B	C	C
B3.2. Condition of Natural Buffer - Soils	A	A	A	A	B	B	B	C
VEGETATION METRICS								
V1. Native Plant Species Cover	C	C	C	C	C	C	C-	C-
V2. Invasive Nonnative Plant Species Cover	A	A	A	A	B	B	B	B
V3. Native Plant Species Composition	B	A	B	C	C	C	D	C
V4. Vegetation Structure	B	A	C	B	B	A	C	C
V5. Regen. of Native Woody Species **(opt.)**	A	A	B	A	B	A	B	A
V65. Coarse and Fine Woody Debris **(opt.)**	A	B	B	B	B	B	C	B
# Individual Metrics Disagree	4		2		3		6	
# Individual Metrics Agree	8		10		9		6	
% Individual Metrics Agree	66.7%		83.3%		75.0%		50.0%	

Table 59. C-value ranges and associated interpretations (Lemly, Gilligan, and Wiechmann 2016)

C-Values	*Interpretation*
0	Nonnative species. Very prevalent in new ground or non-natural areas.
1-3	Commonly found in non-natural areas.
4-6	Equally found in natural and non-natural areas.
7-9	Obligate to natural areas but can sustain some habitat degradation.
10	Obligate to high quality natural areas (relatively unaltered from pre-European settlement).

Figure 1. Average Mean C-values by AA – Conejos River

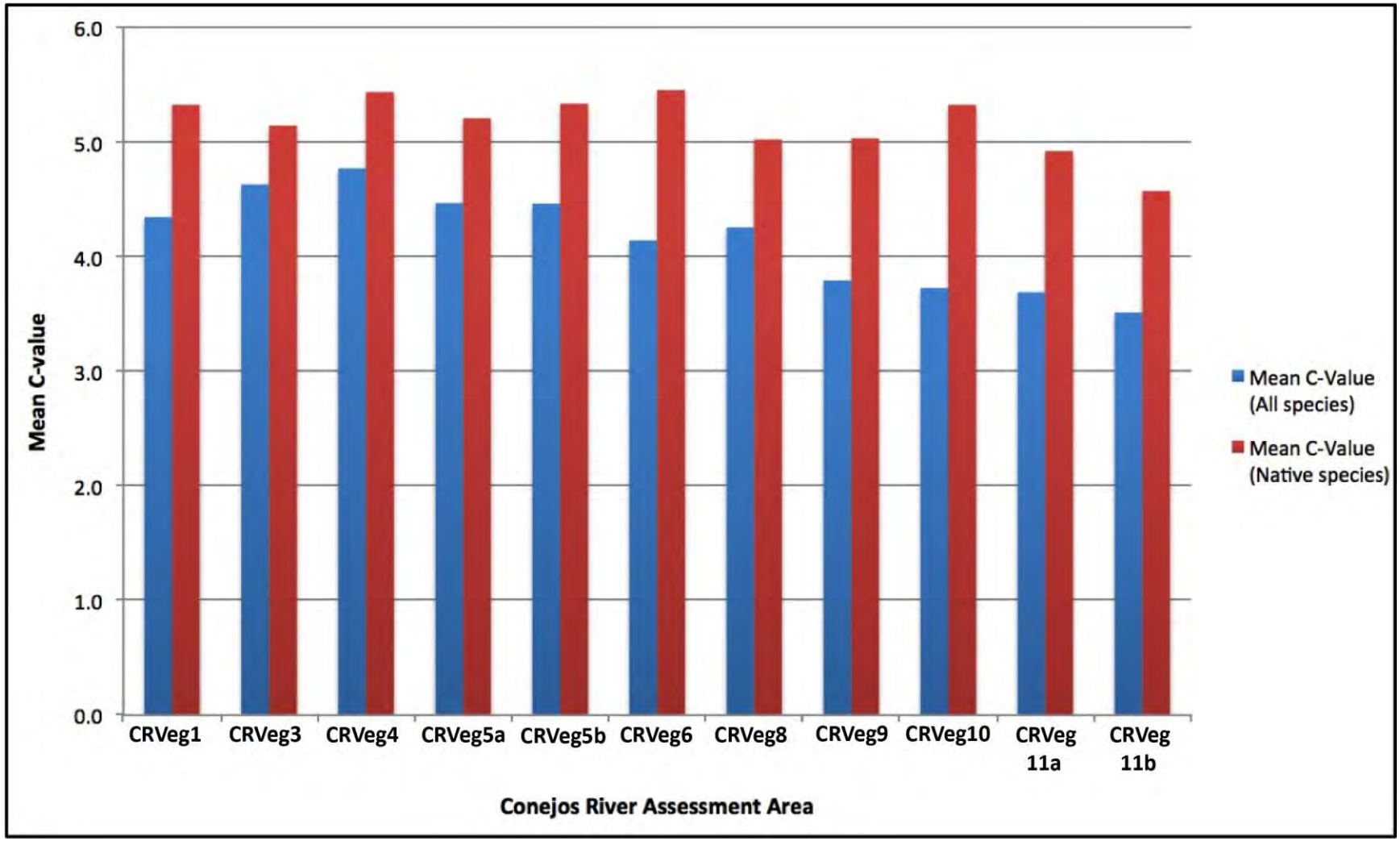


Figure 2. Average cover weighted mean C-values by AA – Conejos River

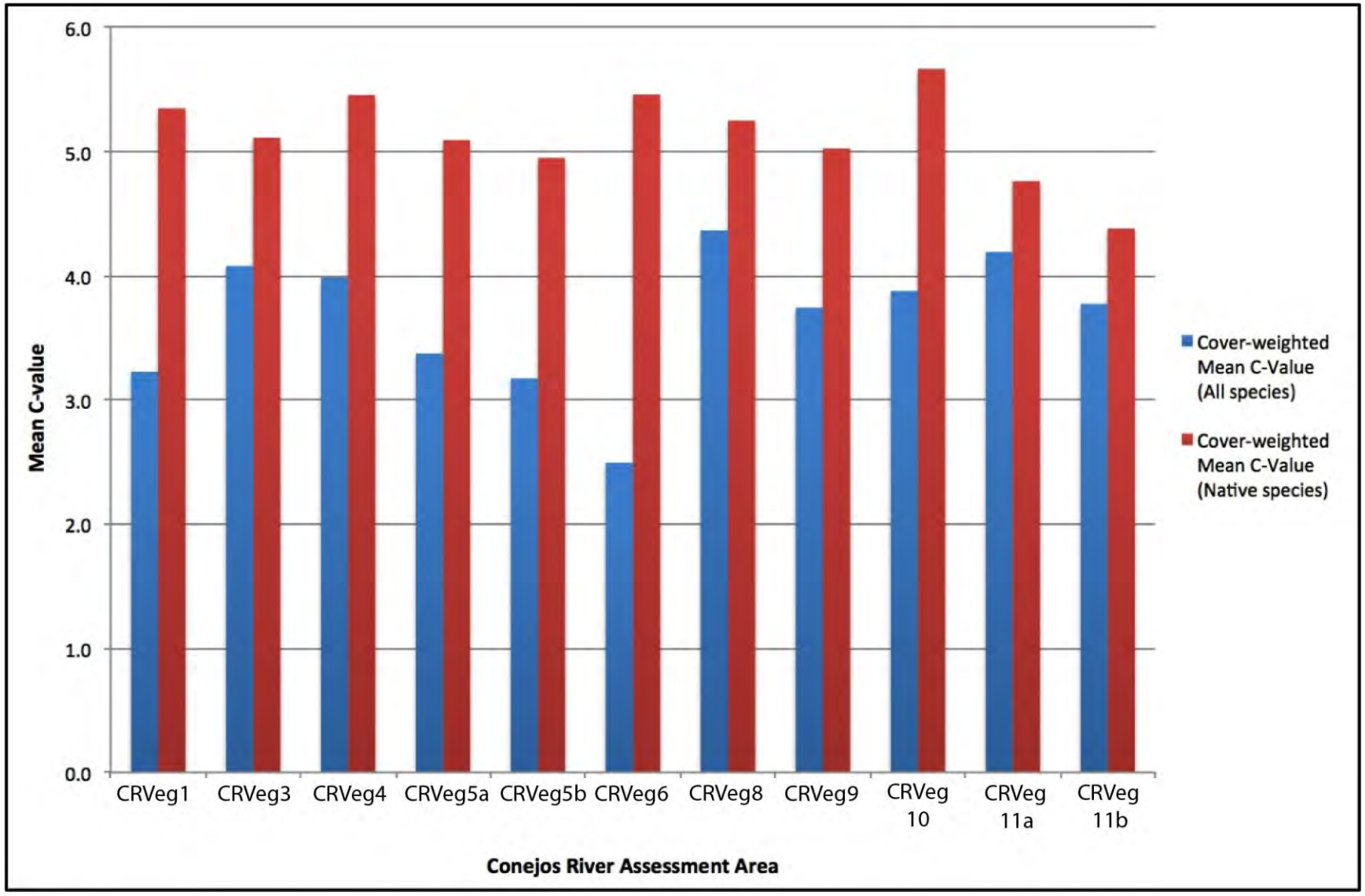


Figure 3. Average Mean C-values by AA – Rio Grande

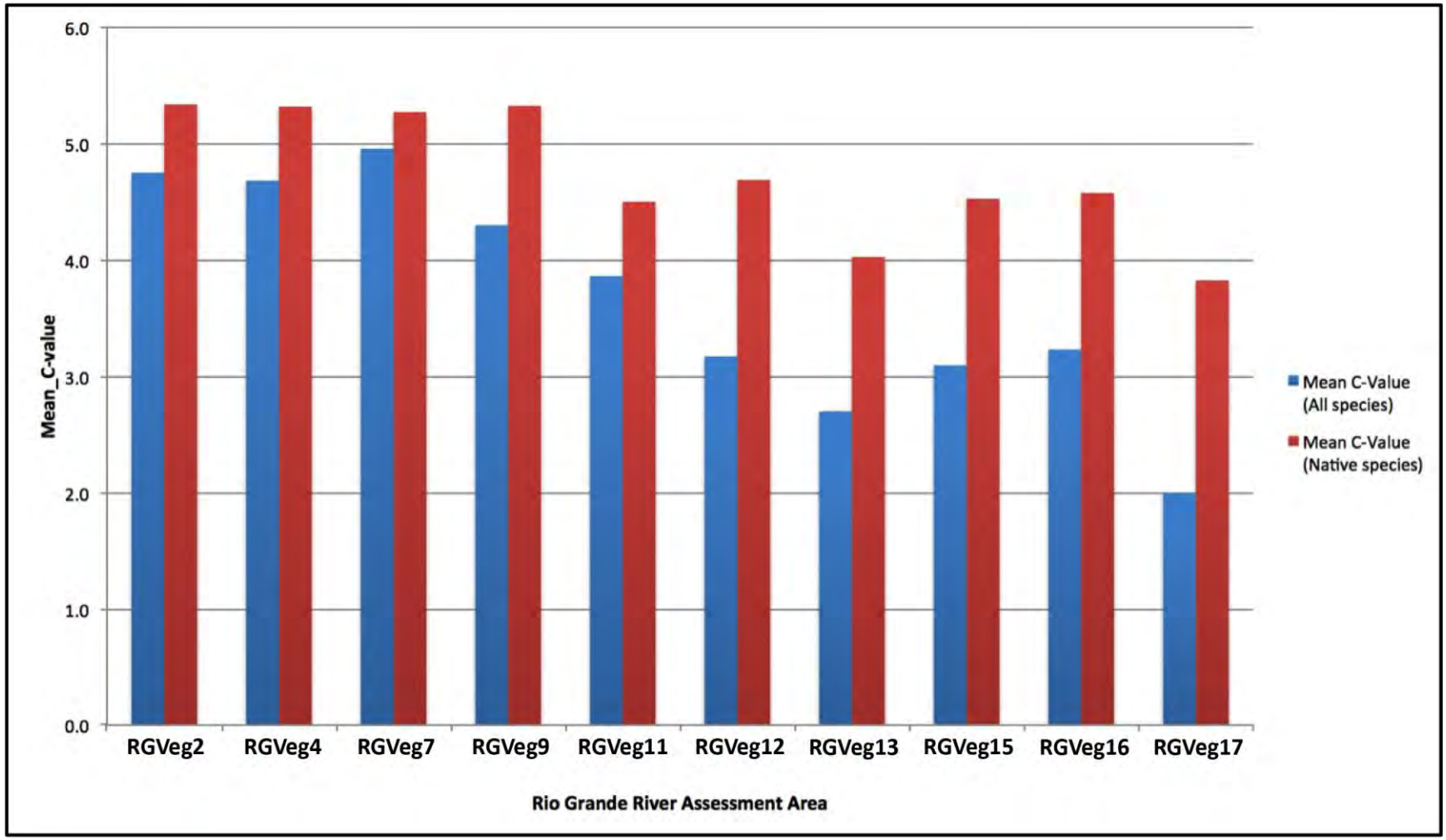


Figure 4. Average cover weighted mean C-values by AA – Rio Grande

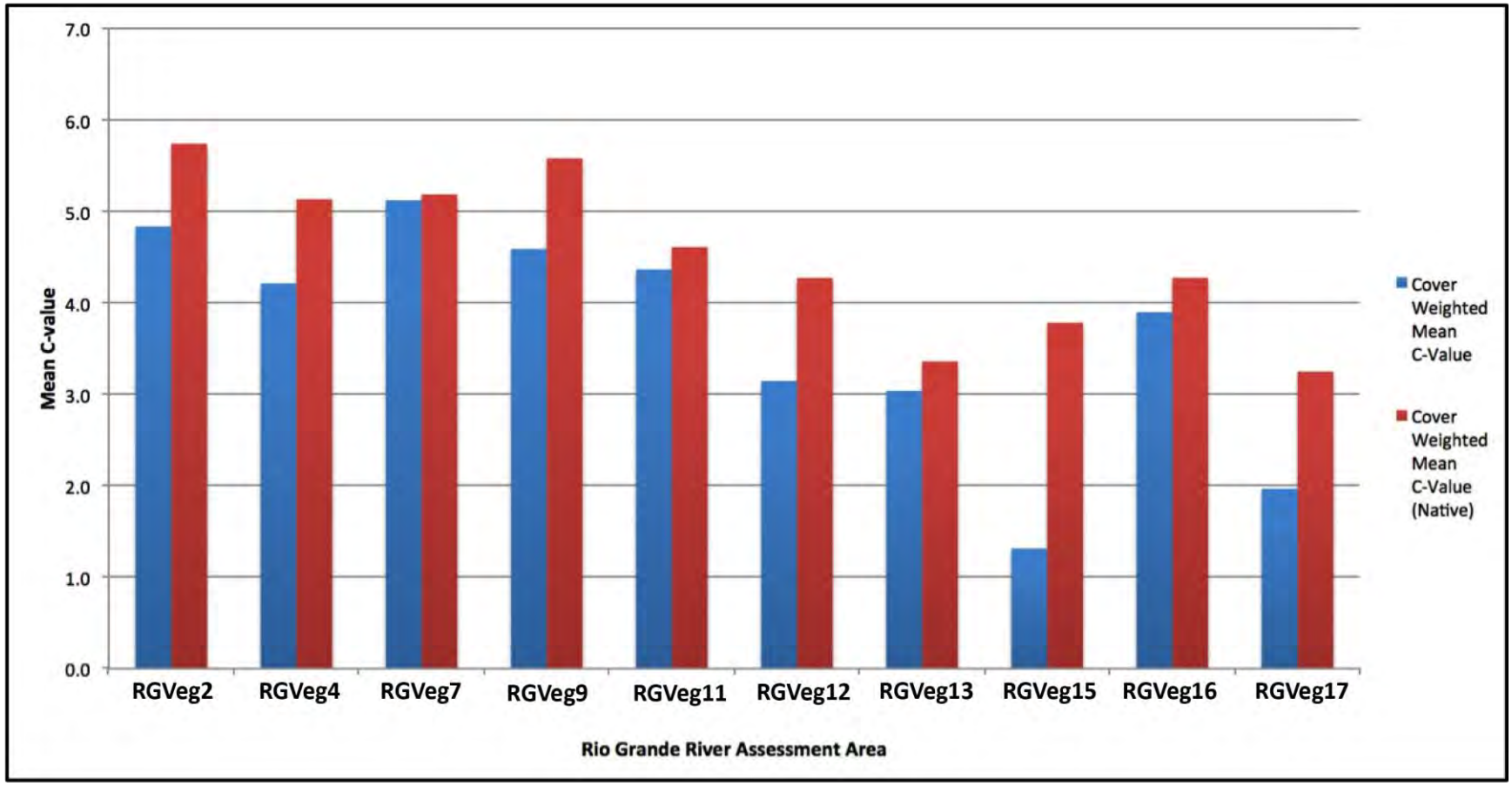


Figure 5. Average Mean C-values by AA – Saguache Creek

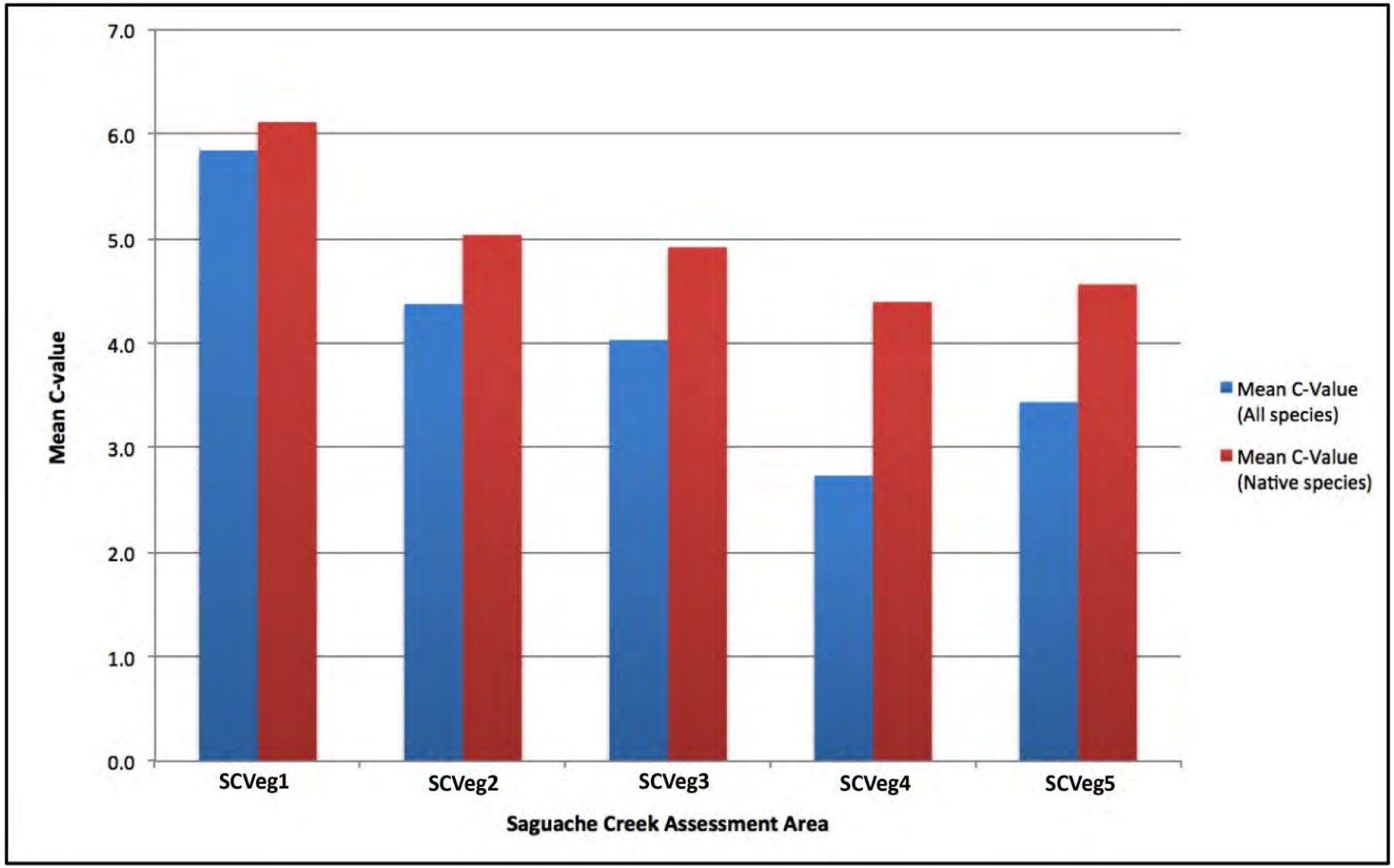
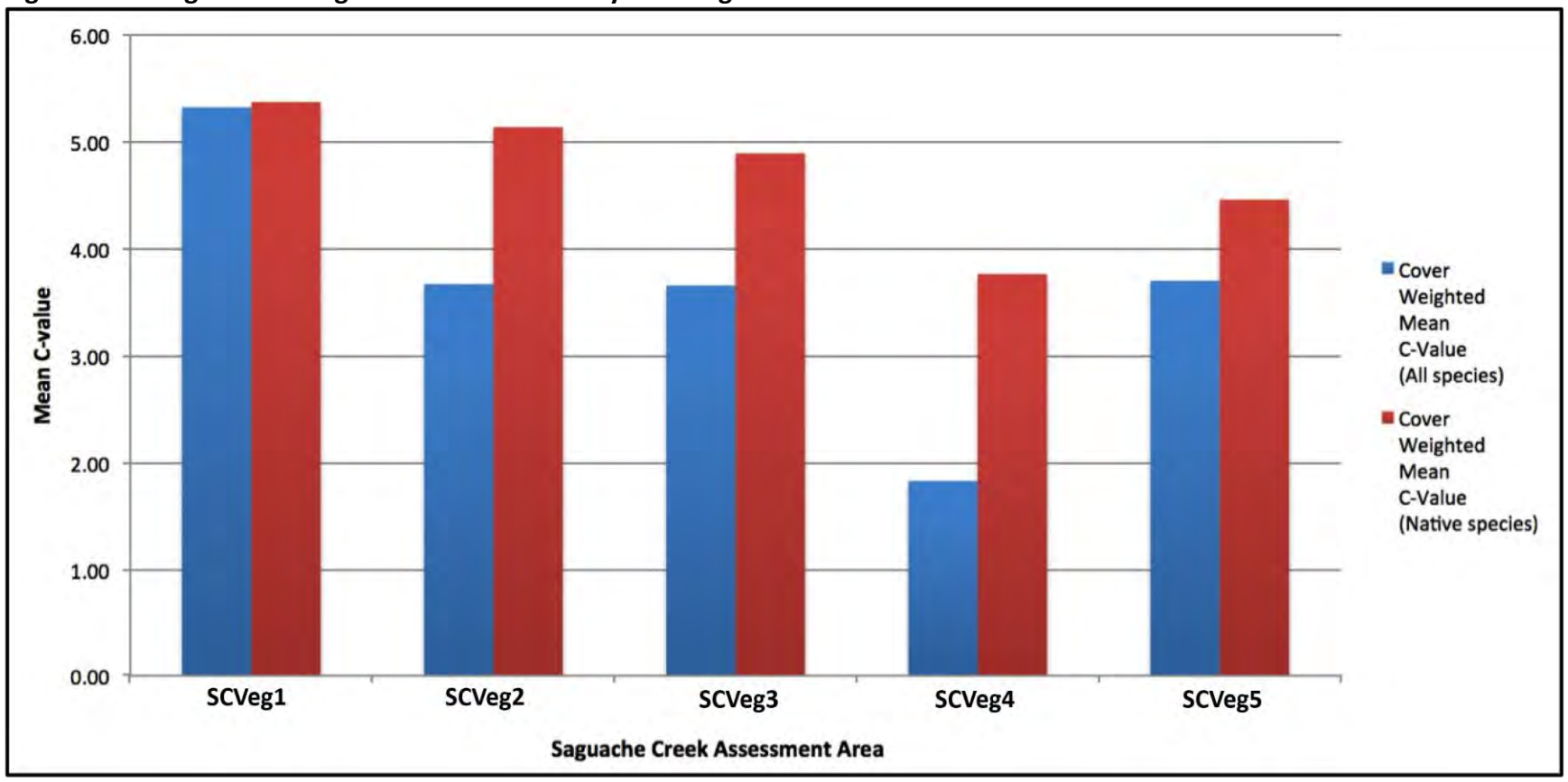


Figure 6. Average cover weighted mean C-values by AA – Saguache Creek



Appendix E:
GIS Remote Sensing Vegetation Assessment for Rio Grande, Conejos River, and Saguache Creek Stream Management Plans

To assess riparian vegetation condition at a larger scale, the RGHRP employed a set of GIS tools. The tools are collectively known as the Riparian Condition Assessment Tool (RCAT), which includes the Valley Bottom Extraction Tool (VBET), Riparian Vegetation Departure (RVD) tool, and the Riparian Condition Assessment (RCA) tool (Macfarlane et al., 2016). These GIS tools consist of ArcPython scripts that use nationally available digital elevation models (DEMs) and 30-meter LANDFIRE imagery to assess the current condition of riparian vegetation. Because the RCAT tools and analysis are based upon watershed boundaries, the analysis was completed for all perennial streams within the Rio Grande Basin. First, VBET was used to delineate the maximum possible extent of riparian vegetation along each study stream using a digital elevation model (DEM) and average slope and valley width thresholds. Note: the riparian extent does not include wetlands that are not associated with the perennial stream network. Where available, a 2-meter DEM, derived from LiDAR data, was used. For the remainder of the Basin, the nationally available 10-meter DEM was used.

The RVD assessment tool divides each stream into discrete 500-meter assessment units. Within each assessment unit, the tools overlay the VBET output and LANDFIRE imagery. To compare current and reference vegetation, two LANDFIRE datasets are used. Current riparian vegetation cover is modeled using the Existing Vegetation Type (EVT) layer, while historic (pre-European settlement) vegetation is modeled using the LANDFIRE Bio-physical Setting (BpS) layer. Imagery falling within the VBET boundary is included in each assessment. RVD calculates the degree to which each unit has “departed” or been converted from pre-European, or “reference,” condition. This is expressed as a percentage. Additionally, the tool analyzes the LANDFIRE imagery to determine what primary type of land conversion, if any, has occurred within each unit.

The more comprehensive RCA tool assesses riparian area condition using three inputs: riparian vegetation departure (modeled by the RVD tool), land use intensity, and floodplain connectivity. Each assessment unit is attributed with values on continuous scales for each of the three inputs. To determine floodplain connectivity, roads, railroads, development, and other types of land conversion were used to assess overall riparian conditions for each spatial unit. The overall RCA score is calculated using all three inputs and is expressed as a value between 0 and 1. An example of the RCA output is shown in Figure 7.

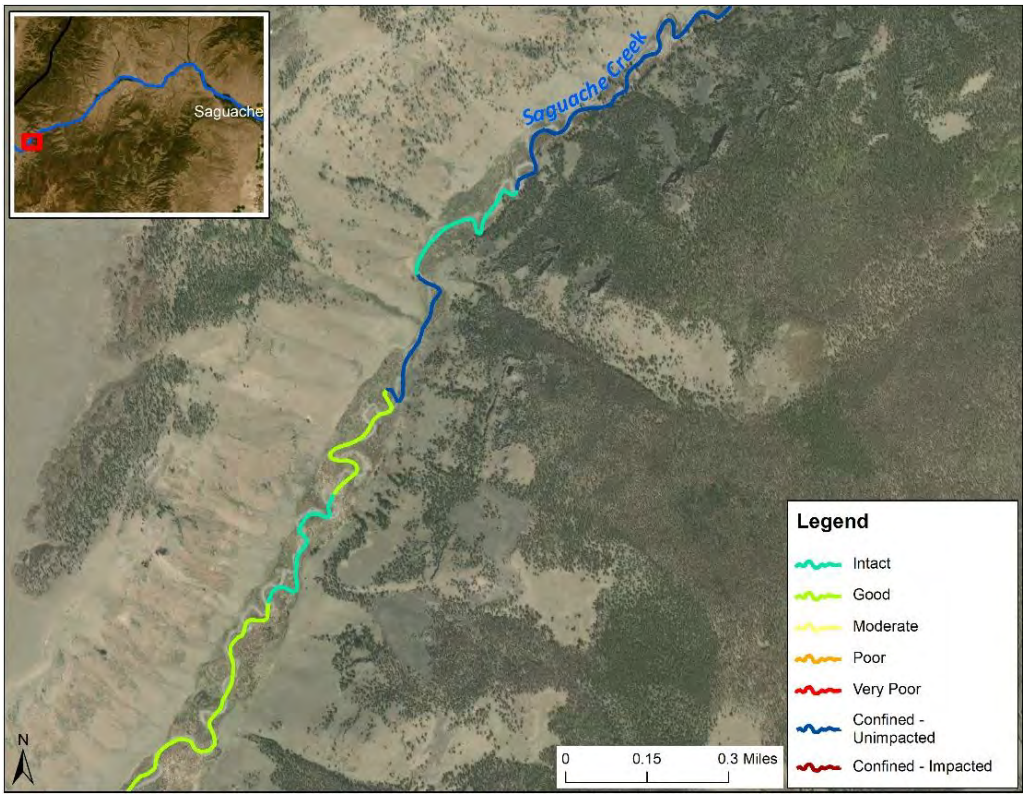


Figure 7: Example of GIS riparian vegetation assessment results.

The RCA rating scale, including RCA score thresholds, is shown in Table 60.

Table 60. Rating scale used GIS remote sensing vegetation assessment

Rating Scale	Impairment	RCA Score	Description
A ≥ 90	Negligible	≥ 0.9	Riparian vegetation is considered to be in reference condition. Few, if any, nonnative species are present, land use intensity is negligible, and floodplain connectivity is intact.
B ≥ 80	Mild	0.6 - 0.89	Riparian vegetation is in good condition with few nonnative species present. Land use intensity is low and river-floodplain connectivity is mostly intact.
C ≥ 70	Significant	0.3 - 0.59	Riparian vegetation is in moderate condition and small populations of noxious species may be present. Land use intensity is moderate and there is some loss of river-floodplain connectivity.
D ≥ 60	Severe	0.1 - .29	Riparian vegetation is in poor condition. Noxious plant species are prevalent. Land use intensity is high and, in many areas, the river lacks floodplain access.
F ≥ 50	Profound	< 0.1	Riparian vegetation is in very poor condition. Noxious plant species are dominant. Land use intensity is extreme and the majority of the reach lacks floodplain access.

The RCAT tools were developed by a team of researchers at Utah State University. Additional information and documentation of these tools is available at this url: http://rcat.riverscapes.xyz/. As noted above, both the site-level and GIS assessments were used in assessing overall riparian vegetation condition. The EIA rating and RCA ratings were averaged to calculate a final grade for each SMP reach.

Remote Sensing Vegetation Assessment Results

Tables 61 through 63 show the RCA, EIA, and overall riparian vegetation rating for each SMP reach. A discussion of riparian stressors associated with each reach is available in the SMP documents.

Table 61. Rio Grande SMP RCA, EIA, and overall reach rating results

SMP Reach	Number of RCA Units	Average RCA Score	RCA Rating	EIA Site Rating	Overall Reach Rating
RG01	25	0.84	B+	N/A	**B+**
RG02	27	0.85	B+	B+	**B+**
RG03	31	0.78	B	N/A	**B**
RG04	34	0.57	C+	B+	**B**
RG05	21	0.64	B-	N/A	**B-**
RG06	42	0.74	B	N/A	**B**
RG07	24	0.78	B	B-	**B**
RG08	24	0.75	B	N/A	**B**
RG09	49	0.6	B-	B-	**B-**
RG10	15	0.47	C	N/A	**C**
RG11	11	0.35	C-	B-	**C**
RG12	15	0.42	C	B-	**C+**
RG13	35	0.52	C+	B-	**B-**
RG14	7	0.41	C	N/A	**C**
RG15	31	0.44	C	B-	**C+**
RG16	18	0.57	C+	B-	**B-**
RG17	27	0.83	B+	C+	**B**

Table 62. Conejos River SMP RCA, EIA, and overall reach rating results

SMP Reach	Number of RCA Units	Average RCA Score	RCA Rating	EIA Site Rating	Overall Reach Rating
CR01	8	0.74	B	B-	**B**
CR02	10	0.79	B	N/A	**B**
CR03	13	0.8	B+	B+	**B+**
CR04	20	0.84	B+	B+	**B+**
CR05	33	0.63	B-	B+, B+	**B**
CR06	32	0.82	B+	B-	**B**
CR07	14	0.77	B	N/A	**B**
CR08	26	0.54	C+	B-	**B-**
CR09	21	0.51	C+	B-	**B-**
CR10	40	0.53	C+	B-	**B-**
CR11	59	0.5	C+	B-, C+	**C+**

Table 63. Saguache Creek SMP RCA, EIA, and overall reach rating results

SMP Reach	Number of RCA Units	Average RCA Score	RCA Rating	EIA Site Rating	Overall Reach Rating
SC01	28	0.83	B+	A-	**A-**
SC02	14	0.76	B	B+	**B**
SC03	104	0.47	C	C+	**C**
SC04	42	0.42	C	B-	**C+**
SC05	30	0.45	C	B-	**C+**

Appendix F. Water Quality and Aquatic Life Data - Rio Grande, Conejos River, and Saguache Creek SMPs

This appendix contains the water quality and aquatic life datasets used in the Stream Management Plans.

Acronyms

BDL – Below Detection Limit
BLM AIM – Bureau of Land Management Aquatic Assessment, Inventory, and Monitoring program
MRP – Colorado Department of Public Health and Environment Measurable Results Program
RGHRP – Rio Grande Headwaters Restoration Project
RW – River Watch of Colorado
URGWA – Upper Rio Grande Watershed Assessment

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1 Rio Grande, Conejos River, and Saguache Creek Water Quality Datasets

1.1 Rio Grande SMP - Water Quality Data

The tables below highlight any water quality impairments documented within a given Rio Grande SMP reach.

Table 1.1: Summary of dissolved metals results from the Upper Rio Grande Watershed Assessment (URGWA [SGM & Lotic Hydrological, 2018]).

Rio Grande SMP Reach	URGWA Site ID	Abbre-viation	Median As (µg/L)	Median Al (µg/L)	Median Cd (µg/L)	Median Mn (µg/L)	Median Pb (µg/L)	Median Zn (µg/L)	Number of Acute As Exceedances	Number of Chronic As Exceedances	Number of Acute Zn Exceedances	Number of Chronic Zn Exceedances	Median Zn Loading Rate (kg/year)
RG02	URGA 02	UT	12.99	17.33	0.00	7.55	BDL	6.30	0	1	0	0	
RG03	URGA 03	TM	7.65	67.11	0.56	43.25	1.91	8.10	1	2	0	0	708
RG03	URGA 04	BC	8.99	167.31	0.73	10.16	BDL	4.09	1	3	0	1	638
RG04	URGA 06			31.98	BDL	BDL	BDL	8.62	0	1	0	0	
RG05	URGA 07	MP	7.58	44.91	0.68	12.90	2.79	18.10	2	3	2	0	10443
RG06	URGA 08	WC	15.47	17.20	1.06	50.92	BDL	31.90	0	1	1	0	
RG07	URGA 09	WW	5.07	56.31	0.73	17.24	1.41	54.83	1	2	3	4	37234
RG08	URGA 11	EC	8.54	20.20		14.80	BDL	23.60	0	1	0	1	
RG09	URGA 14			10.71	BDL	27.00	BDL	17.40	0	1	0	0	
RG09	URGA 15	DN	8.91	148.24	1.20	10.61	1.95	22.22	1	2	0	1	8245

CO Reg. 36 Segment Codes		
RGRG02	RGRG04b	
RGRG04a		

Above chronic standard

Above acute standard

*This data applies to Rio Grande SMP reaches RG01 through RG09.

In addition to metals data, water temperature, nutrients, pH, conductivity, turbidity, total dissolved solids, total suspended solids, and dissolved oxygen were analyzed as part of the URGWA. Results showed that with the exception of turbidity and total suspended solids, all these parameters were within normal ranges and did not exceed state water quality standards. Elevated turbidity and total suspended solids were attributed to short-term wildfire impacts

Rio Grande SMP reaches RG01 through RG05 (CDPHE segment CORGRG02)

Table 1.2: Water quality sampling site information

Site ID	Site description	Org	Latitude	Longitude
RG-2	Bridge Over Rio Grande On Airport Rd.	CDPHE HazWaste	37.81687199	-106.9148639
8155	South Clear Creek Below Browns Lake SWA	WQCD	37.83005	-107.16323
134	Rio Grande River Near Creede	WQCD	37.81699	-106.914935
USGS-08213500	Rio Grande At Thirtymile Bridge, Nr Creede, Co.	USGS	37.724722	-107.2556094

Table 1.3: Assessment of attainment of acute or one-day standards

Parameter	# of samples	Max. measured value	Aquatic life standard (acute)	Water supply standard (acute)	Agriculture standard (acute)	Exceeding acute standard?
Ag-D ug/L	14	0	0.26	N/A	N/A	No
Ag-T ug/L	5	0	N/A	100	N/A	No
Al-D ug/L	14	141	N/A	N/A	N/A	No
Al-T ug/L	5	472	N/A	N/A	N/A	No
As-D ug/L	14	1.07	340	N/A	N/A	No
Cd-D ug/L	14	0	0.6	N/A	N/A	No
Cd-T ug/L	5	0	N/A	5	10	No
Cu-D ug/L	14	0.97	4.38	N/A	N/A	No
Hg-T ug/L	1	0	N/A	2	N/A	No
Mn-D ug/L	14	158.15	2008.55	50	N/A	No
Ni-D ug/L	14	1.45	171.09	N/A	N/A	No
NO2-T mg/L	1	0	N/A	1	10	No
NO3-T mg/L	1	0	N/A	10	100	No
NO5-T mg/L	9	0.21	N/A	10	100	No
Pb-D ug/L	14	0.40	17.31	N/A	N/A	No
Pb-T ug/L	5	0	N/A	50	100	No
pH min	8	7.76	6.5	5	N/A	No
pH max	8	8.5	9	9	N/A	No
Se-D ug/L	14	0.06	18.4	N/A	N/A	No
U-D ug/L	9	0.24	N/A	N/A	N/A	No
Zn-D ug/L	14	2.86	54.21	N/A	N/A	No

Table 1.4: Assessment of attainment of chronic or 30-day standards

Parameter	# of samples	Aquatic life standard (chronic)	Water supply standard (chronic)	Agriculture standard (chronic)	Median of samples measured	Exceeding chronic standard?
Ag-D ug/L	12	0.01	N/A	N/A	0	No
Ag-T ug/L	4	N/A	100	N/A	0	No
Al-D ug/L	12	67.0	N/A	N/A	74.53	Yes; Aquatic Life

Parameter	# of samples	Aquatic life standard (chronic)	Water supply standard (chronic)	Agriculture standard (chronic)	Median of samples measured	Exceeding chronic standard?
Al-T ug/L	4	N/A	N/A	N/A	186	No
NH3 mg/L	9	13.96	N/A	N/A	0.08	No
As-D ug/L	12	150	N/A	N/A	0.75	No
As-T ug/L	12	N/A	0.02	100	1.09	Yes; Water Supply
Be-D ug/L	4	N/A	N/A	N/A	0	No
Be-T ug/L	4	N/A	4	100	0	No
Cd-D ug/L	12	0.17	N/A	N/A	0	No
Cd-T ug/L	4	N/A	5	10	0	No
Cl- mg/L	1	N/A	250	N/A	0.24	No
Cu-D ug/L	12	3.24	N/A	N/A	0.09	No
Cu-T ug/L	4	N/A	1000	200	0	No
DO-D mg/L	9	N/A	3	3	7.34	No
Fe-D ug/L	12	N/A	300	N/A	290.77	No
Fe-T ug/L	12	1000	N/A	N/A	677.5	No
Hard. mg/L	13	N/A	N/A	N/A	30.42	No
Hg-T ug/L	1	0.01	2	N/A	0	No
Mn-D ug/L	12	1109.73	50	N/A	44.56	No
Mn-T ug/L	4	N/A	N/A	200	32.28	No
Mo-D ug/L	8	N/A	N/A	N/A	1.24	No
Mo-T ug/L	8	N/A	210	160	0	No
Ni-D ug/L	12	19	N/A	N/A	0	No
Ni-T ug/L	4	N/A	100	200	0	No
NO2-T mg/L	1	N/A	1	10	0	No
NO3-T mg/L	1	N/A	10	100	0	No
NO5-T mg/L	8	N/A	10	100	0.07	No
Pb-D ug/L	12	0.67	N/A	N/A	0.1	No
Pb-T ug/L	4	N/A	50	100	0	No
pH min	N/A	N/A	5	N/A	7.89	No
pH max	N/A	N/A	9	N/A	8.4	No
Se-D ug/L	12	4.6	N/A	N/A	0.01	No
Se-T ug/L	4	N/A	50	20	0	No
SO4-T mg/L	9	N/A	250	N/A	5.12	No
U-D ug/L	8	N/A	N/A	N/A	0.22	No
U-T ug/L	8	N/A	30	N/A	0.12	No
Zn-D ug/L	12	41.06	N/A	N/A	2.85	No
Zn-T ug/L	4	N/A	5000	2000	0	No

Table 1.5: Assessment of nutrient attainment

Parameter	# of samples	Aquatic life standard (chronic)	Median of samples measured	Exceeding standard?
Total Nitrogen (mg/L)	10	2.01	0.22	No
Total Phosphorous (mg/L)	10	0.11	0.075	No

Table 1.: Water temperature standards at Mouth of the Rio Grande Box Canyon

Season	MWAT	DM
April – Oct.	17	21.7
Nov. – March	9.0	13.0

Table 1.: Assessment of water temperature attainment at Mouth of the Rio Grande Box Canyon

Season	Number of Exceedances (MWAT)	Number of Exceedances (DM)
Winter	1	0
Summer	0	0

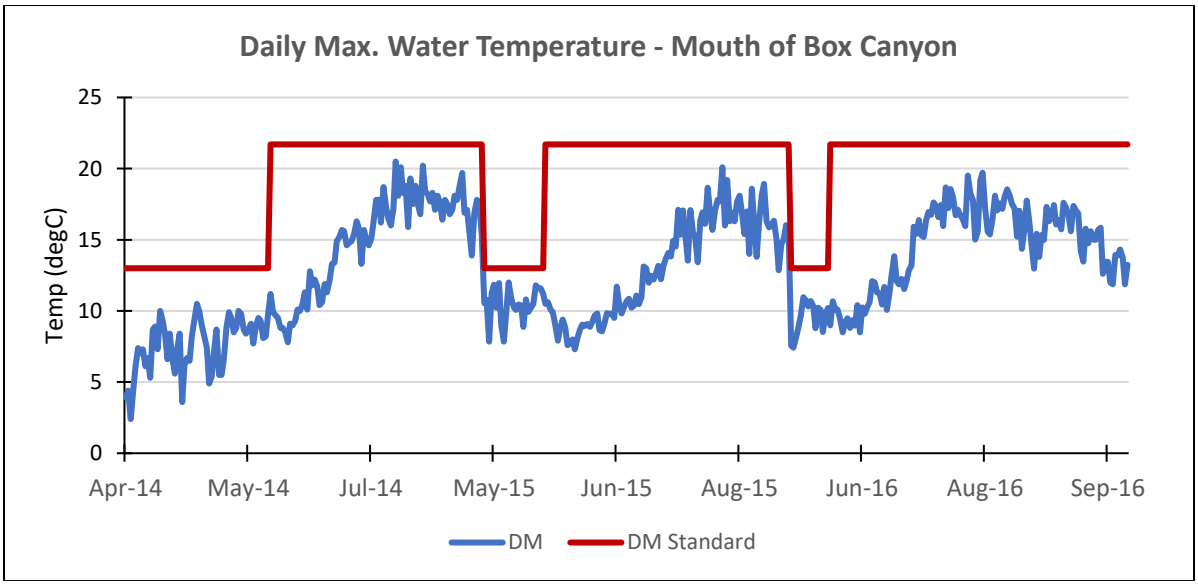

Figure 1.: Daily maximum water temperature and corresponding seasonal standards at Mouth of the Rio Grande Box Canyon

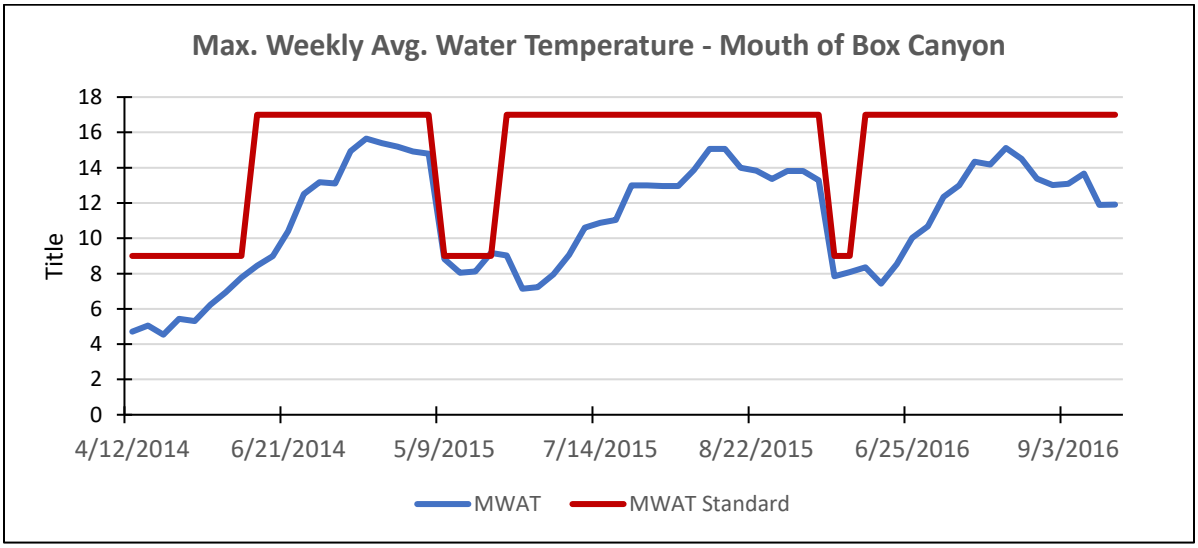

Figure 1.: Maximum weekly average water temperature and corresponding seasonal standards at the Mouth of the Rio Grande Box Canyon

Table 1.: Water temperature standards at Marshall Park

Season	MWAT	DM
April – Oct.	17	21.7
Nov. – March	9.0	13.0

Table 1.: Assessment of water temperature attainment at Marshall Park

Season	Number of Exceedances (MWAT)	Number of Exceedances (DM)
Winter	3	0
Summer	2	0

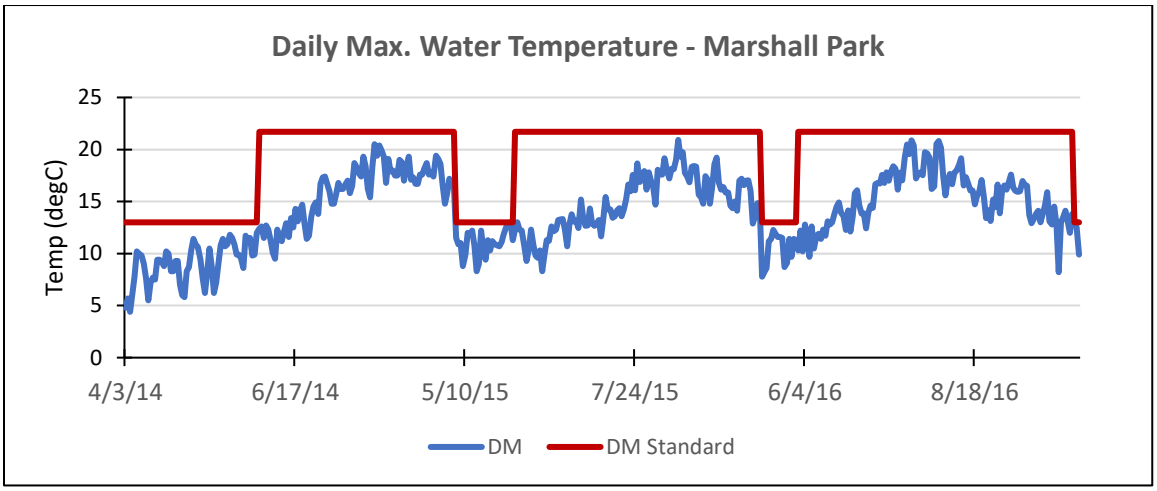

Figure 1.: Daily maximum water temperature and corresponding seasonal standards at Marshall Park

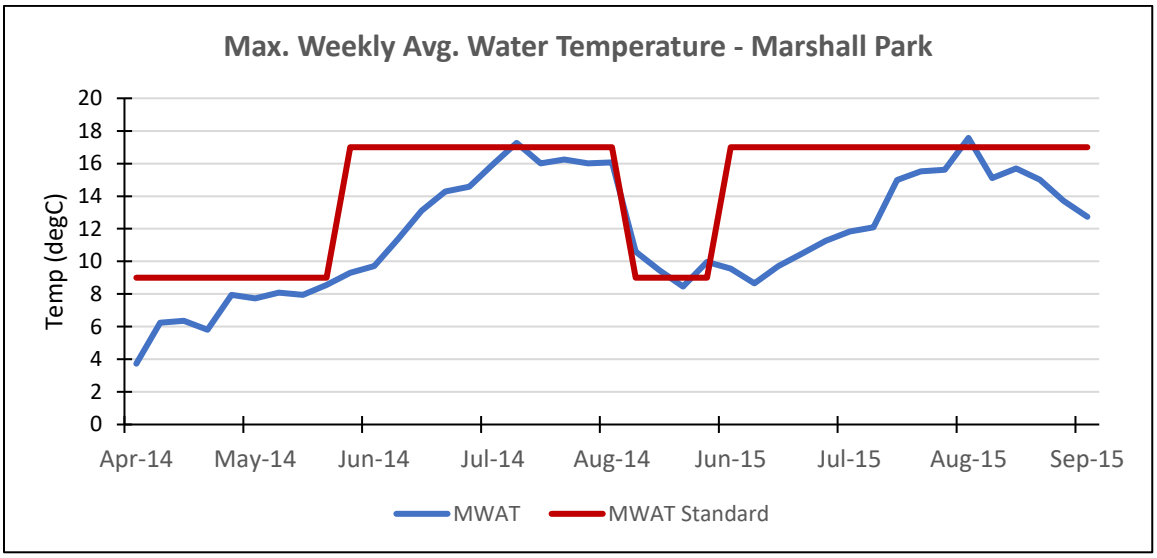

Figure 1.: Maximum weekly average water temperature and corresponding seasonal standards at Marshall Park

Rio Grande SMP reaches RG06 through RG08 (CDPHE segment CORGRG04a)

Table 1.6: Water quality sampling site information

Site ID	Site description	Org	Latitude	Longitude
RG-9	Bridge Over Rio Grande On Hwy 149 At Wagon Wheel Gap	CDPHE HazWaste	37.76622631	-106.8309151
653	Rio Grande at Hwy 149	RW	37.6765	-106.6538
RG-4	Bridge Over Rio Grande On Hwy 149 At Wason	CDPHE HazWaste	37.82178374	-106.8896889
135	Rio Grande Near Wagon Wheel Gap	WQCD	37.766423	-106.831078
8103	Rio Grande At Wagon Wheel Gap - North Bank	WQCD	37.775233	-106.832358
8104K	Rio Grande at Hwy 149	WQCD	37.8219666	-106.8897
RG-8	Bridge Over Rio Grande On Hwy 149 at Canyon	CDPHE HazWaste	37.77755415	-106.8365815

Table 1.7: Assessment of attainment of acute or one-day standards

Parameter	# of samples	Max. measured value	Aquatic life standard (acute)	Water supply standard (acute)	Agriculture standard (acute)	Exceeding acute standard?
Ag-D ug/L	8	0	0.31	N/A	N/A	No
Ag-T ug/L	4	0	N/A	100	N/A	No
Al-D ug/L	9	160	N/A	N/A	N/A	No
Al-T ug/L	5	457.6	N/A	N/A	N/A	No
As-D ug/L	9	1.09	340	N/A	N/A	No
Cd-D ug/L	9	0.54	varies	N/A	N/A	No
Cd-T ug/L	5	0.58	N/A	5	10	No
Cu-D ug/L	9	0.54	4.79	N/A	N/A	No
Hg-T ug/L	1	0	N/A	2	N/A	No
Mn-D ug/L	9	32.53	2072.48	50	N/A	No
Ni-D ug/L	8	0	185.26	N/A	N/A	No
NO5-T mg/L	4	0.07	N/A	10	100	No
Pb-D ug/L	9	0.67	19.23	N/A	N/A	No
Pb-T ug/L	5	2.28	N/A	50	100	No
pH min	3	7.52	6.5	5	N/A	No
pH max	3	8.36	9	9	N/A	No
Se-D ug/L	9	0	18.4	N/A	N/A	No
U-D ug/L	4	0.13	N/A	N/A	N/A	No
Zn-D ug/L	9	169.67	varies	5000	2000	No

Table 1.8: Assessment of attainment of chronic or 30-day standards

Parameter	# of samples	Aquatic life standard (chronic)	Water supply standard (chronic)	Agriculture standard (chronic)	Median of samples measured	Exceeding chronic standard?
Ag-D ug/L	8	0.01	N/A	N/A	0	No
Ag-T ug/L	4	N/A	100	N/A	0	No
Al-D ug/L	9	N/A	N/A	N/A	63.84	No
Al-T ug/L	5	N/A	N/A	N/A	105	No
NH3 mg/L	4	10.59	N/A	N/A	0.02	No
As-D ug/L	9	150	N/A	N/A	1.1	No
As-T ug/L	7	N/A	0.02	100	0	No
Be-D ug/L	4	N/A	N/A	N/A	0	No
Be-T ug/L	4	N/A	4	100	0	No

Parameter	# of samples	Aquatic life standard (chronic)	Water supply standard (chronic)	Agriculture standard (chronic)	Median of samples measured	Exceeding chronic standard?
Cd-D ug/L	9	varies	N/A	N/A	0.39	No
Cd-T ug/L	5	N/A	5	10	0.4	No
Cl- mg/L	2	N/A	250	N/A	0.65	No
Cu-D ug/L	9	3.51	N/A	N/A	0	No
Cu-T ug/L	5	N/A	1000	200	0	No
DO-D mg/L	4	N/A	3	3	8.25	No
Fe-D ug/L	9	N/A	300	N/A	144.8	No
Fe-T ug/L	7	1000	N/A	N/A	244	No
Hard. mg/L	9	N/A	N/A	N/A	33.42	No
Hg-T ug/L	1	0.01	2	N/A	0	No
Mn-D ug/L	9	N/A	50	N/A	23.4	No
Mn-T ug/L	5	N/A	N/A	200	35.5	No
Mo-D ug/L	2	N/A	N/A	N/A	0	No
Mo-T ug/L	3	N/A	210	160	0	No
Ni-D ug/L	8	20.58	N/A	N/A	0	No
Ni-T ug/L	4	N/A	100	200	0	No
NO5-T mg/L	4	N/A	10	100	0.03	No
Pb-D ug/L	9	0.74	N/A	N/A	0.65	No
Pb-T ug/L	5	N/A	50	100	1.96	No
pH min	N/A	N/A	5	N/A	7.61	No
pH max	N/A	N/A	9	N/A	8.1	No
Se-D ug/L	9	4.6	N/A	N/A	0	No
Se-T ug/L	5	N/A	50	20	0	No
SO4-T mg/L	4	N/A	250	N/A	8.78	No
U-D ug/L	4	N/A	N/A	N/A	0.11	No
U-T ug/L	4	N/A	30	N/A	0.04	No
Zn-D ug/L	9	44.73	N/A	N/A	107.7	Yes, Aquatic Life
Zn-T ug/L	5	N/A	5000	2000	81.9	No

Table 1.9: Assessment of nutrient attainment

Parameter	# of samples	Aquatic life standard (chronic)	Median of samples measured	Exceeding standard?
Total Nitrogen (mg/L)	2	2.01	0.37	No
Total Phosphorous (mg/L)	3	0.11	0.042	No

Table 1.: Water temperature standards

Season	MWAT	DM
April – Oct.	18.3	23.9
Nov. – March	9.0	13.0

Table 1.: Assessment of water temperature attainment

Season	Number of Exceedances (MWAT)	Number of Exceedances (DM)
Winter	N/A	N/A
Summer	0	0

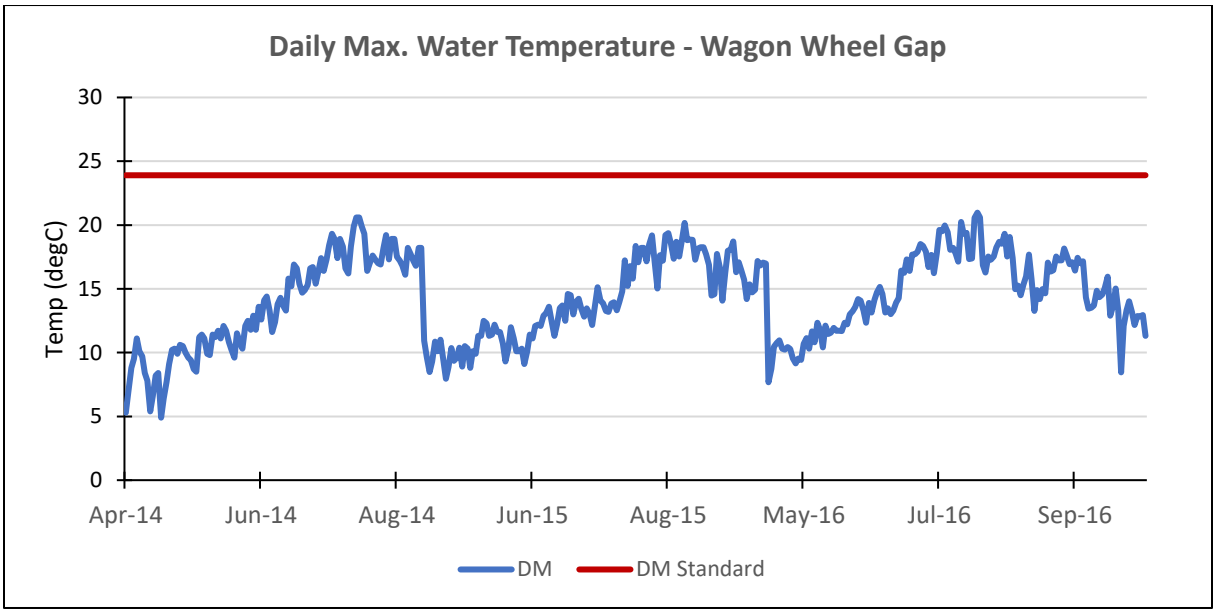

Figure 1.: Daily maximum water temperature and corresponding seasonal standards at Wagon Wheel Gap

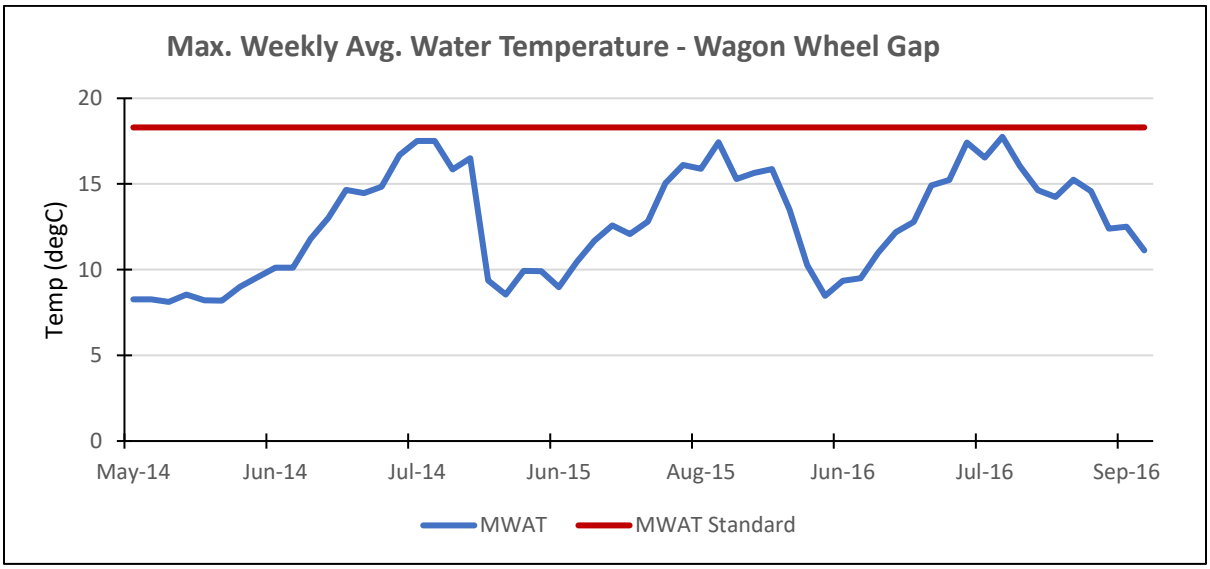

Figure 1.: Maximum weekly average water temperature and corresponding seasonal standards at Wagon Wheel Gap

Rio Grande SMP reach RG09 (CDPHE segment CORGRG04b_D)

Table 1.10: Water quality sampling site information

Site ID	Site description	Org	Latitude	Longitude
8101	Rio Grande R Near Del Norte	WQCD	37.688797	-106.459829
136	Rio Grande At 3 West	RW	37.62400731	-106.2042332
134	Rio Grande At 112 Br	RW	37.685249	-106.3507485
8101A	Rio Grande River At Hwy 112 In Del Norte	WQCD	37.68521333	-106.3511533
137	Rio Grande At Gun	RW	37.60935874	-106.1493552
133	Rio Grande At State Br	RW	37.68879695	-106.4598929
133	Rio Grande At State Br	RW	37.68879695	-106.4598929

Table 1.11: Assessment of attainment of acute or one-day standards

Parameter	# of samples	Max. measured value	Aquatic life standard (acute)	Water supply standard (acute)	Agriculture standard (acute)	Exceeding acute standard?
Ag-D ug/L	10	0	0.67	N/A	N/A	No
Ag-T ug/L	10	0	N/A	100	N/A	No
Al-D ug/L	94	240	N/A	N/A	N/A	No
Al-T ug/L	90	2504	N/A	N/A	N/A	No
As-D ug/L	94	0.91	340	N/A	N/A	No
Cd-D ug/L	94	0.66	0.97	N/A	N/A	No
Cd-T ug/L	90	1.23	N/A	5	10	No
Cu-D ug/L	94	6.40	7.35	N/A	N/A	No
Mn-D ug/L	94	171.60	2411.7	50	N/A	No
Ni-D ug/L	10	2	272.26	N/A	N/A	No
NO5-T mg/L	23	0.37	N/A	10	100	No
Pb-D ug/L	94	15.30	31.93	N/A	N/A	No
Pb-T ug/L	90	20.15	N/A	50	100	No
pH min	0	N/A	6.5	5	N/A	N/A
pH max	0	N/A	9	9	N/A	N/A
Se-D ug/L	94	0.08	18.4	N/A	N/A	No
U-D ug/L	10	0.36	N/A	N/A	N/A	No
Zn-D ug/L	94	156.70	89.33	N/A	N/A	Yes; Aquatic Life (6)

Table 1.12: Assessment of attainment of chronic or 30-day standards

Parameter	# of samples	Aquatic life standard (chronic)	Water supply standard (chronic)	Agriculture standard (chronic)	Median of samples measured	Exceeding chronic standard?
Ag-D ug/L	10	0.02	N/A	N/A	0	No
Ag-T ug/L	10	N/A	100	N/A	0	No
Al-D ug/L	81	N/A	N/A	N/A	37	No
Al-T ug/L	77	N/A	N/A	N/A	336.5	No
NH3 mg/L	17	15.28	N/A	N/A	0.03	No
As-D ug/L	81	150	N/A	N/A	0	No
As-T ug/L	80	N/A	0.02	100	0	No
Cd-D ug/L	81	0.26	N/A	N/A	0.3	Yes; Aquatic Life
Cd-T ug/L	77	N/A	5	10	0.24	No
Cl- mg/L	14	N/A	250	N/A	1.89	No
Cu-D ug/L	81	5.18	N/A	N/A	1.7	No
Cu-T ug/L	77	N/A	1000	200	0	No
DO-D mg/L	10	N/A	3	3	7.75	No

Parameter	# of samples	Aquatic life standard (chronic)	Water supply standard (chronic)	Agriculture standard (chronic)	Median of samples measured	Exceeding chronic standard?
Fe-D ug/L	81	N/A	300	N/A	119	No
Fe-T ug/L	82	1000	N/A	N/A	412	No
Hard. mg/L	82	N/A	N/A	N/A	52.68	No
Mn-D ug/L	81	1332.47	50	N/A	55.7	Yes; Water Supply
Mn-T ug/L	77	N/A	N/A	200	65.85	No
Mo-D ug/L	6	N/A	N/A	N/A	0	No
Mo-T ug/L	9	N/A	210	160	0	No
Ni-D ug/L	10	30.24	N/A	N/A	0	No
Ni-T ug/L	10	N/A	100	200	0	No
NO5-T mg/L	23	N/A	10	100	0.04	No
Pb-D ug/L	81	1.24	N/A	N/A	4.7	Yes; Aquatic Life
Pb-T ug/L	77	N/A	50	100	5	No
pH min	0	N/A	5	N/A	7.94	No
pH max	0	N/A	9	N/A	8.35	No
Se-D ug/L	81	4.6	N/A	N/A	0	No
Se-T ug/L	77	N/A	50	20	0	No
SO4-T mg/L	23	N/A	250	N/A	14.83	No
U-D ug/L	10	N/A	N/A	N/A	0.18	No
U-T ug/L	10	N/A	30	N/A	0.11	No
Zn-D ug/L	81	67.66	N/A	N/A	63.9	No
Zn-T ug/L	77	N/A	5000	2000	39.6	No

Table 1.13: Assessment of nutrient attainment

Parameter	# of samples	Aquatic life standard (chronic)	Median of samples measured	Exceeding standard?
Total Nitrogen (mg/L)	7	2.01	0.3	No
Total Phosphorous (mg/L)	23	0.11	0.063	No

Table 1.14: Water temperature standards

Season	MWAT	DM
April – Oct.	18.3	23.9
Nov. – March	9.0	13.0

Table 1.15: Assessment of water temperature attainment

Season	Number of Exceedances (MWAT)	Number of Exceedances (DM)
Winter	0	0
Summer	9	1

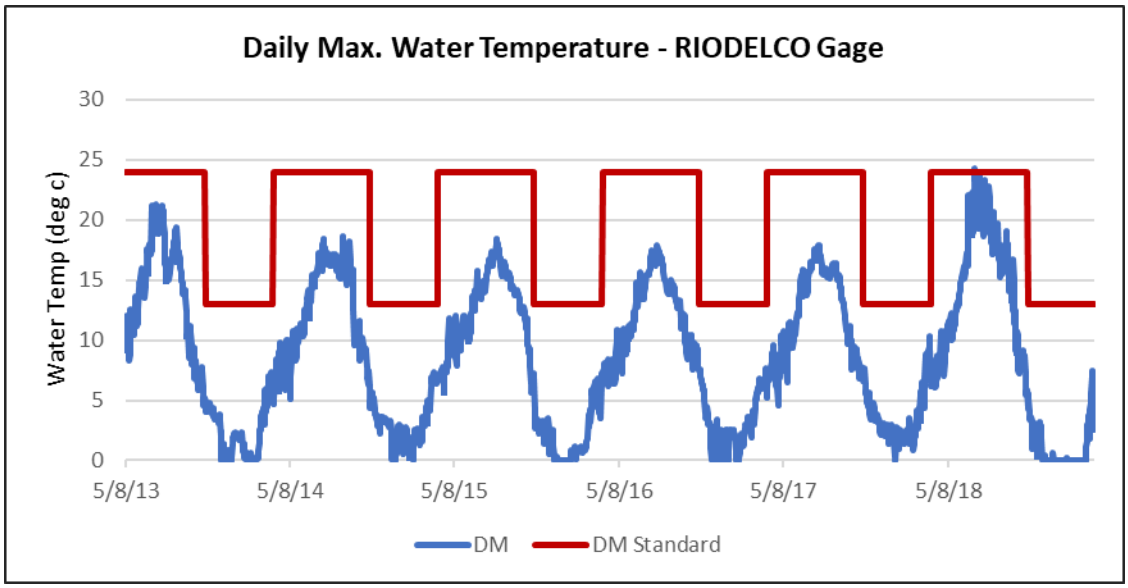

Figure 1.1: Daily maximum water temperature and corresponding seasonal standards at the Rio Grande Near Del Norte streamgage

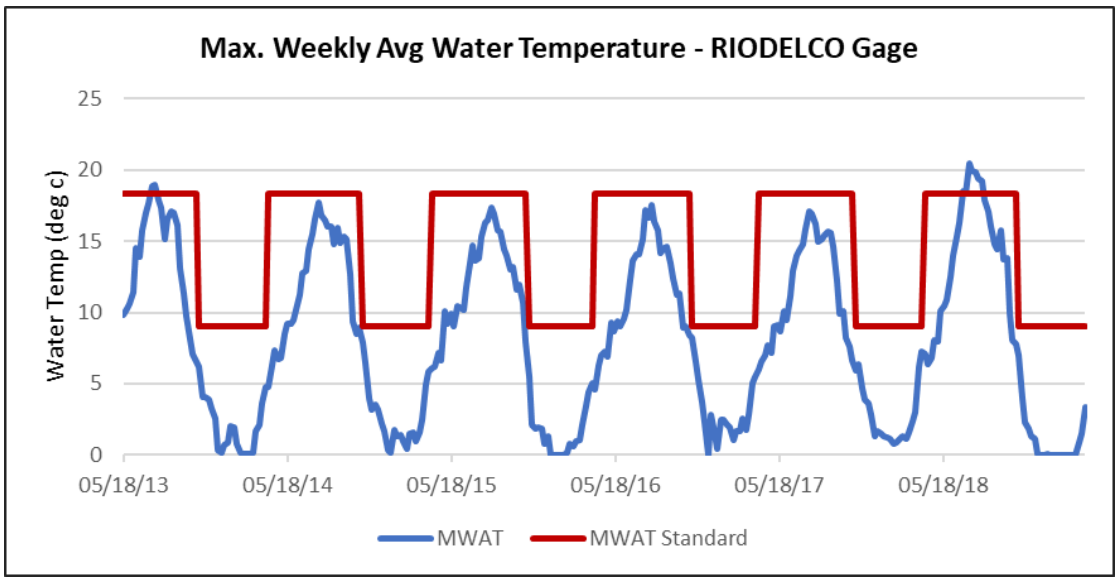

Figure 1.2: Maximum weekly average water temperature and corresponding seasonal standards at the Rio Grande Near Del Norte streamgage

Rio Grande SMP reaches RG10 and RG11 (CDPHE segment CORGRG04b_B)

Table 1.14: water quality sampling site information

Site ID	Site description	Org	Latitude	Longitude
137	Rio Grande At Gunbarrel Road	RW	37.60935874	-106.1493552
136	Rio Grande at 3 West	RW	37.62400731	-106.2042332

Table 1.15: Assessment of attainment of acute or one-day standards

Parameter	# of samples	Max. measured value	Aquatic life standard (acute)	Water supply standard (acute)	Agriculture standard (acute)	Exceeding acute standard?
Al-D ug/L	33	56.50	N/A	N/A	N/A	No
Al-T ug/L	32	2394	N/A	N/A	N/A	No
As-D ug/L	33	<0	340	N/A	N/A	No
Cd-D ug/L	33	0.47	0.77	N/A	N/A	No
Cd-T ug/L	32	1.23	N/A	5	10	No
Cu-D ug/L	33	7.50	5.71	N/A	N/A	Yes; Aquatic Life (2)
Mn-D ug/L	33	81.20	2205.64	50	N/A	No
NO5-T mg/L	3	0.37	N/A	10	100	No
Pb-D ug/L	33	31	23.7	N/A	N/A	No
Pb-T ug/L	32	33.80	N/A	50	100	No
pH min	10	7.83	6.5	5	N/A	No
pH max	10	8.51	9	9	N/A	No
Se-D ug/L	33	<0	18.4	N/A	N/A	No
Zn-D ug/L	33	137.80	70	N/A	N/A	No

Table 1.16: Assessment of attainment of chronic or 30-day standards

Parameter	# of samples	Aquatic life standard (chronic)	Water supply standard (chronic)	Agriculture standard (chronic)	Median of samples measured	Exceeding chronic standard?
Al-D ug/L	33	N/A	N/A	N/A	35.6	No
Al-T ug/L	32	N/A	N/A	N/A	315.5	No
As-D ug/L	33	150	N/A	N/A	0	No
As-T ug/L	32	N/A	0.02	100	0	No
Cd-D ug/L	33	0.21	N/A	N/A	0.42	Yes; Aquatic Life
Cd-T ug/L	32	N/A	5	10	0.31	No
Cl- mg/L	3	N/A	250	N/A	1.1	No
Cu-D ug/L	33	4.12	N/A	N/A	1.24	No
Cu-T ug/L	32	N/A	1000	200	0	No
Fe-D ug/L	33	N/A	300	N/A	118.2	No
Fe-T ug/L	32	1000	N/A	N/A	375.5	No
Hard. mg/L	32	N/A	N/A	N/A	40.29	No
Mn-D ug/L	33	1218.62	50	N/A	42.9	No
Mn-T ug/L	32	N/A	N/A	200	51.45	No
NO5-T mg/L	3	N/A	10	100	0.26	No
Pb-D ug/L	33	0.92	N/A	N/A	4.76	Yes; Aquatic Life
Pb-T ug/L	32	N/A	50	100	5.65	No
pH min	10	N/A	5	N/A	7.94	No
pH max	10	N/A	9	N/A	8.35	No
Se-D ug/L	33	4.6	N/A	N/A	0	No
Se-T ug/L	32	N/A	50	20	0	No
SO4-T mg/L	3	N/A	250	N/A	11.73	No
Zn-D ug/L	33	53.02	N/A	N/A	73.42	Yes; Aquatic Life
Zn-T ug/L	32	N/A	5000	2000	61.8	No

Table 1.17: Assessment of nutrient attainment

Parameter	# of samples	Aquatic life standard (chronic)	Median of samples measured	Exceeding standard?
Total Nitrogen (mg/L)	N/A	2.01	N/A	N/A
Total Phosphorous (mg/L)	3	0.11	0.087	No

Rio Grande SMP reach RG12 (CDPHE segment CORGRG04c)

Table 1.18: Water quality sampling site information

Site ID	Site description	Org	Latitude	Longitude
138	Rio Grande at 3 East	RW	37.58272832	-106.0940173
138	Rio Grande at 3 East	RW	37.58272832	-106.0940173
8307A	Rio Grande At N Cr 3E Near Monte Vista	WQCD	37.58279667	-106.0956767
8307	Rio Grande at Rio Grande-Alamosa County Line	WQCD	37.570322	-106.040368

Table 1.19: Assessment of attainment of acute or one-day standards

Parameter	# of samples	Max. measured value	Aquatic life standard (acute)	Water supply standard (acute)	Agriculture standard (acute)	Exceeding acute standard?
Ag-D ug/L	9	0	0.55	N/A	N/A	No
Ag-T ug/L	9	0	N/A	100	N/A	No
Al-D ug/L	49	160	N/A	N/A	N/A	No
Al-T ug/L	41	9880	N/A	N/A	N/A	No
As-D ug/L	49	0.98	340	N/A	N/A	No
Cd-D ug/L	49	0.46	1.41	N/A	N/A	No
Cd-T ug/L	41	1.72	N/A	5	10	No
Cu-D ug/L	49	1.60	6.54	N/A	N/A	No
Mn-D ug/L	49	223.50	2315	50	N/A	No
Ni-D ug/L	9	0	245.38	N/A	N/A	No
NO5-T mg/L	15	0.37	N/A	10	100	No
Pb-D ug/L	49	12.9	27.86	N/A	N/A	No
Pb-T ug/L	41	52.60	N/A	50	100	No
pH min	9	7.42	6.5	5	N/A	No
pH max	9	8.14	9	9	N/A	No
Se-D ug/L	49	0	18.4	N/A	N/A	No
U-D ug/L	9	0.33	N/A	N/A	N/A	No
Zn-D ug/L	49	376.80	79.89	N/A	N/A	Yes; Aquatic Life

Table 1.20: Assessment of attainment of chronic or 30-day standards

Parameter	# of samples	Aquatic life standard (chronic)	Water supply standard (chronic)	Agriculture standard (chronic)	Median of samples measured	Exceeding chronic standard?
Ag-D ug/L	9	0.09	N/A	N/A	0	No
Ag-T ug/L	9	N/A	100	N/A	0	No
Al-D ug/L	48	N/A	N/A	N/A	49.55	No
Al-T ug/L	41	N/A	N/A	N/A	288	No
NH3 mg/L	14	11.87	N/A	N/A	0.06	No
As-D ug/L	48	150	N/A	N/A	0	No
As-T ug/L	47	N/A	0.02	100	0	Yes, Water Supply
Cd-D ug/L	48	0.24	N/A	N/A	0.3	Yes, Aquatic Life
Cd-T ug/L	41	N/A	5	10	0.39	No
Cl- mg/L	6	N/A	250	N/A	1.3	No
Cu-D ug/L	48	4.66	N/A	N/A	0	No
Cu-T ug/L	41	N/A	1000	200	0	No
DO-D mg/L	9	N/A	3	3	7.48	No
Fe-D ug/L	48	N/A	300	N/A	188.75	No
Fe-T ug/L	48	1000	N/A	N/A	539.5	No

Parameter	# of samples	Aquatic life standard (chronic)	Water supply standard (chronic)	Agriculture standard (chronic)	Median of samples measured	Exceeding chronic standard?
Hard. mg/L	48	N/A	N/A	N/A	46.59	No
Mn-D ug/L	48	1279.04	50	N/A	102.57	Yes; Water Supply
Mn-T ug/L	41	N/A	N/A	200	93.9	No
Mo-D ug/L	6	N/A	N/A	N/A	0.45	No
Mo-T ug/L	9	N/A	210	160	0	No
Ni-D ug/L	9	27.25	N/A	N/A	0	No
Ni-T ug/L	9	N/A	100	200	0	No
NO5-T mg/L	14	N/A	10	100	0.11	No
Pb-D ug/L	48	1.09	N/A	N/A	5.4	Yes, Aquatic Life
Pb-T ug/L	41	N/A	50	100	5.9	No
pH min	9	N/A	5	N/A	7.63	No
pH max	9	N/A	9	N/A	8.03	No
Se-D ug/L	48	4.6	N/A	N/A	0	No
Se-T ug/L	41	N/A	50	20	0	No
SO4-T mg/L	14	N/A	250	N/A	8.56	No
U-D ug/L	9	N/A	N/A	N/A	0.26	No
U-T ug/L	9	N/A	30	N/A	0.13	No
Zn-D ug/L	48	60.51	N/A	N/A	64.44	Yes; Aquatic Life
Zn-T ug/L	41	N/A	5000	2000	62.5	No

Table 1.21: Assessment of nutrient attainment

Parameter	# of samples	Aquatic life standard (chronic)	Median of samples measured	Exceeding standard?
Total Nitrogen (mg/L)	9	2.01	0.39	No
Total Phosphorous (mg/L)	3	0.11	0.075	No

Rio Grande SMP reaches RG13 and RG14 (CDPHE segment CORGRG12)

Table 1.22: Water quality sampling site information

Site ID	Site description	Org	Latitude	Longitude
CO0044458-UPSTREAM	Rio Grande at Alamosa u/s of CO0044458 Alamosa	WQCD	37.480698	-105.878097
8305	Rio Grande at Alamosa	WQCD	37.47563	-105.86647

Table 1.23: Assessment of attainment of acute or one-day standards

Parameter	# of samples	Max. measured value	Aquatic life standard (acute)	Water supply standard (acute)	Agriculture standard (acute)	Exceeding acute standard?
Ag-D ug/L	21	0	0.95	N/A	N/A	No
Al-D ug/L	21	190	N/A	N/A	N/A	No
NH3 mg/L	21	0.048	8.11	N/A	N/A	No
As-D ug/L	21	1.6	340	N/A	N/A	No
As-T ug/L	21	4.4	N/A	N/A	100	No
Cd-D ug/L	21	0.17	1.86	N/A	N/A	No
Chloride-T mg/L	21	4.2	N/A	N/A	N/A	No
Cu-D ug/L	21	8.5	8.85	N/A	N/A	No
DO-D mg/L	21	5.92	5	3	3	No
Fe-D ug/L	21	270	N/A	N/A	N/A	No
Fe-T ug/L	16	1700	N/A	N/A	N/A	No
Hardness mg/L	12	92	N/A	N/A	N/A	No
Mn-D ug/L	21	620	2575.66	N/A	N/A	No
Mo-D ug/L	21	2.5	N/A	N/A	N/A	No
Mo-T ug/L	15	0	N/A	N/A	160	No
Ni-D ug/L	21	0	321.76	N/A	N/A	No
NO5-T mg/L	21	0.3	N/A	N/A	100	No
Pb-D ug/L	21	2	39.72	N/A	N/A	No
pH min-D ug/L	20	7.36	6.50	N/A	N/A	No
pH max-D ug/L	20	8.14	9	N/A	N/A	No
Se-D ug/L	21	0.07	18.40	N/A	N/A	No
SO4-T mg/L	21	16	N/A	N/A	N/A	No
Temp(s) C	57	29.78	28.6	N/A	N/A	DM exceeded 1 in 57
Temp(w) C	57	10.5	14.3	N/A	N/A	No
U-D ug/L	21	0.63	N/A	N/A	N/A	No
Zn-D ug/L	21	34	106.90	N/A	N/A	No

Table 1.24: Assessment of attainment of chronic or 30-day standards

Parameter	# of samples	Aquatic life standard (chronic)	Water supply standard (chronic)	Agriculture standard (chronic)	Median of samples measured	Exceeding chronic standard?
Ag-D ug/L	21	0.15	N/A	N/A	0	No
Al-D ug/L	21	N/A	N/A	N/A	39	No
NH3 mg/L	21	14.10	N/A	N/A	0.018	No
As-D ug/L	21	7.60	N/A	N/A	0.87	No
As-T ug/L	21	N/A	N/A	100	1.85	No
Cd-D ug/L	21	0.30	N/A	N/A	0.129	No
Chloride-T mg/L	21	N/A	N/A	N/A	1.6	No
Cu-D ug/L	21	6.13	N/A	N/A	8.5	No
DO-D mg/L	21	N/A	3	3	7.65	No
Fe-D ug/L	21	N/A	N/A	N/A	185	No
Fe-T ug/L	16	1000	N/A	N/A	745	No
Hardness mg/L	12	N/A	N/A	N/A	53	No
Mn-D ug/L	21	1423.05	N/A	N/A	74	No
Mo-D ug/L	21	N/A	N/A	N/A	1.7	No
Mo-T ug/L	15	N/A	N/A	160	0	No
Ni-D ug/L	21	35.74	N/A	N/A	0	No
NO5-T mg/L	21	N/A	N/A	100	0.17	No
Pb-D ug/L	21	1.55	N/A	N/A	0.75	No
pH ug/L	20	N/A	N/A	N/A	7.73	No
Se-D ug/L	21	4.60	N/A	N/A	0.064	No
SO4-T mg/L	21	N/A	N/A	N/A	8.1	No
U-D ug/L	21	N/A	N/A	N/A	0.345	No
Zn-D ug/L	21	80.97	N/A	N/A	7.15	No

Table 1.21: Assessment of nutrient attainment

Parameter	# of samples	Aquatic life standard (chronic)	Median of samples measured	Exceeding standard?
Total Nitrogen (mg/L)	45	2.01	0.30	No
Total Phosphorous (mg/L)	55	0.11	0.096	No

Rio Grande SMP reach RG15 (CDPHE segment CORGRG12)

Table 1.22: Water quality sampling site information

Site ID	Site description	Org	Latitude	Longitude
8303	RIO GRANDE R. NR ALAMOSA-CONEJOS COUNTY LINE ON NAT'L WILDLIFE REFUGE	WQCD	37.36929	-105.76733

Table 1.23: Assessment of attainment of acute or one-day standards

Parameter	# of samples	Max. measured value	Aquatic life standard (acute)	Water supply standard (acute)	Agriculture standard (acute)	Exceeding acute standard?
Ag-D ug/L	1	0	0.95	N/A	N/A	No
Al-D ug/L	1	14	N/A	N/A	N/A	No
As-D ug/L	1	1.6	340	N/A	N/A	No
As-T ug/L	1	2.1	N/A	N/A	100	Yes; chronic std
Cd-D ug/L	1	0	1.86	N/A	N/A	No
Chloride-T mg/L	1	4.2	N/A	N/A	N/A	No
Cu-D ug/L	1	0	8.85	N/A	N/A	No
DO-D mg/L	1	6.65	5	3	3	No
Fe-D ug/L	1	120	N/A	N/A	N/A	No
Fe-T ug/L	1	760	N/A	N/A	N/A	No
Hardness mg/L	1	76	N/A	N/A	N/A	No
Mn-D ug/L	1	48	2575.66	N/A	N/A	No
Mo-D ug/L	1	2.7	N/A	N/A	N/A	No
Mo-T ug/L	1	5	N/A	N/A	160	No
Ni-D ug/L	1	0	321.76	N/A	N/A	No
Pb-D ug/L	1	0.47	39.72	N/A	N/A	No
pH min-D ug/L	1	7.79	6.50	N/A	N/A	No
pH max-D ug/L	1	7.79	9	N/A	N/A	No
Se-D ug/L	1	0	18.40	N/A	N/A	No
SO4-T mg/L	1	13	N/A	N/A	N/A	No
Temp(s) C	1	19.1	28.6	N/A	N/A	No
Temp(w) C	1	N/A	14.3	N/A	N/A	N/A
U-D ug/L	1	0.56	N/A	N/A	N/A	No
Zn-D ug/L	1	4.5	106.90	N/A	N/A	No

Table 1.21: Assessment of nutrient attainment

Parameter	# of samples	Aquatic life standard (chronic)	Median of samples measured	Exceeding standard?
Total Nitrogen (mg/L)	1	2.01	0.20	No
Total Phosphorous (mg/L)	1	0.11	0.1	No

Rio Grande SMP reaches RG16 and RG17 (CDPHE segments CORGRG12 and CORGRG13)

Table 1.18: Water quality sampling site information

Site ID	Site description	Org	Latitude	Longitude
764.6	Rio Grande abv NM-CO border at Lobatos Bridge	NM Environmental Dept./SWQB	37.078540	-105.757003
4171	Rio Grande - At 142 Br	River Watch	37.180550	-105.729866

Table 1.19: Assessment of attainment of acute or one-day standards

Parameter	# of samples	Max. measured value	Aquatic life standard (acute)	Water supply standard (acute)	Agriculture standard (acute)	Exceeding acute standard?
Ag-D ug/L	44	0.7	0.55	N/A	N/A	No
Al-D ug/L	46	770	N/A	N/A	N/A	No
Al-T ug/L	10	1700	N/A	N/A	N/A	No
As-D ug/L	48	5	340	N/A	N/A	No
Cd-D ug/L	45	0.6	1.41	N/A	N/A	No
Fe-D ug/L	50	400	1000	N/A	N/A	No
Hg-D ug/L	12	0.0001	N/A	2	N/A	No
Cu-D ug/L	47	6	6.54	N/A	N/A	No
Mn-D ug/L	56	250	2315	50	N/A	No
Mo-D ug/L	42	7	N/A	N/A	N/A	No
Ni-D ug/L	47	2.7	245.38	N/A	N/A	No
NO5-T mg/L	21	0.3	N/A	10	100	No
Pb-D ug/L	54	2	27.86	N/A	N/A	No
pH min	59	7.6	6.5	5	N/A	No
pH max	59	9.09	9	9	N/A	No
Se-D ug/L	52	0.29	18.4	N/A	N/A	No
U-D ug/L	46	2	N/A	N/A	N/A	No
Zn-D ug/L	45	11	79.89	N/A	N/A	No

Table 1.20: Assessment of attainment of chronic or 30-day standards

Parameter	# of samples	Aquatic life standard (chronic)	Water supply standard (chronic)	Agriculture standard (chronic)	Median of samples measured	Exceeding chronic standard?
Ag-D ug/L	44	0.16	N/A	N/A	0.0001	No
Al-D ug/L	46	N/A	N/A	N/A	21.9	No
Al-T ug/L	10	N/A	N/A	N/A	990	No
NH3 mg/L	41	11.87	N/A	N/A	0.01	No
As-D ug/L	48	150	N/A	N/A	2.1	No
Cd-D ug/L	45	0.24	N/A	N/A	0.001	No
Cd-T ug/L	45	N/A	5	10	0.0001	No
Cu-D ug/L	47	4.66	N/A	N/A	0.0001	No
DO mg/L	57	N/A	3	3	9.4	No
Fe-D ug/L	50	N/A	300	N/A	95.35	No
Fe-T ug/L	17	1000	N/A	N/A	900	No
Hard. mg/L	56	N/A	N/A	N/A	57.7	No
Mn-D ug/L	56	1279.04	50	N/A	31.2	No
Mo-D ug/L	42	N/A	N/A	N/A	1.73	No
Ni-D ug/L	47	27.25	N/A	N/A	0.45	No
NO5-T mg/L	21	N/A	10	100	0.01	No
Pb-D ug/L	54	1.09	N/A	N/A	0.118	No
pH median	59	N/A	5, 9	N/A	8.46	No
Se-D ug/L	52	4.6	N/A	N/A	0.07	No

Parameter	# of samples	Aquatic life standard (chronic)	Water supply standard (chronic)	Agriculture standard (chronic)	Median of samples measured	Exceeding chronic standard?
SO4-T mg/L	50	N/A	250	N/A	14.65	No
U-D ug/L	46	N/A	N/A	N/A	0.63	No
Zn-D ug/L	45	60.51	N/A	N/A	0.0001	No

Table 1.21: Assessment of nutrient attainment

Parameter	# of samples	Aquatic life standard (chronic)	Median of samples measured	Exceeding standard?
Total Nitrogen (mg/L)	15	2.01	0.221	No
Total Phosphorous (mg/L)	58	0.11	0.099	No

Reach RG17 Water Temperature

Table 1.23: Water temperature standards

Season	MWAT	DM
March – Nov.	27.5	28.6
Dec. – Feb.	13.8	14.3

Table 1.24: Assessment of water temperature attainment

Season	Number of Exceedances (MWAT)	Number of Exceedances (DM)
Winter	0	0
Summer	0	0

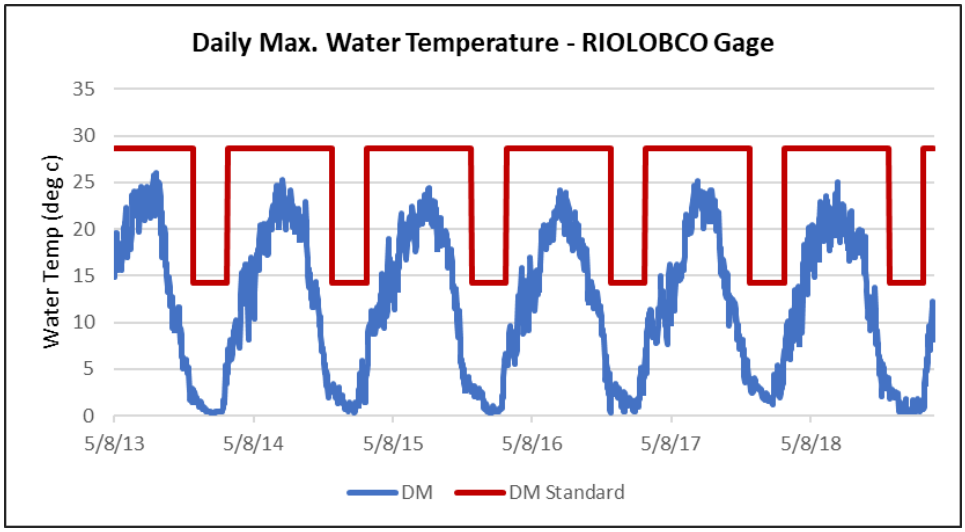

Figure 1.: Daily maximum water temperature and corresponding seasonal standards at the Rio Grande Near Lobatos streamgage

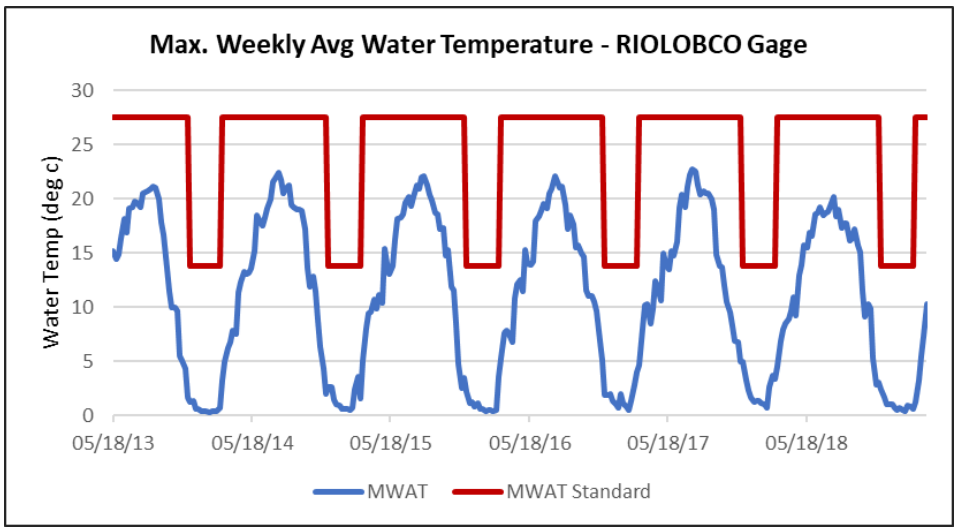

Figure 1.: Maximum weekly average water temperature and corresponding seasonal standards at the Rio Grande Near Lobatos streamgage

1.2 Conejos River SMP - Water Quality Data

The tables below highlight any water quality impairments documented within a given Conejos River SMP reach.

Conejos River SMP reaches CR01 through CR05 (CDPHE segment CORGAL14a)

Unpublished data collected by EPA showed that all metals concentrations within this segment were below standards with the exception of arsenic. Samples collected both upstream and downstream of the Glacier/Chilkat abandoned mine site showed arsenic exceeds the standard downstream of the mine but not upstream, suggesting the mine is the source of elevated arsenic. Tributaries to the Conejos River, such as La Manga Creek, also exhibit elevated arsenic.

Table 2.1: Water quality sampling site information

Site ID	Site description	Org	Latitude	Longitude
8715	La Manga Creek Above Elk Creek	WQCD	37.116933	-106.37783

Table 2.2: Assessment of attainment of acute or one-day standards

Parameter	# of samples	Max. measured value	Aquatic life standard (acute)	Water supply standard (acute)	Agriculture standard (acute)	Exceeding acute standard?
Ag-D ug/L	4	0	0.61	N/A	N/A	No
Ag-T ug/L	4	0	N/A	100	N/A	No
Al-D ug/L	4	160	N/A	N/A	N/A	No
Al-T ug/L	4	0	0	N/A	N/A	No
As-D ug/L	4	0.89	340	N/A	N/A	No
Cd-D ug/L	4	0	0.92	N/A	N/A	No
Cu-D ug/L	4	0	6.93	N/A	N/A	No
Mn-D ug/L	4	4.10	2362.2	50	N/A	No
Ni-D ug/L	4	0	258.29	N/A	N/A	No
NO5-T mg/L	4	0.54	N/A	10	100	No
Pb-D ug/L	4	0.05	29.8	N/A	N/A	No
pH min	3	7.91	6.5	5	N/A	No
pH max	3	8.11	9	9	N/A	No
Se-D ug/L	4	0	18.4	N/A	N/A	No
U-D ug/L	4	0	N/A	N/A	N/A	No
Zn-D ug/L	4	2.90	84.41	N/A	N/A	No

Table 2.3: Assessment of attainment of chronic or 30-day standards

Parameter	# of samples	Aquatic life standard (chronic)	Water supply standard (chronic)	Agriculture standard (chronic)	Median of samples measured	Exceeding chronic standard?
Ag-D ug/L	4	0.02	N/A	N/A	0	No
Ag-T ug/L	4	N/A	100	N/A	0	No
Al-D ug/L	4	N/A	N/A	N/A	151	No
Al-T ug/L	4	0	N/A	N/A	84.5	No
NH3 mg/L	4	11.39	N/A	N/A	0.02	No

Parameter	# of samples	Aquatic life standard (chronic)	Water supply standard (chronic)	Agriculture standard (chronic)	Median of samples measured	Exceeding chronic standard?
As-D ug/L	4	150	N/A	N/A	0.49	No
As-T ug/L	4	N/A	0.02	100	0.52	Yes, Chronic Water Supply
Cd-D ug/L	4	0.25	N/A	N/A	0	No
Cd-T ug/L	4	N/A	5	10	0	No
Cl- mg/L	1	N/A	250	N/A	0.87	No
Cu-D ug/L	4	4.91	N/A	N/A	0	No
Cu-T ug/L	4	N/A	1000	200	0	No
DO-D mg/L	3	N/A	3	3	7.9	No
Fe-D ug/L	4	N/A	300	N/A	198.5	No
Fe-T ug/L	4	1000	N/A	N/A	395	No
Hard. mg/L	4	N/A	N/A	N/A	49.5	No
Mn-D ug/L	4	1305.12	50	N/A	4.06	No
Mn-T ug/L	4	N/A	N/A	200	4	No
Mo-D ug/L	4	N/A	N/A	N/A	0	No
Mo-T ug/L	4	N/A	210	160	0	No
Ni-D ug/L	4	28.69	N/A	N/A	0	No
Ni-T ug/L	4	N/A	100	200	0	No
NO5-T mg/L	4	N/A	10	100	0.24	No
Pb-D ug/L	4	1.16	N/A	N/A	0.03	No
Pb-T ug/L	4	N/A	50	100	0	No
pH min	N/A	N/A	5	N/A	7.92	No
pH max	N/A	N/A	9	N/A	8.06	No
Se-D ug/L	4	4.6	N/A	N/A	0	No
Se-T ug/L	4	N/A	50	20	0	No
SO4-T mg/L	4	N/A	250	N/A	1.36	No
Temp(s) C	N/A	N/A	N/A	N/A	N/A	No
Temp(w) C	N/A	N/A	N/A	N/A	N/A	No
U-D ug/L	4	N/A	N/A	N/A	0	No
U-T ug/L	4	N/A	30	N/A	0	No
Zn-D ug/L	4	63.93	N/A	N/A	1.59	No
Zn-T ug/L	4	N/A	5000	2000	0	No

Table 2.4: Assessment of nutrient attainment

Parameter	# of samples	Aquatic life standard (chronic)	Median of samples measured	Exceeding standard?
Total Nitrogen (mg/L)	4	2.01	0.3	No
Total Phosphorous (mg/L)	4	0.11	0.065	No

Conejos River SMP reaches CR06 through CR08 (CDPHE segment CORGAL14b)

Table 2.5: Water quality sampling site information

Site ID	Site description	Org	Latitude	Longitude
8704K	CONEJOS RIVER @ HWY 17 @ FR 250	WQCD	37.1285	-106.35705

Table 2.6: Assessment of attainment of acute or one-day standards

Parameter	# Samples (chronic, acute)	Max. measured value	Median of samples measured	Aquatic Life (Chronic)	Aquatic Life (Acute)	Water Supply	Agriculture (TREC)	Exceeding Standard?
Ag-D ug/l	3	0	0	0	0.11	N/A	N/A	No
Ag-T ug/l	3	0	0	N/A	N/A	100	N/A	No
NH3 mg/l	3	0	0	4.31	17.01	N/A	N/A	No
Cd-D ug/l	3	0	0	0.12	0.39	N/A	N/A	No
Cd-T ug/l	3	0	0	N/A	N/A	5	10	No
Cu-D ug/l	3	0	0	2.14	2.77	N/A	N/A	No
Cu-T ug/l	3	0	0	N/A	N/A	1000	200	No
DO-D mg/l	3	10	8.849	N/A	7	3	3	No
Fe-D ug/l	3	77	63.8	N/A	N/A	300	N/A	No
Fe-T ug/l	3	800	63	1000	N/A	N/A	N/A	No
Hardness mg/l	3	32	18.7	N/A	N/A	N/A	N/A	No
Mn-D ug/l	3	9	8.7	943.68	1708.02	50	N/A	No
Mn-T ug/l	3	0	8	N/A	N/A	N/A	200	No
NO5-T mg/l	3	0	0	N/A	N/A	10	100	No
Pb-D ug/l	3	0	0	0.39	10	N/A	N/A	No
Pb-T ug/l	3	0	0	N/A	N/A	50	100	No
pH min	3	7.23	7.386	N/A	6.5	5	N/A	No
pH max	3	7.95	7.89	N/A	9	9	N/A	No
Se-D ug/l	3	0	0	4.6	18.4	N/A	N/A	No
Se-T ug/l	3	0	0	N/A	N/A	50	20	No
SO4-T mg/l	3	4	3	N/A	N/A	250	N/A	No
Temp(s) C	2	12.59	N/A	N/A	23.8	N/A	N/A	No DM exceedances
Temp(w) C	1	2.49	N/A	N/A	13	N/A	N/A	No DM exceedances
Zn-D ug/l	3	0	0	26.38	34.83	N/A	N/A	No
Zn-T ug/l	3	0	0	N/A	N/A	5000	2000	No

Table 2.7: Assessment of nutrient attainment

Parameter	# of samples	Aquatic life standard (chronic)	Median of samples measured	Exceeding standard?
Total Nitrogen (mg/L)	N/A	2.01	N/A	N/A
Total Phosphorous (mg/L)	3	0.11	0.062	No

Conejos River SMP reaches CR09 through CR10 (CDPHE segment CORGAL15)

Table 2.8: Water quality sampling site information

Site ID	Site description	Org	Latitude	Longitude
8704	CONEJOS RIVER AT COUNSELORS CABIN, NEAR MOGOTE	WQCD	37.0605556	-106.0966667

Table 2.9: Assessment of attainment of acute or one-day standards

Parameter	# Samples (chronic, acute)	Max. measured value	Median of samples measured	Aquatic Life (Chronic)	Aquatic Life (Acute)	Water Supply	Agriculture (TREC)	Exceeding Standard?
Ag-D ug/l	8	0	0	0.01	0.22	N/A	N/A	No
Ag-T ug/l	8	0	0	N/A	N/A	100	N/A	No
NH3 mg/l	8	0.036	0.0309	3.97	12.4	N/A	N/A	No
As-D ug/l	3	0	0	150	340	N/A	N/A	No
As-T ug/l	3	0	0	N/A	N/A	0.02	100	No
Cd-D ug/l	8	0	0	0.16	0.55	N/A	N/A	No
Cd-T ug/l	8	0	0	N/A	N/A	5	10	No
Cu-D ug/l	8	0	0	2.98	4	N/A	N/A	No
Cu-T ug/l	8	0	0	N/A	N/A	1000	200	No
DO-D mg/l	8	10.93	9.0815	N/A	7	3	3	No
Fe-D ug/l	8	260	147.4	N/A	N/A	300	N/A	No
Fe-T ug/l	8	3400	190	1000	N/A	N/A	N/A	No
Hardness mg/l	8	41	27.62	N/A	N/A	N/A	N/A	No
Mn-D ug/l	8	11	9.9	1074.6	1944.98	50	N/A	No
Mn-T ug/l	8	0	7	N/A	N/A	N/A	200	No
NO5-T mg/l	8	0	0	N/A	N/A	10	100	No
Pb-D ug/l	8	0	0	0.61	15.53	N/A	N/A	No
Pb-T ug/l	8	0	0	N/A	N/A	50	100	No
pH min	8	7.4	7.67	N/A	6.5	5	N/A	No
pH max	8	8.13	7.989	N/A	9	9	N/A	No
Se-D ug/l	8	0	0	4.6	18.4	N/A	N/A	No
Se-T ug/l	8	0	0	N/A	N/A	50	20	No
SO4-T mg/l	8	4	3	N/A	N/A	250	N/A	No
Temp(s) C	4	17.85	N/A	N/A	23.8	N/A	N/A	No DM exceedances
Temp(w) C	4	4.16	N/A	N/A	13	N/A	N/A	No DM exceedances
Zn-D ug/l	8	0	0	37.61	49.66	N/A	N/A	No
Zn-T ug/l	8	0	0	N/A	N/A	5000	2000	No

Table 2.10: Assessment of nutrient attainment

Parameter	# of samples	Aquatic life standard (chronic)	Median of samples measured	Exceeding standard?
Total Nitrogen (mg/L)	N/A	2.01	N/A	N/A
Total Phosphorous (mg/L)	8	0.11	0.04	No

Conejos River SMP reaches CR11 (CDPHE segment CORGAL16)

Table 2.11: Water quality sampling site information

Site ID	Site description	Org	Latitude	Longitude
8700	CONEJOS RIVER NEAR LASAUSES	WQCD	37.3002778	-105.7472222

Table 2.12: Assessment of attainment of acute or one-day standards

Parameter	# Samples (chronic, acute)	Max. measured value	Median of samples measured	Aquatic Life (Chronic)	Aquatic Life (Acute)	Water Supply	Agriculture (TREC)	Exceeding Standard?
Ag-D ug/L	5 , 5	0	0	0.07	0.48	N/A	N/A	No
Ag-T ug/L	5 , 5	0	0	N/A	N/A	N/A	N/A	No
Al-D ug/L	5 , 5	120	72.60	N/A	N/A	N/A	N/A	No
Al-T ug/L	5 , 5	0	36			N/A	N/A	No
NH3 mg/L	5 , 0	0.19	0.10	11.45	8.91	N/A	N/A	No
As-D ug/L	5 , 5	1.70	1.34	7.60	340	N/A	N/A	Yes, Chronic Water Supply
As-T ug/L	5 , NA	2.30	2	N/A	N/A	N/A	100	No
Cd-D ug/L	5 , 5	0	0	0.22	1.31	N/A	N/A	No
Cd-T ug/L	5 , 0	0	0	N/A	N/A	N/A	10	No
Cu-D ug/L	5 , 5	0	0	4.35	6.07	N/A	N/A	No
Cu-T ug/L	5 , NA	0	0	N/A	N/A	N/A	200	No
DO-D mg/L	5 , 0	9.77	7.87	N/A	5	3	3	No
Fe-D ug/L	5 , 0	220	208	N/A	N/A	N/A	N/A	No
Fe-T ug/L	5 , 0	1800	880	1000	N/A	N/A	N/A	No
Hardness mg/L	5 , 0	49	43	N/A	N/A	N/A	N/A	No
Mn-D ug/L	5 , 5	40	37	N/A	N/A	N/A	N/A	No
Mn-T ug/L	5 , NA	0	23	N/A	N/A	N/A	200	No
Mo-D ug/L	5 , 0	1.90	1.72	N/A	N/A	N/A	N/A	No
Mo-T ug/L	5 , 0	0	0	N/A	N/A	N/A	160	No
Ni-D ug/L	5 , 5	0	0	25.47	229.29	N/A	N/A	No
Ni-T ug/L	5 , NA	0	0	N/A	N/A	N/A	200	No
NO5-T mg/L	5 , 5	0.19	0.02	N/A	N/A	N/A	100	No
Pb-D ug/L	5 , 5	0.12	0.10	0.99	25.48	N/A	N/A	No
Pb-T ug/L	5 , 0	0	0.06	N/A	N/A	N/A	100	No
pH min	N/A , 5	7.67	7.75	N/A	6.50	N/A	N/A	No
pH max	N/A , 5	8.35	8.25	N/A	9	N/A	N/A	No
Se-D ug/L	5 , 5	0.07	0.03	4.60	18.40	N/A	N/A	No
Se-T ug/L	5 , NA	0	0	N/A	N/A	N/A	20	No
SO4-T mg/L	5 , 0	8.80	6.28	N/A	N/A	N/A	N/A	No
U-D ug/L	5 , 5	0.45	0.34	N/A	N/A	N/A	N/A	No
U-T ug/L	5 , NA	0	0.17	N/A	N/A	N/A	N/A	No
Zn-D ug/L	5 , 5	2.70	1.08	56.25	74.27	N/A	N/A	No
Zn-T ug/L	5 , NA	0	0	N/A	N/A	N/A	2000	No

Table 2.13: Assessment of nutrient attainment

Parameter	# of samples	Aquatic life standard (chronic)	Median of samples measured	Exceeding standard?
Total Nitrogen (mg/L)	5	2.01	0.12	N/A
Total Phosphorous (mg/L)	6	0.11	0.06	No

1.3 Saguache Creek SMP - Water Quality Data

The tables below highlight any water quality impairments documented within a given Saguache Creek SMP reach.

Saguache Creek SMP reaches SC01-SC02 (CDPHE segment CORGCB12a)

Table 3.1: Water quality sampling site information

Site ID	Site description	Org	Latitude	Longitude
8641	Johns Creek Above South Fork Saguache Creek	WQCD	38.003716	-106.655968
8639	Middle Saguache Creek at Stone Cellar	WQCD	38.014052	-106.699135
8638	North Fork Saguache Creek at Mouth	WQCD	38.019726	-106.681783

Table 3.2: Assessment of attainment of acute or one-day standards

Parameter	# of samples	Max. measured value	Aquatic life standard	Water supply standard	Agriculture standard	Exceeding standard?
Ag-D ug/L	3	0.182	0.62	N/A	N/A	No
Al-D ug/L	3	318	N/A	N/A	N/A	No
As-D ug/L	3	3.43	340	N/A	N/A	No
Cd-D ug/L	3	0	0.93	N/A	N/A	No
Cu-D ug/L	3	0	7	N/A	N/A	No
Mn-D ug/L	3	19.7	2370.43	50	N/A	No
Ni-D ug/L	3	0	260.58	N/A	N/A	No
Pb-D ug/L	3	0	30.15	N/A	N/A	No
pH min	3	7.4	6.5	5	N/A	No
pH max	3	8.3	9	9	N/A	No
Se-D ug/L	3	0	18.4	N/A	N/A	No
U-D ug/L	3	0	N/A	N/A	N/A	No
Zn-D ug/L	3	2.1	85.22	N/A	N/A	No

Table 3.3: Assessment of attainment of chronic or 30-day standards

Parameter	# of samples	Aquatic life standard	Water supply standard	Agriculture standard	Median of samples measured	Exceeding standard?
Al-D ug/L	3	N/A	N/A	N/A	68.7	No
As-D ug/L	3	150	N/A	N/A	0.49	No
As-T ug/L	3	N/A	0.02	100	0.78	Yes; Water Supply
Cd-D ug/L	3	0.25	N/A	N/A	0	No
Cl- mg/L	3	N/A	250	N/A	0.59	No
Cu-D ug/L	3	4.95	N/A	N/A	0	No
DO-D mg/L	3	N/A	3	3	8.6	No
Fe-D ug/L	3	N/A	300	N/A	162	No
Fe-T ug/L	3	1000	N/A	N/A	598	No

Parameter	# of samples	Aquatic life standard	Water supply standard	Agriculture standard	Median of samples measured	Exceeding standard?
Hard. mg/L	3	N/A	N/A	N/A	34.9	No
Mn-D ug/L	3	1309.67	50	N/A	10.1	No
Mo-T ug/L	3	N/A	210	160	0	No
Ni-D ug/L	3	28.94	N/A	N/A	0	No
Pb-D ug/L	3	1.17	N/A	N/A	0	No
pH min	3	N/A	5	N/A	7.7	No
pH max	3	N/A	9	N/A	7.7	No
Se-D ug/L	3	4.6	N/A	N/A	0	No
SO4-T mg/L	3	N/A	250	N/A	2.8	No
U-D ug/L	3	N/A	N/A	N/A	0	No
Zn-D ug/L	3	64.54	N/A	N/A	2.1	No

Table 3.4: Assessment of nutrient attainment

Parameter	# of samples	Aquatic life standard (chronic)	Median of samples measured	Exceeding standard?
Total Nitrogen (mg/L)	3	2.01	0.288	N/A
Total Phosphorous (mg/L)	3	0.11	0.079	Yes

Saguache Creek SMP reach SC03 (CDPHE segment CORGCB12b)

Table 3.5: Water quality sampling site information

Site ID	Site description	Org	Latitude	Longitude
USGS-08227000	Saguache Creek Near Saguache, Co	USGS	38.1633329	-106.290583
8635	Saguache Creek Near Saguache	WQCD	38.1633333	-106.29

Table 3.6: Assessment of attainment of acute or one-day standards

Parameter	# of samples	Max. measured value	Aquatic life standard	Water supply standard	Agriculture standard	Exceeding standard?
Ag-D ug/L	4	0	0.62	N/A	N/A	No
Ag-T ug/L	4	0	N/A	100	N/A	No
Al-D ug/L	4	260	N/A	N/A	N/A	No
Al-T ug/L	4	0	0	N/A	N/A	No
As-D ug/L	20	2	340	N/A	N/A	No
Cd-D ug/L	4	0	0.93	N/A	N/A	No
Cd-T ug/L	4	0	N/A	5	10	No
Cu-D ug/L	4	0	7	N/A	N/A	No
Mn-D ug/L	4	13	2370.43	50	N/A	No
Ni-D ug/L	4	0	260.58	N/A	N/A	No
NO2-T mg/L	12	0.02	N/A	1	10	No
NO3-T mg/L	16	0.27	N/A	10	100	No
NO5-T mg/L	4	0.06	N/A	10	100	No
Pb-D ug/L	4	0	30.15	N/A	N/A	No
pH min	21	7.30	6.5	5	N/A	No
pH max	21	8.40	9	9	N/A	No
Se-D ug/L	20	2.40	18.4	N/A	N/A	No
U-D ug/L	4	0.42	N/A	N/A	N/A	No
Zn-D ug/L	4	21	85.22	N/A	N/A	No

Table 3.7: Assessment of attainment of chronic or 30-day standards

Parameter	# of samples	Aquatic life standard	Water supply standard	Agriculture standard	Median of samples measured	Exceeding standard?
Ag-D ug/L	4	0.02	N/A	N/A	0	No
Ag-T ug/L	4	N/A	100	N/A	0	No
Al-D ug/L	4	N/A	N/A	N/A	179	No
Al-T ug/L	4	0	N/A	N/A	75.5	No
NH3 mg/L	14	9.61	N/A	N/A	0.02	No
As-D ug/L	20	150	N/A	N/A	1.73	No
As-T ug/L	20	N/A	0.02	100	1.3	Yes; Water Supply
Boron-T ug/L	16	N/A	N/A	750	7	No

Parameter	# of samples	Aquatic life standard	Water supply standard	Agriculture standard	Median of samples measured	Exceeding standard?
Cd-D ug/L	4	0.25	N/A	N/A	0	No
Cd-T ug/L	4	N/A	5	10	0	No
Cl- mg/L	16	N/A	250	N/A	1.15	No
Cu-D ug/L	4	4.95	N/A	N/A	0	No
Cu-T ug/L	4	N/A	1000	200	0	No
DO-D mg/L	20	N/A	3	3	8.17	No
Fe-D ug/L	20	N/A	300	N/A	204.5	No
Fe-T ug/L	4	1000	N/A	N/A	1350	Yes; Aquatic Life
Hard. mg/L	20	N/A	N/A	N/A	50.02	No
Mn-D ug/L	4	1309.67	50	N/A	11.65	No
Mn-T ug/L	4	N/A	N/A	200	9.95	No
Mo-T ug/L	4	N/A	210	160	0	No
Ni-D ug/L	4	28.94	N/A	N/A	0	No
Ni-T ug/L	4	N/A	100	200	0	No
NO2-T mg/L	12	N/A	1	10	0	No
NO3-T mg/L	16	N/A	10	100	0.09	No
NO5-T mg/L	4	N/A	10	100	0	No
Pb-D ug/L	4	1.17	N/A	N/A	0	No
Pb-T ug/L	4	N/A	50	100	0	No
pH min	N/A	N/A	5	N/A	7.6	No
pH max	N/A	N/A	9	N/A	8.2	No
Se-D ug/L	20	4.6	N/A	N/A	0.12	No
Se-T ug/L	20	N/A	50	20	0.08	No
SO4-T mg/L	20	N/A	250	N/A	6.54	No
U-D ug/L	4	N/A	N/A	N/A	0.38	No
U-T ug/L	4	N/A	30	N/A	0.29	No
Zn-D ug/L	4	64.54	N/A	N/A	16.95	No
Zn-T ug/L	4	N/A	5000	2000	12	No

Table 3.8: Assessment of nutrient attainment

Parameter	# of samples	Aquatic life standard (chronic)	Median of samples measured	Exceeding standard?
Total Nitrogen (mg/L)	13	2.01	0.42	N/A
Total Phosphorous (mg/L)	20	0.11	0.13	Yes

Saguache Creek SMP reach SC03 - Water Temperature

Table 3.9: Water temperature standards

Season	MWAT	DM
April – Oct.	18.3	23.9
Nov. – March	9.0	13.0

Table 3.10: Assessment of water temperature attainment

Season	Number of Exceedances (MWAT)	Number of Exceedances (DM)
Winter	0	0
Summer	26	37

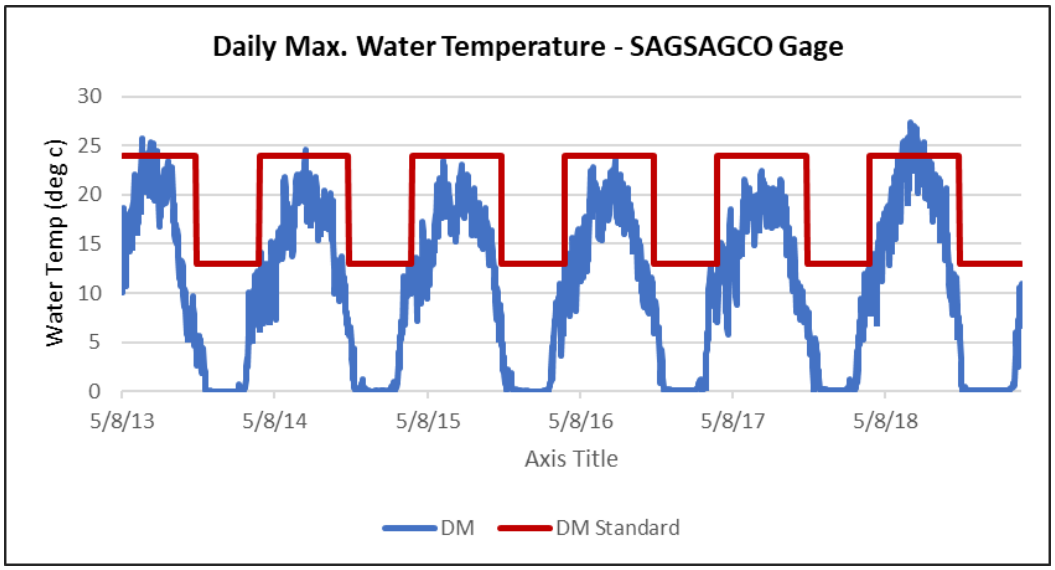

Figure 2.1: Daily maximum water temperature and corresponding seasonal standards at the Saguache Creek Near Saguache, Co streamgage

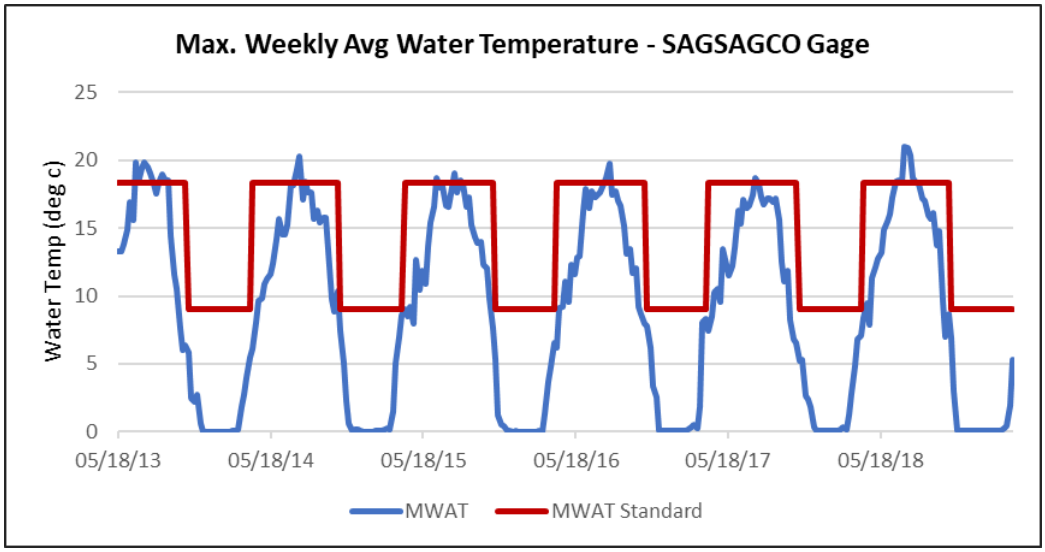

Figure 2.2: Maximum weekly average water temperature and corresponding seasonal standards at the Saguache Creek Near Saguache, Co streamgage

Saguache Creek SMP reach SC04 (CDPHE segment CORGCB12c)

Table 3.11: Water quality sampling site information

Site ID	Site description	Org	Latitude	Longitude
352	Saguache Creek at County Road Z	CORIVWCH	38.088149	-106.180433

Table 3.12: Assessment of attainment of acute or one-day standards

Parameter	# of samples	Max. measured value	Aquatic life standard	Water supply standard	Agriculture standard	Exceeding standard?
Al-D ug/L	1	7	N/A	N/A	N/A	No
Al-T ug/L	1	764	0	N/A	N/A	No
As-D ug/L	1	0	340	N/A	N/A	No
As-T ug/L	1	0	N/A	0.02	100	No
Cd-D ug/L	1	1.06	0.93	N/A	N/A	Yes; Aquatic Life
Cd-T ug/L	1	2.32	N/A	5	10	No
Cu-D ug/L	1	1.5	7	N/A	N/A	No
Fe-T ug/L	1	1049	1000	N/A	N/A	Yes; Aquatic Life
Mn-D ug/L	1	22	2370.43	50	N/A	No
Pb-D ug/L	1	9	30.15	N/A	N/A	No
pH min	1	7.56	6.5	5	N/A	No
pH max	1	7.91	9	9	N/A	No
Se-D ug/L	1	0	18.4	N/A	N/A	No
Zn-D ug/L	1	0	85.22	N/A	N/A	No

1.4 Supplemental SMP Water Quality Data

Table 4.1: Rio Grande Headwaters Restoration Project supplemental data

SMP Reach	Latitude	Longitude	Date	pH	Conductivity (mg/L)	Water Temperature (deg C)	DO (mg/L)
RG02	37.75452	-107.4129	9/26/2018	7.8	50	8.0	7.35
RG02	37.75452	-107.4129	4/17/2019	7.1	60	8.6	7.4
RG03	37.77122	-107.1448	9/26/2018	7.6	50	12.0	8.16
RG03	37.77122	-107.1448	4/17/2019	7.2	50	8.8	8.12
RG04	37.72713	-107.0197	8/17/2018	8.1	60	15.0	7.2
RG04	37.72713	-107.0197	4/17/2019	7.8	40	9.1	8.01
RG07	37.75352	-106.7681	8/17/2018	8.1	40	16.0	7.5
RG07	37.75352	-106.7681	4/17/2019	7.9	40	9.3	7.98
RG09	37.68909	-106.4558	8/17/2018	8.2	40	18.0	7.9
RG09	37.68909	-106.4558	4/17/2019	7.9	50	9.5	7.9
RG11	37.62918	-106.2173	8/17/2018	8.9	50	19.0	7.1
RG11	37.62918	-106.2173	4/29/2019	7.8	60	9.5	7.79
RG12	37.58062	-106.0799	8/17/2018	8.2	60	18.0	7.1
RG12	37.58062	-106.0799	4/29/2019	8.1	50	9.8	7.84
RG13	37.52529	-105.939	8/17/2018	7.8	100	25.0	6.8
RG13	37.52529	-105.939	4/29/2019	7.9	80	10.5	79
RG15	37.42989	-105.7897	8/17/2018	8.3	190	18.0	7.2
RG15	37.42989	-105.7897	4/29/2019	8.0	150	10.8	7.4
RG16	37.30344	-105.7358	8/24/2018	8.6	190	17.0	7.3
RG17	37.14374	-105.7442	8/15/2018	8.6	170	23.0	6.8
CR01	37.35348	-106.5229	8/22/2018	9.3	60	13.0	8.8
CR01	37.35348	-106.5229	4/30/2019	8.1	50	8.8	8.12
CR03	37.32554	-106.474	8/22/2018	8.8	60	13.0	8.4
CR03	37.32554	-106.474	4/30/2019	7.5	40	9.0	8.19
CR04	37.26104	-106.4704	8/22/2018	8.3	90	13.0	8.6
CR04	37.26104	-106.4704	4/30/2019	7.8	80	8.9	8.08
CR05	37.16964	-106.443	8/21/2018	8.5	60	20.0	7.8
CR05	37.16964	-106.443	4/30/2019	7.7	50	9.5	7.98
CR05	37.13089	-106.3903	8/21/2018	8.2	60	21.0	8.2
CR05	37.13089	-106.3903	4/30/2019	7.8	50	9.9	8.01
CR06	37.0986	-106.3093	8/21/2018	8.8	40	19.0	7.7
CR06	37.0986	-106.3093	4/30/2019	8.0	40	10.2	7.9
CR08	37.05079	-106.1526	8/21/2018	8.3	40	19.0	7.7
CR08	37.05079	-106.1526	4/30/2019	8.6	30	10.6	7.87
CR09	37.10123	-106.0107	8/15/2018	8.1	30	20.0	7.5
CR09	37.10123	-106.0107	4/30/2019	8.4	30	10.8	7.92
CR10	37.13415	-105.923	9/24/2018	Dry, not sampled	N/A	N/A	N/A
CR10	37.13415	-105.923	4/30/2019	8.2	50	10.9	7.84
CR11	37.1941	-105.8857	9/24/2018	Dry, not sampled	N/A	N/A	N/A
CR11	37.29717	-105.7981	7/31/2018	8.3	70	20.0	7.6
CR11	37.29717	-105.7981	4/30/2019	8.1	60	11.1	7.8
SC01	38.01642	-106.6475	10/1/2018	7.9	40	12.0	8.2
SC02	38.07283	-106.521	10/1/2018	8.1	40	12.0	7.2
SC02	38.07283	-106.521	4/27/2019	7.8	40	7.2	8.34
SC03	38.12995	-106.4566	10/1/2018	7.6	50	12.0	7

SMP Reach	Latitude	Longitude	Date	pH	Conductivity (mg/L)	Water Temperature (deg C)	DO (mg/L)
SC03	38.12995	-106.4566	4/27/2019	7.4	40	8.3	8.45
SC03	38.16328	-106.2901	9/23/2018	7.5	60	11.2	7.2
SC03	38.16328	-106.2901	4/27/2019	7.9	40	8.4	8.52
SC03	38.16328	-106.2901	4/27/2019	7.1	40	8.5	8.47
SC04	38.10974	-106.2279	9/24/2018	8.4	60	11.4	7.24
SC04	38.10974	-106.2279	4/27/2019	8.0	50	8.8	8.6
SC05	38.07481	-106.1531	9/24/2018	7.9	70	11.0	6.86
SC05	38.07481	-106.1531	4/27/2019	7.7	50	9.0	8.4

Table 4.2: Rio Grande Natural Area River Condition Assessment supplemental data

SMP Reach	Date	pH	Water Temperature (deg C)	Turbidity (NTU)
RG17	May-14	8.48	9.6	9.2
RG17	May-14	8.4	12.3	10.9

Table 4.3: BLM Aquatic Assessment, Inventory, and Monitoring (AIM) Program supp.

SMP Reach	Date	pH	Water Temperature (deg C)	Latitude	Longitude	Total Nitrogen (mg/L)	Total Phosphorous (mg/L)	Specific Conductance (µS/cm)
RG16	Sep-16	7.91	25.2	37.21935	-105.74532	0.3609	0.1094	215.9
RG17	Sep-16	8.54	25.3	37.01342	-105.74118	0.4472	0.1239	242.9
RG17	Sep-16	8.19	15.5	37.30267	-105.73241	0.511	0.1401	235.5
RG17	Sep-16	8.2	15	37.18023	-105.72992	0.4595	0.1096	250.5
CR11	Sep-16	6.97	18.4	37.29742	-105.79783	0.1224	0.0436	108.4

2 Rio Grande, Conejos River, and Saguache Creek Aquatic Life Datasets

The tables below summarize macroinvertebrate and trout biomass data for each SMP reach.

2.1 Rio Grande SMP Aquatic Life Data

Rio Grande SMP		Metrics					Reach Rating	
SMP Reach	MMI Data Source	MMI Score	Avg MMI Score	Overall MMI Rating	Trout (lbs/acre)	Trout Rating	Overall Score	Reach Rating
RG01	See RG02	See RG02	74.3 (inferred from RG02)	B+ (inferred from RG02)	N/A	N/A	88 (inferred from RG02)	**B+**
RG02	RGHRP	84.8	74.3	B+	N/A	N/A	88	**B+**
	URGWA	63.8						
RG03	URGWA	40.5	50.8	C	N/A	N/A	75	**C**
	URGWA	61.1						
RG04	RGHRP	93	78.0	B+	N/A	N/A	88	**B+**
	URGWA	63						
RG05	See RG06	See RG06	84.4 (inferred from RG06)	A- (inferred from RG06)	N/A	N/A	91	**A-**
RG06	URGWA	84.4	84.4	A-	N/A	N/A	91	**A-**
RG07	RGHRP	60.3	67.0	B-	62.8	A	88	**B+**
	URGWA	73.6						
RG08	See RG07	See RG07	67 (inferred from RG07)	B- (inferred from RG07)	62.8 (inferred from RG07)	88 (inferred from RG07)	88 (inferred from RG07)	**B+**
RG09	MRP	75.5	74.9	B+	>60.0	A	91.5	**A-**
	MRP	77.2						
	MRP	78.7						
	URGWA	68.3						
RG10	N/A	N/A	N/A	N	133.6	A	95	**A**
RG11	RGHRP	88.2	84.2	A-	N/A	N/A	91	**A-**
	MRP	80.1						
RG12	RGHRP	72.7	72.7	B	N/A	N/A	85	**B**
RG13	MRP	42.3	53.3	C	N/A	N/A	75	**C**
	RGHRP	64.3						
RG14	See RG13	See RG13	53.3 (inferred from RG13)	C (inferred from RG13)	N/A	N/A	75 (inferred from RG13)	**C**
RG15	RGHRP	58.3	58.3	C+	N/A	N/A	78	**C+**
RG16	RGHRP	56.3	56.3	C	N/A	N/A	75	**C**
RG17	RGHRP	19.6	30.6	F+	N/A	N/A	55	**F+**
	BLM AIM	47.6						
	BLM AIM	24.5						

2.2 Conejos River SMP Aquatic Life Data

Conejos River SMP		Metrics					Reach Rating	
SMP Reach	**MMI Data Source**	**MMI Score**	**Avg MMI Score**	**Overall MMI Rating**	**Trout (lbs/acre)**	**Trout Rating**	**Overall Rating**	**Reach Rating**
CR01	RGHRP	40.5	40.5	D-	59.2 (inferred from CR02)	B+	75	**C**
CR02	See CR01	40.5 (inferred from CR01)	40.5 (inferred from CR01)	D- (inferred from CR01)	59.2	B+	75	**C**
CR03	RGHRP	72.2	72.2	B	N/A	N/A	85	**B**
CR04	RGHRP	55.8	55.8	C	N/A	N/A	75	**C**
CR05	RGHRP	85.5	82.8	A-	42.8	B	88	**B+**
	RGHRP	80.1						
CR06	RGHRP	57.8	69.0	B-	>60	A	89.5	**A-**
	WQCD	80.1						
CR07	See CR06	See CR06	69.0 (inferred from CR06)	B- (inferred from CR06)	>60 (inferred from CR06)	A (inferred from CR06)	89.5 (inferred from CR06)	**A-**
CR08	RGHRP	84.6	84.8	A-	N/A	N/A	91	**A-**
	WQCD	84.9						
CR09	RGHRP	76.5	76.5	B+	N/A	N/A	88	**B+**
CR10	See RCR11	72.9 (inferred from CR11)	72.9 (inferred from CR11)	B (inferred from CR11)	N/A	N/A	N/A	**B-**
CR11	RGHRP	72.9	72.9	B	N/A	N/A	85	**B**

2.3 Saguache Creek SMP Aquatic Life Data

Saguache Creek SMP		Metrics			Reach Rating	
SMP Reach	MMI Data Source	MMI Score	Avg MMI Score	Overall MMI Rating	Overall Rating	Reach Rating
SC01	RGHRP	76.5	76.5	B+	B+	**B+**
SC02	RGHRP	89	89	A	A	**A**
SC03	RGHRP	92	77	B+	B+	**B+**
	MRP	61.9				
SC04	RGHRP	68.5	68.5	B-	B-	**B-**
SC05	RGHRP	52.2	52.2	C	C	**C**