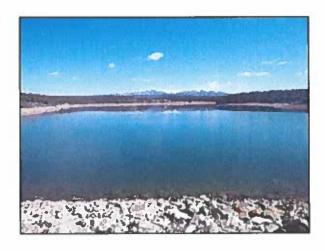
# REDMESA RESERVOIR ENLARGEMENT FINAL FEASIBILITY STUDY



May 2020

Prepared by



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FEASIBILITY STUDY APPROVAL

Pursuant to Colorado Revisad Statutes 37-60-121 &122, and in accordance with policias adopted by the Board. The CWCB staff has determined this Feasibility Study meets all applicable requirements for approval.

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# REDMESA RESERVOIR ENLARGEMENT FINAL FEASIBILITY STUDY

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SGM Project # 2018-148.001

# TABLE OF CONTENTS

1.0 Executive Summary		
2.0 Introduction		
2.1	Project Purpose and Need	5
2.2	Project Sponsor	6
2.2.2 2.2.3 2.2.3 2.2.4 2.2.5 2.2.6	Revenue Sources and Existing Rates  Water Facilities  Summary of Water Rights  Summary of Water Supply	6 7 8 8 9 10
3.0 R	edmesa Reservoir Enlargement Alternatives Analysis	11
3.1	Summary of Previous Studies	11
3.1.2 3.1.2 3.1.3	2 2003 Wright Water Engineers Feasibility Study	11 11 12
3.2	2018 Analysis of Alternatives	13
3.2.2 3.2.2 3.2.2 3.2.2 3.2.2 3.2.2 3.2.2	2 2020 La Plata River Basin Modeling 3 Alternate No. 1: Zero Enlargement – Cursory Planning Level Engineering 4 Alternative No. 2: Zero Enlargement – Cursory Planning Level Engineering 5 Alternative No. 3: 500 AF Enlargement – Cursory Planning Level Engineering 6 Alternative No. 4: 900 AF Enlargement – Cursory Planning Level Engineering 7 Alternative No. 5: 1,190 AF Enlargement – Cursory Planning Level Engineering	13 14 16 17 17 18 18
3.3	Selected Alternative	20
3.3.2 3.3.2 3.3.3	Summary of Future Operations Summary of Regional Benefits	20 20 22 23
4.0 Redmesa Reservoir Enlargement Impacts 24		
4.1	Impacts—Wetlands and Aquatic Resources	24
4.2	Anticipated Environmental Permitting Requirements	24
4.2.2 4.2.2		25 25
4.3	Institutional Considerations	26



4.4	Estimated Costs for Environmental Permitting	27
4.4.1	•	27
5.0 Fi	nancial Plan	28
5.1	Financial Sources	28
5.2	Loan Amount	28
5.3	Revenue and Expenditure Projections	29
5.4	Repayment Sources	29
5.5	Financial Condition of the Borrower and Financial Impacts	30
5.5.1	Annual Financial Statements	30
6.0 Conclusions and Recommendations 31		
6.1	Conclusions	31
6.2	Recommendations	31
7.0 References 33		



# LIST OF TABLES

- Table 1. Redmesa Reservoir and Ditch Company Water Rights
- Table 2. Historical Redmesa Reservoir Hay Gulch Diversions
- Table 3. Historical Redmesa Supply Ditch Diversions
- Table 4. Historical Old Indian Ditch Diversion from Redmesa Reservoir
- Table 5. Historical Joseph Freed Ditch Diversions from Redmesa Reservoir
- Table 6. Historical Revival Ditch Diversion from Redmesa Reservoir
- Table 7. Historical Warren-Vosburgh Ditch Diversions from Redmesa Reservoir
- Table 8. Redmesa Reservoir End of Month (EOM) Contents No Enlargement (1,176 AF)
- Table 9. Redmesa Reservoir End of Month (EOM) Contents Add 550 AF (1,726 AF)
- Table 10. Redmesa Reservoir End of Month (EOM) Contents Add 1,170 AF (2,346 AF)
- Table 11. Summary of Potential Supplemental Native Fish Water
- Table 12. Irrigation Demand, Deliveries Met (AF), and Deliveries Met (%) No Enlargement
- Table 13. CDWR Demand, Deliveries Met (AF), and Deliveries Met (%) No Enlargement
- Table 14. CPW Demand, Deliveries Met (AF), and Deliveries Met (%) No Enlargement
- Table 15. Augmentation Demand, Deliveries Met (AF), and Deliveries Met (%) No Enlargement
- Table 16. Irrigation Demand, Deliveries Met (AF), and Deliveries Met (%) 1,190 AF Enlargement
- Table 17. CDWR Demand, Deliveries Met (AF), and Deliveries Met (%) 1,190 AF Enlargement
- Table 18. CPW Demand, Deliveries Met (AF), and Deliveries Met (%) 1,190 AF Enlargement
- Table 19. Augmentation Demand, Deliveries Met (AF), and Deliveries Met (%) 1,190 AF Enlargement
- Table 20. Phase 1 Redmesa Reservoir Enlargement Engineering and Permitting Cost Estimate
- Table 21. Redmesa Reservoir Alternate No. 1 2020 Estimated Project Cost
- Table 22. Redmesa Reservoir Alternate No. 2 2020 Estimated Project Cost
- Table 23. Redmesa Reservoir Alternate No. 3 2020 Estimated Project Cost
- Table 24. Redmesa Reservoir Alternate No. 4 2020 Estimated Project Cost
- Table 25. Redmesa Reservoir Alternate No. 5 2020 Estimated Project Cost
- Table 26. Redmesa Reservoir Total Project Cost Alternate No. 5



# LIST OF FIGURES

Figure 1.	Vicinity Map Redmesa Study Area
Figure 2.	Project Area
Figure 3.	Redmesa Reservoir End of Month Contents
Figure 4.	Redmesa Reservoir Study Period Average End of Month Contents
Figure 5.	Redmesa Reservoir Annual Maximum Reservoir Contents
Figure 6.	Redmesa Reservoir End of Month Contents – Operations Model
Figure 7.	Redmesa Reservoir Storage by Account – Operations Model
Figure 8.	Redmesa Reservoir Enlargement



# LIST OF APPENDICES

- Appendix A. Redmesa Reservoir & Ditch Company Financial Summaries (2016 2018).
- Appendix B. Wetland Delineation Report Redmesa Reservoir Enlargement Project.
- Appendix C. Preliminary Redmesa Reservoir Enlargement Plan and Profile Drawings



# 1.0 Executive Summary

The Redmesa Reservoir and Ditch Company (RR&DC) owns and operates the 1,176 acrefoot (AF) Redmesa Reservoir; originally constructed in 1910 and known as the Red Mesa Ward Reservoir and/or Mormon Reservoir. Redmesa Reservoir is an on-channel reservoir located in La Plata County, Colorado on Hay Gulch, tributary to the La Plata River. The water supply stored within Redmesa Reservoir is used for the irrigation of crops by four ditches located below Redmesa Reservoir.

The existing dam and the outlet works configuration are essentially the same as when enlarged in 1945, with repairs over time to the outlet gate tower to address concrete cracking and structural deflection from ice loading that occurs during the winter. Redmesa Reservoir is considered a High Hazard Dam, and on January 5, 2018, the Colorado Division of Water Resources (CDWR) Office of the State Engineer, Dam Safety placed a Reservoir Storage Restriction Order (Order) to a maximum gage height of 26.9 feet, limiting storage to 376 AF, based on the hydraulic inability of the spillway to pass required stormflows.

Multiple studies over the past two decades have contemplated the feasibility and anticipated project costs to rehabilitate Redmesa Reservoir's narrow spillway and aging outlet works to comply with the current Colorado Office of the State Engineer's (SEO) dam safety requirements, while enlarging the reservoir to increase the water supply available for the Reservoir Ditches. The RR&DC, the Reservoir Ditches, and other local stakeholders would like to proceed with the design, permitting, and construction of a future Redmesa Reservoir Enlargement Project.

Over the past twelve years, an overall dry period, Redmesa Reservoir has filled eight times. As such, Redmesa Reservoir is a critical water source for the Reservoir Ditches as it provides supplemental water that can be released as needed to more efficiently meet irrigation demands.

The RR&DC has continued to coordinate with various stakeholders, and in March 2018 and obtained funding from the Colorado Water Conservation Board (CWCB) and the Southwestern Water Conservation District (SWCD) to complete a Final Feasibility Study (FFS) to facilitate the project's implementation by refining project costs and determining funding options for the selected alternative. In May 2019 the RR&DC received additional CWCB funding to complete the FFS once the Dam Safety Branch of the Office of the State Engineer finalized its updated tools and dam safety regulations.

Building upon previous studies, during the 2020 FFS, the RR&DC elected to carry forward five alternatives: two repair alternatives without an enlargement, a 500 AF enlargement, 900 AF enlargement, and a 1,190 AF enlargement project. The La Plata Basin StateMod water allocation model was rerun to verify how often various alternatives would fill, which equated to approximately one third of the time.

The La Plata River basin model results indicated the optimum size for a reservoir enlargement, based on water supply yield, would be approximately 1,170 AF. SGM developed an operations model to simulate how stakeholders in the Redmesa Reservoir Project would use their supplies, including inter-reservoir operations with Bobby K. Taylor Reservoir (BKT Reservoir).



Based on the available survey data, SGM completed a comparison between two noenlargement alternatives and a 500 AF, 900 AF, or 1,190 AF enlargement alternatives. The 2016 estimated construction costs for the repair without enlargement and 550 AF enlargement alternatives were reviewed and updated with 2020 unit costs and more site-specific data to update the estimated project costs for all alternatives on a 2020 cost-basis. In summary, the estimated 2020 construction costs are:

- Alternative No. 1 (total capacity of 1,176 AF): \$2,764,500 (\$2,351 per AF)
- Alternative No. 2 (total capacity of 1,176 AF): \$2,896,500 (\$2,463 per AF)
- Alternative No. 3 (total capacity of 1,676 AF): \$6,452,400 (\$3,850 per AF)
- Alternative No. 4 (total capacity of 2,076 AF): \$7,699,500 (\$3,709 per AF)
- Alternative No. 5 (total capacity of 2,366 AF): \$8,542,400 (\$3,610 per AF)

On a cost per AF of available water, the no-enlargement alternatives are less expensive than enlargement alternatives; however, there will be less regional and state-wide benefits for a project solely benefitting irrigators. A no-enlargement alternative would also reduce the funding opportunities available to the RR&DC. Therefore, the RR&DC and stakeholders have selected to pursue the 1,190 AF enlargement, which has the least expensive unit cost per AF of storage for all enlargement alternatives at \$3,610 per AF.

In order to fund enlargement alternatives, project partners are needed. The primary project partners contemplated are the Colorado Division of Water Resources (CDWR) and Colorado Parks and Wildlife (CPW). The RR&DC will paper exchange its Reservoir Ditches irrigation supply in BKT Reservoir with CDWR and CPW's Redmesa Reservoir supplies. The resulting tandem operations with the Long Hollow Project - BKT Reservoir will allow for additional CDWR and CPW supplies to be used for La Plata River Compact compliance and native fisheries. In addition, there are multiple regional benefits, including:

- Increased storage capacity in Redmesa Reservoir will allow stakeholders to increase
  the storage of available supply on the La Plata River during favorable hydrologic
  conditions (wet and average years) for use in subsequent dry years, increasing
  agricultural, Compact, fisheries, and augmentation supplies during time of drought, as
  observed in 2018.
- The Project will provide additional capacity for the RR&DC and CDWR staff to better manage diversions to during periods with large fluctuations in diurnal flow.
- The ability to complete intra-reservoir paper exchanges will reduce CDWR's administrative transit/stream losses, and further increase the supply available to stakeholders.
  - This includes increasing the supply available to CDWR for Compact compliance and to CPW for native fisheries in the La Plata River below Long Hollow. Both the CDWR and CPW supplies released from BKT Reservoir will bolster the riparian corridor in the La Plata River and will provide additional streamflow in the La Plata River during dry years and seasonally low-flow conditions.
- All increases in irrigation supply will result in additional ditch and reservoir seepage as
  well as irrigation return flows, all of which would recharge the Redmesa Aquifer. The
  aquifer recharge will ultimately accrue to the La Plata River, Government Draw and
  Long Hollow and will generally increase flows in the lower portion of the basin.
- Increased return flows in the lower portion of the basin will benefit irrigators, provide operational flexibility for water managers and CDWR staff, and will provide



- supplemental flows benefiting the environmental communities within the river and the adjacent riparian habitat.
- During the winter, BKT Reservoir's bypass requirements could preferentially be made from Redmesa Reservoir. In doing so, the addition of supplemental flow for threatened and endangered fish species in the La Plata River below the confluence with Long Hollow would be bolstered upstream all the way to its confluence with Hay Gulch.
- The RR&DC anticipates providing access to Redmesa Reservoir for recreational uses including non-motorized boating and seasonal waterfowl hunting.
  - o CPW does not envision allowing fishing in Redmesa Reservoir, as non-native fish compete with native fish, which are a focal point of this project.

In addition to additional supply being available to CDWR for release from BKT Reservoir to bolster La Plata River streamflow to meet its daily flow delivery requirements to the Compact at the Colorado-New Mexico Stateline, the following state-wide benefits will be realized.

- The Project will further develop Colorado's usage of its La Plata River entitlement under the 1922 La Plata River Compact and increase native/base flows in the La Plata River due to lagged return flows.
- The Project will result in fewer days of Compact over-deliveries from Colorado, as Colorado better manages its portion of its highly variable La Plata River entitlement.
- The Project will result in fewer days of Compact under-deliveries to New Mexico due to increased storage capacity.
- The reduction in under-deliveries to New Mexico reduces the potential of future litigation between the states.

Additional, as a part of the project, SGM completed a wetland delineation report, and submitted an Approved Jurisdictional Determination (AJD) to the U.S. Army Corps of Engineers (Corps). This wetland delineation work found that most of the bottom of the existing reservoir is unconsolidated sediment, with or without some plants, most of which are upland weeds. There is a total of 1.752 acres that technically meets the criteria for wetland under Section 404. This area is dominated by several "facultative" wetland species and upland plants, most of which are weeds and/or poisonous plants. Therefore, this 1.752 acre area is very low value "wetland" with minimal to no aquatic resource functions. Therefore, flooding of the 1.752 acres of low quality wetlands would be considered an impact and require some type of mitigation under Section 404.

Based on mapping of wetlands below the embankment and within the reservoir footprint, along with observations of the extent of wetlands along Hay Gulch upstream of the Redmesa Reservoir, it is estimated that a total of 2.164 acres of wetlands would be impacted from a 1,190 AF expansion, as follows:

- Below embankment: 0.192 acres.
- Within reservoir footprint: 1.752 acres.
- Along hay Gulch upstream of reservoir: 0.22 acres.

Therefore, a Section 404 permit would be required for expansion of Redmesa Reservoir since fill material would be discharged into wetlands and Hay Gulch below the existing embankment; and wetlands within the reservoir footprint upstream along Hay Gulch would be inundated, thus changing their nature (and associated functions). Based on the total estimated impact of 2.164 acres, an Individual Section 404 Permit (IP) would be required. The application for



the IP will have to include an alternatives analysis that demonstrates that impacts to wetlands have been avoided and minimized to the extent practicable, and that an alternative does not exist that meets the project purpose and would result in fewer impacts. A mitigation plan would also have to be prepared that fully mitigates the functions of the impacted wetlands.

SGM anticipates the permitting portion of the Redmesa Reservoir Enlargement project can be completed over the following timeframes.

- <u>Section 404 Permit</u>: assume 9 months for preparation of application information and processing of the request by the Corps.
- Other environmental and cultural resources studies and approvals (including 401 Certification) would occur during the same timeframe.

The 2020 estimated total project cost for the 1,190 AF enlargement of Redmesa Reservoir is \$9,124,800, which includes engineering, permitting, and construction costs. The RR&DC intends to apply for grants from the Southwestern Water Conservation District, the Colorado Water Conservation Board (both Colorado Water Plan Grants and the Water Supply Reserve Fund), a Department of Homeland Security Pre-Disaster Mitigation program, US Bureau of Reclamation WaterSmart program, and US Fish and Wildlife Service native fish programs. Additionally, RR&DC will apply for a Colorado Water Conservation Board Loan to pay for the project.

In order to repay its future project loan, the RR&DC will increase its shareholder's annual assessments, create new B-class shares for the enlargement pool, provide additional water for augmentation uses, and is considering opening Redmesa Reservoir for recreational purposes, including non-motorized boating and waterfowl hunting, totaling 140 acres. Additionally, RR&DC is working with adjacent landowners and other landowners in the area to open up approximately 1,000 acres of land that could be enrolled through CPW's Walk-in Access Program. The increased annual assessments and new sources of income will allow RR&DC to repay its annual loan payment over the next 30 years and will also provide income for other annual expenses and operations and maintenance costs.



# 2.0 Introduction

The Redmesa Reservoir and Ditch Company (RR&DC) owns and operates the 1,176 acrefoot (AF) Redmesa Reservoir, historically known as the Red Mesa Ward Reservoir and/or Mormon Reservoir. As shown on Figure 1, Redmesa Reservoir is an on-channel reservoir located in La Plata County, Colorado on Hay Gulch, tributary to the La Plata River. The water supply stored within Redmesa Reservoir is used for the irrigation of crops by four Reservoir Ditches below Redmesa Reservoir including: Old Indian Ditch, Joseph Freed Ditch, Revival Ditch, and the Warren-Vosburgh Ditch.

Multiple studies over the past two decades have contemplated the feasibility and anticipated project costs to rehabilitation Redmesa Reservoir's narrow spillway and aging outlet works to comply with the current Colorado Office of the State Engineer's (SEO) dam safety requirements, while enlarging the reservoir to increase the water supply available for the Reservoir Ditches. The RR&DC, the Reservoir Ditches, and other local stakeholders would like to proceed with the design, permitting, and construction of a future Redmesa Reservoir Enlargement Project; however, uncertainties revolving around total project costs, additional potential project partners, and the availability of loan and/or grant monies have prevented the implementation of a reservoir enlargement project.

The RR&DC has continued to coordinate with various stakeholders, and in March 2018 obtained funding from the Colorado Water Conservation Board (CWCB) and the Southwestern Water Conservation District (SWCD) to complete a Final Feasibility Study (FFS) to facilitate the project's implementation by refining project costs and determining funding options for the selected alternative. SGM was selected by the RR&DC to complete the FFS, given individual staff's experience with water rights, water supply planning, and reservoir project implementation within the La Plata River basin.

As the 2018 FFS was nearing completion, the RR&DC elected to temporarily stop the this project as the State of Colorado began implementing changes to its dam safety regulations including: the use of the Colorado and New Mexico Regional Extreme Precipitation Study (CO-NM REPS), inclusion of the Reclamation Consequence Estimating Methodology (RCEM) to reduce the hazard classification, and overall revisions to the Rules and Regulations for Dam Safety and Dam Construction. The Dam Safety Branch of the Office of the State Engineer finalized their revisions, analyses, and new tools in January 2020. This report summarizes the work originally started in 2018 that was finalized in 2020 once the new Dam Safety Rules and Regulations were completed.

## 2.1 Project Purpose and Need

The Redmesa Reservoir was originally built in 1910, and the dam was repaired in the 1920s after being damaged by flooding in 1911. Two reservoir enlargement projects have been completed to Redmesa Reservoir, with the first occurring in the 1920s and the second in 1945. The existing dam and the outlet works configuration are the same as constructed in 1945, with a maximum storage capacity of 1,176 AF. Repairs to the outlet gate tower were performed in 1973 and the 1990s to address concrete cracking and structural deflection from ice loading that occurs during the winter.

Redmesa Reservoir is considered a High Hazard Dam, and on January 5, 2018, the Colorado Division of Water Resources (CDWR) Office of the State Engineer, Dam Safety placed a Reservoir Storage Restriction Order (Order) to a maximum gage height of 26.9 feet, limiting



storage to 376 AF. The stated basis for the Order was the hydraulic inadequacy of the existing spillway to convey the 24-hour, 100-year storm event without breaching the dam, as required by the SEO. According to the Order, hydraulic inadequacy was first reported in 1984 by the Soil Conservation Service, and again in 1988 by the Dam Safety Engineer's inspection report and every year thereafter.

After receiving the Order, the RR&DC had emergency spillway modifications completed in February 2018 to significantly increase the spillway capacity. The excavated materials from the spillway were placed atop the Redmesa dam crest to re-establish the original crest elevation. As a result, the Dam Safety Engineer, temporarily waived the Order, allowing the RR&DC to fully operate Redmesa Reservoir during the 2018 irrigation season. The RR&DC acknowledges that a long-term solution is required to repair the aging dam infrastructure and increase the spillway capacity to comply with current dam safety regulations, to ensure continued long-term operation of Redmesa Reservoir.

The most recent Redmesa Reservoir enlargement study completed by AECOM in 2016, estimated the design, permitting, and construction cost associated with repairing the outlet structure and dam, along with spillway modification to be \$4,500,000. Importantly, the incremental costs associated with enlarging the dam and spillway to create additional storage capacity within Redmesa Reservoir are relatively minor when compared to the base cost. Additional storage could be used by new project partners and the Reservoir Ditches to offset direct project costs to RR&DC, increase regional and state-wide benefit, and increase water supply within the water-short La Plata River basin.

The purpose of the FFS is to briefly summarize the key findings from previously studied alternatives, refine project costs, identify project partners that could utilize additional water storage for the greatest regional and state-wide benefit; and analyze the ability of each entity to assist in repaying debt along with on-going operations and maintenance (O&M) costs. The RR&DC intends to apply for various grants and will pursue a future CWCB and/ or other loan application. This FFS was completed in accordance with the CWCB's Loan Feasibility Study Requirements to support its future application.

## 2.2 Project Sponsor

The project sponsor for the Redmesa Reservoir Enlargement FFS is the RR&DC. Relevant information about RR&DC including a description of the organization, its water facilities, water rights, annual revenue sources, existing rates, and service area are summarized within this section of the report.

#### 2.2.1 Redmesa Reservoir and Ditch Company Overview

The RR&DC was originally formed as the Red Mesa Ward Reservoir and Ditch Company (Company) in 1923 and is recognized as a not-for-profit corporation under Colorado law. Article II of the Company RR&DC's Articles of incorporation list the following purposes and objectives for formulating the organization:

 To file on, appropriate or otherwise acquire 4,000 acre feet, more or less, of the flood water of the La Plata River in said county and state, and other waters, for storage in reservoirs, for distribution and for the use of members of the Company and other persons entitled thereto, for domestic and irrigation purposes;



- To acquire by purchase or otherwise the title in the Company of the rights of way for headgates, ditches, flumes and of reservoirs for the carrying and conduction of water from the source of supply thereof to such reservoirs, and the storage of such water in such reservoirs, and the distribution of such waters to the members of the Company and other persons entitled thereto;
- To acquire by purchase or otherwise lands upon which to construct, maintain and operate the reservoirs of the Company for storage of waters therein for domestic and irrigation purposes;
- To construct, maintain and operate irrigation ditches, laterals, reservoirs and irrigation works, together with all necessary gates, dams, flumes, pipes and other appurtenances for the carrying, conveying storage and distribution of waters for irrigation and domestic purposes; and
- Also to levy and collect pro-rata and as may be provided by the by-laws of the Company, such assessments as may from time to time be necessary for the enlargement, repairs, maintenance, operation and superintendence of such irrigation works, ditches and reservoirs, and to provide for the sale of the memberships, membership certificates, rights and interests of the member of the Company and other persons entitled to receive water from said irrigation works, ditches and reservoirs for their default and neglect in payment of much assessments, all as my be provided by the by-laws of the Company.

The RR&DC currently has 1,138 outstanding shares, held by 48 shareholders. Since its incorporation in 1923, the RR&DC has achieved its stated purposes and objectives and continues to operate its water rights and facilities for the beneficial use of its shareholders.

There are approximately 3,198 acres of irrigable land in the RR&DC's service area. However, given the limited water available in the area, a maximum of 1,600 acres can be practically irrigated, while in most years approximately 1,140 acres of land is irrigated within the RR&DC's service area. The service area is located mostly around the town of Red Mesa (unincorporated) in the southwestern portion of the La Plata County. The reservoir water is conveyed downstream to its shareholders through the Reservoir Ditches. The project area, Reservoir Ditches, and historically irrigated lands are shown on Figure 2.

#### 2.2.2 Revenue Sources and Existing Rates

The RR&DC's annual revenue is obtained solely from shareholder assessments, which are currently set at \$20.50 per share, totaling \$23,329. Between 2016 and 2018, an average of 58 percent (\$13,100 per year) of the total income, has been used for the operation and maintenance of the reservoir, taxes, and other administrative expenses, including the labor costs for the dam tender and secretary/treasurer. Annual summary sheets of the RR&DC's financial sheets are included as Appendix A. As stated in the RR&DC's Articles of Incorporation, the company does set and collect annual assessments for the ongoing operations and maintenance of its water facilities. The RR&DC will need to increase its annual assessments to pay its portion of any Redmesa Reservoir enlargement project, as its current rates are not sufficient to cover an annual loan repayment.



#### 2.2.3 Water Facilities

As shown on Figure 1, the Redmesa Reservoir is located at the lower end of Hay Gulch, a relatively small watershed of approximately 29.9 square miles. Water is diverted from the La Plata River at the northern point of Hay Gulch through the Hay Gulch diversion structure and is used as an irrigation supply for multiple non-RR&DC ditches upstream of the reservoir. Upstream irrigation return flows diverted by the Hay Gulch and Big Stick Ditches bolster the relatively small amounts of native Hay Gulch flows, all of which are stored in-priority in Redmesa Reservoir when physically and legally available. In addition, the RR&DC owns and operates the Redmesa Supply Ditch diversion structure on the west bank of La Plata River approximately 1.25 to the east of the reservoir, which is shown on Figure 2. This structure was substantially made more efficient and improved in 2017. La Plata River supplies are diverted in-priority when physically and legally available and allow for the conveyance of additional water supply directly into the reservoir.

The RR&DC operates and regularly performs routine maintenance of its facilities, including but not limited to, the Redmesa Reservoir, the Redmesa Supply Ditch headgate and associated ditch, and key appurtenances, such as measurement structures, headgates, valves, and piping.

#### 2.2.4 Summary of Water Rights

The RR&DC's senior storage water right at Redmesa Reservoir is for 4,074 AF, of which 1,176 AF has been made absolute and the remaining 2,898 AF is conditional. The original storage water right has appropriation date of April 30, 1905. The decreed uses include irrigation, municipal, industrial, recreational, fishery and domestic. The RR&DC and La Plata Water Conservancy District (LPWCD) have a joint refill right for Redmesa Reservoir, of which 656 AF has been made absolute and the remaining 3,418 AF is conditional. The refill right has an appropriation date of December 31, 2000, with the following decreed uses: irrigation, commercial, industrial, recreational, fishery, fire, augmentation, and wildlife.

In addition, the RR&DC holds an absolute water right for its Redmesa Supply Ditch, up to 120 cubic feet per second (cfs) off the La Plata River. The Redmesa Supply Ditch has an appropriation date of April 30, 1905, and is decreed for the following uses: irrigation, municipal, industrial, recreational, and domestic. Table 1 summarizes the water rights owned by the RR&DC.

Given, the RR&DC's existing storage and refill water rights, a future enlargement (up to 4,074 AF) would not require any new water rights application or filings, provided the stored supply was diverted in-priority and was put to beneficial use under the previously decreed uses. Otherwise, water put to beneficial use for non-decreed uses would need to be diverted during times when the La Plata River was administered under a free river condition. Further, an enlargement of Redmesa Reservoir would allow the RR&DC to increase its absolute water rights amounts after the beneficial use of the increased storage amounts within the ongoing water rights diligence periods.

Since the Redmesa Reservoir is decreed for numerous uses in addition to irrigation, including municipal, commercial, industrial, recreation, fishery, stock, fire, domestic, augmentation water, and wildlife enhancement, supplies stored in a future enlargement of Redmesa Reservoir could be used for non-irrigation purposes. Non-irrigation uses will prove critical in



developing additional project partners that may financially support the future enlargement project.

Currently, when Redmesa Reservoir is full at 1,176 AF, the 1,138 outstanding shares in the RR&DC, yield 1 AF of water. Water is delivered on a pro-rata shareholder basis, and in years when the reservoir does not fill, each share yields a pro-rata and equal allotment of the total annual storage volume.

# 2.2.5 Summary of Water Supply

The La Plata River is considered a severely over-appropriated river and is administered under the 1922 La Plata River Compact (Compact), approved by Congress in 1925. The Compact requires the State of Colorado to deliver one-half of the daily mean flow of the La Plata River measured at the Hesperus stream gage to the La Plata River State Line gage the following day after February 15<sup>th</sup> until December 1<sup>st</sup> (Compact period), not to exceed 100 cfs. Each state has an unrestricted right of use to La Plata River water between December 1st and February 15th. Historically, Colorado has not always been able to satisfy the Compact due to a variety of factors, including low stream flows, surface flow loss to groundwater, evapotranspiration and increasing water demands. Moreover, attempting to deliver water to meet the Compact from Hesperus results in significant delivery losses to the system.

In order to help meet Compact requirements and limit delivery losses, the Bobby K. Taylor (BKT) Reservoir and Long Hollow Dam were built in 2014 to provide a more efficient delivery mechanism by allowing Colorado water users to divert water that would otherwise be curtailed by Compact delivery obligations. The LPWCD owns and operates the BKT Reservoir on behalf of its shareholders. While the RR&DC is not directly a shareholder in the BKT Reservoir, the individual Reservoir Ditches are project participants and use their pro-rata allotment(currently 20%) of the supplemental irrigation supply, by exchange, to increase the water delivered to crops. As described in Section 2.3.2, future operations between an enlarged Redmesa Reservoir and the existing BKT Reservoir, will be used to benefit project participants, bolster regional and state-wide benefits, and will facilitate the delivery of New Mexico's entitlement of river flows under the Compact.

Tables 2 through 7, respectively, tabulate the historical Redmesa Reservoir Hay Gulch diversions to storage, Redmesa Supply Ditch Diversions to storage, Old Indian Ditch diversions of Redmesa Reservoir supplies, Joseph Freed Ditch diversions of Redmesa Reservoir supplies, and the Warren-Vosburgh Ditch diversion of Redmesa Reservoir supplies between 1975 and 2009. This period was selected, as it coincides with the period of record used for the La Plata River StateMod model developed on behalf of the RR&DC. The broad range and variability of tabulated diversions shown in Tables 2 through 7 is consistent with long-term historical diversions, as well as the more recent diversions from 2010 thru 2017.

In summary, the long-term average annual diversions to storage in Redmesa Reservoir amounts to 1,149 AF per year from Hay Gulch and an additional 326 AF per year through the Redmesa Supply Ditch. The total annual average diversion of Redmesa Reservoir supplies by the four Reservoir Ditches is 875 AF per year. Over the past twelve years, an overall dry period, Redmesa Reservoir has filled eight times. As such, Redmesa Reservoir is a critical water source for the Reservoir Ditches, as it provides supplemental water that can be released as needed to more efficiently meet irrigation demands.



Water is physically released from Redmesa Reservoir, conveyed through Hay Gulch and diverted at the respective Reservoir Ditches headgates. The Old Indian Ditch headgate is located on Hay Gulch, and solely receives its irrigation supply through Redmesa Reservoir supplies. The other three ditches that use Redmesa supplies also have water rights that allow for direct diversions from the La Plata River. However, the physical and legal availability of the La Plata River supply is limited and used for seasonal irrigation, primarily in the spring and early summer. The use of the reservoir water extends the irrigation season when adjudicated supplies are no longer available in the La Plata River. Not all water users under the Reservoir Ditches have RR&DC shares.

#### 2.2.6 Summary of Water Demands

As stated in Section 1.2.1, in most years approximately 1,140 acres of land is irrigated under the Reservoir Ditches with a supply-limited maximum amount of 1,600 acres of land. The 1995 Red Mesa Reservoir Enlargement Feasibility Study identified an average irrigation consumptive use demand of 1.97 AF/ac, which including ditch and system losses equates to an average irrigation water requirement of 3.74 AF/ac for alfalfa and irrigated pastures. The irrigation water requirement results in an average annual water demand of 4,264 AF per year for 1,140 acres of lands commonly irrigated by the Reservoir Ditches. For 3,198 acres of irrigated land, the annual water demand increases to 11,960 AF per year. The long-term annual delivery of Redmesa Reservoir supply (875 AF per year) is approximately 21 percent of the average annual water demand, and 7 percent of the maximum annual demand of 11,960 AF per year. Within the project area, the irrigation demand greatly exceeds the available water supply. Generally, the combination of the direct water supply and stored Redmesa Reservoir supply allows irrigators up to 1.5 cuttings of alfalfa hay each year.

The 2016 AECOM report documented that vast shortage of irrigation supplies exists within the La Plata River Basin. Specifically in Section 7.5 it is noted, "Appendix I of the SWSI, which was undertaken by CWCB in 2010, evaluated agricultural water demand vs. supplies for the 10 year period from 1997 through 2006, and concluded that the La Plata River basin (Water District 33) has the greatest water shortage between the irrigation water requirement and supply-limited consumptive use among all basins within the San Juan River drainage system which have an annual irrigation water requirement in excess of 10,000 AF. In fact, the annual agricultural demand is equal to approximately three times the available supply." Any additional water supply available for irrigation through a Redmesa Reservoir enlargement will be put to beneficial use by irrigators, especially later in the season, when direct diversions from the La Plata River are curtailed to meet the Compact.



# 3.0 Redmesa Reservoir Enlargement Alternatives Analysis

# 3.1 Summary of Previous Studies

Three feasibility studies have been completed on behalf of the RR&DC since the mid-1990s. The first study was prepared by Harris Engineering in 1995 which proposed a reservoir enlargement to 4,070 AF. A second study occurred in 2003 by Wright Water Engineers that was sponsored by the La Plata Water Conservancy District (LPWCD), also for an enlargement to 4,070 AF; and the third study was prepared by AECOM in 2016 considering enlargements of 250 AF and 550 AF. SGM briefly summarized the previous studies to provide context for the work completed in the FFS; however, each study is a stand-alone document that was considered and generally built upon by the subsequent feasibility study.

#### 3.1.1 1995 Harris Water Engineering Feasibility Study

The RR&DC received CWCB and SWCD funding to conduct a feasibility study for a reservoir enlargement that would utilize its absolute and conditional storage rights to a capacity of 4,070 AF. It was estimated, the enlargement would include raising the dam and spillway by 29 feet. The dam would have a crest length of approximately 1,450 feet and crest width of 25 feet. The upstream and downstream slopes would be modified to a 3.2:1 slope and 2.5:1 slope, respectfully. The outlet works would also need to be modified, the gate tower and intake would be replaced with hydraulic gates, and the spillway enlarged.

The operation plan included the additional storage to be used primarily for irrigation but a portion for domestic uses such as augmentation for existing wells, direct diversions to a centralized domestic system, or used for exchange of upstream irrigators.

According to the Harris report, the "total annual increase in supply from the enlarged reservoir for all uses was estimated at 1,862 AF, or approximately 64 percent of the increased storage capacity of the reservoir." It also assumed that the RR&CD would receive "unlimited winter flows from the La Plata River" conveyed through the Redmesa Supply Ditch and/or the Hay Gulch Ditch to the reservoir. To gain unlimited flows during winter, the historical diversions from other sub-basins within the La Plata River basin would need to be modified. The anticipated total cost for the project was estimated at \$3,000,000 for an average water supply of 1,872 AF at \$1,600 per AF. The RR&DC moved forward in requesting the necessary funding from the CWCB; however, the project was not pursued due to disagreements with users from other sub-basins regarding winter operations.

## 3.1.2 2003 Wright Water Engineers Feasibility Study

In 2003, the LPWCD obtained CWCB funds to analyze the feasibility of enlarging Redmesa Reservoir for its uses. Wright Water Engineers (WWE) completed the study and proposed a similar enlargement of 4,070 AF to utilize the RR&DC absolute and conditional storage rights. However, WWE used a different approach to fill the Enlarged Redmesa Reservoir and expanded on the spillway construction based on the 2003 SEO dam safety requirements.

LPWCD was evaluating five future reservoir sites and chose Long Hollow as the preferred project with Red Mesa a close second. The purpose of the Long Hollow Project was to better meet Compact requirements and provide supplemental irrigation water to LPWCD ditches and



Red Mesa could not solely meet this primary need. However, the two reservoirs, operating in tandem, provide synergies that allow for efficient water management.

WWE considered two enlargements: 3,000 AF which would require an increase of the surface water elevation by 19.5 feet and the full decreed storage rights of 4,070 AF with a surface water elevation increase of 27 feet. The larger of the two projects was chosen that would have required the dam crest to be raised by 34 feet, the dam crest length increased to 1,250 feet with a crest width of 25 feet. The outlet works would also be modified, the gate tower and intake would be replaced, and the spillway enlarged.

WWE performed a water availability study through the StateMod model program for the La Plata River Basin and developed a period of record from 1989 through 1998. It was concluded that the reservoir would fill approximately 40 percent of the time, and that the water yield could be increased by another 30 percent if basin-wide winter water use could be decreased. The total cost of the two projects were \$6.1 million for the 3,000 AF enlargement and \$7.1 million for the 4,070 AF enlargement, which were estimated at \$3,211 per AF of increased capacity and \$2,450 per AF of increased capacity (not total available storage), respectively.

WWE assumed that funding for the enlargement project would be covered under the LPWCD's available funds; therefore, the RR&DC did not pursue additional funding opportunities. In the end, the LPWCD used all the available funding to construct the BKT Reservoir and Long Hollow Dam, leaving the RR enlargement without funding.

## 3.1.3 2016 AECOM Feasibility Study

AECOM prepared the most recent feasibility study in July 2016 to assist the RR&DC in designing a spillway compliant with the SEO's dam safety requirement, along with reservoir enlargements of either 250 AF or 550 AF. It was also determined in this feasibility study that modifications to the outlet works would be needed to meet the current SEO dam safety requirements.

For the 2016 AECOM study, Hertzman Consulting, LLC (HC) was contracted to evaluate water availability for the proposed reservoir enlargements through a StateMod water allocation computer model originally created for the LPWCD during the preliminary stages of the Long Hollow Reservoir Project to assess La Plata River operations. The model considers water rights, along with historical river flows, diversions, precipitation, and irrigation demands over a 35-year period (October 1974-September 2009) to predict the numerous basin-wide river flows, ditch and reservoir diversions, system operations, and water rights yields. The focus of HC in the 2016 AECOM study was to estimate the total monthly volume in storage for each Redmesa Reservoir alternative, along with changes in monthly and annual diversions under each scenario conveyed through the Reservoir Ditches. Based upon the updated La Plata River Model, the 250 AF and 550 AF enlargement alternatives both filled 13 out of 35 years, or 37 percent of the time.

AECOM included a "no-action" scenario, which included the costs associated with breeching the dam, as the baseline to define the different costs of enlargement. AECOM determined that the 550 AF increase was economically viable. Therefore, the larger of the two alternatives was selected. It was estimated the dam crest would need to be raised by 14 feet, the dam crest length increased to 560 feet with a crest width of 25 feet. The upstream and downstream embankment slopes would be 3:1 and 2.5:1 respectively. The outlet works would also be modified, the gate tower and intake would be replaced, and the spillway enlarged. The no-



action scenario estimated cost was \$1.12 million, and the 550 AF enlargement estimated cost was \$5.1 million.

# 3.2 2018 Analysis of Alternatives

During the 2020 FFS, SGM coordinated with the RR&DC to carry forward the repair without enlargement alternative, a 500 AF enlargement alternative, a 900 AF enlargement alternative, and an enlargement alternative of 1,190 AF. The additional 1,190 AF enlargement alternative would result in a total storage volume of 2,366 AF, effectively double the storage volume of the existing Redmesa Reservoir. The basis for the 1,190 AF enlargement was determined sequentially through the updating, use, and analysis of the La Plata River Basin StateMod model, as described in Section 3.2.1.

#### 3.2.1 2018 La Plata River Basin Modeling

RR&DC representatives noted that both the 250 AF and 550 AF enlargement alternatives both filled 12 out of 35 years. Therefore, the RR&DC requested that SGM use the La Plata River Basin StateMod model to estimate the largest reservoir enlargement alternative that would similarly fill approximately one third of the time. In addition, RR&DC representatives wanted to verify the model had correct Redmesa Reservoir diversion records, as the methods for annotating historical diversion records maintained by the CDWR have varied between 1975 and 2009.

In 2018, SGM coordinated with Randy Hertzman to obtain the 2016 AECOM version of the model and associated files. SGM then verified the model contained the correct historical Redmesa Reservoir and Reservoir Ditch diversion records, which are tabulated in Tables 2 through 7.

Other than increasing the Redmesa Reservoir capacity for each model run, SGM did not alter the modeled La Plata River basin simulations. After verifying the reservoir diversion data, SGM tested the model to ensure HC's 2016 AECOM output could be replicated. Once completed, the first model run consisted of increasing the Redmesa Reservoir capacity to the maximum decreed capacity of 4,074 AF. The maximum decreed capacity was modeled to fill in three of the 35 years. However, based on the threshold of filling approximately one third of the time (12 out of 35 years), a total maximum reservoir volume of 2,346 AF (enlargement of 1,170 AF) was selected as the largest feasible enlargement for the FFS, solely based on the modeled water supply yield.

Figure 3 compares the end of month (EOM) contents for the modeled period for the following four modeled scenarios: repair without enlargement, 550 AF enlargement, 1,170 AF enlargement, and the maximum decreed storage volume of 4,074 AF. The model output for the repair without enlargement and 550 AF enlargement alternatives are consistent with those developed by HC during the 2016 AECOM study. As illustrated in Figure 3, the modeled diversions to storage for each scenario follow the same pattern, and only change when the modeled hydrology allows for additional storage. Typically, the storage contents at the end of the irrigation season are the same across all modeled scenarios, as the irrigation demand far exceeds the additional supplies.

SGM did not modify the StateMod demands on Redmesa Reservoir, which are entirely agricultural. As described in Section 3.2.2, SGM developed a Microsoft-Excel-based monthly operations model to simulate future reservoir operations for all stakeholders and their uses.



Tables 8 through 10 show the monthly EOM contents' values in AF for all StateMod modeled scenarios, which were then used as the reservoir inflow values for the operations model. In summary, the peak average monthly EOM contents value for all StateMod scenarios occurs in May.

- Repair without enlargement Average May EOM contents: 900 AF.
- 550 AF enlargement Average May EOM contents: 1,113 AF (additional 213 AF; average increase equal to 39 percent of the enlargement volume).
- 1,170 AF enlargement Average May EOM contents: 1,322 AF (additional 422 AF; average increase equal to 36 percent of the enlargement volume).
- Maximum enlargement Average May EOM contents: 1,546 AF (additional 224 AF; average increase equal to 22 percent of the enlargement volume).

Figure 4 shows the monthly average EOM contents for each of the four StateMod scenarios, which visually illustrates the average increase in available supplies for decreed uses throughout the year.

Comparatively, Figure 5 shows the annual maximum EOM contents between 1975 and 2009 for each of the four modeled scenarios. The increase in the estimated water supply varies greatly year-by-year; which is a function of the variability in southwestern Colorado hydrology, especially within the La Plata River basin. However, increases in the maximum EOM contents for each modeled scenario occur throughout the modeled period of record and do not appear to be limited to a single wetter hydrologic period or cycle. The increase in the average May EOM contents between each modeled scenario generally characterizes the aggregate modeled increase in average annual deliveries to the project stakeholders.

SGM relied upon historical land-based survey information provided by RR&DC and supplemented that data with a new land-based survey to account for the projects completed to widen the spillway and regrade the dam crest. Based upon the available survey data, SGM staff refined the StateMod alternate enlargement sizes based upon incremental dam crest raises. For the engineering analyses, SGM completed preliminary engineering analyses for reservoir enlargements of 500 AF, 900 AF, and 1,190 AF.

## 3.2.2 2020 La Plata River Basin Modeling

In 2020, SGM developed a monthly Microsoft Excel-based operations model (Operations Model) to approximate all stakeholders' desired operations given historical reservoir inflows. SGM used the La Plata River StateMod output of the physically and legally available inflows for Redmesa and BKT reservoirs to simulate intra-reservoir paper exchanges between Redmesa Reservoir and BKT Reservoir along with evaporation, and separate stakeholders demands. Based on discussions with potential stakeholders both the Colorado Division of Water Resources (CDWR) and Colorado Parks and Wildlife (CPW) expressed interest in the Redmesa Reservoir Enlargement Project. Both CDWR and CPW are ultimately interested in additional supplies in BKT Reservoir for La Plata River Compact Administration and to support native fisheries, respectively. The RR&DC is also interested in additional capacity in the enlarged reservoir to offset historical sedimentation and lost capacity (60 AF), as well as to increase the amount of water available each year for augmentation purposes (30 AF).



Currently, the CDWR is entitled to the first 300 AF that are stored in BKT Reservoir beginning in the non-Compact period (December 1st through February 15th). In discussions with the Division 7 Engineer, he indicated that the CDWR would be interested in as much as 600 AF of capacity within Redmesa Reservoir that could be paper exchanged each year to BKT Reservoir for subsequent release to Long Hollow during the Compact period for La Plata River Compact compliance. In order to model a variable demand each year, SGM analyzed historical streamflow in the La Plata River to calculate a monthly Compact demand, which averaged 1,200 AF over the 1975 through 2009 period of record. Since the construction and operation of BKT Reservoir, the operations of the La Plata River have improved with the availability of Compact and irrigation exchange supplies below the historical dry-up reach of the La Plata River, near Breen, CO. This effectively allows upstream agricultural diversion to continue by releasing an equivalent exchange amount from BKT Reservoir to meet Compact demands and keep the La Plata River flowing at Colorado-New Mexico Stateline. The CDWR's Compact account can be used in conjunction with BKT Reservoir exchange releases, or separately to bolster La Plata River streamflows for Compact compliance. Therefore, SGM estimated the increased efficiency of streamflow management based on current operations and reduced the historical Compact Demand accordingly. For Operations Model, CDWR's participation in the enlarged Redmesa Reservoir was set to 600 AF.

Currently, the BKT Reservoir operations allow for native fish flow releases during the non-Compact period. In discussions with CPW staff, they would like to bolster winter releases from BKT Reservoir to maintain a minimum of 4.0 cfs within the La Plata River below its confluence with Long Hollow. In order to model the variable demand each year, SGM analyzed the historical streamflow in the La Plata River below its confluence with Long Hollow. Conveniently, the available streamflow data after the construction and operation of BKT Reservoir contained representative hydrology of a dry year (2018), a wet year (2017), and an average year (2016). SGM used the streamflow records and desired minimum streamflow of 4.0 cfs to estimate the non-Compact demand for native fisheries following a dry, average, and wet year, as shown in Table 11. For the available period of record, the average native fisheries demand during the non-Compact period is approximately 138 AF/yr. After discussions with CPW staff their portion of the enlarged Redmesa Reservoir was set to 500 AF for the Operations Model.

As discussed in Section 2.2.5, the individual Reservoir Ditches are BKT Reservoir project participants that use their pro-rata allotment (currently 20%) of the supplemental irrigation supply, by exchange, to increase the water delivered to crops. The average annual yield of the BKT Reservoir project is 3,066 AF, of which a 20% share represents an average annual exchange potential of approximately 613 AF for the Reservoir Ditches in BKT Reservoir. To the extent a comparable volume of water is physically available in an enlarged Redmesa Reservoir account for CDWR and/or CPW uses those allocations can be changed between reservoirs, bringing the Reservoir Ditches BKT supply up to Redmesa Reservoir and the CDWR and CPW Redmesa Reservoir supplies down to BKT Reservoir. The purpose of the Operations Model is to simulate this operation and the resulting Redmesa Reservoir storage levels for potential recreational uses, such as non-motorized boating and waterfowl hunting.

Tables 12, 13, 14, and 15 show the annual demand, demand met (AF), and demand met (%) for the Reservoir Ditches, CDWR, CPW, and Augmentation accounts, respectively, under current conditions. Note that the Reservoir Ditches' existing yields and the CDWR releases of its BKT Reservoir pool are included in the current conditions. Tables 16 through 19 show the same values under an enlarged reservoir scenario of 1,190 AF. In summary, by comparing



the differences between the two sets of tables, SGM estimates an enlargement of 1,190 AF, will result in the following yields:

- CDWR (600 AF):
  - Average annual increase in yield of 93 AF.
  - o Maximum annual increase in yield of 420 AF.
- CPW (500 AF):
  - Average annual increase in yield of 65 AF.
  - Maximum annual increase in yield of 319 AF.
- Reservoir Ditches (60 AF):
  - o Average annual increase in yield of 23 AF.
  - Maximum annual increase in yield of 47 AF.
- Augmentation Pool (30 AF):
  - o Average annual increase in yield of 7 AF.
  - Maximum annual increase in yield of 17 AF.

Figure 6 shows the Operations Model end-of-month contents compared to the StateMod end-of-month contents for Redmesa Reservoir. Individual stakeholder end-of-month volumes are shown on Figure 7. As illustrated by these figures, the proposed operations for the enlarged Redmesa Reservoir are projected to have carryover water remaining in Redmesa Reservoir in 26 out of 35 years (74%). The proposed operations will result in more consistent water storage throughout the year, which would bolster the opportunities for recreational activities.

Historically, the RR&DC has limited its diversions to storage in Redmesa Reservoir during the winter to minimize icing on the existing tower structure and outlet works. Once the reservoir is enlarged and the outlet works are replaced and improved, the RR&DC anticipates that diversions to storage may increase over the historical diversions to accommodate the physically and legally available inflows. It is possible the actual annual project yield of each scenario will be larger than quantified by the StateMod model.

#### 3.2.3 Alternate No. 1: Zero Enlargement – Cursory Planning Level Engineering

In 2019, SGM received HEC-HMS, HEC-RAS modeling and RCEM preliminary analysis from Colorado Dam Safety (CDS) that investigated the new (pending 2020 meteorology) inflow design flood (IDF) impacts on the existing embankment. SGM reviewed the modeling data for validity and associated impacts and found the RCEM findings to be beneficial to RR&DC. The CDS work allowed a higher frequency design storm to be used for the spillway sizing with the proviso that an early warning system coordination with local and federal agencies was inplace. Note, without the reduction in IDF peak flow, a rehabilitated spillway would have had to provide capacity for a 40,000 cubic foot per second (cfs) peak flow. The reduced IDF flow of 14,000-cfs allowing a considerable reduction in the spillway capacity and associated costs the outweighed the early warning system costs.

Direction from RR&DC focused on providing a preliminary design for a spillway to handle the reduced IDF peak flow. SGM developed a straight crest spillway section and hydraulically appropriate approach and exit channel configuration for a zero-enlargement reservoir. The spillway created using the 5-foot of available headwater was 360-foot long. A schematic plans and related cost estimate were produced for this alternative.

As part of this work SGM contacted state, and county Department of Homeland Security (DHS) staffs about early warning system configuration and support with favorable responses from both agencies. SGM was directed to the National Weather Service (NWS) office in Grand



Junction to assess if Redmesa could tie into NWS GOES early warning system. NWS reviewed the request and provided an affirmative answer. Thus, providing the early warning system organizational framework needed to utilize the lower IDF value for the spillway sizing. CDS was contacted about NWS and DHS agreements to participate in an early warning system.

The excavation volume for the straight spillway crest and related channel is significant and costly; hence, SGM looked into an alternate spillway configuration known as a labyrinth weir spillway crest. SGM developed a spreadsheet for analyzing this spillway configuration with assistance from the Utah Water Research Center and modelled this alternative spillway configuration. The spillway plan was developed along with an associated cost estimate. This alternative while yielding considerably less earthwork had an overall higher cost due primarily to the cost of concrete.

In January 2020, CDS formally adopted the new Rules and Regulation for Dam Safety and Construction. As part of the formal adoption further research into the new tools for rainfall analysis identified that the rainfall for the controlling storm scenario for Red Mesa switched from a 6-hour duration storm to the 2-hour duration storm, suggesting a slightly lower IDF peak flow. Although the IDF peak flow was slightly lower for the controlling storm the allowance for future weather pattern change wasn't used to determine the peak runoff and subsequent flow rates for the IDF. SGM updated the meteorology model (HEC-HMS) to reflect the 2020 adopted regulatory requirements. The outcome of the modeling identified that the peak flow of the IDF went up slightly to 14,400-cfs.

Communication with CDS in the early 2020 identified that that there was more free board available for the current conditions of the reservoir due to the recent reconstruction of the spillway. RR&DC authorized a verification survey which SGM performed. The findings of the survey identified that 8-feet of total headwater was available, which had an applicable effect on spillway sizing.

SGM analyzed a new straight spillway with the updated headwater information from the survey and IDF peak flow. The spillway was reduced to 195-feet, which is a substantial reduction from 360-feet. A schematic plan and profile of this spillway was prepared along with a cost estimate.

# 3.2.4 Alternative No. 2: Zero Enlargement – Cursory Planning Level Engineering

CDS identified that they were open to add a concrete crest on the existing dam embankment which would allow the use of additional headwater depth in the analysis of the spillway. SGM modeled a 1-foot concrete crest addition. The additional 1-foot of headwater reduced the spillway to 150-feet in length; however, the cost for the concrete crest added \$100,000.00 to the construction costs making this option less attractive.

#### 3.2.5 Alternative No. 3: 500 AF Enlargement – Cursory Planning Level Engineering

The establishment of the construction costs (i.e., Alternatives No. 1 and 2) to bring Redmesa into conformance with CDS regulations provided the baseline to compare enlargement options and develop a cost per acre-foot for each enlargement option. Three enlargement options were analyzed to develop a storage to cost curve. The first enlargement was for 500 AF. The embankment was raised to allow this increase in storage and to address CDS regulations on free board height needed during and IDF vent. The new embankment crest



was raised to 11.75 feet from existing allowing 11-feet of headwater for the spillway analysis. The resulting trapezoidal spillway bottom width for this option is 135-feet wide.

## 3.2.6 Alternative No. 4: 900 AF Enlargement – Cursory Planning Level Engineering

The second enlargement alternative was for 900 AF. The embankment was raised to allow this increase in storage and to address CDS regulations on free board height needed during and IDF event. The new embankment crest was raised to 16.75 feet from existing allowing 11-feet of headwater for the spillway analysis. The resulting trapezoidal spillway bottom width for this option is 80-feet wide. The reduction in spillway width is attributable to the increase storage within the reservoir above the spillway which provides enhanced IDF peak attenuation.

# 3.2.7 Alternative No. 5: 1,190 AF Enlargement – Cursory Planning Level Engineering

The last enlargement alternative was for 1,190 AF. The embankment was raised to allow this increase in storage and to address CDS regulations on free board height needed during and IDF event. The new embankment crest was raised to 19.5 feet allowing 11-feet of headwater for the spillway analysis. The resulting trapezoidal spillway bottom width for this option is 70-feet wide. The reduction in spillway width is attributable to the increase storage within the reservoir above the spillway.

Alternatives 3, 4, and 5 require the use of a concrete gravity wall parallel to the spillway to terminate the embankment crest at the spillway channel. Schematic level plans for Alternatives Nos. 1 through 5 are provided in Appendix C.

The United States Bureau of Reclamation provides guidance on the determination of fatality risks associated with dams in the document, Reclamation Consequences Estimating Methodology (RCEM) dated 2015. As noted in the 2019 work, CDS provided a preliminary RCEM for the existing dam given the rationale that a higher frequency IDF can be used for the spillway capacity determination. SGM in exploring the three enlargements in 2020, conducted an update of the RCEM for the 1,190-acre foot enlargement. The CDS HEC-RAS model was reconfigured to represent the enlargement. This included updating the geometry files and associated dam breach parameters, as well as introducing the 2-hour duration IDF into the reservoir body.

SGM then reviewed all risk sites used by CDS and looked for others that might be in the way of the overtopping embankment failures flood wave. No new at-risk sites were identified. The revised RCEM identified that the fatality risk remained below one for the upper limit of the suggested range, thus CDS determination will work for the largest of the enlargements. This conclusion can be applied to the remaining two enlargements investigated.

#### 3.2.8 2020 Project Cost Estimates

As a part of the 2020 FFS, SGM reviewed the 2016 AECOM estimated construction costs for the repair without enlargement and 550 AF enlargement alternatives. SGM staff were a part of the BKT Reservoir construction project management team, and compared various project components, unit costs, quantities, and volumes associated with the final construction costs of the BKT Reservoir to those listed in the 2016 AECOM report. While the BKT Reservoir was constructed in 2014 and has an active capacity of approximately 5,309 AF, the proximity of BKT Reservoir to Redmesa Reservoir as well as the underlying geology at both reservoir



sites, provides an excellent cost-basis and quantity-basis to complete a comparative analysis. Where applicable, SGM updated unit costs based upon regional West Slope price indexes.

Based upon our experience, BKT Reservoir project costs, and updated 2020-unit costs, SGM estimated the 2020 total project costs for each scenario will increase as compared to the 2016 AECOM estimated construction costs. The primary reasons for the increase in project costs were due to:

- Increases in the foundation preparation and right abutment grouting costs, to be more consistent with the construction costs experienced at BKT Reservoir.
- Increases in the unit costs for the shell and core materials.
- SGM also added a 6-inch layer of aggregate base course materials along the dam crest, based upon the construction of the BKT Reservoir.

In order to expedite the necessary engineering work to comply with the CDS's storage restriction order on Redmesa Reservoir, the RR&DC has elected to separate the engineering and permitting costs associated with an enlargement of Redmesa Reservoir (Phase 1). Currently, the RR&DC must submit final plans and specifications to CDS by March 1, 2021 to avoid a zero restriction order. SGM has prepared a cost estimate for the necessary engineering and permitting work in Phase 1 to comply with the CDS storage restriction order, as shown in Table 20. The Phase 1 work includes schematic design, spillway hazard classification, survey, geotechnical investigations, final design, Section 404 permitting, and NEPA compliance activities.

For the Phase 1 work, the RR&DC has secured \$75,000 of emergency grant funding from Southwestern Water Conservation District and is seeking a combined grant application of \$275,000 from the Southwest Basin Roundtable and State Water Supply Reserve Fund (WRSF) accounts. Presently, the RR&DC plans to use available funding, share assessments, and CWCB loans to finance the remaining portion of the Phase 1 work (approximately \$232,400).

For the actual construction cost estimates (Phase 2) SGM estimated the 2020 total costs using updated unit-cost from the 2016 AECOM study along with additional design considerations from our preliminary engineering analyses. The increased unit costs result in and increased estimated construction costs, which increase the contingency cost, as it is based on a percentage of the direct construction costs. Tables 21 through 25 show the detailed cost estimates for Alternative Nos. 1 through 5, respectively. In summary, the estimated 2020 construction costs are:

- Alternative No. 1 (total capacity of 1,176 AF): \$2,764,500 (\$2,351 per AF)
- Alternative No. 2 (total capacity of 1,176 AF): \$2,896,500 (\$2,463 per AF)
- Alternative No. 3 (total capacity of 1,676 AF): \$6,452,400 (\$3,850 per AF)
- Alternative No. 4 (total capacity of 2,076 AF): \$7,699,500 (\$3,709 per AF)
- Alternative No. 5 (total capacity of 2,366 AF): \$8,542,400 (\$3,610 per AF)

As shown, the lease expensive project is Alternative No. 1. This also has the lowest unit cost per AF of total storage capacity. However, Alternative No. 1 would not result in any new storage capacity in Redmesa Reservoir, which would preclude the RR&DC from key funding mechanisms, such as the Colorado Water Plan Grant. Alternative No. 1 would also preclude



additional stakeholders from participating in the project and would limit the regional and statewide values of a project solely benefiting the Reservoir Ditches.

For the Redmesa Reservoir enlargement alternatives, Alternative No. 5 is the most expensive, but has the lowest unit cost per AF of total storage capacity. This would maximize the opportunities for other stakeholders and would increase the regional and state-wide benefits, while optimizing the modeled available yields.

#### 3.3 Selected Alternative

Based upon the completed analyses, the RR&DC and stakeholders have selected to pursue the 1,190 AF enlargement alternative. The selection is primarily based on the modeled optimization of the water rights yield and the increase in the average annual water supply and the modeled average annual increase in yield for all stakeholders.

SGM recommends the RR&DC complete the design of the 1,190 AF enlargement alternative in the near future to fully refine the dam configuration and size, including the normal WSEL for the selected alternative, project quantities, and spillway dimensions. Ultimately, the design of the selected alternative will refine and further constrain the construction cost estimate for the alternative. SGM believes its cursory planning level cost estimate is conservative and may be reduced after additional design work is completed.

For the Redmesa Reservoir enlargement project to be economically viable, it is critical that the RR&DC and stakeholders commit to participation in the project, including equitably sharing project costs amount project participants. The estimated total costs associated with the 1,170 AF enlargement alternative are significantly more than the no enlargement alternative but is the least expensive enlargement alternative on a unit cost-basis.

## 3.3.1 Summary of Project Stakeholders

At this point in time, the three primary stakeholders for the selected alternative are the RR&DC, CDWR, and CPW. The RR&DC will own, operate, and maintain the enlarged Redmesa Reservoir on behalf of its shareholders. The RR&DC will also need the support and commitment for future operations of BKT Reservoir with the LPWCD Board and its shareholders. RR&DC will need to have an agreement with LPWCD in allow additional CDWR and new CPW supplies in BKT Reservoir; however, no additional capacity will be needed, as the infill of CDWR and CPW capacity in BKT Reservoir will be equal to the Reservoir Ditches exchange allocation each year. For this report, the summary of future operations highlights the anticipated operations possible between RR&DC and the LPWCD.

The La Plata River is carefully administered and operated by the CDWR staff to meet the requirements and Colorado's obligations specified within the 1922 La Plata River Compact. Therefore, the future operations of the enlarged Redmesa Reservoir with BKT Reservoir will be directly monitored and administered by CDWR staff.

#### 3.3.2 Summary of Future Operations

For each water year, the initial fill (up to 1,176 AF) will be allocated to RR&DC for the distribution to, and beneficial use by, its shareholders. Fills, and refills, above 1,176 AF, up to the total enlarged reservoir volume of 2,366 AF, will be allocated to CDWR, CPW, and the Reservoir Ditches on a pro-rata basis of their enlargement ownership. Historically, Redmesa



Reservoir has had very little year-to-year carryover storage. The primary reason for the lack of carryover is the irrigation demands greatly exceed the irrigation supply. Secondly, the RR&DC has experienced icing conditions during the winter that can damage the existing outlet control tower. Once the Redmesa Reservoir enlargement is completed and future operations of CDWR and CPW's storage accounts occur, an opportunity for carryover storage will likely occur as described in Section 3.2.1.

The net reservoir evaporation will be assessed to the project stakeholders on a pro-rata basis given the stored supplies within each stakeholder's pool. The RR&DC and CDWR/CPW accounts will operate in concert with each other, to the extent that equivalent supplies are available in both Redmesa and BKT Reservoirs. Additional CDWR and CPW supplies above the Reservoir Ditches allocation in BKT Reservoir will remain in Redmesa Reservoir for use in subsequent years. Additional Reservoir Ditches supply above the CDWR and CPW supply available in BKT Reservoir cannot be paper exchanged to the Reservoir Ditches but could be physically released from BKT Reservoir for subsequent exchange on the La Plata River as currently done.

The LPWCD owns, operates, and maintains the BKT Reservoir, which has a maximum operational capacity of 5,309 AF. If full, the BKT Reservoir would provide approximately 5,000 AF of exchange supply to BKT Reservoir shareholders for supplemental irrigation water. The anticipated long-term average annual yield from BKT Reservoir is approximately 3,066 AF. Currently, the combined RR&DC ditches participation in the BKT Reservoir project represents approximately 20% of the annual yield to project shareholder. Given the RR&DC participation in BKT Reservoir the preferred annual operation for the enlarged Redmesa Reservoir in most years will be to complete a paper exchange of supplies in both reservoirs, for the benefit of all RR&DC ditches in Redmesa Reservoir and CDWR and CPW in BKT Reservoir.

For example, if the total BKT Reservoir District Pool volume was set at 2,000 AF in a given year, approximately 400 AF of exchange supply would be available to the RR&DC ditches. If, in that same year, the CDWR and CPW pools in the enlarged Redmesa Reservoir was collectively 600 AF, 400 AF of that could be paper exchanged between the two reservoirs, leaving 200 AF CDWR and CPW supplies in Redmesa Reservoir.

Under the described scenario, CDWR use of supplies from BKT reservoir would be used in the late irrigation season for Compact compliance purposes; any remaining CDWR supply in BKT could be booked over to CPW's BKT volume for subsequent fish releases in the non-Compact season and a comparable amount swapped from CPW's account in Redmesa Reservoir to CDWR's Redmesa Account. Overall, the proposed operations would allow for ample flexibility for stakeholders to put their Redmesa Reservoir supplies to beneficial uses at their desired locations and times of the year.

By completing a reservoir paper exchange, the Reservoir Ditches' BKT Reservoir supplemental irrigation supply would not be subject to the periods with sufficient exchange potential on the La Plata River or Hay Gulch. A paper exchange would not require a release of CDWR and CPW supplies from Redmesa Reservoir, effectively eliminating CDWR assessed transit/stream losses from Hay Gulch down to Long Hollow on their supplies from an enlarged Redmesa Reservoir. Similarly, a paper exchange of CDWR and CPW supplies into BKT Reservoir would eliminate the constraints of physical exchanges, including sufficient streamflow in the La Plata River, inflows into BKT Reservoir, and exchange potential on Long Hollow.



In addition to the preferred operation, the following alternative operations could be completed at various times throughout the year to more effectively convey irrigation supplies during the La Plata River's greatly varying seasonal and annual hydrologic conditions.

In summary, the enlarged Redmesa Reservoir will be able to work in tandem with the BKT Reservoir to the mutual benefit of the Compact, native fisheries, and irrigators. This includes increasing the supply available to CDWR for Compact compliance and to CPW for native fisheries in the La Plata River below Long Hollow. Both the CDWR and CPW supplies released from BKT Reservoir will bolster the riparian corridor in the La Plata River and will provide additional streamflow in the La Plata River during dry years and seasonally low-flow conditions. In addition, RR&DC intends to provide more augmentation water to water users within the La Plata River Basin, including domestic, commercial, industrial, and municipal uses.

#### 3.3.3 Summary of Regional Benefits

As illustrated in Section 2.3.2., the primary benefits of the enlarged Redmesa Reservoir Project is to maintain the historical irrigation supply available to all RR&DC ditches, assist the CDWR in Compact compliance, and to support native fisheries. In addition, the enlarged Redmesa Reservoir Project will directly result in the following regional benefits.

- Increased storage capacity in Redmesa Reservoir will allow stakeholders to increase
  the storage of available supply on the La Plata River during favorable hydrologic
  conditions (wet year) for use in subsequent dry years, increasing agricultural,
  Compact, fisheries, and augmentation supplies during time of drought, as observed
  in 2018.
- The Project will provide additional capacity for the RR&DC and CDWR staff to better manage diversions to during periods with large fluctuations in diurnal flow.
- The ability to complete intra-reservoir paper exchanges will eliminate CDWR's administrative transit/stream losses down Hay Gulch to the La Plata River for exchange up Long Hollow into BKT Reservoir, and further increase the supply available to stakeholders.
- All increases in irrigation supply will result in additional ditch and reservoir seepage
  as well as irrigation return flows, all of which would recharge the Redmesa Aquifer.
  The aquifer recharge will ultimately accrue to the La Plata River, Government Draw
  and Long Hollow and will generally increase flows in the lower portion of the basin.
- Increased return flows in the lower portion of the basin will benefit irrigators, provide operational flexibility for water managers and CDWR staff, help to meet Compact deliveries, and will provide supplemental flows benefiting the environmental communities within the river and the adjacent riparian habitat.
- During the winter, BKT Reservoir's bypass requirements could preferentially be made from Redmesa Reservoir. In doing so, the addition of supplemental flow for threatened and endangered fish species in the La Plata River below the confluence with Long Hollow would be bolstered upstream all the way to its confluence with Hay Gulch.
- The RR&DC anticipates providing access to Redmesa Reservoir for recreational uses including non-motorized boating and seasonal waterfowl hunting.



 CPW does not envision allowing fishing in Redmesa Reservoir, as non-native fish compete with native fish, which are a focal point of this project.

# 3.3.4 Summary of Statewide Benefits

Based on the recent operations of BKT Reservoir since it was completed in 2014, the availability of stored supplies for exchange within the lower portion of the La Plata River basin has increased the operational flexibility of the La Plata River. This flexibility has directly benefitted irrigation users throughout the basin, as well as CDWR staff in managing their Compact requirements for daily flow delivery at the Colorado-New Mexico Stateline. Based on the operational success of BKT Reservoir, the following statewide benefits will occur as a result from the enlarged Redmesa Reservoir Project.

- The Project will further develop Colorado's usage of its La Plata River entitlement under the 1922 La Plata River Compact.
- The Project will result in fewer days of Compact over-deliveries from Colorado as Colorado better manages its portion of the highly variable La Plata River entitlement.
- The Project will result in fewer days of Compact under-deliveries to New Mexico. The reduction in under-deliveries to New Mexico reduces the potential of future litigation between the states.
- The Project will provide additional irrigation water that is delivered on a timelier basis to New Mexico irrigators.



# 4.0 Redmesa Reservoir Enlargement Impacts

# 4.1 Impacts—Wetlands and Aquatic Resources

The area around the reservoir is primarily pinon-juniper; irrigated pastureland occurs upstream of the reservoir. Emergent and scrub-shrub wetlands occur at the base of the embankment for the reservoir. Relatively narrow bands of emergent wetlands also occur along the Hay Gulch channel upstream of the reservoir.

In addition, some wetland plants have invaded portions of the reservoir bottom which are intermittently flooded and exposed as the reservoir fills then drains. Initial work by SGM, including consultations with the local representative with the U.S. Army Corps of Engineers (Corps), indicated the potential for a relatively large area of wetlands within the reservoir footprint, which if present, could have a significant impact on the cost of permitting the project. Therefore, additional work was completed to determine the extent that any of the area within the reservoir footprint is wetlands, as defined by Section 404 of the Clean Water Act. The results of this work are included in the wetland delineation report included as Appendix B, which was provided to the Corps for concurrence in mid-June 2018. SGM asked the Corps to complete an Approved Jurisdictional Determination (AJD) based upon the wetland delineation report, to quantify and limit future impacts solely to the delineated wetlands.

This report found that most of the bottom of the existing reservoir is unconsolidated sediment, with or without some plants, most of which are upland weeds. There is a total of 1.752 acres that technically meets the criteria for wetland under Section 404. This area is dominated by several "facultative" wetland species and upland plants, most of which are weeds and/or poisonous plants. Therefore, this 1.752-acre area is very low value "wetland" with minimal to no aquatic resource functions.

Based on mapping of wetlands below the embankment and within the reservoir footprint, along with observations of the extent of wetlands along Hay Gulch upstream of the RR, it is estimated that a total of 2.164 acres of wetlands would be impacted from a 1,170 AF expansion, as follows:

- Below embankment: 0.192 acres.
- Within reservoir footprint: 1.752 acres.
- Along hay Gulch upstream of reservoir: 0.22 acres.

It is important to note that, under Section 404, impacts to wetlands include those from the discharge of fill material into wetlands, and also from flooding of vegetated wetlands that would change the nature of the aquatic resource, such as would occur with raising the embankment, as is proposed. Therefore, flooding of the 1.752 acres of low quality wetlands would be considered an impact and require mitigation under Section 404.

It should also be noted that the extent of additional wetland impacts upstream along Hay Gulch from a larger reservoir expansion would be relatively small, since most of the wetland impacts would occur at the embankment and within the existing reservoir footprint, and the extent of wetlands along Hay Gulch upstream is relatively small.

## 4.2 Anticipated Environmental Permitting Requirements



#### 4.2.1 Section 404

Based on consultations with the Corps, Hay Gulch would be considered to be a "waters of the U.S." under Section 404 since it likely has enough natural flow without ditch diversions to be considered as a "relatively permanent water" or a "tributary to a relatively permanent water", which would be the La Plata River. The Corps stated that they have considered the channel of Hay Gulch well upstream of RR to be a water of the U.S. in another permitting matter.

The fact that most of the water in the reservoir is diverted from the La Plata River and used for irrigation was discussed with the Corps. However, the Corps indicated that they would not consider the wetlands within the reservoir to be non-jurisdictional since this designation is only for wetlands that are created and sustained by the direct application of irrigation water—not wetlands that are caused by water stored in a reservoir.

Therefore, a Section 404 permit would be required for expansion of Redmesa Reservoir since fill material would be discharged into wetlands and Hay Gulch below the existing embankment; and wetlands within the reservoir footprint upstream along Hay Gulch would be inundated, thus changing their nature (and associated functions). Based on the total estimated impact of 2.164 acres, an Individual Section 404 Permit (IP) would be required. The application for the IP will have to include an alternatives analysis that demonstrates that impacts to wetlands have been avoided and minimized to the extent practicable, and that an alternative does not exist that meets the project purpose and would result in fewer impacts. A mitigation plan would also have to be prepared that fully mitigates the functions of the impacted wetlands.

#### 4.2.2 Related Approvals

Below is a summary of related approvals that will be required during the Section 404 permitting process.

- 401 Certification: A requirement of an IP is that a project receive "401 Certification" from the Colorado Water Quality Control Division that the proposed project will not adversely affect water quality and State water quality standards. This is a separate, but parallel process that could entail an analysis of possible effects on water quality from the project.
- National Environmental Policy Act (NEPA): Compliance with NEPA is required for every Section 404 permitting action by the Corps. The extent of work required for NEPA compliance depends on the amount of wetland impact and magnitude of related impacts. Based on consultations with the Corps, compliance with NEPA would very likely be met by either preparation of an internal environmental assessment (EA) by the Corps, or worst case, by preparation of a more detailed EA by an outside contractor. It is very unlikely that the proposed enlargement of RR would trigger the need for an environmental impact statement (EIS)—which would be significantly more involved and costly.
- Threatened and Endangered Species Act: It will be necessary to make sure that the project does not adversely affect any federal or CO-state listed threatened or endangered (T&E) species. A combination of research and field work could be required to ensure compliance. Consultation for increased depletions for the San Juan River T&E fishes is also required under Section 7 of the ESA.



- Migratory Bird Treaty Act: Consultation for with the U.S. Fish and Wildlife Service will be necessary to make sure that the project does not adversely affect the nesting and breeding of any migratory birds.
- <u>Cultural Resources</u>: The State Historic Preservation Office (SHPO) requires that any
  impacts to cultural resources from a project be disclosed prior to issuance of a Section
  404 permit. This means that a cultural resource study will have to be completed for the
  affected area, if one does not already exist. The Corps will consult with SHPO to
  document if there will be impacts to significant cultural resources.

#### 4.3 Institutional Considerations

The 2016 AECOM report identified several impacts and institutional considerations that will need to be addressed by the RR&DC going forward to implement the design, permitting, and eventual construction of the preferred alternative. Those impacts and institutional considerations are still relevant for the 1,170 AF enlargement of Redmesa Reservoir. In summary key considerations include:

- Lands upstream of the dam will require a flood easement from property owners affected by the enlarged reservoir footprint.
- The reservoir enlargement will increase the depletions to the San Juan River system (including evaporation) and will result in greater consumptive uses of water from the basin. The RR&DC will need to quantify the increased depletions to the San Juan River, consult with the U.S. Fish and Wildlife Service regarding its participation in the San Juan Basin Recovery Implementation Program.
- Modifications to the dam and spillway will need to meet the SEO dam safety requirements, and the spillway will need to pass the 24-hour, 100-year storm event.
- Completion of the final design will require approval by the SEO, prior to putting the project out to bid by construction contractors.
- Coordination with the Williams Company, Inc. regarding the existing pipeline on the left abutment area will be necessary.
- Additional geotechnical activities should be completed in areas where grouting of the abutments will occur. These activities will allow for more detailed engineering and accurate cost estimates to be developed.
- The RR&DC through its Board will need to coordinate with and/or obtain approval from
  its shareholders to proceed with the engineering, permitting, and construction of the
  project; allow the RR&DC to encumber debt, develop additional company shares to
  incorporate additional project participants, and develop operational plans.
- The RR&DC will need to coordinate with the CDWR on the continued and new operations at an enlarged Redmesa Reservoir.
- The RR&DC will likely need to coordinate with Colorado Parks and Wildlife (CPW) regard T&E fish species in the La Plata River and cooperative ways to manage and operate the enlarged reservoir.
- Since most of the project occurs on private lands, local and state permitting will be relatively streamlined; however, consultation with La Plata County and various State agencies will be required for items such as: floodplain development permit, construction dewatering permit, and a fugitive dust permit.



# 4.4 Estimated Costs for Environmental Permitting

The primary costs for environmental permitting of the reservoir enlargement are associated with obtaining the required Section 404 permit and related requirements, as described in Section 4.2. The Section 404 permit application will have to include a relatively detailed alternatives analysis that meets the requirements of the 404(b)(1) Guidelines and the Corps Public Interest Review Criteria. A Final Mitigation Plan will also likely be required that meets the standards of the 2008 Final Mitigation Rule. The costs for mitigation will depend on the Mitigation Ratio Checklist process that the Corps uses to determine the appropriate amount of mitigation needed to replace lost aquatic resource functions.

The following provides planning-level cost estimates for the project, assuming around 2.2 acres of wetland impact with at least 1:1 mitigation, and no significant issues with T&E species, cultural resources or other unforeseen issues that could trigger the need for an EIS and protracted permitting process:

- Section 404 Permit (including alternative analysis, mitigation plan and 401 certification): \$55,000.
- Cultural Resources: \$20,000.
- EA for NEPA: \$25,000.
- Wildlife and miscellaneous Studies: \$15,000.
- Mitigation construction (creation of 2-3 acres of replacement wetlands): \$120,000 to \$200,000.

## 4.4.1 Permitting Schedule

Based upon our experience, we anticipate the permitting portion of the Redmesa Reservoir Enlargement project can be completed over the following timeframes.

- <u>Section 404 Permit</u>: assume 9 months for preparation of application information and processing of the request by the Corps.
- Other environmental and cultural resources studies and approvals (including 401 Certification) would occur during the same timeframe.



# 5.0 Financial Plan

To fully fund the selected alternative to enlarge Redmesa Reservoir by 1,190 AF, the following funding proposal was developed on behalf of the RR&DC and the other Project Partners. Table 26 shows the total project costs, including the Phase 1 engineering and permitting costs along with the Phase 2 construction costs. In summary, the 2020 estimated total project cost for the 1,190 AF enlargement of Redmesa Reservoir is \$9,124,800.

#### 5.1 Financial Sources

The RR&DC intends to apply for the following financial sources to fund its portion of the project.

- A SWCD Grant of \$75,000 for the final engineering portion (Phase 1) of the project.
- A combined Southwest Basin Roundtable Water Supply Reserve Fund (WSRF) and CWCB Statewide WSRF grant application of \$275,000 for the final engineering and permitting portions (Phase 1) of the project.
- A CWCB Colorado Water Project Grant application of \$4,000,000, given the regional and state-wide importance of this project along with multi-party project benefits.
  - RR&DC acknowledges the listed amount exceeds the annual Colorado Water Project Grant application amount of \$3,000,000 and will seek to coordinate with the Southwest Basin Roundtable and CWCB Board to see if there are ways to fund the project over multiple years.
- A Department of Homeland Security Pre-Disaster Mitigation grant application of \$1,000,000 for the spillway portion of the project along with critical infrastructure to minimize the current dam hazards applicable under the competitive federal grant program.
- A US Bureau of Reclamation WaterSmart grant application of \$250,000 for the upgrade of the reservoirs outlet works, construction of a SCADA system, and incorporation of power and a remote telemetry system at Redmesa Reservoir.
- Contribution of US Fish and Wildlife Service grant funds of \$750,000 for the construction of a compliant reservoir fish screen, and project benefits to native fish species within Hay Gulch and the La Plata River.
- A CWCB Water Project Loan application of \$2,774,800 (rounded to \$2,775,000), as described in Section 5.2.

The specific loans and grants amounts described are not guaranteed and may change based on the amounts available and awarded. As such, the total anticipated RR&DC financial contribution for the Redmesa Reservoir Enlargement Project is estimated to be \$2,775,000 but may change. We also acknowledge that as the final design for the Reservoir Enlargement Project is completed additional information will be gathered, and the design will be advanced for construction purposes. This process will better quantify the actual construction cost and will decrease the planned construction contingency (currently set at 30%).

# 5.2 Loan Amount

The RR&DC intends to apply for a \$2,775,000, 30-year term, loan from the Colorado Water Conservation Board's Water Project Loan Program in May 2020. The current 30-year agricultural interest rate is 1.35 percent; however, the existing CDWR Storage Restriction placed on Redmesa Reservoir allows for an interest rate reduction of 0.5 percent, equating to



a fixed 30-year interest rate of 0.85 percent. The resulting annual payment amount for the described loan would equate to \$105,184.90, resulting in a total interest amount of \$380,547.03 paid over the life of the loan.

# 5.3 Revenue and Expenditure Projections

SGM will update and provide a detailed schedule of estimated annual revenues and annual expenditures by year for the entire period of debt retirement with CWCB, once all the Project Participants and funding sources are fully vetted and obtained.

# 5.4 Repayment Sources

The RR&DC will repay its annual CWCB loan payment through an increase in RR&DC annual share assessment fees. The current RR&DC shares will become A-class shares and will increase their annual assessment by \$16.70. As previously stated, the current RR&DC annual share assessment is \$20.50 per share. The RR&DC does not believe its shareholders can afford more than an incremental increase of \$16.70 per share, raising the annual share assessment to a total of \$37.20 per share. For the existing 1,138 outstanding A-class shares an annual increase of \$16.70 per share would generate a maximum annual loan repayment amount of \$19,004.60

The RR&DC will create new B-class shares with the enlargement of the reservoir. Each AF of capacity within the enlarged Redmesa Reservoir will be equal to 1 B-class share. The RR&DC anticipates assessing each B-class share an initial annual assessment of \$24.25 per share, and a secondary assessment of \$18.00 each year water is stored and used within the enlargement pool. Given that hydrologically, the reservoir would completely fill approximately 12 out of 35 years (34-percent of the time), an average annual use amount would be \$6.17 per year. On average the B-class shares would generate \$30.42 each year, equating to an annual loan repayment amount of \$36,199.80

The RR&DC will prioritize the use of up to 30 AF each year for augmentation purposes at an average annual cost of \$1,000 per AF. While it is not likely that the full 30 AF would be used each year, the anticipated augmentation demand for known and potential uses in the basin could average 25 AF per year, generating a loan repayment amount of \$25,000.

The RR&DC is considering opening up Redmesa Reservoir for recreational purposes, including non-motorized boating and waterfowl hunting, totaling 140 acres. Additionally, RR&DC is working with adjacent landowners and other landowners in the area to open up approximately 1,000 acres of land that could be enrolled through CPW's Walk-in Access Program. Preliminary discussions have occurred, and RR&DC acknowledges that it will take time to vet key parcels that could be used for upland bird, waterfowl, turkey, small game, and big game hunting access. The enrollment process is competitive and requires the appropriation of designed CPW funds for the program through the Colorado legislature. Properties with conservation easements, ideal habitat, and larger tracks of land are more likely to be enrolled in the Walk-in Access Program. Exact repayment amounts are not known at this time, but for planning purposes a placeholder an annual lease amount of \$25 per acre each year was used to estimate an annual loan repayment amount of \$25,000.

The estimated loan repayment sources total \$105,204.40 per year and are excess of the current income generated by the existing shares. Any additional funds collected by the RR&DC will be used to cover current expensed and future operations and maintenance costs.



# 5.5 Financial Condition of the Borrower and Financial Impacts

The RR&DC does not have any outstanding debt and has remained solvent since its incorporation in 1923. For 95 years, the RR&DC has collected annual assessments and maintained its physical assets and water rights for the benefit of its shareholders. The RR&DC believes its shareholders will financially be able to afford an increase in annual assessments by \$30 to a total annual assessment cost of \$50 per year.

# 5.5.1 Annual Financial Statements

The RR&DC's annual financial statements between 2016 and 2018 are attached as Appendix A. Conclusions and Recommendations



# 6.0 Conclusions and Recommendations

#### 6.1 Conclusions

The following conclusions have been determined through the work completed in the Redmesa Reservoir FFS.

- The historical long-term average annual delivery of Redmesa Reservoir supply to the Reservoir Ditches is 875 AF.
- The modeled hydrology shows an enlargement of Redmesa Reservoir by 1,170 AF (total storage of 2,346 AF) would fill 12 of 35 years, or 34 percent of the time.
- The RR&DC does not believe breaching the existing Redmesa Reservoir dam is a viable alternative for their shareholders, the environment, or other water users within the La Plata River basin.
- An enlargement of 1,190 AF, will result in the following yields:
  - o CDWR (600 AF):
    - Average annual increase in yield of 93 AF.
    - Maximum annual increase in yield of 420 AF.
  - o CPW (500 AF):
    - Average annual increase in yield of 65 AF.
    - Maximum annual increase in yield of 319 AF.
  - Reservoir Ditches (60 AF):
    - Average annual increase in yield of 23 AF.
    - Maximum annual increase in yield of 47 AF.
  - Augmentation Pool (30 AF):
    - Average annual increase in yield of 7 AF.
    - Maximum annual increase in yield of 17 AF.
- The estimated Redmesa Reservoir Enlargement of 1,190 AF (total capacity of 2,366 AF) has an estimated 2020 construction cost of \$8,542,400 (\$3,610 per AF).
- The RR&DC and project stakeholders have selected the 1,190 AF enlargement of Redmesa Reservoir as their preferred alternative to pursue.
- For the selected alternative, the Project participants include: RR&DC, CDWR, and CPW.
- Future operations will provide multiple regional and state-wide benefits.
- The total impact to wetlands by the selected alternative is estimated to be less than 2.2 acres of wetlands, as delineated by SGM during the FFS.
  - Most of the delineated wetlands are dominated by weeds and/or poisonous plants that have a very low "wetland" value and provide minimal to no aquatic resources function.
- Based on the total estimated impact of less than 2.2 acres, and Individual Section 404
  Permit (IP) would be required.
- All permitting fees, including mitigation at a 1:1 ratio of disturbed wetlands, are estimated to be \$300,000 in 2020.

### 6.2 Recommendations



SGM recommends the RR&DC and other Project Participants begin the identified process of the Financial Plan specified within Section 4 of this FFS to begin the implementation of enlarging Redmesa Reservoir. Specifically, SGM recommends the RR&DC begin Phase 1 of the project to complete the engineering necessary to extent the use of its existing reservoir and avoid the zero storage restriction by CDS. Further, Phase 1 work should begin on the permitting aspect of the project. This will allow the Project Participants to fully vet the estimated construction costs and revise the participation costs and/or grant and loan application amounts based upon the final cost estimate.



# 7.0 References

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Wright Water Engineers, Inc. (WWE), Red Mesa Ward Dam Enlargement Feasibility Study, April 2003.

WWE, Letter to Mr. Brice Lee, Re: Red Mesa Reservoir Enlargement Hydrology: Reservoir Inflow, August 15, 2002.



# **TABLES**



Table 1. Redmesa Reservoir and Ditch Company Water Rights

Name	Case No.1	Adjudication Date	Appropriation Date	Administration No.	Priority Number	Absolute / Conditional	Uses	Volume (AF)	Decreed Amount (cfs)	Action Comment
	CA0807	3/21/1966	4/30/1905	23914.20208	65-1	Absolute	1,2,4,5,6,8,Q	1,176	-	Storage
Redmesa	CA0807	3/21/1966	4/30/1905	23914.20208	65-1	Conditional	1,2,4,5,6,8,Q	2,898		Storage for enlargement; DD August 2018
Reservoir	01CW0110; 09CW0066	12/31/2001	12/31/2000	55152.55152	•	Conditional	1,3,4,5,6,7,A,Q,W	3,418	-	Refill; DD February 2024
	01CW0110; 09CW0066	12/31/2001	12/31/2000	55152.55152	•	Absolute	1,3,4,5,6,7,A,Q,W	656	-	Refill
Redmesa Supply Ditch	CA0807-C	3/21/1966	4/30/1905	23914.20208	65-2	Absolute	1,2,4,5,8,Q	•	120	Source-La Plata River

Notes:
cfs = cubic feet per second
AF = acre-feet
Use Types: 0 - storage; 1 - irrigation; 2 - municipal; 3 - commercial; 4 - industrial; 5 - recreation; 6 - fishery; 7 - fire; 8 - domestic; 9 - stock; A - augmentation; Q - other; W - wildlife.

1) The application in Case No. 01CW0110 was a joint filling between the Red Mesa Ward Reservoir and Ditch Company and the La Plata Water Conservancy District

Table 2. Historical Redmesa Reservoir Hay Gulch Diversions (AF)

Year/	Oct	Nov	Dec	Jan	Feb	Mar	Anr	May	Jun	Jul	Διια	Con	Total
Month	Oct	NOV	Dec	Jan	reb	Iviar	Apr	iviay	Jun	Jui	Aug	Sep	Total
1975	150	808	315	340	362	946	0	0	0	0	0	0	2,920
1976	530	246	405	354	489	421	0	0	0	0	0	0	2,445
1977	485	370	194	132	206	165	0	0	0	0	0	0	1,551
1978	231	188	120	159	159	788	0	0	0	0	0	0	1,645
1979	142	276	281	180	161	703	0	0	0	0	0	0	1,744
1980	276	137	166	150	129	20	0	0	0	0	0	36	914
1981	140	305	287	378	250	76	0	0	0	15	0	25	1,476
1982	83	0	269	341	347	100	0	0	0	0	130	259	1,530
1983	73	227	178	142	0	0	0	0	0	0	0	0	620
1984	292	180	165	153	146	41	0	0	0	0	0	0	978
1985	0	29	187	188	198	456	0	0	0	0	0	0	1,059
1986	210	59	66	370	503	0	0	0	0	0	0	23	1,232
1987	92	0	101	151	179	0	0	0	0	0	0	0	523
1988	56	209	219	201	57	342	146	0	0	0	0	0	1,230
1989	0	103	218	125	139	888	0	0	0	0	0	0	1,473
1990	94	75	95	116	86	91	0	0	0	0	19	0	576
1991	76	226	117	113	126	439	0	0	0	0	0	0	1,096
1992	0	87	142	108	173	245	0	0	0	0	0	0	754
1993	21	0	62	158	46	481	371	239	2	0	0	0	1,379
1994	0	0	0	138	185	312	0	34	0	0	1	11	680
1995	80	69	109	128	688	178	0	0	0	0	0	0	1,253
1996	0	0	35	118	300	283	2	0	0	0	0	14	752
1997	54	0	465	78	89	164	353	0	0	44	82	284	1,612
1998	0	24	0	70	126	480	0	0	0	0	0	0	700
1999	79	293	94	104	118	59	0	60	0	0	374	333	1,513
2000	98	18	67	65	32	5	0	0	0	0	0	40	324
2001	0	128	77	284	361	65	0	0	0	0	0	0	915
2002	0	175	72	92	224	161	0	0	0	0	0	0	723
2003	17	81	148	145	153	252	0	0	0	0	0	110	905
2004	0	43	52	64	108	814	0	0	0	0	0	0	1,081
2005	0	69	295	390	130	0	0	0	0	0	0	0	884
2006	111	216	160	147	96	139	70	0	0	0	0	0	939
2007	632	72	86	100	175	150	0	0	0	0	0	0	1,215
2008	0	62	450	122	64	48	335	175	0	0	0	0	1,255
2009	0	45	37	50	83	8	0	92	0	0	0	0	314
Average	115	138	164	170	191	266	36	17	0	2	17	32	1,149
Total	4,022	4,821	5,733	5,955	6,687	9,318	1,276	598	2	59	605	1,136	40,211

<sup>\*</sup>Data taken from Colorado Division of Water Resources/Diversion Records website.

Table 3. Historical Redmesa Supply Ditch Diversions (AF)

Year/													
Month	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
1975	0	0	0	8	73	293	0	0	0	0	0	0	373
1976	0	20	121	117	171	167	0	0	0	0	0	0	596
1977	0	0	0	0	52	66	0	0	0	0	0	0	118
1978	0	0	0	17	27	276	227	0	12	0	0	0	559
1979	0	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	114	86	0	0	0	0	0	0	0	200
1982	0	0	146	267	240	68	0	0	0	0	83	183	987
1983	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	133	0	0	0	0	0	0	133
1986	147	0	0	201	382	0	0	0	0	0	0	0	729
1987	81	0	0	0	0	0	0	0	0	0	0	0	81
1988	0	0	0	0	0	0	105	0	0	0	0	0	105
1989	0	60	48	0	0	803	0	0	0	0	0	0	911
1990	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	64	287	0	0	0	0	0	0	351
1992	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	165	0	34	0	0	0	0	199
1995	0	0	0	0	521	155	0	0	0	0	0	0	676
1996	0	0	0	0	105	112	0	0	0	0	0	0	216
1997	0	0	262	0	0	0	0	0	0	44	82	284	671
1998	0	0	0	0	0	443	0	0	0	0	0	0	443
1999	0	152	0	0	33	0	0	60	0	0	202	238	685
2000	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	0	0	0	149	266	52	0	0	0	0	0	0	466
2002	0	0	0	20	144	60	0	0	0	0	0	0	224
2003	0	0	0	0	0	65	0	0	0	0	0	79	145
2004	0	0	0	0	35	685	0	0	0	0	0	0	720
2005	0	12	184	173	4	0	0	0	0	0	0	0	373
2006	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	507	0	0	0	0	73	0	0	0	0	0	0	580
2008	0	0	276	44	0	0	291	175	0	0	0	0	786
2009	0	0	0	0	0	0	0	92	0	0	0	0	92
Average	21	7	30	32	63	112	18	10	0	1	10	22	326
Total	735	244	1,038	1,110	2,201	3,903	623	359	12	44	367	784	11,420

<sup>\*</sup>Data taken from Colorado Division of Water Resources/Diversion Records website.

Table 4. Historical Old Indian Ditch Diversions from Redmesa Reservoir (AF)

Year/ Month	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
1975	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	13	0	0	0	13
1977	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	11	0	0	0	11
1979	0	0	0	0	0	0	0	0	0	5	0	0	5
1980	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	18	0	0	0	18
1982	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	10	0	0	10
1985	0	0	0	0	0	0	0	0	0	10	0	0	10
1986	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	3	0	3
1989	0	0	0	0	0	0	0	2	24	6	0	0	31
1990	0	0	0	0	0	0	0	0	5	0	0	0	5
1991	0	0	0	0	0	0	0	0	10	20	0	0	30
1992	0	0	0	0	0	0	0	0	2	20	0	0	22
1993	0	0	0	0	0	0	0	0	0	15	0	0	15
1994	0	0	0	0	0	0	0	0	22	24	0	0	46
1995	0	0	0	0	0	0	0	0	0	0	8	0	8
1996	0	0	0	0	0	0	0	15	2	0	0	0	17
1997	0	0	0	0	0	0	0	0	0	14	0	0	14
1998	0	0	0	0	0	0	0	0	12	17	0	0	29
1999	0	0	0	0	0	0	0	0	0	15	0	0	15
2000	0	0	0	0	0	0	0	0	15	25	0	0	40
2001	0	0	0	0	0	0	0	0	36	0	0	0	36
2002	0	0	0	0	0	0	26	0	0	0	0	0	26
2003	0	0	0	0	0	0	0	2	15	8	0	0	25
2004	0	0	0	0	0	0	0	0	36	17	0	0	52
2005	0	0	0	0	0	0	0	0	0	50	16	0	65
2006	0	0	0	0	0	0	0	0	33	0	0	0	33
2007	0	0	0	0	0	0	0	0	35	0	0	0	35
2008	0	0	0	0	0	0	0	0	0	2	14	0	17
2009	0	0	0	0	0	0	0	0	10	18	0	0	28
Average	0	0	0	0	0	0	1	1	8	8	1	0	19
Total	0	0	0	0	0	0	26	18	297	275	41	0	657

<sup>\*</sup>Data taken from Colorado Division of Water Resources/Diversion Records website.

Table 5. Historical Joseph Freed Ditch Diversions from Redmesa Reservoir (AF)

Year/ Month	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
1975	0	0	0	0	0	0	0	0	0	72	345	206	623
1976	13	0	0	0	0	0	0	95	152	318	96	51	725
1977	0	0	0	0	0	0	26	216	79	76	40	192	630
1978	4	27	4	0	0	0	0	0	70	323	296	64	788
1979	6	0	0	0	0	0	0	0	0	272	203	152	632
1980	26	58	0	0	0	0	0	0	0	286	261	161	792
1981	10	0	0	0	0	0	0	142	109	167	160	8	595
1982	0	0	0	0	0	0	0	0	54	324	143	99	620
1983	0	0	0	0	0	0	0	0	0	65	344	249	658
1984	10	0	0	0	0	0	0	0	62	429	59	8	568
1985	0	46	0	0	0	0	0	0	12	326	81	9	475
1986	0	0	0	0	0	0	0	0	3	126	221	44	394
1987	0	0	0	0	0	0	0	0	0	378	145	52	575
1988	23	0	0	0	0	0	0	0	201	254	72	68	618
1989	0	0	0	0	0	0	0	310	159	60	16	0	545
1990	59	13	0	0	0	0	0	0	146	72	21	17	327
1991	0	0	0	0	0	0	0	7	156	250	62	6	482
1992	57	20	0	0	0	0	0	0	14	368	136	40	634
1993	0	0	0	0	0	0	0	0	0	284	128	20	432
1994	0	0	0	0	0	0	0	0	138	338	43	47	566
1995	0	0	0	0	0	0	0	0	0	229	281	53	564
1996	0	0	0	0	0	0	0	326	33	40	0	30	430
1997	28	0	0	0	0	0	0	0	42	349	149	42	610
1998	0	0	0	0	0	0	0	0	282	251	76	17	626
1999	3	0	0	0	0	0	1	0	28	405	48	62	548
2000	282	0	0	0	0	0	0	52	238	347	4	0	923
2001	0	0	0	0	0	0	0	0	207	248	50	35	540
2002	0	0	0	0	0	0	0	239	40	6	8	0	293
2003	0	0	0	0	0	0	0	156	362	131	31	0	681
2004	1	0	0	0	0	0	0	35	193	397	141	16	783
2005	9	0	0	0	0	0	0	0	5	430	116	69	628
2006	11	0	0	0	0	0	0	355	127	36	0	41	570
2007	0	0	0	0	0	0	0	42	292	128	41	21	525
2008	0	0	0	0	0	0	0	0	64	254	175	28	521
2009	30	0	0	0	0	0	0	31	172	229	145	51	658
Average	16	5	0	0	0	0	1	57	98	236	118	56	588
Total	571	164	4	0	0	0	27	2,007	3,440	8,267	4,140	1,957	20,578

<sup>\*</sup>Data taken from Colorado Division of Water Resources/Diversion Records website.

Table 6. Historical Revival Ditch Diversions from Redmesa Reservoir (AF)

Year/			_										
Month	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
1975	0	0	0	0	0	0	0	0	0	1	56	0	57
1976	0	0	0	0	0	0	0	2	56	5	0	0	63
1977	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	40	5	0	45
1979	0	0	0	0	0	0	0	0	0	12	0	0	12
1980	0	0	0	0	0	0	0	0	0	44	19	3	66
1981	0	0	0	0	0	0	0	0	29	42	0	0	71
1982	0	0	0	0	0	0	0	0	10	51	0	0	61
1983	0	0	0	0	0	0	0	0	0	10	0	0	10
1984	0	0	0	0	0	0	0	0	0	68	11	0	80
1985	0	0	0	0	0	0	0	0	0	33	7	0	41
1986	0	0	0	0	0	0	0	0	0	8	85	2	95
1987	0	0	0	0	0	0	0	0	0	74	15	0	88
1988	0	0	0	0	0	0	0	0	0	49	53	30	132
1989	1	0	0	0	0	0	0	0	16	74	4	0	95
1990	0	0	0	0	0	0	0	0	20	5	0	0	25
1991	0	0	0	0	0	0	0	0	0	66	20	29	116
1992	7	0	0	0	0	0	0	0	0	36	23	0	66
1993	0	0	0	0	0	0	0	0	0	38	17	0	55
1994	0	0	0	0	0	0	0	0	28	49	0	0	77
1995	0	0	0	0	0	0	0	0	0	13	47	33	93
1996	0	0	0	0	0	0	0	7	27	0	0	0	33
1997	34	0	0	0	0	0	0	0	0	41	10	39	123
1998	0	0	0	0	0	0	0	0	1	36	16	16	69
1999	13	0	0	0	0	0	0	0	0	0	0	0	13
2000	70	0	0	0	0	0	0	0	21	76	14	0	180
2001	0	0	0	0	0	0	0	0	8	43	19	0	70
2002	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0	0	6	0	0	6
2005	15	0	0	0	0	0	0	0	0	25	26	1	67
2006	0	0	0	0	0	0	0	24	11	27	0	22	84
2007	3	0	0	0	0	0	0	0	28	73	0	0	104
2008	0	0	0	0	0	0	0	0	0	58	12	28	98
2009	0	0	0	0	0	0	0	0	7	44	9	0	60
Average	4	0	0	0	0	0	0	1	7	33	13	6	64
Total	142	0	0	0	0	0	0	33	260	1,148	468	202	2,253

<sup>\*</sup>Data taken from Colorado Division of Water Resources/Diversion Records website.

Table 7. Historical Warren-Vosburgh Ditch Diversions from Redmesa Reservoir (AF)

Year/	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Month	OCI	INOV	Dec	Jaii	ren	IVIAI	Арі	iviay	Juli	Jui	Aug	Зер	TOTAL
1975	0	0	0	0	0	0	0	0	0	29	109	0	138
1976	0	0	0	0	0	0	0	42	59	52	0	0	154
1977	0	0	0	0	0	0	0	10	7	0	0	0	18
1978	0	0	0	0	0	0	0	0	15	117	9	0	141
1979	0	0	0	0	0	0	0	0	0	82	114	3	199
1980	0	0	0	0	0	0	0	0	0	81	106	0	186
1981	0	0	0	0	0	0	0	59	64	78	0	0	201
1982	0	0	0	0	0	0	0	0	15	149	45	0	209
1983	0	0	0	0	0	0	0	0	0	16	27	52	95
1984	0	0	0	0	0	0	0	0	6	185	86	29	306
1985	0	0	0	0	0	0	0	0	13	144	55	73	285
1986	0	0	0	0	0	0	0	0	0	50	33	0	83
1987	0	0	0	0	0	0	0	0	0	133	55	54	242
1988	0	0	0	0	0	0	0	0	5	87	120	64	275
1989	25	0	0	0	0	0	32	72	69	73	21	0	293
1990	0	0	0	0	0	0	0	0	0	50	32	0	82
1991	0	0	0	0	0	0	0	3	68	132	25	0	229
1992	0	0	0	0	0	0	0	0	18	199	0	0	218
1993	0	0	0	0	0	0	0	0	0	217	52	7	276
1994	0	0	0	0	0	0	0	0	74	216	22	0	312
1995	0	0	0	0	0	0	0	0	0	94	100	50	244
1996	0	0	0	0	0	0	0	22	53	0	0	0	76
1997	10	0	0	0	0	0	0	0	0	151	24	49	233
1998	0	0	0	0	0	0	0	0	85	92	8	0	185
1999	0	0	0	0	0	0	0	0	0	61	0	0	61
2000	0	0	0	0	0	0	0	9	151	29	0	0	188
2001	0	0	0	0	0	0	0	14	161	134	0	0	309
2002	0	0	0	0	0	0	0	97	5	0	0	0	101
2003	0	0	0	0	0	0	0	27	128	20	0	0	175
2004	0	0	0	0	0	0	0	0	81	147	0	0	227
2005	0	0	0	0	0	0	0	0	0	191	56	0	246
2006	0	0	0	0	0	0	0	141	95	22	0	0	258
2007	0	0	0	0	0	0	0	14	80	143	1	0	238
2008	0	0	0	0	0	0	0	26	96	172	61	0	355
2009	0	0	0	0	0	0	0	0	57	160	86	0	303
Average	1	0	0	0	0	0	1	15	40	100	36	11	204
Total	34	0	0	0	0	0	33	537	1,405	3,505	1,247	381	7,142

<sup>\*</sup>Data taken from Colorado Division of Water Resources/Diversion Records website.

Table 8. Redmesa Reservoir End of Month (EOM) Contents
Repair w/o Enlargement (1,176 AF)

													Avg EOM	Max EOM
Vaan		r.h	D.A	A	D.4	l	ll	A	Cara	0-4	Navi	Dan	Contents	Contents
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
1974	-	-	-	-	-	-	-	-	-	62	105	283	38	283
1975	487	634	1,084	1,112	1,154	726	35	5	5	5	182	349	482	1,154
1976	422	537	542	539	533	-	-	-	-	-	95	95	230	542
1977	95	95	105	105	102	-	-	-	-	-	-	-	42	105
1978	-	-	-	123	146	-	-	-	-	-	9	9	24	146
1979	9	31	431	546	764	384	26	26	23	23	228	473	247	764
1980	650	814	1,176	1,176	1,176	1,072	34	34	36	36	306	523	586	1,176
1981	619	715	803	900	898	32	32	-	-	-	125	239	364	900
1982	480	709	1,076	1,141	1,176	107	31	31	31	31	220	526	463	1,176
1983	904	1,176	1,176	1,176	1,176	1,062	341	34	33	33	422	688	685	1,176
1984	881	1,094	1,176	1,174	1,175	201	22	17	17	26	23	312	510	1,176
1985	681	982	1,176	1,175	1,176	303	36	36	49	51	435	765	572	1,176
1986	1,176	1,176	1,176	1,176	1,175	214	145	36	36	1,176	1,176	1,176	820	1,176
1987	1,176	1,176	1,176	1,176	1,171	423	36	17	17	17	537	856	648	1,176
1988	1,176	1,176	1,176	1,174	1,162	39	32	-	-	-	223	441	550	1,176
1989	660	776	1,176	1,174	1,159	7	-	-	-	-	6	6	414	1,176
1990	6	12	99	102	101	-	-	-	-	-	391	396	92	396
1991	451	598	993	995	982	-	-	-	-	-	216	220	371	995
1992	272	338	674	832	1,060	154	32	-	-	-	44	44	288	1,060
1993	58	78	1,176	1,176	1,176	487	35	35	35	35	383	498	431	1,176
1994	651	855	1,148	1,175	1,176	36	-	-	-	-	2	56	425	1,176
1995	297	762	1,176	1,170	1,172	937	35	24	24	24	75	216	493	1,176
1996	350	551	808	804	793	-	-	-	-	2	83	755	346	808
1997	1,176	1,176	1,176	1,176	1,176	316	39	35	728	353	864	1,176	783	1,176
1998	1,176	1,176	1,176	1,170	1,156	31	31	12	-	26	247	336	545	1,176
1999	354	372	907	920	909	29	29	303	31	31	31	81	333	920
2000	159	208	433	430	424	26	-	-	-	-	-	292	164	433
2001	629	784	1,118	1,176	1,174	32	-	-	-	-	-	2	410	1,176
2002	18	41	41	41	41	-	-	-	-	-	-	-	15	41
2003	199	543	543	540	533	-	-	-	-	-	82	82	210	543
2004	82	82	1,060	1,174	1,166	-	-	-	-	-	147	211	327	1,174
2005	565	1,176	1,176	1,176	1,176	63	-	-	-	-	112	523	497	1,176
2006	835	991	1,063	1,075	1,061	-	-	-	-	327	413	507	523	1,075
2007	587	822	1,176	1,176	1,162	-	-	-	-	-	15	457	450	1,176
2008	692	933	1,176	1,176	1,171	24	-	-	-	-	168	183	460	1,176
2009	303	459	637	635	632	10	-	-	-	-	-	-	223	637
Avg	508	640	867	889	900	187	27	18	30	63	205	355	390	921
Max	1,176	1,176	1,176	1,176	1,176	1,072	341	303	728	1,176	1,176	1,176	820	1,176
	_, •	_, •	_,	_, 5	_,	_,,	J	300	, _ 3	_, 5	_, 5	_, 3		_, ~

Table 9. Redmesa Reservoir End of Month (EOM) Contents
Add 550 AF (1,726 AF)

													1	
													Avg EOM	Max EOM
V	la.a	r.h	D.A	A	D.4	l	ll	A	Com	0-4	Navi	Daa	Contents	Contents
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
1974	-	-	-	-	-	-	-			62	105	283	38	283
1975	487	634	1,084	1,112	1,154	766	44	7	7	7	184	351	486	1,154
1976	424	539	544	541	535	-	-	-	-	-	95	95	231	544
1977	95	95	105	105	102	-	-	-	-	-	-		42	105
1978	-	-	-	123	146	1	-	-	-	-	9	9	24	146
1979	9	31	431	546	763	384	27	27	23	23	228	474	247	763
1980	652	817	1,203	1,303	1,351	1,348	51	51	53	53	323	541	646	1,351
1981	637	732	820	917	915	49	49	-	-	-	126	240	374	917
1982	481	710	1,076	1,142	1,183	109	29	29	29	29	218	525	463	1,183
1983	903	1,288	1,726	1,726	1,725	1,605	874	101	51	51	440	706	933	1,726
1984	899	1,113	1,726	1,722	1,724	353	38	33	33	42	39	328	671	1,726
1985	697	999	1,726	1,725	1,725	808	52	52	65	68	452	782	763	1,726
1986	1,213	1,726	1,726	1,726	1,725	728	279	128	126	1,588	1,726	1,726	1,201	1,726
1987	1,726	1,726	1,726	1,726	1,719	932	56	33	33	34	554	873	928	1,726
1988	1,229	1,505	1,726	1,721	1,705	161	51	-	-	-	223	442	730	1,726
1989	660	777	1,726	1,723	1,703	28	-	-	-	-	7	7	553	1,726
1990	7	12	100	103	101	-	-	-	-	-	393	398	93	398
1991	454	601	996	999	985	-	-	-	-	-	216	220	373	999
1992	272	338	674	833	1,060	161	33	-	-	-	44	44	288	1,060
1993	58	78	1,364	1,726	1,725	1,027	51	51	51	51	398	514	591	1,726
1994	667	871	1,164	1,198	1,202	48	-	-	-	-	2	56	434	1,202
1995	297	762	1,726	1,715	1,721	1,477	132	42	42	42	93	235	690	1,726
1996	369	570	827	823	812	-	-	-	-	2	83	755	353	827
1997	1,217	1,679	1,726	1,726	1,725	859	159	52	748	374	885	1,254	1,034	1,726
1998	1,418	1,562	1,726	1,715	1,696	129	49	30	-	29	250	339	745	1,726
1999	357	375	911	924	913	30	30	304	34	34	34	84	336	924
2000	162	211	437	433	427	31	-	-	-	-	-	292	166	437
2001	629	784	1,118	1,181	1,211	33	-	-	-	-	-	2	413	1,211
2002	18	41	41	41	41	-	-	-	-	-	-	-	15	41
2003	199	543	543	540	533	-	-	-	-	-	82	82	210	543
2004	82	82	1,060	1,199	1,205	-	-	-	-	-	148	212	332	1,205
2005	566	1,189	1,726	1,726	1,725	187	-	-	-	-	113	524	646	1,726
2006	837	992	1,065	1,077	1,063	-	-	-	-	328	415	509	524	1,077
2007	589	824	1,385	1,394	1,380	10	-	-	-	-	17	459	505	1,394
2008	694	936	1,726	1,726	1,720	81	-	-	-	-	169	184	603	1,726
2009	305	461	639	637	634	11	-	-	-	-	-	-	224	639
Avg	536	711	1,064	1,099	1,113	315	56	26	36	78	224	376	470	1,134
Max	1,726	1,726	1,726	1,726	1,725	1,605	874	304	748	1,588	1,726	1,726	1,201	1,726
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Table 10. Redmesa Reservoir End of Month (EOM) Contents
Add 1,170 AF (2,346 AF)

													Δνσ ΕΩΜ	Max EOM
Voor	lon	Гоb	Max	Δ	Mari	1	11	A	Com	Oct	Nov	Doo	Contents	Contents
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
1974	-	- 62.4	- 1 004	- 4 4 4 2	- 454	766	-	-	-	62	105	283	38	283
1975	487	634	1,084	1,112	1,154	766	48	8	8	8	185	352	487	1,154
1976	424	540	545	541	535	-	-	-	-	-	95	95	231	545
1977	95	95	105	105	102	-	-	-	-	-	-	-	42	105
1978	-	-	-	123	146	1	-	-	-	-	9	9	24	146
1979	9	31	431	546	764	384	27	27	24	24	228	474	247	764
1980	652	817	1,204	1,304	1,351	1,348	59	59	63	63	334	553	651	1,351
1981	649	744	832	929	927	67	67	18	-	-	126	240	383	929
1982	481	710	1,077	1,143	1,184	110	29	30	30	30	219	526	464	1,184
1983	903	1,290	1,808	1,861	1,881	1,812	1,080	174	66	66	455	721	1,010	1,881
1984	914	1,128	2,346	2,341	2,344	940	55	50	50	59	57	345	886	2,346
1985	714	1,016	2,023	2,344	2,345	1,407	102	70	83	86	470	800	955	2,345
1986	1,231	1,768	2,346	2,346	2,344	1,339	457	299	268	1,730	2,346	2,346	1,568	2,346
1987	2,346	2,346	2,346	2,346	2,338	1,543	194	53	53	53	574	892	1,257	2,346
1988	1,248	1,524	2,157	2,244	2,225	438	67	5	5	5	229	448	883	2,244
1989	667	783	2,346	2,342	2,319	46	7	-	-	-	7	7	710	2,346
1990	7	12	100	103	101	2	-	-	-	-	395	400	93	400
1991	457	604	999	1,002	989	-	-	-	-	-	217	221	374	1,002
1992	273	339	675	833	1,061	169	34	-	-	-	44	44	289	1,061
1993	58	78	1,364	2,244	2,345	1,640	86	68	68	68	415	531	747	2,345
1994	684	889	1,182	1,216	1,220	66	-	-	-	-	2	56	443	1,220
1995	297	762	2,346	2,333	2,340	2,087	593	60	60	60	111	253	942	2,346
1996	387	588	845	841	830	13	-	-	-	2	84	756	362	845
1997	1,218	1,680	2,346	2,346	2,345	1,471	297	69	769	395	906	1,276	1,260	2,346
1998	1,440	1,584	2,346	2,333	2,310	375	66	48	-	33	255	343	928	2,346
1999	361	380	915	929	918	27	27	302	33	33	33	83	337	929
2000	161	211	436	432	427	31	-	-	-	-	-	292	166	436
2001	629	784	1,118	1,181	1,211	33	-	-	-	-	-	2	413	1,211
2002	18	41	41	41	41	-	-	-	-	-	-	-	15	41
2003	199	543	543	540	533	-	-	-	-	-	82	82	210	543
2004	82	82	1,060	1,199	1,205	-	-	-	-	-	148	212	332	1,205
2005	566	1,190	2,346	2,346	2,345	754	14	-	-	-	114	526	850	2,346
2006	839	995	1,068	1,080	1,066	-	-	-	-	328	416	511	525	1,080
2007	591	826	1,387	1,396	1,382	12	-	-	-	-	17	460	506	1,396
2008	695	936	2,345	2,343	2,337	353	21	-	-	-	170	185	782	2,345
2009	306	462	640	638	636	12	-	-	-	-	-	-	225	640
Avg	558	734	1,243	1,306	1,322	479	93	37	44	86	246	398	545	1,344
Max	2,346	2,346	2,346	2,346	2,345	2,087	1,080	302	769	1,730	2,346	2,346	1,568	2,346
	_,5 .0	_,5 .0	_,5 .5	_,5 .5	_,5 .5	_,	_,,,,,	JU-	, 00	_,,, 00	_,5 .0	_,5 .5	_,550	_,0 .0

# **Table 11. Summary of Potential Supplemental Native Fish Water**

La Plata River Below Mouth Long Hollow Near Red Mesa, CO

Su	pplemental Wate	er Needed (	AF) to Maint	ain 4 cfs Stre	eamflow <sup>(1)(2)</sup>	
Water Year / Month	2016	2017	2018	2019	Average (AF)	Max (AF)
December	115.3	31.1	18.0	81.1	61.4	115.3
January	26.6	5.6	13.7	161.1	51.7	161.1
February 1st-15th	7.2	1.9	10.2	78.0	24.3	78.0
Total (AF)	149.1	38.7	41.9	320.2	137.4	320.2

- (1) Period of data 12/1 2/15; Data from Colorado Division of Water Resources LAPLONCO gage
- (2) Where data was not available, previous day's flow was used for missing values.

batio	n Acco	u			<b>-</b>	blo 12o T	otal lee'	tion Do	ands					
						ble 12a. T	-							
									e = 1176 /					
									OWR Accoun				40	
Mater		11	12	1	2	3	4	5	6	7	8	9	10	
Water Year	Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	SUN
1975	WET	211.0							812.8	2,816.0	2,030.0	1,383.0	1,056.0	8,30
1976	DRY	119.0							857.5	2,533.0	1,740.0	1,034.0	1,019.0	7,30
1977	DRY	75.0							895.3	2,121.0	1,387.0	1,501.0	989.0	6,96
1978	NORMAL	122.0							835.5	3,235.0	2,239.0	1,286.0	609.0	8,32
1979	WET								851.8	3,012.0	1,465.0	1,911.0	897.0	8,13
1980	WET	86.0							898.3	3,472.0	1,670.0	1,227.0	662.0	8,01
1981	DRY	130.0							874.5	1,738.0	1,387.0	1,438.0	421.0	5,98
1982	NORMAL	168.0							836.3	2,670.0	1,629.0	986.0	782.0	7,07
1983	WET	188.0							686.8	2,222.0	1,763.0	1,365.0	918.0	7,14
1984	NORMAL	21.0							730.8	3,030.0	1,189.0	1,402.0	428.0	6,80
1985	WET	548.0							908.5	2,746.0	1,924.0	750.0	591.0	7,46
1986	WET	52.0							750.5	1,927.0	1,123.0	823.0	309.0	4,98
1987	NORMAL	34.0							888.8	2,876.0	1,200.0	1,606.0	494.0	7,09
1988	NORMAL	168.0							785.3	3,415.0	1,499.0	1,474.0	1,153.0	8,49
1989	DRY	320.0							877.5	2,798.0	1,626.0	1,659.0	735.0	8,03
1990	DRY	22.0							867.0	2,503.0	1,627.0	495.0	786.0	6,30
1991	NORMAL	15.0							788.0	2,660.0	1,905.0	1,005.0	1,022.0	7,39
1992	NORMAL	206.0							803.0	2,022.0	1,512.0	1,060.0	854.0	6,45
1993	WET	232.0							793.8	3,448.0	884.0	1,259.0	687.0	7,30
1994	NORMAL	312.0							846.5	3,319.0	1,877.0	757.0	459.0	7,57
1995	NORMAL	465.0							773.0	3,144.0	1,765.0	1,609.0	1,174.0	8,93
1996	DRY	387.0							755.5	3,024.0	2,038.0	1,240.0	156.0	7,60
1997	WET	196.0							745.5	2,304.0	1,784.0	676.0	835.0	6,54
1998	NORMAL	150.0							816.8	2,127.0	2,131.0	1,792.0	140.0	7,15
1999	NORMAL	145.0							789.8	2,357.0	866.0	1,426.0	1,256.0	6,83
2000	DRY	1,102.0							859.0	3,254.0	1,517.0	1,879.0	231.0	8,84
2001	NORMAL								880.8	3,028.0	1,143.0	1,853.0	1,004.0	7,90
2002	DRY	287.0							1,001.8	3,309.0	2,047.0	1,147.0	466.0	8,2
2003	DRY								869.5	3,652.0	1,405.0	941.0	1,130.0	7,99
2004	NORMAL	38.0							789.8	2,742.0	1,822.0	513.0	710.0	6,61
2005	WET	48.0							841.3	3,233.0	1,960.0	458.0	534.0	7,07
2006	NORMAL	132.0							809.5	2,793.0	1,579.0	1,105.0	441.0	6,85
2007	NORMAL	126.0							919.5	2,624.0	1,774.0	1,286.0	1,141.0	7,87
2008	NORMAL	165.0							848.3	3,133.0	1,362.0	1,709.0	1,198.0	8,41
2009	NORMAL	100.0							783.3	2,701.0	1,501.0	1,337.0		6,42
Ī	Vlin	15.0	-	-	-	-	-	-	686.8	1,738.0	866.0	458.0	140.0	4,98
	erage	199.1							830.6	2,799.7	1,610.6	1,239.8	743.7	7,38
I.	Лах	1,102.0	-	-	-	-	-	-	1,001.8	3,652.0	2,239.0	1,911.0	1,256.0	8,93

						-		Met Irriga						
		Irriga	tion Enlarge					ervoir Size t = 0 AF; D'			W Account	= 0 AF		
		11	12	1	2	3	4	5	6	7	8	9	10	
Water Year	Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	SUM
1975	WET	80.6							812.8	535.6	-	-	3.4	1,432.3
1976	DRY	107.1							822.9	-	-	-	-	930.0
1977	DRY	5.0							289.5	23.6	-	-	-	318.1
1978	NORMAL	-							442.8	26.2	-	-	-	469.0
1979	WET								851.8	486.6	8.0	-	19.4	1,365.7
1980	WET	86.0							898.3	871.2	11.8	23.6	57.8	1,948.7
1981	DRY	110.0							874.5	389.3	2.0	-	1.2	1.377.0
1982	NORMAL	28.0							836.3	733.0	-	-	29.0	1,626.2
1983	WET	101.6							686.8	1,153.9	21.4	69.4	78.8	2,111.9
1984	NORMAL	21.0							730.8	739.6	68.6	39.0	110.6	1,709.5
1985	WET	106.4							908.5	454.1	85.4	57.2	90.2	1,701.8
1986	WET	52.0							750.5	801.0	92.6	91.8	105.2	1,893.1
1987	NORMAL	34.0							888.8	797.4	78.6	94.8	118.0	2.011.5
1988	NORMAL	168.0							785.3	500.0	30.4	-	11.0	1,494.7
1989	DRY	127.6							877.5	810.2	-	12.6	26.0	1,853.9
1990	DRY	22.0							461.6	010.2		-	20.0	483.6
1991	NORMAL	-							788.0	397.4	-	-	3.0	1,188.4
1992	NORMAL	11.6							803.0	766.9	9.4	-	-	1.590.9
1993	WET	65.2							793.8	1,192.9	9.0	31.6	104.4	2,196.9
1994	NORMAL	156.4							846.5	660.8	10.0	37.4	62.0	1,773.1
1995	NORMAL	102.2							773.0	969.8	39.4	80.0	109.6	2,074.0
1996	DRY	141.0							755.5	347.0	39.4	80.0	109.0	1,243.5
1997	WET	9.0							745.5	1,076.5		10.8	91.8	1,933.6
1998	NORMAL	150.0							816.8	856.3	28.8	44.6	81.8	1,978.3
1998	NORMAL	86.4							789.8	386.7	27.0	297.9	81.6	1,669.4
	DRY								859.0	87.1	-	237.3	61.0	
2000		103.9												1,050.0
2001	NORMAL DRY	36.5							880.8	653.4	-	-	4.2	1,538.4 323.9
2002	DRY	36.5					<b> </b>		287.4 649.1		-	-	46.9	695.9
	NORMAL	-							789.8		-		46.9	
2004							ļ			587.7	-			1,377.4
2005	WET	-					-		841.3	655.1	-	-	-	1,496.4
2006	NORMAL	31.4							809.5	430.9	-	-	-	1,271.8
2007	NORMAL	97.0							919.5	293.3	-	-	-	1,309.8
2008	NORMAL	14.3							848.3	530.8	-	-	-	1,393.4
2009	NORMAL	-							783.3	52.4	-	-		835.7
	Min		-	-	-	-	-	-	287.4	-	-	-	-	318.1
	erage	64.2							762.8	521.9	14.9	25.4	36.3	1,419.1
	Max	168.0	-	-	-	-	-	-	919.5	1,192.9	92.6	297.9	118.0	2,196.9

			Irriga	ition Enlarge						e = <b>1176</b> A WR Account		PW Account	:= 0 AF		
1			11	12	1	2	3	4	5	6	7	8	9	10	
	Water Year	Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	SUM
	1975	WET	38%							100%	19%	0%	0%	0%	17%
	1976	DRY	90%							96%	0%	0%	0%	0%	13%
	1977	DRY	7%							32%	1%	0%	0%	0%	5%
	1978	NORMAL	0%							53%	1%	0%	0%	0%	6%
	1979	WET								100%	16%	1%	0%	2%	17%
	1980	WET	100%							100%	25%	1%	2%	9%	24%
	1981	DRY	85%							100%	22%	0%	0%	0%	23%
	1982	NORMAL	17%							100%	27%	0%	0%	4%	23%
	1983	WET	54%							100%	52%	1%	5%	9%	30%
	1984	NORMAL	100%							100%	24%	6%	3%	26%	25%
	1985	WET	19%							100%	17%	4%	8%	15%	23%
	1986	WET	100%							100%	42%	8%	11%	34%	38%
	1987	NORMAL	100%							100%	28%	7%	6%	24%	28%
	1988	NORMAL	100%							100%	15%	2%	0%	1%	18%
	1989	DRY	40%							100%	29%	0%	1%	4%	23%
	1990	DRY	100%							53%	0%	0%	0%	0%	8%
	1991	NORMAL	0%							100%	15%	0%	0%	0%	16%
	1992	NORMAL	6%							100%	38%	1%	0%	0%	25%
	1993	WET	28%							100%	35%	1%	3%	15%	30%
	1994	NORMAL	50%							100%	20%	1%	5%	14%	23%
	1995	NORMAL	22%							100%	31%	2%	5%	9%	23%
	1996	DRY	36%							100%	11%	0%	0%	0%	16%
	1997	WET	5%							100%	47%	0%	2%	11%	30%
	1998	NORMAL	100%							100%	40%	1%	2%	58%	28%
	1999	NORMAL	60%							100%	16%	3%	21%	6%	24%
	2000	DRY	9%							100%	3%	0%	0%	0%	12%
I	2001	NORMAL								100%	22%	0%	0%	0%	19%
	2002	DRY	13%							29%	0%	0%	0%	0%	4%
	2003	DRY								75%	0%	0%	0%	4%	9%
	2004	NORMAL	0%							100%	21%	0%	0%	0%	21%
	2005	WET	0%							100%	20%	0%	0%	0%	21%
I _	2006	NORMAL	24%							100%	15%	0%	0%	0%	19%
	2007	NORMAL	77%							100%	11%	0%	0%	0%	17%
	2008	NORMAL	9%							100%	17%	0%	0%	0%	17%
	2009	NORMAL	0%							100%	2%	0%	0%		13%
		Viin	-	-	-	-	-	-	-	29%	-	-	-	-	4%
-		erage	43%							93%	19%	1%	2%	7%	20%
J		Иах	100%		_	L -	-	-	-	100%	52%	8%	21%	58%	38%

Table 12c. Percent of Irrigation Demands Met

# **DWR Account**

					Та	ble 13a. 1	otal Comp	oact Dema	ands					
					Modeled	Scenario:	Total Res	ervoir Siz	e = 1176 <i>A</i>	\F				
			ition Enlarge	ement Acco	unt = 0 AF;	Augmenta	tion Accoun	t = 0 AF; D	WR Accoun	t = 0 AF; CF	W Account	= 0 AF		
		11	12	1	2	3	4	5	6	7	8	9	10	
Water	Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	SUM
Year	icai	1404	Dec	Jan	160	IVIAI	Арі	iviay	Juli	Jui	Aug	Зер	OCC	JOIVI
1975	WET	-	-	-	-	-	-	-	-	-	63.1	-	-	63.1
1976	DRY	-	-	-	-	-	120.5	291.0	195.8	225.8	174.0	137.7	315.9	1,460.6
1977	DRY	-	-	-	-	-	97.3	272.0	168.6	-	40.1	264.1	184.7	1,026.8
1978	NORMAL	33.9	2.2	-	-	-	-	-	385.6	130.7	335.1	190.6	134.0	1,212.1
1979	WET	15.2	0.6	-	-	-	-	-	-	105.2	-	113.1	7.0	241.1
1980	WET	-	-	-	-	-	-	-	-	548.7	169.5	-	-	718.2
1981	DRY	-	-	-	-	-	125.0	171.8	182.3	-	213.2	276.5	19.7	988.5
1982	NORMAL	-	-	-	-	-	-	-	739.6	-	-	67.0	-	806.7
1983	WET	-	-	-	-	-	-	-	-	-	-	-	-	-
1984	NORMAL	-	-	-	-	-	-	-	213.6	202.2	64.9	-	-	480.7
1985	WET	-	-	-	-	-	-	-	-	28.1	-	-	-	28.1
1986	WET	-	-	-	-	-	-	-	329.5	-	-	-	-	329.5
1987	NORMAL	-	-	-	-	-	-	-	-	36.3	-	-	-	36.3
1988	NORMAL	-	-	-	-	-	-	171.8	-	-	89.7	57.9	-	319.3
1989	DRY	-	-	-	-	-	-	150.0	210.2	147.8	-	-	-	507.9
1990	DRY	16.1	0.4	-	-	-	-	73.5	212.5	123.0	302.2	13.3	115.9	857.0
1991	NORMAL	117.2	2.9	-	-	-	-	455.7	130.3	160.4	376.8	6.9	26.5	1,276.7
1992	NORMAL	-	-	-	-	-	-	-	-	-	142.4	-	-	142.4
1993	WET	-	-	-	-	-	-	-	-	58.8	-	-	-	58.8
1994	NORMAL	-	-	-	-	-	-	360.9	466.0	-	-	-	-	826.9
1995	NORMAL	-	-	-	-	-	-	-	-	176.1	-	-	-	176.1
1996	DRY	-	-	-	-	-	-	262.4	-	254.0	17.5	195.6	224.5	954.0
1997	WET	-	-	-	-	-	-	-	-	-	-	-	-	
1998	NORMAL	-	-	-	-	-	-	496.7	178.6	-	-	-	-	675.2
1999	NORMAL	-	-	-	-	-	-	-	223.1	-	-	-	-	223.1
2000	DRY	-	-	-	-	-	-	349.2	-	59.5	64.8	11.5	-	485.0
2001	NORMAL	-	-	-	-	-	-	-	-	118.7	101.6	-	-	220.2
2002	DRY	-	-	-	-	-	-	20.6	123.7	37.0	27.0	307.4	198.1	713.8
2003	DRY	35.4	3.8	-	-	-	-	-	75.1	308.6	262.8	-	64.9	750.6
2004	NORMAL	-	-	-	-	-	-	81.5	-	45.0	216.5	244.7	-	587.7
2005	WET	-	2.0	-	-	-	-	-	318.8	-	-	-	-	320.8
2006	NORMAL	-	-	-	-	-	-	-	-	23.6	58.1	96.0	-	177.7
2007	NORMAL	122.3	-	-	-	-	-	201.3	-	3.1	-	-	9.1	335.8
2008	NORMAL	-	-	-	-	-	-	-	468.5	-	-	-	-	468.5
2009	NORMAL	-	-	-	-	-	-	454.5	6.2	18.9	95.0	149.4	6.4	730.5
	Min				_	_	-	-		-	-	-	-	
	erage	9.7	0.3			-	9.8	108.9	132.2	80.3	80.4	60.9	37.3	520.0
	Max	122.3	3.8			_	125.0	496.7	739.6	548.7	376.8	307.4	315.9	1,460.6
	TIUA	144.3	3.0		_		123.0	730.7	133.0	J+0./	370.0	307.4	313.3	1,400.0

						•	act Deliver							
		Irriga	tion Enlarg				tion Account				W Account	= 0 AF		
		11	12	1	2	3	4	5	6	7	8	9	10	
Water Year	Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	SUM
1975	WET										63.1			63.1
1976	DRY						120.5	169.3	-	-	-	-	-	289.8
1977	DRY						97.3	192.3	-		-	-	-	289.6
1978	NORMAL	-	-						286.8		-		-	286.8
1979	WET	-	-							105.2		113.1	7.0	225.3
1980	WET									284.6	-			284.6
1981	DRY						125.0	164.9	-		-	-	-	289.9
1982	NORMAL								286.8			-		286.8
1983	WET													-
1984	NORMAL								213.6	72.6	-			286.
1985	WET									28.1				28.:
1986	WET								286.8					286.
1987	NORMAL									36.3				36.
1988	NORMAL							171.8			89.7	24.7		286.:
1989	DRY							150.0	137.9	-				287.
1990	DRY	-	-					73.5	212.5	1.3	-		-	287.
1991	NORMAL	-	-					288.9		-	_	-	-	288.9
1992	NORMAL										142.4			142.4
1993	WET									58.8				58.
1994	NORMAL							288.9	-					288.
1995	NORMAL									176.1				176.3
1996	DRY							262.4		26.1	_	-	_	288.
1997	WET													
1998	NORMAL							288.9						288.9
1999	NORMAL					1		_50.5	223.1					223.:
2000	DRY							288.9						288.
2001	NORMAL					1		_50.5		118.7	101.6	,		220.
2002	DRY					1		20.6	123.7	37.0	27.0	76.2	_	284.
2003	DRY	-	-			1		20.0	75.1	210.0	-	7012	-	285.:
2004	NORMAL							81.5		45.0	158.1	-		284.
2005	WET		-		1				286.8					286.8
2006	NORMAL								230.0	23.6	58.1	96.0		177.
2007	NORMAL	101.9		1	1	<del>                                     </del>		201.3		3.1	50.1	50.0	9.1	315.4
2008	NORMAL	101.5		1	1	<del>                                     </del>			286.8	3.1			3.1	286.
2009	NORMAL					1		288.9	-		-	-	-	288.9
	Min	_		l .	_	_	97.3	20.6	-	_	_	_	_	200
	erage	17.0		<del>  </del>	<del>                                     </del>	<del>                                     </del>	114.3	195.5	134.4	58.4	33.7	20.7	1.3	228.3
	Max	101.9		<del>                                     </del>	-	<del>                                     </del>	125.0	288.9	286.8	284.6	158.1	113.1	9.1	315.4

					Table 13	Rc Percer	nt of Com	act Dema	nds Met					
							Total Res			\F				
		Irriga	ation Enlarge				tion Accoun				W Account	= 0 AF		
		11	12	1	2	3	4	5	6	7	8	9	10	
Water														
Year	Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	SUM
1975	WET										100%			100%
1976	DRY						100%	58%	0%	0%	0%	0%	0%	20%
1977	DRY						100%	71%	0%		0%	0%	0%	28%
1978	NORMAL	0%	0%						74%	0%	0%	0%	0%	24%
1979	WET	0%	0%							100%		100%	100%	93%
1980	WET									52%	0%			40%
1981	DRY						100%	96%	0%		0%	0%	0%	29%
1982	NORMAL								39%			0%		36%
1983	WET													-
1984	NORMAL								100%	36%	0%			60%
1985	WET									100%				100%
1986	WET								87%					87%
1987	NORMAL									100%				100%
1988	NORMAL							100%			100%	43%		90%
1989	DRY							100%	66%	0%				57%
1990	DRY	0%	0%					100%	100%	1%	0%	0%	0%	34%
1991	NORMAL	0%	0%					63%	0%	0%	0%	0%	0%	23%
1992	NORMAL										100%			100%
1993	WET									100%				100%
1994	NORMAL							80%	0%					35%
1995	NORMAL									100%				100%
1996	DRY							100%		10%	0%	0%	0%	30%
1997	WET													-
1998	NORMAL							58%	0%					43%
1999	NORMAL								100%					100%
2000	DRY							83%		0%	0%	0%		60%
2001	NORMAL									100%	100%			100%
2002	DRY							100%	100%	100%	100%	25%	0%	40%
2003	DRY	0%	0%						100%	68%	0%		0%	38%
2004	NORMAL							100%		100%	73%	0%		48%
2005	WET		0%						90%					89%
2006	NORMAL									100%	100%	100%		100%
2007	NORMAL	83%						100%		100%			100%	94%
2008	NORMAL								61%					61%
2009	NORMAL							64%	0%	0%	0%	0%	0%	40%
	Min	-	-	-	-	-	100%	58%	-	-	-	-	-	-
	erage	14%	-				100%	85%	51%	56%	35%	18%	17%	60%
1	Vlax	83%	-	-	-	-	100%	100%	100%	100%	100%	100%	100%	100%

CP	W	Acc	our	ıt

								Flow Dem						
								servoir Siz						
								nt = 0 AF;						
		11	12	1	2	3	4	5	6	7	8	9	10	
Water Year	Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	SUM
1975	WET		61.4	51.7	24.3									137
1976	DRY		24.6	9.7	6.1									40
1977	DRY		81.1	161.1	78.0									32
1978	NORMAL		81.1	161.1	78.0									32
1979	WET		61.4	51.7	24.3									13
1980	WET		24.6	9.7	6.1									4
1981	DRY		24.6	9.7	6.1									4
1982	NORMAL		81.1	161.1	78.0									32
1983	WET		61.4	51.7	24.3									13
1984	NORMAL		24.6	9.7	6.1									4
1985	WET		61.4	51.7	24.3									13
1986	WET		24.6	9.7	6.1									4
1987	NORMAL		24.6	9.7	6.1									4
1988	NORMAL		61.4	51.7	24.3									13
1989	DRY		61.4	51.7	24.3									13
1990	DRY		81.1	161.1	78.0									32
1991	NORMAL		81.1	161.1	78.0									32
1992	NORMAL		61.4	51.7	24.3									13
1993	WET		61.4	51.7	24.3									13
1994	NORMAL		24.6	9.7	6.1									4
1995	NORMAL		61.4	51.7	24.3									13
1996	DRY		61.4	51.7	24.3									13
1997	WET		81.1	161.1	78.0									32
1998	NORMAL		24.6	9.7	6.1									4
1999	NORMAL		61.4	51.7	24.3									13
2000	DRY		61.4	51.7	24.3									13
2001	NORMAL		81.1	161.1	78.0									32
2002	DRY		61.4	51.7	24.3									13
2003	DRY		81.1	161.1	78.0									32
2004	NORMAL		81.1	161.1	78.0									32
2005	WET		61.4	51.7	24.3									13
2006	NORMAL		24.6	9.7	6.1									4
2007	NORMAL		61.4	51.7	24.3									13
2008	NORMAL		61.4	51.7	24.3			1						13
2009	NORMAL		61.4	51.7	24.3			1						13
	Min		24.6	9.7	6.1	-	_	-	_	_	_	_	_	4
	erage	<u> </u>	57.0	69.0	33.4		<u> </u>	<del>                                     </del>	<u> </u>	<del>-</del>		-	-	15
	Max		81.1	161.1	78.0			-	_	_	_	-	_	32

								ries: Met ervoir Size						
		Irriga	tion Enlarge							<b>\r</b> t = 0 AF; CF	W Account	= 0 AF		
		11	12	1	2	3	4	5	6	7	8	9	10	
Water Year	Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	SUM
1975	WET		-	-	-									-
1976	DRY		-	-	-									-
1977	DRY		-	-	-									-
1978	NORMAL		-	-	-									-
1979	WET		-	-	-									-
1980	WET		-	-	-									-
1981	DRY		-	-	-									-
1982	NORMAL		-	-	-									-
1983	WET		-	-	-									-
1984	NORMAL		-	-	-									-
1985	WET		-	-	-									-
1986	WET		-	-	-									-
1987	NORMAL		-	-	-									-
1988	NORMAL		-	-	-									-
1989	DRY		-	-	-									-
1990	DRY		-	-	-									-
1991	NORMAL		-	-	-									-
1992	NORMAL		-	-	-									-
1993	WET		-	-	-									-
1994	NORMAL		-	-	-									-
1995	NORMAL		-	-	-									-
1996	DRY		-	-	-									-
1997	WET		-	-	-									-
1998	NORMAL		-	-	-									-
1999	NORMAL		-	-	-									-
2000	DRY		-	-	-									-
2001	NORMAL		-	-	-									-
2002	DRY		-	-	-									-
2003	DRY		-	-	-									-
2004	NORMAL		-	-	-									-
2005	WET		-	-	-									-
2006	NORMAL		-	-	-									-
2007	NORMAL		-	-	-									-
2008	NORMAL		-	-	-									-
2009	NORMAL		-	-	-									-
	Min	-	-	-	-	-	-	-	-	-	-	-	-	-
Av	erage		-	-	-									-
-	Max	-	-	-	-	-	-	-	-	-	-	-	-	-

					Table 14	c. Percen	t of Fish F	low Dem	ands Met					
							Total Res							
		Irriga 11	tion Enlarge	ement Acco	unt = 0 AF;	Augmentar 3	tion Accoun	t = 0 AF; D	WR Accoun	t = 0 AF; CF	W Account	9 9	10	
Water		11	12			3	4	3	0		۰	9	10	
Year	Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	SUM
1975	WET		0%	0%	0%									-
1976	DRY		0%	0%	0%									1
1977	DRY		0%	0%	0%									1
1978	NORMAL		0%	0%	0%									•
1979	WET		0%	0%	0%									-
1980	WET		0%	0%	0%									-
1981	DRY		0%	0%	0%									-
1982	NORMAL		0%	0%	0%									-
1983	WET		0%	0%	0%									-
1984	NORMAL		0%	0%	0%									-
1985	WET		0%	0%	0%									-
1986	WET		0%	0%	0%									-
1987	NORMAL		0%	0%	0%									-
1988	NORMAL		0%	0%	0%									-
1989	DRY		0%	0%	0%									-
1990	DRY		0%	0%	0%									-
1991	NORMAL		0%	0%	0%									-
1992	NORMAL		0%	0%	0%									-
1993	WET		0%	0%	0%									-
1994	NORMAL		0%	0%	0%									-
1995	NORMAL		0%	0%	0%									-
1996	DRY		0%	0%	0%									-
1997	WET		0%	0%	0%									-
1998	NORMAL		0%	0%	0%									-
1999	NORMAL		0%	0%	0%									-
2000	DRY		0%	0%	0%									-
2001	NORMAL		0%	0%	0%									-
2002	DRY		0%	0%	0%									-
2003	DRY		0%	0%	0%									-
2004	NORMAL		0%	0%	0%									-
2005	WET		0%	0%	0%									-
2006	NORMAL		0%	0%	0%									-
2007	NORMAL		0%	0%	0%									-
2008	NORMAL		0%	0%	0%									-
2009	NORMAL		0%	0%	0%									-
N	Viin	-	-	-	-	-	-	-	-	-	-	-	-	-
Ave	erage		-	-	-									-
N	Иах	-	-	-	-	-	-	-	-	-	-	-	-	-

Augmentation Account		
Table 15a. Total Augmentation Demands	Table 15b. Augmentation Deliveries: Met Demands	Table 15c. Percent of Augmentation Demands Met
Modeled Scenario: Total Reservoir Size = 1176 AF	Modeled Scenario: Total Reservoir Size = 1176 AF	Modeled Scenario: Total Reservoir Size = 1176 AF
Irrigation Enlargement Account = 0 AF; Augmentation Account = 0 AF; DWR Account = 0 AF; CPW Account = 0 AF	Irrigation Enlargement Account = 0 AF; Augmentation Account = 0 AF; DWR Account = 0 AF; CPW Account = 0 AF	Irrigation Enlargement Account = 0 AF; Augmentation Account = 0 AF; DWR Account = 0 AF; CPW Account = 0 AF
11 12 1 2 3 4 5 6 7 8 9 10	11 12 1 2 3 4 5 6 7 8 9 10	11 12 1 2 3 4 5 6 7 8 9 10
Water	Water Year Nov Dec Ian Feh Mar Anr May Jun Jul Aug Sen Oct SIIM	Water
Year         Your         Dec         Jan         Feb         Mar         Apr         May         Jun         Jul         Aug         Sep         Oct         SUM	Year Year Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct SUM	Year         Nov         Dec         Jan         Feb         Mar         Apr         May         Jun         Jul         Aug         Sep         Oct         SUM
1975 WET 3.3 3.3 10.0	1975 WET	1975 WET 0% 0% 0% -
1976 DRY 3.3 3.3 3.3 3.3 3.3 20.0	1976 DRY	1976 DRY 0% 0% 0% 0% 0% -
1977 DRY - 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3	1977 DRY	1977 DRY 0% 0% 0% 0% 0% 0% -
1978 NORMAL 3.3 3.3 3.3 3.3 3.3 3.3 3.3 23.3	1978 NORMAL	1978 NORMAL 0% 0% 0% 0% 0 -
1979 WET - 3.3 3.3 3.3 3.3 3.3 16.7	1979 WET	1979 WET 0% 0% - 0% 0% -
1980 WET 3.3 <b>6.7</b>	1980 WET	1980 WET 0% 0% -
1981 DRY 3.3 3.3 3.3 3.3 16.7	1981 DRY	1981 DRY 0% 0% 0% 0% -
1982 NORMAL 3.3 - 3.3 <b>10.0</b>	1982 NORMAL	1982 NORMAL 0% 0% -
1983 WET 3.3 3.3 10.0	1983 WET	1983 WET 0% 0% 0% -
1984 NORMAL 3.3 3.3 3.3 - <b>10.0</b>	1984 NORMAL	1984 NORMAL 0% 0% 0 -
1985 WET 3.3 3.3 6.7	1985 WET	1985 WET 0% 0% -
1986 WET 3.3 3.3 3.3 - 10.0	1986 WET	1986 WET 0% 0% 0 -
1987 NORMAL 3.3 3.3 3.3 3.3 - <b>13.3</b>	1987 NORMAL	1987 NORMAL 0% 0% 0% -
1988 NORMAL 3.3 3.3 3.3 3.3 16.7	1988 NORMAL	1988 NORMAL 0% 0% 0% 0% -
1989 DRY 3.3 3.3 3.3 3.3 3.3 20.0	1989 DRY	1989 DRY 0% 0% 0% 0% 0% -
1990 DRY - 3.3 3.3 3.3 3.3 3.3 3.3 3.3 26.7	1990 DRY	1990 DRY 0% 0% 0% 0% 0% 0% -
1991 NORMAL 3.3 3.3 3.3 3.3 - 3.3 16.7	1991 NORMAL	1991 NORMAL 0% 0% 0% 0% -
1992 NORMAL - 3.3 3.3 3.3 3.3 16.7	1992 NORMAL	1992 NORMAL 0% 0% 0% 0% -
1993 WET - 3.3 3.3 3.3 3.3 3.3 16.7	1993 WET	1993 WET 0% 0% 0% 0% 0 -
1994 NORMAL 3.3 3.3 3.3 3.3 13.3	1994 NORMAL	1994 NORMAL 0% 0% 0% -
1995 NORMAL 3.3 3.3 10.0	1995 NORMAL	1995 NORMAL 0% 0% -
1996 DRY 3.3 3.3 3.3 3.3 3.3 16.7	1996 DRY	1996 DRY 0% 0% 0% 0% -
1997 WET 3.3 - 3.3 6.7 1998 NORMAL 3.3 3.3 3.3 3.3 3.3 - 13.3	1997 WET	1997 WET 0% 0% -
	1998 NORMAL	1998 NORMAL 0% 0% 0% 0 - 1999 NORMAL 0% 0% 0% 0
2000 DRY 3.3 3.3 3.3 3.3 3.3 3.3 3.3 23.3 2	2000   DRY   -   -   -   -   -   -   -   -   -	
2001 NORMAL 3.3 3.3 3.3 3.3 3.3 3.3 20.0 2002 DRY 3.3 3.3 3.3 3.3 3.3 3.3 3.3 23.3	2001   NORMAL	2001 NORMAL 0% 0% 0% 0% 0% 0 0 0 0 0 0 0 0 0 0 0 0
2002 DRY 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3	2002 DRY	2002 DRY 0% 0% 0 0% 0% 0 0% 0 0% 0 0% 0 0 0 0 0
2004 NORMAL - 3.3 3.3 3.5 3.3 3.3 3.3 3.3 3.3 3.3 3.3 23.3	2004 DRY	2003 DR1 0/6 0/6 0/6 0/6 0/6 0/6 0/6 0/6 0/6 0/6
2005 WET 3.3 3.3 3.3 3.3 3	2004 NORWINE	2004 NORWINE 0/8 0/8 0/8 0/8 0/8
2006 NORMAL 3.3 3.3 3.3 3.3	2005 WEI	2005 WEI 076 076 076 076 076 076 076 076 076 076
2007 NORMAL 3.3 3.3 3.3 3.3 3.3	2005 NORMAL	2006 NORMAL 0% 0% 0% 0% 0% -
2007 NORMAL 3.3 3.3 3.3 3	2007 NORMAL	2007 NORMAL 0% 0% 0% 0% -
2009 NORMAL 3.3 3.3 3.3 3.3 16.7	2009 NORMAL	2009 NORMAL 0% 0% 0% 0% 0% 0 -
Min	Min	Min
Average 0.5 0.8 0.6 1.0 1.7 2.8 3.1 2.9 2.7 15.9	Average	Average
Max 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3	Max	Max

					Ta	able 16a.	Total Irrig	gation Dem	nands									Table	e 16b. Irr	igation De	eliveries: I	Met Irriga	tion Dema	ınds										Table 16	6c. Percer	nt of Ir
					Modeled	d Scenario	: Total Re	eservoir Siz	ze = 2366 A	AF								N	/lodeled s	Scenario: 1	Total Rese	ervoir Size	e = 2366 AI	=									1	Modeled	Scenario:	: Total
		Irrigation	Enlargem	ent Accoun	t = 60 AF;	Augmentati	ion Account	t = 30 AF; D\	WR Account	= 600 AF;	CPW Accou	nt = 500 AF	:			Irrigation	Enlargemen	nt Account =	60 AF; A	ugmentation	n Account =	30 AF; DW	/R Account =	600 AF; (	CPW Accoun	t = 500 AF					Irrigation	Enlargeme	nt Account	= 60 AF; A	Augmentatio	on Accoi
		11	12	1	2	3	4	5	6	7	8	9	10			11	12	1	2	3	4	5	6	7	8	9	10				11	12	1	2	3	4
Water Year	Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct St	M Water Year	Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	SUM	Water Year	Year	Nov	Dec	Jan	Feb	Mar	Ар
1975	WET	211.0							812.8	2,816.0	2,030.0	1,383.0	1,056.0 8,3	08.8 1975	WET	169.8							812.8	520.7	28.8	-	3.4	1,535.5	1975	WET	80%					
1976	DRY	119.0							857.5	2,533.0	1,740.0	1,034.0	1,019.0 <b>7,</b> 3	02.5 1976	DRY	119.0							857.5	2.5	2.6	-	-	981.7	1976	DRY	100%					
1977	DRY	75.0							895.3	2,121.0	1,387.0	1,501.0		68.3 1977	DRY	5.0							289.5	23.6	-	-	-	318.1	1977	DRY	7%					
1978	NORMAL	122.0							835.5	3,235.0	2,239.0	1,286.0		<b>26.5</b> 1978	NORMAL	-							442.8	26.2	-	-	-	469.0		NORMAL	0%				<u> </u>	<b>⊥</b>
1979	WET								851.8	3,012.0	1,465.0	1,911.0		36.8 1979	WET								851.8	486.6	8.0	-			1979	WET						
1980	WET	86.0							898.3	3,472.0	1,670.0	1,227.0		15.3 1980	WET	86.0							898.3	812.8	89.4	23.6	65.8	1,975.8	1980	WET	100%					
1981	DRY	130.0							874.5	1,738.0	1,387.0	1,438.0		88.5 1981	DRY	110.0							874.5	410.0	2.0	-	1.2	1,397.7	1981	DRY	85%					↓
1982	NORMAL	168.0							836.3	2,670.0	1,629.0	986.0	<u> </u>	<b>71.3</b> 1982		28.0							836.3	751.1	2.4	1.9	29.0	1,648.6		NORMAL	17%					
1983	WET	188.0							686.8	2,222.0	1,763.0	,		42.8 1983		101.6							686.8	1,206.4	23.4	69.4		2,166.3	1983	WET	54%					
1984	NORMAL	21.0							730.8	3,030.0	1,189.0	,		1984		21.0							730.8	817.4	68.6	39.0		1,787.3		NORMAL	100%					—
1985	WET	548.0							908.5	2,746.0	1,924.0			67.5 1985	WET	117.2							908.5	558.7	85.4	57.2		1,840.3	1985	WET	21%					—
1986	WET	52.0							750.5	1,927.0	1,123.0	823.0	<u> </u>	1986	WET	52.0							750.5	864.6	92.6	91.8		1,956.7	1986	WET	100%					
1987	NORMAL	34.0							888.8	2,876.0	1,200.0	1,606.0		<b>98.8</b> 1987	NORMAL	34.0							888.8	945.2	78.6	94.8		2,159.3		NORMAL	100%					
1988	NORMAL	168.0							785.3	3,415.0	1,499.0			94.3 1988		168.0							785.3	543.7	30.4	- 42.6	11.0	1,538.3		NORMAL	100%					
1989	DRY	320.0							877.5	2,798.0	1,626.0	,		15.5 1989	DRY	127.6							877.5	864.6	-	12.6	26.0	1,908.3	1989	DRY	40%					₩
1990	DRY	22.0							867.0	2,503.0	1,627.0	495.0		00.0 1990	DRY	22.0							491.2	-	-	-	-	513.2	1990	DRY	100%				Ь——	4—
1991	NORMAL	15.0							788.0	2,660.0	1,905.0	1,005.0		95.0 1991	NORMAL	- 44.6							788.0	418.0	-	-	3.0	1,208.9		NORMAL	0%					
1992	NORMAL	206.0					-	-	803.0	2,022.0	1,512.0			57.0 1992		11.6							803.0	767.1	9.4	- 24.6	-	1,591.1		NORMAL	6%				+	┿
1993	WET NORMAL	232.0					-	-	793.8	3,448.0	884.0	,	,	<b>1993 70.5 1994</b>	WET	37.8							793.8	1,266.7	9.0	31.6 37.4		2,243.3	1993	WET NORMAL	16%				+	+
1994	NORMAL	312.0			_				846.5	3,319.0 3.144.0	1,877.0	757.0			NORMAL	167.3							846.5	713.9	10.0 47.4		62.0	1,837.1			54%					+
1995 1996	DRY	465.0 387.0					-	-	773.0 755.5	3,144.0	1,765.0 2.038.0	1,609.0 1,240.0		30.0 1995 00.5 1996	NORMAL	102.2 150.3							773.0	1,079.0 380.5	47.4	80.0	109.6	2,191.2 1.286.3	1995 I	DRY	22%				+	┿
1996		196.0				-	-		745.5	2.304.0	1.784.0	,		40.5 1996									755.5 745.5	1.157.6	0.6	10.8	454.7	2,075.2	1996		39%				+	+
1997	WET NORMAL	150.0				-	-		745.5 816.8	2,304.0	2.131.0	676.0 1.792.0		<b>56.8</b> 1997	NORMAL	9.0 150.0							816.8	948.9	28.8	44.6	151.7 81.8	2,075.2		WET NORMAL	5% 100%				+	+-
1998	NORMAL	145.0							789.8	2,357.0	866.0	,		<b>39.8</b> 1999		94.5							789.8	414.1	27.0	298.6	81.6	1,705.5		NORMAL	65%				+	+
2000	DRY	1,102.0				+	+		859.0	3.254.0				42.0 2000	DRY	142.6							859.0	126.9	27.0	230.0	81.0	1,128.5	2000	DRY	13%				+	+
2000	NORMAL	1,102.0						+	880.8	3,234.0	1,517.0	,		08.8 2001	NORMAL	142.0							880.8	662.2	1.4		4.2	1,128.5		NORMAL	15%				+	+
2001	DRY	287.0							1.001.8	3,028.0	2.047.0	,		57.8 2002	DRY	24.2							290.5	002.2	1.4	-	4.2	314.7	2002	DRY	8%				+	+-
2002	DRY	207.0							869.5	3,652.0	1,405.0	941.0		97.5 2003	DRY	24.2							649.2				46.9	696.0	2002	DRY	0/0				+	+
2004	NORMAL	38.0							789.8	2,742.0	1.822.0	513.0		14.8 2004	NORMAL	_							789.8	590.4	0.8			1,381.0		NORMAL	0%				+	+-
2005	WET	48.0					1		841.3	3.233.0	1,960.0	458.0		74.3 2005	WET								841.3	731.6	-		_	1,572.9	2005	WET	0%				+	+
2005	NORMAL	132.0			-				809.5	2.793.0	1,500.0	1.105.0		<b>59.5</b> 2006		86.3							809.5	457.2				1.353.0		NORMAL	65%				+	+
2007	NORMAL	126.0							919.5	2,624.0	1.774.0	,		<b>70.5</b> 2007		126.0							919.5	336.1				1,333.6		NORMAL	100%				+	+-
2007	NORMAL	165.0			<del>                                     </del>	+	+	1	848.3	3.133.0	1.362.0	,			NORMAL	26.9				$\vdash$			848.3	586.2				1,461.4		NORMAL	16%				+	+
	NORMAL	100.0			<u> </u>	1	1	+	783.3	2,701.0	1,501.0	,	, ,		NORMAL	-		1					783.3	69.7	-			853.0	2009	_	0%				+	+
	/lin	15.0			<del> </del>	-	<del> </del> -	+ -	686.8	1.738.0	866.0	458.0		_	Min	-	_	_		_	_	_	289.5	-	_			314.7	Mi		-	-	_		<del>  -</del>	<del>+-</del>
	erage	199.1							830.6	2,799.7	1,610.6				verage	71.6							764.7	558.3	18.5	25.5	39.0	1,470.3	Aver		47%				+-	+
	/lax	1,102.0			<del>-</del>	<del>-</del>	1	+	1,001.8	3,652.0	2,239.0				Max	169.8	-			1		l	919.5	1,266.7	92.6	298.6	151.7	2,243.3	Ma	_	100%		_		+	+

								-		ands Met					
										e = <b>2366</b> A					
4							_	n Account = 4		/R Account	= 600 AF; C	PW Accoun	it = 500 AF	10	
4	Water		11	12	1	2	3	4	5	6	/	8	9	10	
	Year	Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	SUM
	1975	WET	80%							100%	18%	1%	0%	0%	18%
	1976	DRY	100%							100%	0%	0%	0%	0%	13%
	1977	DRY	7%							32%	1%	0%	0%	0%	5%
	1978	NORMAL	0%							53%	1%	0%	0%	0%	6%
	1979	WET								100%	16%	1%	0%	2%	17%
	1980	WET	100%							100%	23%	5%	2%	10%	25%
	1981	DRY	85%							100%	24%	0%	0%	0%	23%
	1982	NORMAL	17%							100%	28%	0%	0%	4%	23%
	1983	WET	54%							100%	54%	1%	5%	9%	30%
	1984	NORMAL	100%							100%	27%	6%	3%	26%	26%
	1985	WET	21%							100%	20%	4%	8%	19%	25%
	1986	WET	100%							100%	45%	8%	11%	34%	39%
1	1987	NORMAL	100%							100%	33%	7%	6%	24%	30%
	1988	NORMAL	100%							100%	16%	2%	0%	1%	18%
1	1989	DRY	40%							100%	31%	0%	1%	4%	24%
1	1990	DRY	100%							57%	0%	0%	0%	0%	8%
	1991	NORMAL	0%							100%	16%	0%	0%	0%	16%
1	1992	NORMAL	6%							100%	38%	1%	0%	0%	25%
1	1993	WET	16%							100%	37%	1%	3%	15%	31%
1	1994	NORMAL	54%							100%	22%	1%	5%	14%	24%
1	1995	NORMAL	22%							100%	34%	3%	5%	9%	25%
	1996	DRY	39%							100%	13%	0%	0%	0%	17%
1	1997	WET	5%							100%	50%	0%	2%	18%	32%
	1998	NORMAL	100%							100%	45%	1%	2%	58%	29%
	1999	NORMAL	65%							100%	18%	3%	21%	6%	25%
	2000	DRY	13%							100%	4%	0%	0%	0%	13%
	2001	NORMAL								100%	22%	0%	0%	0%	20%
	2002	DRY	8%							29%	0%	0%	0%	0%	4%
	2003	DRY								75%	0%	0%	0%	4%	9%
	2004	NORMAL	0%							100%	22%	0%	0%	0%	21%
	2005	WET	0%							100%	23%	0%	0%	0%	22%
	2006	NORMAL	65%							100%	16%	0%	0%	0%	20%
Ī	2007	NORMAL	100%							100%	13%	0%	0%	0%	18%
Ī	2008	NORMAL	16%							100%	19%	0%	0%	0%	17%
L	2009	NORMAL	0%							100%	3%	0%	0%		13%
Ī.		Viin	-	-	-	-	-	-	-	29%	-	-	-	-	4%
	Av	erage	47%							93%	21%	1%	2%	8%	20%
I	- 1	Иах	100%	-	-	-	-	-	-	100%	54%	8%	21%	58%	39%

# **DWR Account**

							otal Comp			۸.				
		Irrigation	n Enlargeme				Total Res				PW Accour	nt = 500 AF		
		11	12	1	2	3	4	5	6	7	8	9	10	
Water Year	Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	SUM
1975	WET	_	_	-	-	-	-		-	-	63.1	-	-	63
1976	DRY	-	-	-	-	-	120.5	291.0	195.8	225.8	174.0	137.7	315.9	1,460
1977	DRY	-	-	-	-	-	97.3	272.0	168.6	-	40.1	264.1	184.7	1,026
1978	NORMAL	33.9	2.2	-	-	-	-	-	385.6	130.7	335.1	190.6	134.0	1,212
1979	WET	15.2	0.6	-	-	-	-	-	-	105.2	-	113.1	7.0	241
1980	WET	-	-	-	-	-	-	-	-	548.7	169.5	-	-	718
1981	DRY	-	-	-	-	-	125.0	171.8	182.3	-	213.2	276.5	19.7	988
1982	NORMAL	-	-	-	-	-	-	-	739.6	-	-	67.0	-	806
1983	WET	-	-	-	-	-	-	-	-	-	-	-	-	-
1984	NORMAL	-	-	-	-	-	-	-	213.6	202.2	64.9	-	-	480
1985	WET	-	-	-	-	-	-	-	-	28.1	-	-	-	28
1986	WET	-	-	-	-	-	-	-	329.5	-	-	-	-	329
1987	NORMAL	-	-	-	-	-	-	-	-	36.3	-	-	-	36
1988	NORMAL	-	-	-	-	-	-	171.8	-	-	89.7	57.9	-	319
1989	DRY	-	-	-	-	-	-	150.0	210.2	147.8	-	-	-	507
1990	DRY	16.1	0.4	-	-	-	-	73.5	212.5	123.0	302.2	13.3	115.9	857
1991	NORMAL	117.2	2.9	-	-	-	-	455.7	130.3	160.4	376.8	6.9	26.5	1.276
1992	NORMAL	-	-	-	-	-	-	-	-	-	142.4	-	-	142
1993	WET	-	-	-	-	-	-	-	-	58.8	-	-	-	58
1994	NORMAL	-	-	-	-	-	-	360.9	466.0	-	-	-	-	826
1995	NORMAL	-	-	-	-	-	-	-	-	176.1	-	-		176
1996	DRY	-	-	-	-	-	- 1	262.4	-	254.0	17.5	195.6	224.5	954
1997	WET	-	-	-	-	-	-	-	-	-	-	-	-	
1998	NORMAL	-	-		-	-	-	496.7	178.6	-	-	-	-	675
1999	NORMAL	-	-	-	-	-	-	-	223.1	-	-	-	-	223
2000	DRY	-	-	-	-	-	-	349.2	-	59.5	64.8	11.5	-	485
2001	NORMAL	-	-	-	-	-	-	-	-	118.7	101.6	-	-	220
2002	DRY	-	-	-	-	-	-	20.6	123.7	37.0	27.0	307.4	198.1	713
2003	DRY	35.4	3.8	-	-	-	-	-	75.1	308.6	262.8	-	64.9	750
2004	NORMAL	-	-	-	-	-	-	81.5	-	45.0	216.5	244.7	-	587
2005	WET	_	2.0	-	-	-	-	-	318.8	-	-	-	-	320
2006	NORMAL	-	-	-	-	-	-	-	-	23.6	58.1	96.0	-	177
2007	NORMAL	122.3	-	-	-	-	-	201.3	-	3.1	-	-	9.1	335
2008	NORMAL	-	-	-	-	-	-	-	468.5	-	-	-	-	468
2009	NORMAL	-	-	-	-	-	-	454.5	6.2	18.9	95.0	149.4	6.4	730
	Min	_	_		_	-	_	55	-	-	-	-	-	
	erage	9.7	0.3		-	-	9.8	108.9	132.2	80.3	80.4	60.9	37.3	520
	Max	122.3	3.8				125.0	496.7	739.6	548.7	376.8	307.4	315.9	1.460

					Modeled	Scenario:	ct Deliver	ervoir Size	= 2366 A		D147.4			
						-	n Account =							
14/-4		11	12	1	2	3	4	5	6	7	8	9	10	
Water Year	Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	SUM
1975	WET										63.1			63
1976	DRY						120.5	291.0	173.5	0.1	1.3	-	-	586
1977	DRY						97.3	192.3	-		-	-	-	289
1978	NORMAL	-	-						286.8	-	-	-	-	286
1979	WET	-	-							105.2		113.1	7.0	225
1980	WET									393.9	76.7			470
1981	DRY						125.0	171.8	88.1		-	-	-	384
1982	NORMAL								287.0			7.9		294
1983	WET													
1984	NORMAL								213.6	202.2	64.9			480
1985	WET									28.1				28
1986	WET								329.5					329
1987	NORMAL									36.3				3
1988	NORMAL							171.8			89.7	57.9		31
1989	DRY							150.0	210.2	147.8				50
1990	DRY	16.1	-					73.5	212.5	123.0	254.6	-	-	67
1991	NORMAL	-						288.9	-		-	-	-	28
1992	NORMAL										142.4			14
1993	WET									58.8				5
1994	NORMAL							360.9	374.0					73
1995	NORMAL									176.1				17
1996	DRY							262.4		254.0	17.5	140.3	-	67
1997	WET													
1998	NORMAL							496.7	178.6					67
1999	NORMAL								223.1					22
2000	DRY							288.9		-	-	-		28
2001	NORMAL									118.7	101.6			22
2002	DRY							20.6	123.7	37.0	27.0	158.1	-	36
2003	DRY	-	-						75.1	211.4	-		-	28
2004	NORMAL							81.5		45.0	176.9	-		30
2005	WET		-						318.8					31
2006	NORMAL									23.6	58.1	96.0		17
2007	NORMAL	122.3						201.3		3.1			9.1	33
2008	NORMAL								468.5					46
2009	NORMAL							454.5	6.2	18.9	45.1	-	-	52
-	Viin	-	-	-	-	-	97.3	20.6	-	-	-	-	-	
Av	erage	23.1	-				114.3	233.7	198.3	94.4	58.9	38.2	1.3	32:
	Иах	122.3			-	-	125.0	496.7	468.5	393.9	254.6	158.1	9.1	734

					Table 1	Za Dawasa	-+ -f C	and Dame	anda Mak					
							nt of Comp							
		Irrigation	Enlargomo				Total Res				^DW/ Accour	+ - EOO AE		
		11	12	1	2 2	3	4	5 5	6	7	8	9	10	
Water			1	<u> </u>		1								
Year	Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	SUM
1975	WET										100%			100%
1976	DRY						100%	100%	89%	0%	1%	0%	0%	40%
1977	DRY						100%	71%	0%		0%	0%	0%	28%
1978	NORMAL	0%	0%						74%	0%	0%	0%	0%	24%
1979	WET	0%	0%							100%		100%	100%	93%
1980	WET									72%	45%			66%
1981	DRY						100%	100%	48%		0%	0%	0%	39%
1982	NORMAL								39%			12%		37%
1983	WET													
1984	NORMAL								100%	100%	100%			100%
1985	WET									100%				100%
1986	WET								100%					100%
1987	NORMAL									100%				100%
1988	NORMAL							100%			100%	100%		100%
1989	DRY							100%	100%	100%				100%
1990	DRY	100%	0%					100%	100%	100%	84%	0%	0%	79%
1991	NORMAL	0%	0%					63%	0%	0%	0%	0%	0%	23%
1992	NORMAL										100%			100%
1993	WET									100%				100%
1994	NORMAL							100%	80%					89%
1995	NORMAL									100%				100%
1996	DRY							100%		100%	100%	72%	0%	71%
1997	WET													-
1998	NORMAL							100%	100%					100%
1999	NORMAL		ļ		ļ				100%					100%
2000	DRY							83%		0%	0%	0%		60%
2001	NORMAL									100%	100%			100%
2002	DRY							100%	100%	100%	100%	51%	0%	51%
2003	DRY	0%	0%						100%	69%	0%		0%	38%
2004	NORMAL							100%		100%	82%	0%		52%
2005	WET		0%						100%					99%
2006	NORMAL			ļ		ļ	ļ			100%	100%	100%		100%
2007	NORMAL	100%	ļ	ļ	ļ	ļ	ļ	100%		100%		ļ	100%	100%
2008	NORMAL		ļ	ļ	ļ	ļ	ļ	1000/	100%	4.000.	470/	00/	00/	100%
2009	NORMAL			ļ		ļ		100%	100%	100%	47%	0%	0%	72%
	Min	-	-	-	-	-	100%	63%	-	-	-	-	-	-
	erage	33%	-			<u> </u>	100%	94%	79%	78%	56%	29%	17%	73%
	Vlax	100%	-	-			100%	100%	100%	100%	100%	100%	100%	100%

# **CPW Account**

								servoir Siz						
			n Enlargeme			_								
		11	12	1	2	3	4	5	6	7	8	9	10	
Water Year	Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	SUM
1975	WET		61.4	51.7	24.3									137
1976	DRY		24.6	9.7	6.1									40
1977	DRY		81.1	161.1	78.0									320
1978	NORMAL		81.1	161.1	78.0									320
1979	WET		61.4	51.7	24.3									137
1980	WET		24.6	9.7	6.1									40
1981	DRY		24.6	9.7	6.1									40
1982	NORMAL		81.1	161.1	78.0									320
1983	WET		61.4	51.7	24.3									137
1984	NORMAL		24.6	9.7	6.1									40
1985	WET		61.4	51.7	24.3									137
1986	WET		24.6	9.7	6.1									40
1987	NORMAL		24.6	9.7	6.1									40
1988	NORMAL		61.4	51.7	24.3									137
1989	DRY		61.4	51.7	24.3									137
1990	DRY		81.1	161.1	78.0									320
1991	NORMAL		81.1	161.1	78.0									320
1992	NORMAL		61.4	51.7	24.3									137
1993	WET		61.4	51.7	24.3									137
1994	NORMAL		24.6	9.7	6.1									40
1995	NORMAL		61.4	51.7	24.3									137
1996	DRY		61.4	51.7	24.3									137
1997	WET		81.1	161.1	78.0									320
1998	NORMAL		24.6	9.7	6.1									40
1999	NORMAL		61.4	51.7	24.3									137
2000	DRY		61.4	51.7	24.3									137
2001	NORMAL		81.1	161.1	78.0									320
2002	DRY		61.4	51.7	24.3									137
2003	DRY		81.1	161.1	78.0									320
2004	NORMAL		81.1	161.1	78.0									320
2005	WET		61.4	51.7	24.3									137
2006	NORMAL		24.6	9.7	6.1									40
2007	NORMAL		61.4	51.7	24.3									137
2008	NORMAL		61.4	51.7	24.3									137
2009	NORMAL		61.4	51.7	24.3									137
	Min	_	24.6	9.7	6.1		_	-	_	_	_	-	_	40
	erage		57.0	69.0	33.4		l -						_	159
	Max		81.1	161.1	78.0		_	_	_	_	_	_	_	320

		•			Table 18	b. Fish Flo	ow Delive	ries: Met	Demands		•		•	•
								ervoir Size						
			Enlargeme											
	,	11	12	1	2	3	4	5	6	7	8	9	10	
Water Year	Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	SUM
1975	WET		61.4	51.7	24.0									137.1
1976	DRY		24.6	9.7	6.1									40.3
1977	DRY		10.3	-	-									10.3
1978	NORMAL		-	-	-									-
1979	WET		-	-	-									-
1980	WET		24.6	9.7	6.0									40.2
1981	DRY		24.6	9.7	6.1									40.3
1982	NORMAL		-	-	78.0									78.0
1983	WET		5.6	-	21.5									27.1
1984	NORMAL		24.6	9.7	6.1									40.3
1985	WET		61.4	51.7	24.3									137.4
1986	WET		-	-	0.0									0.0
1987	NORMAL		-	9.7	6.1									15.7
1988	NORMAL		12.0	-	-									12.0
1989	DRY		61.4	6.6	-									68.0
1990	DRY		81.1	161.1	77.3									319.5
1991	NORMAL		7.4	-	16.1									23.5
1992	NORMAL		50.2	-	0.6									50.8
1993	WET		61.4	51.7	23.6									136.7
1994	NORMAL		24.6	9.7	6.1									40.3
1995	NORMAL		0.0	-	0.0									0.0
1996	DRY		61.4	51.7	24.0									137.1
1997	WET		-	-	54.0									54.0
1998	NORMAL		24.6	9.7	6.1									40.3
1999	NORMAL		61.4	51.7	24.1									137.2
2000	DRY		61.4	51.7	24.3									137.4
2001	NORMAL		-	25.3	25.6									50.9
2002	DRY		61.4	34.2	-									95.6
2003	DRY		-	-	-									-
2004	NORMAL		-	-	-									-
2005	WET		14.2	-	-									14.2
2006	NORMAL		24.6	9.7	6.1									40.3
2007	NORMAL		61.4	51.7	24.0									137.1
2008	NORMAL		61.4	51.7	24.1									137.2
2009	NORMAL		61.4	29.1	-									90.5
	Min	-	-	-	-	-	-	-	-	-	-	-	-	-
	erage		29.4	21.3	14.7									65.4
1	Max	-	81.1	161.1	78.0	-	-	-	-	-	-	-	-	319.5

								low Dem						
					Modeled 9									
					= 60 AF; At	_							10	
Water		11	12	1	2	3	4	5	6	7	8	9	10	
Year	Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	SUM
1975	WET		100%	100%	99%									100%
1976	DRY		100%	100%	100%									100%
1977	DRY		13%	0%	0%									3%
1978	NORMAL		0%	0%	0%									
1979	WET		0%	0%	0%									
1980	WET		100%	100%	99%									100%
1981	DRY		100%	100%	100%									100%
1982	NORMAL		0%	0%	100%									24%
1983	WET		9%	0%	88%									20%
1984	NORMAL		100%	100%	100%									100%
1985	WET		100%	100%	100%									100%
1986	WET		0%	0%	0%									0%
1987	NORMAL		0%	100%	100%									39%
1988	NORMAL		20%	0%	0%									9%
1989	DRY		100%	13%	0%									49%
1990	DRY		100%	100%	99%									100%
1991	NORMAL		9%	0%	21%									7%
1992	NORMAL		82%	0%	2%									37%
1993	WET		100%	100%	97%									100%
1994	NORMAL		100%	100%	100%									100%
1995	NORMAL		0%	0%	0%									0%
1996	DRY		100%	100%	99%									100%
1997	WET		0%	0%	69%									17%
1998	NORMAL		100%	100%	100%									100%
1999	NORMAL		100%	100%	99%									100%
2000	DRY		100%	100%	100%									100%
2001	NORMAL		0%	16%	33%									16%
2002	DRY		100%	66%	0%									70%
2003	DRY		0%	0%	0%									-
2004	NORMAL		0%	0%	0%									-
2005	WET		23%	0%	0%									10%
2006	NORMAL		100%	100%	100%									100%
2007	NORMAL		100%	100%	99%									100%
2008	NORMAL		100%	100%	99%									100%
2009	NORMAL		100%	56%	0%									66%
	Min	-	-	-	-	-	-	-	-	-	-	-	-	-
	erage		59%	53%	57%									56%
	Vlax	-	100%	100%	100%	-	-	-	-	-	-	-	-	100%

Augm	entati	on A	ccoun	it																																										
						Table	19a. Tot	tal Augm	entation l	Demands	s										Т	Table 19b	Augmen	tation De	eliveries: I	Met Dema	nds										Table 19d	. Percent	of Augmer	ntation De	mands M	1et				
						Modeled		-																		ze = 2366													: Total Res							
			Irrigation E	Fnlargeme							unt = 600 AF	: CPW Acco	ount = 5	500 AF				1	rrigation E	Fnlargeme						WR Account		CPW Acco	nunt = 500	AF				Irrigat	tion Enlar	gement Accour							CPW Accou	int = 500 AF		
			11	12	1	2	3	4	5	6	7	8		9 1	0				11	12	1	2	3	4	5	6	7	8	9	10	)			11			2	3	4	5	6	7	8	9	10	
Wat						1	-	1	1	1							Water					1	1	1	1	1	1	1					Water					1		1	1	I	T	T		
Yea	r Ye	ar	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	S	iep O	ct	SUM	Year	'ear	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	00	t S	UM	Year Ye	r Nov	De	ec Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	SUM
197	5 W	ET	-	-	-	-	-	-	-	-	-	3.3	3	3.3	3.3	10.0	1975	VET										3.	.3	3.3	3.3	10.0	1975 W	Т								İ	100%	100%	100%	100%
197		RY	-	-	-	-	-	-	3.3	3 3.	3.3 3.		_	3.3	3.3	20.0		ORY							3.:	2.8	-	-				6.1	1976 DI							100%	84%	0%	0%	0%	0%	31%
197	7 DI	RY	-	3.3	3.3	-	-	-	3.3	3 3.	3.3	.3 3.3	.3	3.3	3.3	26.7		ORY		-	-				-	-	-	-			-	-	1977 DI	Υ	09	% 0%				0%	0%	0%	0%	0%	0%	-
197	3 NOR	MAL	3.3	3.3	3.3	-	-	-	-	-	3.	.3 3.3	.3	3.3	3.3	23.3	1978 NO	RMAL	-	-	-						-	-	-		-	-	1978 NOR	/AL 0%	0	% 0%						0%	0%	0%	0%	-
197	W	ET	-	3.3	3.3	-	-	-	-	-	-	3.3	.3	3.3	3.3	16.7	1979	VET		-	-							-			-	-	1979 W	Т	09	% 0%							0%	0%	0%	-
198	) W	ET	-	-	-	-	-	-	-	-	-	3.3	.3	-	3.3	6.7	1980	VET										3.	.3		3.3	6.7	1980 W	Т									100%		100%	100%
198		RY	-		-	-	-	-	-	3.	3.3	.3 3.3	.3	3.3	3.3	16.7	1981	ORY								3.3	2.1	-			-	5.4	1981 D	Υ							100%	62%	0%	0%	0%	32%
198			-	-	-	-	-	-	-	-	3.	.3 -			3.3	10.0		RMAL									0.7			0.9	-	1.7	1982 NOR									22%		28%	0%	17%
198			-	-	-	-	-	-	-	-	-		_		3.3	10.0		VET												3.3		10.0	1983 W										100%		100%	100%
198	_		-	-	-	-	-	-	-	-	3.			3.3	-	10.0		RMAL									3.3	-	.3	3.3		10.0	1984 NOR									100%		100%		100%
198			-	-	-	-	-	-	-	-		.3 3.3	_	-	-	6.7		VET									3.3		.3			6.7	1985 W									100%		4		100%
198			-	-	-	-	-	-	-	-		.3 3.3	-	3.3	-	10.0		VET									3.3	3.	.3	3.3		10.0	1986 W									100%	100%	100%		100%
198			-	-	3.3	-	-	-	-	-	3.			3.3	-	13.3		RMAL			3.3						3.3	3.	.3	3.3		13.3	1987 NOR			100%	5					100%	100%	100%		100%
198			-	-	-	-	-	-	-	3.		.3 3.3	-	3.3	3.3	16.7		RMAL								3.3			.3	3.3		16.7	1988 NOR		_		_			4000/	100%	100%			100%	100%
198			-	-	-	-	-	-	3.3	_					3.3	20.0		ORY							3.	3.3	2.7	-			_	9.4	1989 D		00	00/				100%	100%	81%	0%	0%	0%	47%
199		• •	-	3.3	3.3	-	-	-	3.3			.3 3.3		3.3	3.3	26.7 16.7		RMAL		-	-				-	-	-	-			-	-	1990 DI 1991 NOR	-	09	% 0%				0%	0% 0%	0%	0%	0%	0%	-
199			-	3.3	-	-	-	-	3.3	3 3.		.3 3.3		3.3	3.3	16.7	1991 NO					1			-	-	-	-			-	-	1991 NOR		09	0/				0%	0%	0%	0%	0%	0%	-
199			-	3.3		-	-	<del>-</del>	-	_		.3 3.3	_		3.3	16.7		VET									3.3	- 2	.3	3.3	2 2	13.3	1992 NOR		0							100%		100%	100%	80%
199			-	3.3	-		-	1	-	-	3.		_	3.3	3.3	13.3		RMAL		-			-				3.3			3.3		13.3	1994 NOR		U,	/0						100%	100%	100%	100%	100%
199			_	-	_		-	_	-	_	-	3.3	_		3.3	10.0		RMAL									5.5			3.3		10.0	1995 NOR		-							10070	100%	100%	100%	100%
199			-	-	-	-	-	-	3.3	3 3.	3 3	.3 3.3	_	3.3	-	16.7		ORY							3.:	3.3	3.3		.3	3 3		16.7	1996 DI		-					100%	100%	100%		100%	10070	100%
199		•	-	-	-	-	-	-	-	-	-	3.3	_		3.3	6.7		VET							3	5.5	5.5	3.		3.5	3.3	6.7	1997 W							10070	10070	100/0	100%	10070	100%	100%
199		MAL	-	-	-	-	-	-	-	3.	3.3 3.		_	3.3	-	13.3		RMAL								3.3	3.3	3.	.3	3.3		13.3	1998 NOR								100%	100%	100%	100%		100%
199	NOR	MAL	-	-	-	-	-	-	-	3.	3.3	.3 -		3.3	3.3	13.3		RMAL								3.3	3.3			3.3	3.3	13.3	1999 NOR	ΛAL							100%	100%		100%	100%	100%
200	) DI	RY	3.3	-	-	-	-	-	3.3	3 3.	3.3	.3 3.3	.3	3.3	3.3	23.3	2000	ORY	0.2						-	-	-	-			-	0.2	2000 DI	Y 6%						0%	0%	0%	0%	0%	0%	1%
200	1 NOR	MAL	3.3	-	-	-	-	-	-	3.	3.3	.3 3.3	.3	3.3	3.3	20.0	2001 NO	RMAL	-							1.4	-	-			-	1.4	2001 NOR	/AL 0%							41%	0%	0%	0%	0%	7%
200	2 DI	RY	3.3	-	-	-	-	-	3.3	3 3.	3.3	.3 3.3	.3	3.3	3.3	23.3	2002	ORY	-						-	-	-	-			-	-	2002 DI	Y 0%						0%	0%	0%	0%	0%	0%	-
200		RY	3.3	3.3	-	-	-	-	3.3	3 3.	3.3	.3 3.3	.3	-	3.3	23.3		ORY	-	-					-	-	-	-			-	-	2003 DI	Y 0%	09	%				0%	0%	0%	0%		0%	-
200	4 NOR	MAL	-	3.3	3.3	-	-	-	-	3.	3.3	.3 3.3	.3	3.3	3.3	23.3	2004 NO	RMAL			-					1.2	-	-			-	1.2	2004 NOR	ΛAL	09	% 0%					37%	0%	0%	0%	0%	5%
200			-		-	-	-	-	-	-	3.	.3 3.3	.3	3.3	3.3	13.3		VET									3.3	3.	.3	3.3	3.3	13.3	2005 W									100%	100%	100%	100%	100%
	5 NOR		-	-	-	-	-	-	3.3	3 3.	3.3	.3 3.3	.3	3.3	-	16.7		RMAL							3.	3.3	3.3			2.0		15.4	2006 NOR							100%	100%	100%	100%	61%		92%
200			-	-	-	-	-	-	-	3.			_	3.3	3.3	16.7		RMAL								3.3	3.3	_	.8 -		-	9.4	2007 NOR								100%	100%	83%	0%	0%	57%
200			-	-	-	-	-	-	-	-	3.		-	3.3	3.3	13.3		RMAL				ļ					3.3	3.	.3	3.3	3.3	13.3	2008 NOR							ļ		100%	-00,0	100%	100%	100%
200	NOR	MAL	-	-	-	-	-	-	-	3.	3.3	.3 3.3	.3	3.3	3.3	16.7	2009 NO									2.3	-	-			-	2.3	2009 NOR	ΛAL							69%	0%	0%	0%	0%	14%
	Min		-	-	-	-	-	-	-		-			-	-	6.7	Min		-	-	-	-	-	-	-	-	-	-				-	Min	-			_	-	-	-	-	-	<del>  -</del>	<del></del>	<u> </u>	-
	Average		0.5	0.8			-	-	1.0						2.7	15.9	Averag		0.0	-	0.6				1.3							7.1	Average	1%		17%				40%	57%	54%		50%	39%	57%
	Max		3.3	3.3	3.3	-	-	-	3.3	3 3.	.3 3.	.3 3.3	3 I	3.3	3.3	26.7	Max		0.2	-	3.3	-	-	-	3.3	3.3	3.3	1 3.	.3	3.3	3.3	16.7	Max	6%	-	100%	á I -	-	-	100%	100%	100%	100%	100%	100%	100%

Table 20. Phase 1 Redmesa Reservoir Enlargement Engineering and Permitting Cost Estimate

		T	
Task No.	Task Description	Notes	Total
1	Engineering		
а	Phase 1 - Schematic Design to Verify Site Accommodation	Assess downstream hydraulic conditions and identify concern areas; prepare CAD model of proposed embankment; review geologic data; develop schematic construction costs estimate; and meet with Dam Safety Bureau (DSB).	\$ 13,500.00
b	Phase 2 - Determine Spillway Hazard Classification	Prepare Inflow Design Flood (IDF) model for reservoir; survey existing downstream structures and features; develop mapping data; refine embankment design information; prepare model for spillway probable maximum precipitation (PMP) event; Reclamation Consequence Estimating Methodology (RCEM) analysis; inundation mapping; report preparation and delivery to DSB for review.	\$ 23,500.00
	Phase 3 - Surveying & Geotechnical Field	Survey: Stake out schematic embankment location; design level survey of area of impact; and mapping.	\$ 49,400.00
С	Investigations	Geotechnical: DSB review and approval of geotechnical engineer; mapping; field investigations; and design reports preparation.	\$ 100,000.00
d	Phase 4 - Design Process	Prepare hydrology/spillway report for PMP event; analyze water control features; design embankment zone and foundation and prepare associated report, construction plans, and details; prepare instrumentation and monitoring plan and details; prepare cost estimate and technical specifications; prepare Emergency Action Plan (EAP); and prepare and submit application package to DSB.	\$ 281,000.00
	<u> </u>	Sub-total	\$ 467,400.00
2	Permitting		, , , , , , , , , , , , , , , , , , , ,
а	Phase 1 - Section 404 Permitting	Prepare maps and identify limits of project site; prepare alternative analysis; prepare a mitigation/monitoring plan; submit a Jurisdictional Determination (JD) report; submit preconstruction notification to Army Corps of Engineers (Corps); submit 401 certification application; and apply for an "Individual Permit."	\$ 55,000.00
b	Phase 1 - NEPA Compliance	Contract an archaeologist to survey project area and prepare report for compliance with Section 106 of the National Historical Preservation Act; perform Threatened and Endangered and Candidate species survey and prepare report in compliance with Section 7 of the Endangered Species Act; possible additional biologic surveys for New Mexico Meadow Jumping Mouse; and prepare Environmental Assessment (EA).	\$ 60,000.00
		Sub-total Sub-total	
		Total	\$ 582,400.00

Table 21. Redmesa Reservoir Alternate No. 1 - 2020 Estimated Project Cost New High Hazard Capacity Spillway - Straight Crest (L=195 feet) 3/24/2020

Ite	em	/	Description	Quantity	Unit	U	nit Cost	Es	timated Cost
1			Clearing and Grubbing Spillway Site	4.38	AC	\$	10,000	\$	44,000
2			Main Dam						
3			Spillway						
	а		Mass excavate approach and exit channels	77,440	CY	\$	8.00	\$	620,000
	b		Compacted Fill	205	CY	\$	12.00	\$	2,000
	С		Waste Excess Fill from Spillway Excavation to Reservoir	77,235	CY	\$	4.00	\$	309,000
	d		Reinforced Concrete						
		i	Spillway Crest (L= 235-feet 3-feet W x 5-feet D)	130	CY	\$	350	\$	46,000
	e		3-feet Riprap and Bedding (D50 = 18-inch)	1,305	SY	\$	100	\$	131,000
4			Emergency Warning System - NWS Tied						
Ш	а		NWS Home Radios (GOES)	3	EA	\$	1,500	\$	5,000
Ш	b		Reservoir Level Gage	1	EA	\$	25,000	\$	25,000
	С		Reservoir Inlet Level Gage (remote powered)	1	EA	\$	12,500	\$	12,500
	d		Sirens	3	EA	\$	15,000	\$	45,000
	e		Spillway Level Sensor System w\Telemetry (GOES)	1	LS	\$	50,000	\$	50,000
Ш	f		Power to Dam Crest	1	Allow	\$	75,000	\$	75,000
5			Access Roads	1	LS	\$	25,000	\$	25,000
6			Reclamation	2.5	AC	\$	7,500	\$	18,800
7			Unlisted Items (5%)	1	LS	\$	70,400	\$	70,400
8			Mobilization, Bonds, Insurance (10%)	1	LS	\$	141,000	\$	141,000
			Es	stimated Dire	ct Cons	truc	tion Cost	\$	1,619,700
				_			ncy (30%)	\$	486,000
							gineering	\$	450,000
			Environmental Mitigation/Comp	liance and Mo	onitorin	g (Ā	llowance)	\$	200,000
			cquisition	2.2	AC	\$	4,000	\$	8,800
Flo	000	ΙE	asement	0	AC	\$	4,000	\$	-
				Total Es	timated	Pro	oject Cost	\$	2,764,500

Table 22. Redmesa Reservoir Alternate No. 2 - 2020 Estimated Project Cost New High Hazard Capacity Spillway - Straight Crest (L=150 feet) Plus Concrete Embankment Crest 3/24/2020

14		. /	3/24/2020		11	11	:. C	Fating at all Coat
It	em	<b>n/</b>	Description	Quantity	Unit		nit Cost	Estimated Cost
1			Clearing and Grubbing Spillway Site	3.55	AC	\$	10,000	\$ 35,500
2			Main Dam					
	а		Concrete Embankment Rise (1-foot, El. 6901.3 feet)	1,253	CY	\$	350.00	\$ 438,600
3			Spillway					
	а		Mass excavate approach and exit channels	52,125	CY	\$	8.00	\$ 417,000
	b		Compacted Fill	205	CY	\$	12.00	\$ 2,500
	С		Waste Excess Fill from Spillway Excavation to Reservoir	51,920	CY	\$	4.00	\$ 207,700
	d		Reinforced Concrete					
		i	Spillway Crest (L=195-feet 3-feet W x 5-feet D)	110	CY	\$	350	\$ 38,500
	е		3-feet Riprap and Bedding (D50 = 18-inch)	1,100	SY	\$	100	\$ 110,000
4			Emergency Warning System - NWS Tied					
	а		NWS Home Radios (GOES)	3	EA	\$	1,500	\$ 4,500
	b		Reservoir Level Gage	1	EA	\$	25,000	\$ 25,000
	С		Reservoir Inlet Level Gage (remote powered)	1	EA	\$	12,500	\$ 12,500
	d		Sirens	3	EA	\$	15,000	\$ 45,000
	е		Spillway Level Sensor System w\Telemetry (GOES)	1	LS	\$	50,000	\$ 50,000
	f		Power to Dam Crest	1	Allow	\$	75,000	\$ 75,000
5			Access Roads	1	LS	\$	25,000	\$ 25,000
6			Reclamation	1.4	AC	\$	7,500	\$ 10,500
7			Unlisted Items (5%)	1	LS	\$	74,900	\$ 74,900
8			Mobilization, Bonds, Insurance (10%)	1	LS	\$	149,700	\$ 149,700
			Es	timated Dire	ct Cons	truct	tion Cost	\$ 1,721,900
					Conti	ngen	cy (30%)	\$ 517,000
				Cons	truction	n Eng	ineering	\$ 450,000
			Environmental Mitigation/Comp	iance and Mo	onitorin	g (All	lowance)	\$ 200,000
La	nd	ΙA	cquisition	1.9	AC	\$	4,000	\$ 7,600
Flo	000	d E	asement	0	AC	\$	4,000	\$ -
				Total Es	timated	l Pro	ject Cost	\$ 2,896,500

Table 23. Redmesa Reservoir Alternate No. 3 - 2020 Estimated Project Cost

500 AF Enlargement (1,676- AF Total Volume)

Item	Num	nber	Description	Quantity	Unit	l	Init Cost	Est	imated Cost
1			Stream Diversion and Dewatering	1	LS	\$	50,000	\$	50,000
2			Clearing and Grubbing Dam and Spillway Site	4.05	AC	\$	10,000	\$	40,500
3			Borrow Area Preparation and Reclamation	1	LS	\$	50,000	\$	50,000
4			Main Dam						
	а		Existing Embankment Excavation waste to Reservoir	500	CY	\$	5	\$	2,500
	b		Foundation Excavation, Unclassified waste to Reservoir	3,940	CY	\$	5	\$	19,700
	С		Foundation Preparation (Dental Concrete & Spot Fills)	7,085	SY	\$	61.50	\$	435,700
	d		Right Abutment Grouting	1	LS	\$	510,000	\$	510,000
	е	i.	Zone 2 Shell (Source/Spread/Place/Compact) from Spillway Excavation	18,600	CY	\$	9.90	\$	184,100
	е	ii.	Zone 2 Shell (Source/Spread/Place/Compact) from Reservoir Borrow Area	37,625	CY	\$	14.00	\$	526,800
	f		Zone 1 Core (Source/Spread/Place/Compact) from Reservoir Borrow Area	10,885	CY	\$	14	\$	152,400
	g		3-feet Filter - Chimney and Blanket (Source/Deliver/Place/Compact)	5,870	CY	\$	100	\$	587,000
	h		2-feet Riprap and Bedding (D50 = 12-inch)	1,285	CY	\$	100	\$	128,500
	i		Instrumentation	1	LS	\$	50,000	\$	50,000
	i		6-inch Aggregate base course (Dam Crest)	1,650	SY	\$	15	\$	24,800
5			Spillway	,		Ė			
	а		Compacted Fill (Source/Spread/Place/Compact) from Spillway Excavation	5,835	CY	\$	9.90	\$	57,800
	b		Waste Excess Fill from Spillway Excavation to Reservoir	_	CY	\$	4.00	\$	-
	C		Reinforced Concrete			_		_	
		i	Spillway Crest	55	CY	\$	350	\$	19,300
		ii	Abutment Gravity Wall	45	CY	\$	600	\$	27,000
	d		3-feet Riprap and Bedding (D50 = 12-inch)	805	CY	\$	100	\$	80,500
6	- u		Outlet Works	000		Ψ	100	\$	- 00,500
	а		Excavation, Unclassified	3,500	CY	\$	6.15	\$	21,500
	b		Demolish and Remove Existing Intake Tower/Bridge/Controls	1	LS	\$	50,000	\$	50,000
	C		Intake Structure	1	LS	\$		\$	65,000
	d		Intake Structure  Intake Gate (21-inch x 21-inch)	1	EA	\$		\$	35,000
	e		Inlet Structure Trash Rack	1	EA	\$	15,000	\$	15,000
	f		Conduit (Supply/Install) 21-inch Welded Steel Pipe	198	LF	\$	350	\$	69,300
	<u>'</u>		Slip-line and Grout Existing Conduit (Supply/Install) 21-inch Welded Steel Pipe	230	LF	\$		\$	115,000
	g h		Concrete Encasement	175	CY		500	\$	87,500
	- 11		Compacted Fill (Source/Spread/Place/Compact)	4,500	CY	\$	9.84	\$	
	- !			· · · · · ·	LS	\$	50,000		44,300
	J		Controls (Measurement Flumes)	1					50,000
	K		Impact Basin	1	LS	\$		\$	50,000
	_ '		Riprap and Bedding (D50 = 12-inch)	45	CY	\$		\$	4,500
/			Access Roads	1	LS	\$	75,000	\$	75,000
8			Reclamation	1	AC	\$	7,500	\$	7,500
9			Emergency Warning System - NWS GOES Tired			Ļ		\$	-
	a		NWS Home Radios (GOES)	3	EA	\$	1,500	\$	4,500
	b		Reservoir Level Gage	1	EA	\$	25,000	\$	25,000
	С		Reservoir Inlet Level Gage (remote powered)	1	EA	\$		\$	12,500
	d		Sirens	3	EA	\$	15,000		45,000
	e		Spillway Level Sensor System w\Telemetry (GOES)	1	LS	\$	50,000		50,000
	f		Power to Dam Crest	1	Allow	\$	75,000	\$	75,000
10			Unlisted Items (5%)	1	LS	\$		\$	192,000
11			Mobilization, Bonds, Insurance (10%)	1	LS	\$		\$	385,000
				Estimated					4,425,200
					Cont	inge	ency (30%)	\$	1,328,000
					Constructio				450,000
			Environmental Mitigation/						200,000
Land A	Acquis	sition		1.9	AC	\$	4,000		7,600
Flood				10.4	AC	\$	4,000		41,600
				Tota	l Estimate				6,452,400
							,	<u> </u>	

Table 24. Redmesa Reservoir Alternate No. 4 - 2020 Estimated Project Cost

900 AF Enlargement (2,076 AF Total Volume) 3/24/2020

Item	Number		Description 3/24/2020 Quantity			Unit Cost		<b>Estimated Cost</b>	
1	1		Stream Diversion and Dewatering	1	Unit LS	\$		\$	50,000
2			Clearing and Grubbing Dam Site	3.8	AC	\$		\$	38,000
3			Borrow Area Preparation and Reclamation	1	LS	\$	50,000	\$	50,000
4			Main Dam			Ť	00,000	7	20,000
	а		Existing Embankment Excavation waste to Reservoir	_	CY	\$	5	\$	_
-	b		Foundation Excavation, Unclassified waste to Reservoir	7,460	CY	\$	5	\$	37,000
	С		Foundation Preparation (Dental Concrete & Spot Fills)	7,750	SY	\$	61.50	\$	477,000
	d		Right Abutment Grouting	1	LS	\$		\$	510,000
	e	i.	Zone 2 Shell (Source/Spread/Place/Compact) from Spillway Excavation	7,380	CY	\$	9.90		73,000
	е	ii.	Zone 2 Shell ( Source/Spread/Place/Compact) from Reservoir Borrow Area	72,285	CY	\$	14.00	\$	1,012,000
	f		Zone 1 Core (Source/Spread/Place/Compact) from Reservoir Borrow Area	26,260	CY	\$		\$	368,000
	g		3-feet Filter - Chimney and Blanket (Source/Deliver/Place/Compact)	6,660	CY	\$		\$	666,000
-	h		2-feet Riprap and Bedding (D50 = 12-inch)	1,930	CY	\$	100		193,000
	i		Instrumentation	1	LS	\$	50,000	\$	50,000
	i		6-inch Aggregate base course (Dam Crest)	1,680	SY	\$	15		25,000
5			Spillway	1,000		Ť		7	
	а		Compacted Fill (Source/Spread/Place/Compact) from Spillway Excavation	7,225	CY	\$	9.90	\$	72,000
	b		Compacted Fill (Source/Spread/Place/Compact) from Reservoir Borrow Area	_	CY	Ė		\$	-
	С		Waste Excess Fill from Spillway Excavation to Reservoir	_	CY	\$	4.00	\$	_
	d		Reinforced Concrete			Ė			
		i	Spillway Crest	60	CY	\$	350	\$	21,000
		ii	Abutment Gravity Wall	75	CY	\$	600	\$	45,000
	е		3-feet Riprap and Bedding (D50 = 12-inch)	625	CY	\$	100	\$	63,000
6			Outlet Works			Ħ			
	а		Excavation, Unclassified	3,500	CY	\$	6.15	Ś	22,000
	b		Demolish and Remove Existing Intake Tower/Bridge/Controls	1	LS	\$	50.000	\$	50,000
	С		Intake Structure	1	LS	\$	65,000	\$	65,000
	d		Intake Gate (21-inch x 21-inch)	1	EA	\$	35,000	\$	35,000
	е		Inlet Structure Trash Rack	1	EA	\$	15,000	\$	15,000
	f		Conduit (Supply/Install) 21-inch Welded Steel Pipe	210	LF	\$	350	\$	74,000
	g		Slip-line and Grout Existing Conduit (Supply/Install) 21-inch Welded Steel Pipe	230	LF	\$	500	\$	115,000
	h		Concrete Encasement	175	CY	\$		\$	88,000
	i		Compacted Fill (Source/Spread/Place/Compact)	4,500	CY	\$	9.84	\$	44,000
	i		Controls (Measurement Flumes)	1	LS	\$	50,000	\$	50,000
	k		Impact Basin	1	LS	\$	50,000	\$	50,000
	- 1		Riprap and Bedding (D50 = 12-inch)	45	CY	\$	100		5,000
7			Access Roads	1	LS	\$	75,000	\$	75,000
8			Reclamation	1	AC	\$	7,500	\$	7,500
9			Emergency Warning System - NWS GOES Tired				-		•
	а		NWS Home Radios (GOES)	3	EA	\$	1,500	\$	4,500
	b		Reservoir Level Gage	1	EA	\$	25,000	\$	25,000
	С		Reservoir Inlet Level Gage (remote powered)	1	EA	\$	12,500		12,500
	d		Sirens	3	EA	\$		\$	45,000
	е		Spillway Level Sensor System w\ Telemetry (GOES)	1	LS	\$	50,000		50,000
	f		Power to Dam Crest	1	Allow	\$	75,000	\$	75,000
10			Unlisted Items (5%)	1	LS	\$	233,000	\$	233,000
11			Mobilization, Bonds, Insurance (10%)	1	LS	\$	466,000	\$	466,000
				Estimated					5,356,500
				Contingency (30%)				_	1,607,000
				(	Construction Engineering				450,000
	Environmental Mitigation/Compliance and Monitoring (A							200,000	
						4,000		8,400	
Flood Easement 19.4 AC \$ 4,000								77,600	
.oou i	Luscil				al Estimate				7,699,500

Table 24. Redmesa Reservoir Alternate No. 5 - 2020 Estimated Project Cost 1,190 AF Enlargement (2,366 AF Total Volume) 3/24/2020

ltem I	Numbe	r Description	Quantity	Unit	l	Init Cost	Est	imated Cost
1		Stream Diversion and Dewatering	1	LS	\$	50,000	\$	50,000
2		Clearing and Grubbing Dam Site	3.3	AC	\$	10,000	\$	33,000
3		Borrow Area Preparation and Reclamation	1	LS	\$	50,000	\$	50,000
4		Main Dam						,
	а	Existing Embankment Excavation waste to Reservoir	5,520	CY	\$	5	\$	28,000
	b	Foundation Excavation, Unclassified waste to Reservoir	6,480	CY	\$	5	\$	32,000
	С	Foundation Preparation (Dental Concrete & Spot Fills)	8,300	SY	\$	61.50	\$	510,000
	d	Right Abutment Grouting	1	LS	\$	510,000	\$	510,000
	е	i. Zone 2 Shell (Source/Spread/Place/Compact) from Spillway Excavation	1,150	CY	\$	9.90	\$	11,000
		ii. Zone 2 Shell ( Source/Spread/Place/Compact) from Reservoir Borrow Area	95,705	CY	\$	14.00	\$	1,340,000
	f	Zone 1 Core (Source/Spread/Place/Compact) from Reservoir Borrow Area	31,910	CY	\$	14	\$	447,000
	g	3-feet Filter - Chimney and Blanket (Source/Deliver/Place/Compact)	7,285	CY	\$	100	\$	729,000
	h	2-feet Riprap and Bedding (D50 = 12-inch)	2,345	CY	\$	100	\$	235,000
	i	Instrumentation	2,010	LS	\$	50,000	\$	50,000
	i	6-inch Aggregate base course (Dam Crest)	1,750	SY	\$	15	\$	26,000
5	-1	Spillway	1,100	- 31	Ψ		7	20,000
Ť	а	Compacted Fill (Source/Spread/Place/Compact) from Spillway Excavation	7,920	CY	\$	9.90	\$	78,000
	b	Waste Excess Fill from Spillway Excavation to Reservoir		CY	\$	4.00	\$	, 0,000
	C	Reinforced Concrete			Ψ	4.00	7	
		i Spillway Crest	45	CY	\$	350	\$	16,000
		ii Abutment Gravity Wall	150	CY	\$	600	\$	90,000
	d	Riprap and Bedding (D50 = 12-inch)	475	CY	\$	100	\$	48,000
6	- u	Outlet Works	473	CI	Ψ	100	۲	48,000
	а	Excavation, Unclassified	3,500	CY	\$	6.15	\$	22,000
	b	Demolish and Remove Existing Intake Tower/Bridge/Controls	3,300	LS	\$	50.000	\$	50,000
	C	Intake Structure	1	LS	\$	65,000	\$	65,000
	d	Intake Gate (21-inch x 21-inch)	1	EA	\$	35,000	\$	35,000
	e	Inlet Structure Trash Rack	1	EA	\$	15,000	\$	15,000
	f	Conduit (Supply/Install) 21-inch Welded Steel Pipe	230	LF	\$	350	\$	81,000
		Slip-line and Grout Existing Conduit (Supply/Install) 21-inch Welded Steel Pipe	230	LF	\$	500	\$	115,000
	g h	Concrete Encasement	175	CY	\$	500	\$	88,000
	- ''	Compacted Fill (Source/Spread/Place/Compact)	4,500	CY	\$	9.84	\$	44,000
		Controls (Measurement Flumes)	4,500	LS	\$	50,000	\$	50,000
	J k	Impact Basin	1	LS	\$	50,000	\$	50,000
	K I	3-feet Riprap and Bedding (D50 = 12-inch)	45	CY	\$	100	\$	4,500
7	- '-	Access Roads	45	LS	\$	75,000	\$	75,000
8		Reclamation	1	AC	\$	75,000	\$	75,000
9			<u>'</u>	AC	Φ	7,500	Ş	7,500
9	_	Emergency Warning System - NWS GOES Tired	3	ГА	r.	1 500	ć	4.500
	a	NWS Home Radios (GOES)		EA	\$	1,500	\$	4,500
	b	Reservoir Level Gage  Reservoir Inlet Level Gage (remote powered)	1	EA	\$	25,000	\$	25,000
	C	÷	1	EA	\$	12,500	\$	12,500
	а	Sirens	3	EA	\$	15,000		45,000
	e	Spillway Level Sensor System w\ Telemetry (GOES)	1	LS	\$	50,000		50,000
	T	Power to Dam Crest	1	Allow	\$	75,000	\$	75,000
10		Unlisted Items (5%)	1	LS	\$	259,900	\$	260,000
11		Mobilization, Bonds, Insurance (10%)	1	LS	\$	520,000	\$	520,000
	Estimated Direct Construction Co Contingency (30						-	5,977,000
								1,793,000
	Construction Engine					\$	450,000	
Environmental Mitigation/Compliance and Monitoring (Allo					Allowance)		200,000	
Land Acquisition 2.2 AC \$ 4,000							\$	8,800
							\$	113,600
_	•		To	tal Estimat	ed F	Project Cost	Ċ	8,542,400

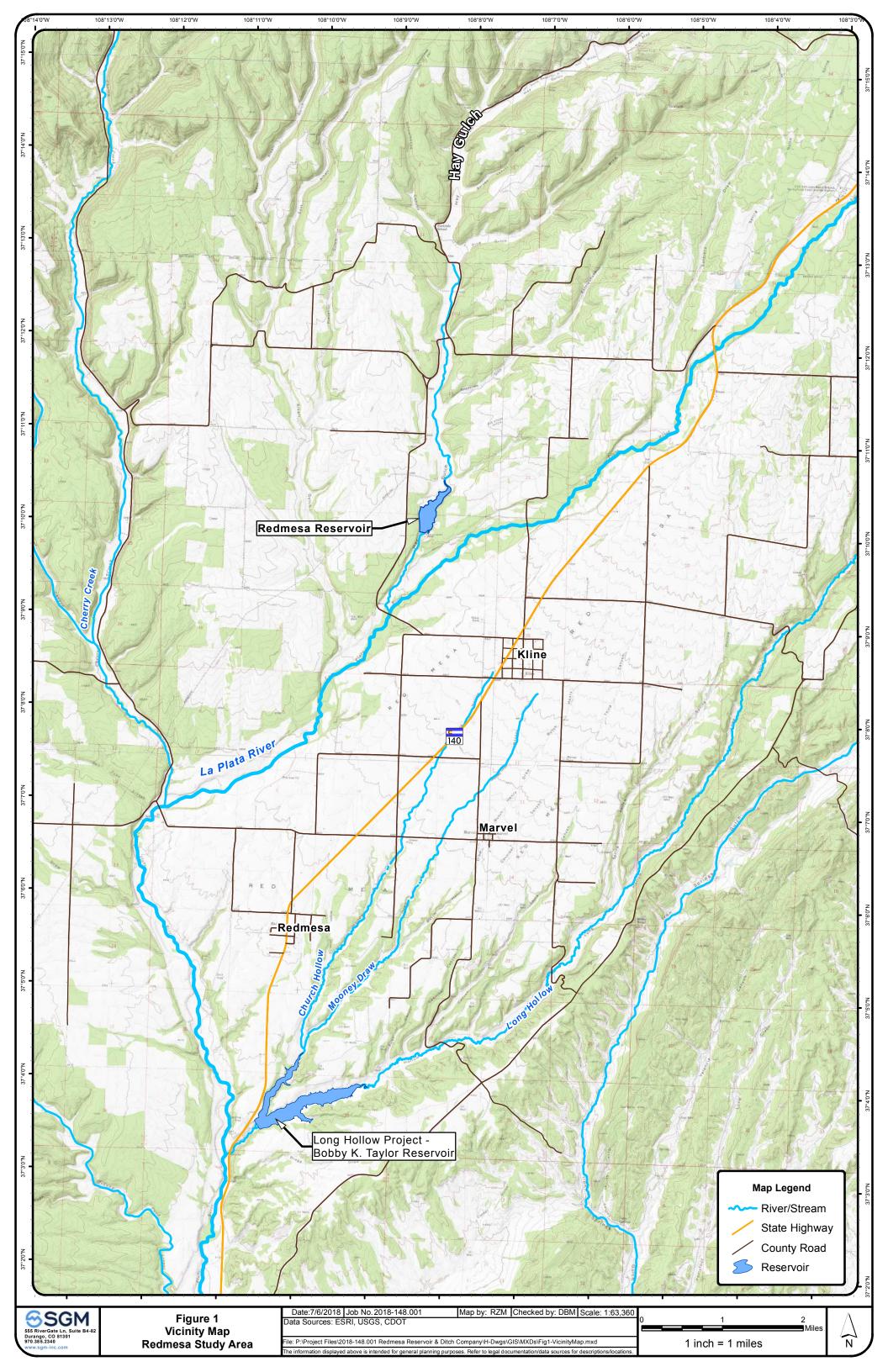
# Table 26. Redmesa Reservoir Total Project Cost Alternate No. 5

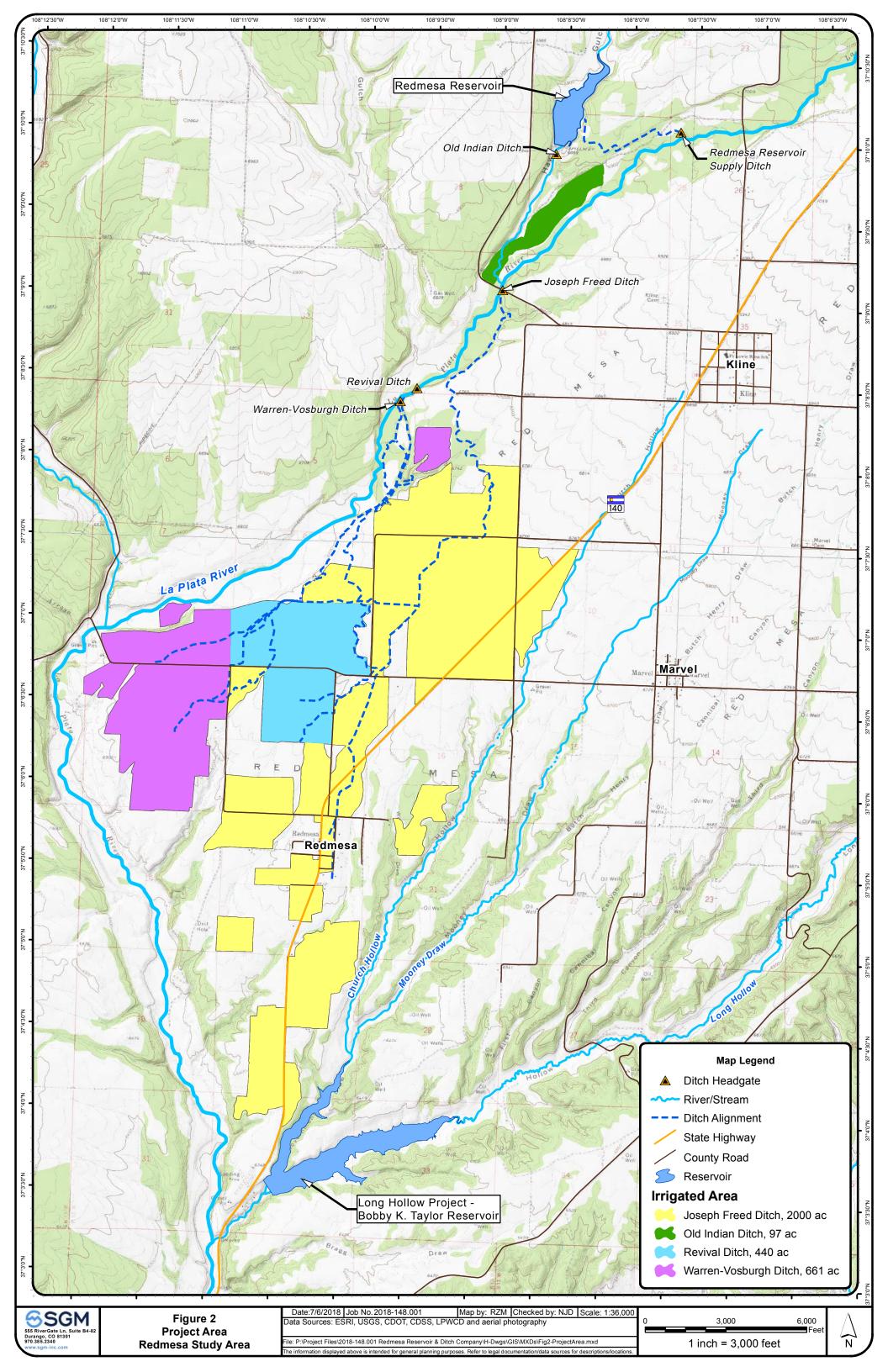
1,190 AF Enlargement (2,366 AF Total Volume) 4/10/2020

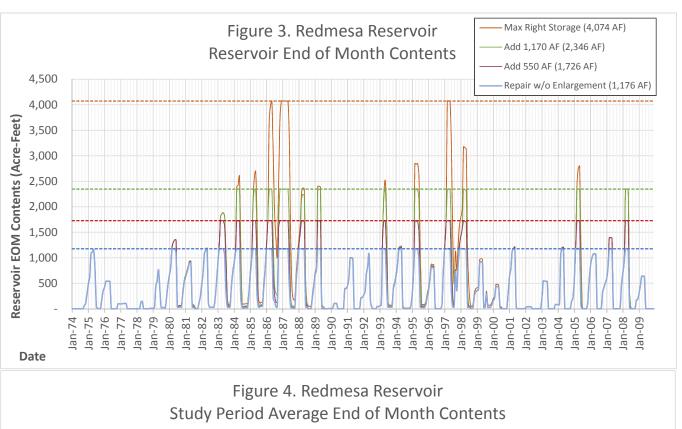
Phase	Description	Esti	mated Cost
1	Final Survey, Geotechnical, and Engineering Design	\$	467,400
1	Final Permitting and NEPA Compliance	\$	115,000
	Phase 1 Subtotal	\$	582,400
2	Direct Construction Cost	\$	5,977,000
2	Contingency (30%)	\$	1,793,000
2	Construction Engineering	\$	450,000
2	Environmental Mitigation Project	\$	200,000
2	Land and Easement Acquisition	\$	122,400
	Phase 2 Subtotal	\$	8,542,400
	\$	9,124,800	

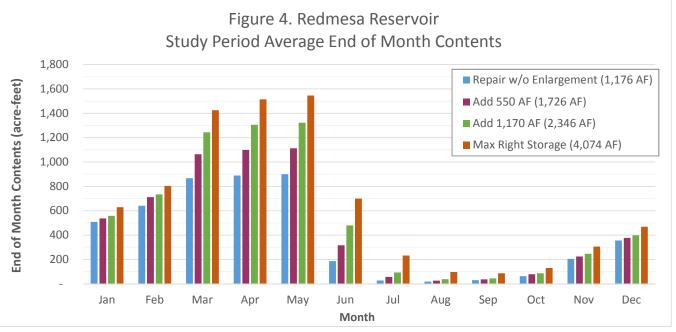
# **FIGURES**

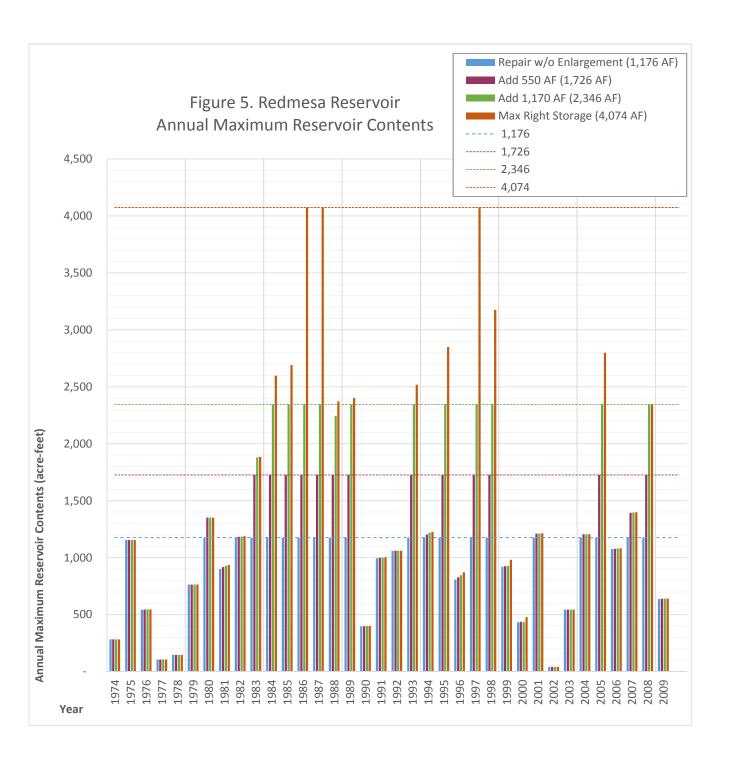


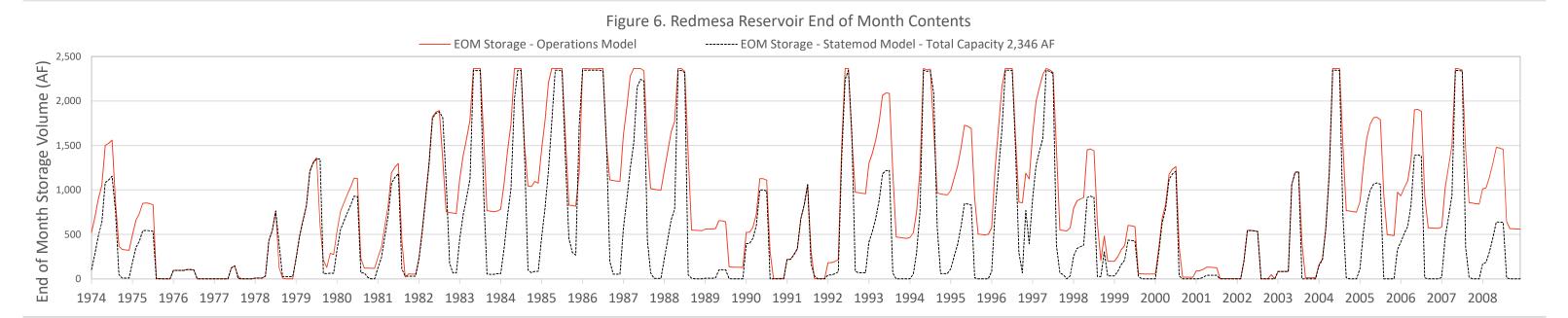


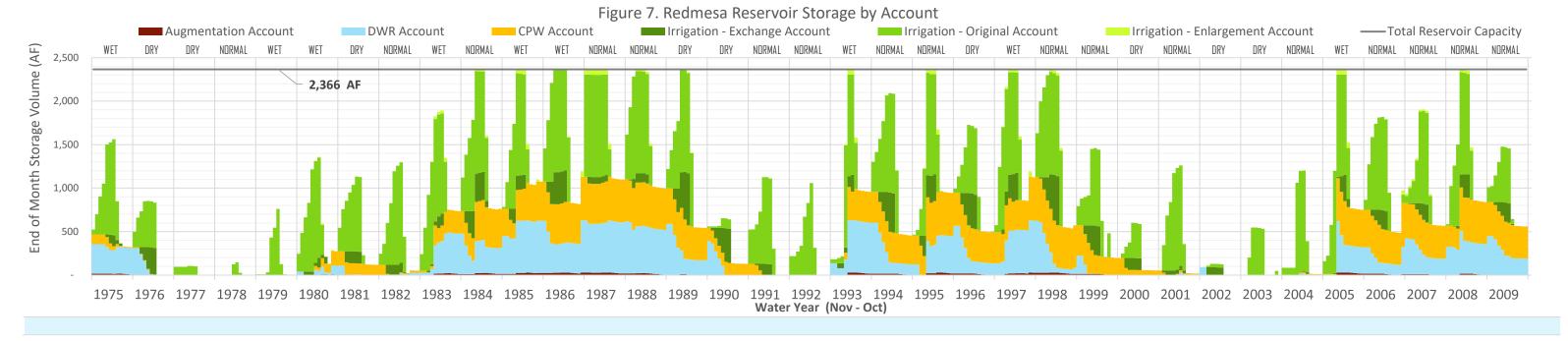


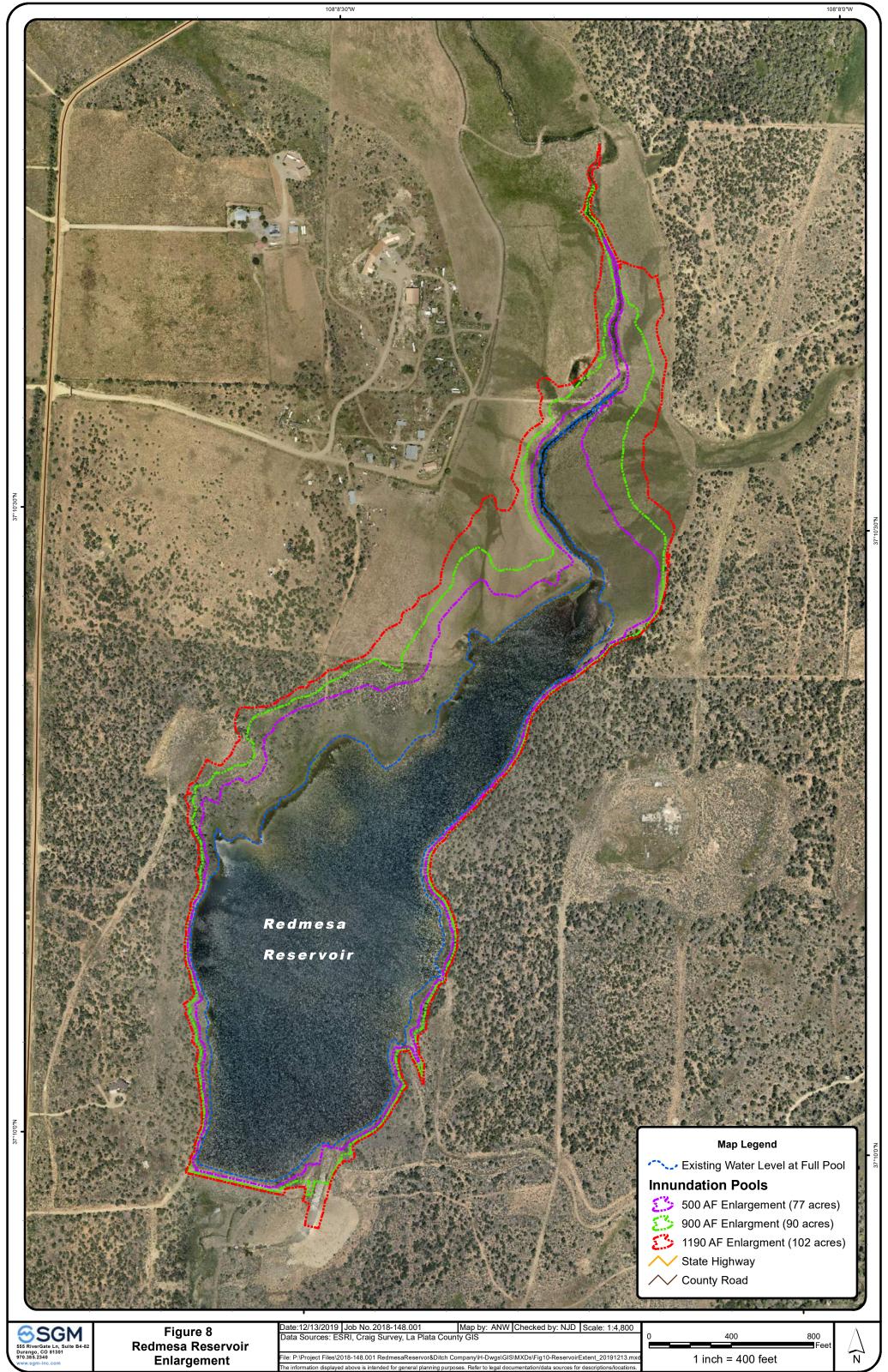












APPENDIX A. REDMESA RESERVOIR & DITCH COMPANY FINANCIAL SUMMARIES (2016 – 2018)



# APPENDIX B. WETLAND DELINEATION REPORT – REDMESA RESERVOIR ENLARGEMENT PROJECT



# WETLAND DELINEATION REPORT REDMESA RESERVOIR ENLARGEMENT PROJECT

# REDMESA RESERVOIR, LA PLATA COUNTY, COLORADO



June 2018

Prepared by



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# TABLE OF CONTENTS

1.0	Executive Summary	1-1
2.0	Introduction/Purpose	2-1
2.1	Contact Information	2-1
3.0	Study Area Location	3-1
4.0	Description of Study Area - Existing Conditions	4-1
5.0	Methods	5-1
6.0	Results	6-1
7.0	References	7-3



# LIST OF TABLES

Table 1. List of Plant Species Found in Study Area

Table 2. Description of Aquatic Resources within Study Area



# LIST OF FIGURES (ALL FIGURES ARE AT THE END OF THE REPORT)

Figure 1. Vicinity Map

Figure 2. National Wetland Inventory Mapping

Figure 3. USDA Soils Mapping

Figure 4. Wetland Delineation



# LIST OF APPENDICES

Appendix A Wetland Determination Data Forms
Appendix B Photographs



# 1.0 Executive Summary

This report was prepared consistent with the "1987 Corps of Engineers Wetland Delineation Manual" and "Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)" to identify and characterize wetlands and other waters of the U.S. within the ordinary high-water mark (existing "footprint) of Redmesa Reservoir (also known as Mormon Reservoir) to support an Approved Jurisdictional Determination (AJD) for the study area. Preliminary work completed by SGM for a feasibility assessment for enlargement of Redmesa Reservoir indicated the potential presence of a relatively large amount of wetlands within the footprint of the existing reservoir. If the enlargement impacted a relatively large acreage of wetlands (>10 acres), there would be a significant bearing on the cost and feasibility of the project due to the need to obtain a Section 404 permit and provide compensatory mitigation.

Therefore, additional field work was completed by SGM to determine the extent of areas that meet the criteria for wetland within the reservoir footprint. This report includes the results of this additional assessment, and was prepared consistent with the "Minimum Standards for Acceptance of Aquatic Resources Delineation Reports" (U.S. Army Corps of Engineers, January 2016).

This study found that most of the study does not meet the criteria for wetland under Section 404. Most of the bottom of Redmesa Reservoir above the "dead" water storage pool is either bare sediment or sediment dominated by upland weeds, several of which are on the La Plata County (and State of Colorado) noxious weed list. These plants include: field bindweed, yellow sweet clover, absinth wormwood, and leafy spurge. In addition, there are several areas dominated by dogbane, which is not on the noxious weed list, but is a toxic plant.

The "soil" in the reservoir bottom is not native soil, but sediment that has accumulated in the reservoir for over the past 100 years since its original construction. This sediment is generally silty in texture but varies in characteristics throughout the study area. Hydric soil indicators are generally weak and mostly include redox dark surface; and they occur over most of the study area which indicates that the sediment is not a good wetland indicator in the study area.

Lastly, the source of water for the reservoir is mostly artificial—from ditch diversions from the La Plata River. The amount of native flow in Hay Gulch is not known, but it is very likely insufficient to come close to filling the reservoir, since the reservoir does not fill every year, even with the ditch diversions. Therefore, the frequency that the vegetated areas in the bottom of the reservoir have wetland hydrology (are flooded or saturated for at least 2 weeks per year) is not known.

In summary, there are a total of 1.752 acres that meet the three criteria for being wetland under Section 404. These areas are dominated by facultative species, including dogbane which is poisonous, and include noxious weeds. It is questionable the extent to which these "wetlands" provide aquatic resource functions. The remainder of the study area (52.34 acres) is either bare, unconsolidated sediment, or sediment vegetated mainly by upland weeds.

#### 2.0 Introduction/Purpose

SGM is in the process of completing a feasibility study for the enlargement of Redmesa Reservoir, which was originally constructed in 1910 along Hay Gulch, a tributary to the La Plata River. The feasibility study included an evaluation of permitting considerations for the project, including for wetlands and Section 404 permitting. Preliminary work by SGM indicated that wetlands may occur in three areas affected by reservoir enlargement: immediately downstream of the dam; within the footprint of the reservoir; and along Hay Gulch upstream of the reservoir. It was possible to identify wetlands above and below the reservoir; the total amount of wetland in these areas (and potential impacts) is relatively small and would likely not affect project feasibility. However, it was not possible to identify vegetation and determine the presence of wetlands within the reservoir footprint, but preliminary work indicated the possible presence of a relatively large amount of wetlands, which if impacted, could have a significant bearing on project feasibility due to the costs associated with Section 404 permitting and required mitigation.

Therefore, this report was prepared to further evaluate areas within the reservoir footprint in terms of meeting the criteria for wetlands, and to support a request for an AJD for this area.

Key to this delineation is an understanding of the hydrology of Redmesa Reservoir (RMR). RMR was constructed to store water decreed for irrigation in Hay Gulch. Hay Gulch is a relatively dry watershed. Water is diverted by the Hay Gulch Ditch and the Redmesa Supply Ditch from the La Plata River to the reservoir. There is no streamflow data or records for Hay Gulch (without including the diversions); and it is not known whether it was or would be an intermittent or a perennial stream. A preliminary water balance was completed by SGM using the USGS program StreamStats to estimate the yield of Hay Gulch and diversion records for the ditches. This evaluation found that 64 percent of the water in the reservoir, on average, is diverted by the ditches from the La Plata River so that the natural yield of Hay Gulch is relatively small.

#### 2.1 Contact Information

Applicant and property owner:

Redmesa Reservoir and Ditch Company C/o Trent Taylor, Board Member

970-769-0950

Email: trenttaylor02@gmail.com

#### Agent:

SGM C/o Dave Mehan, P.W.S. Senior Scientist 555 Rivergate Lane, Suite B4-82 Durango, CO 81301

970-385-2340

Email: DaveM@SGM-Inc.com

### 3.0 Study Area Location

The study area consists of approximately 54 acres within the existing footprint of RMR—which generally coincides with the ordinary high water mark (spillway capacity) of the reservoir. RMR is located along Hay Gulch, approximately 15.2 miles southwest of Durango, Colorado in La Plata County. The study area is located in parts of Section 22 and 27, T 34 North, R 12 West of the NMPM. Figure 1 is a vicinity map of the study area.

The study area is located along Hay Gulch which is a tributary of the La Plata River, which in turn, is tributary to the San Juan River. To reach the study area, take State Highway 160 west from Durango to Hesperus and State Highway 140. Take 140 south around 11.5 miles to Kline. At Kline, take County Road 119 West, then north around 2.7 miles until you are west of RMR. Turn into the private drive to access RMR (Note: The reservoir and surrounding lands are private property and not open to the public. The Redmesa Reservoir Company or a representative should be contacted for access.)

### 4.0 Description of Study Area - Existing Conditions

RMR is located along Hay Gulch on Red Mesa, which has a semi-arid climate. The elevation of the full pool of the reservoir is 6,892.8 feet above mean sea-level, and the average precipitation for the area is 18.2 inches per year (based on the Fort Lewis Weather Station).

The land immediately adjacent to RMR is mostly pinon-juniper with some upland shrub/grassland. Irrigated meadows (which were likely pinon-juniper or shrub/grassland) occur upstream of the reservoir. The study area itself represents the bottom of the reservoir, part of which does have standing water year-round, and part of which is intermittently-exposed sediment.

Figure 2 shows the National Wetland Inventory (NWI) mapping for the study area and adjacent area. The NWI mapping shows the footprint of the reservoir as being open water. Areas to the north, northwest, east and south of RMR are shown as emergent wetland. Also, the channel of Hay Gulch is shown as intermittent stream channel (R4SBC).

Figure 3 shows the soils mapped within the study area and adjacent area. According to the Natural Resources Conservation Service (NRCS) Web Soil Survey

(https://websoilsurvey.sc.egov.usda.gov) most of the reservoir areas is shown as open water. Most of the area adjacent to RMR is shown to have Vosburg fine sandy loam soil, which is described as a deep, well-drained soil derived from alluvium with a depth to groundwater of greater than 80 inches. The area to the southeast of the reservoir is shown to be Lazear-rock outcrop complex. None of the soils in the area are listed as hydric soils.

#### 5.0 Methods

This wetland delineation was completed by Dave Mehan of SGM. Mr. Mehan is a Professional Wetland Scientist with over 30 years of experience with wetland delineations and is very familiar with the occurrence and characteristics of wetlands in the Rocky Mountain Region. Assistance was provided by Ms. Kelly Haun, environmental specialist.

Wetlands and other waters of the U.S. were identified and delineated using the methods and criteria in the "Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region" (Manual), Corps 2010, which is the manual applicable to the study area. A combination of field work and review of existing information was completed. Existing information reviewed included:

- NRCS Web Soil Survey,
- National Wetland Inventory Mapping,
- Aerial photographs (from Google Earth and other sources),
- Diversion Records, and
- Topographic mapping.

Field work was completed on June 7, 2018 and included observations of vegetation communities, soils and hydrologic conditions in the study area. The occurrence of plant species in wetlands was determined using the 2016 "Regional Wetland Plant List for the Arid West Region". In general, the "dominance test" as described in the Manual was used to determine dominance of plant species.

Soils were observed in soil pits dug in the study area to evaluate the presence of hydric soil indicators. Soil colors were determined using Munsell Soil Color charts. The study area was observed for the presence of any wetland hydrologic indicators, as described in "Field Indicators of Hydric Soils in the United States".

Field observations were recorded on Wetland Determination Data Forms (WDDFs) and representative photographs were taken. The locations of features and WDDFs were recorded with a survey-grade GPS.

#### 6.0 Results

Figure 4 shows the results of the delineation. WDDFs are included in Appendix A, and representative photographs are included in Appendix B. Table 1 is a list of plant species in the study area, and Table 2 summarizes the resources present.

Most of the study area is unconsolidated sediment (Photos 1 and 13), with and without upland vegetation, which consists mostly of weeds (field bindweed (*Convolulus arvensis*) and absinth wormwood (*Artemesia absinthium*)) (Photos 7, 12, 17 and 18). Several areas of yellow sweetclover (*Melilotus officinalis*) and leafy spurge (*Euphorbia esula*) also exist within the study area (Photos 16 and 21). All of these species are on the La Plata County (and State of Colorado) noxious weed list.

Patches of two species which are rated as facultative (FAC) occur towards the north end of the study area: Dogbane (*Apocynum cannabinum*) and wild licorice (*Glycyrrhiza lepidota*) (Figure 4). Areas with dogbane are described in WDDFs 2 and 6, and shown in Photos 3, 4, 8 and 20. This species generally occurs with field bindweed and absinth wormwood, which are upland species.

Dogbane is a poisonous plant and is rated FAC in the arid west region (though we question its functions and values as a wetland species). The vegetation criterion is met at WDDF2 if the "dominance test" is used, but it is not met if the "prevalence index" is used.

Absinth wormwood (Photo 7) is not rated as a wetland plant, but is on the List A of the noxious weeds for the county and State of Colorado.

Wild licorice is dominant in two areas (Figure 4) and occurs with field bindweed (WDDF 3). Areas dominated by wild licorice are shown in Photos 5 and 6. This species is not the County Noxious Weed List, but is listed as a weed in "Weeds of the West" (Whitson, et al. 1991).

A small fringe of emergent wetlands dominated by spikerush (*Eleocharis* spp) and reed canary grass (*Phalaris arundinacea*) occurs along the Hay Gulch channel at WDDF 7 (Photo 10). And several relatively small cottonwoods exist at WDDF 10 (Photo 15), though the dominant species in this area are leafy spurge and bindweed.

The soil within the study area is sediment deposited over the years within the reservoir. The texture of the soil is generally silty to a depth of 12 inches. As discussed previously, the Websoil Survey shows areas within the reservoir footprint (and around parts of the reservoir) to be Vosburg fine sandy loam which is a well-drained soil, with reported textures including: fine sandy loam, clay loam, loam and sandy clay loam—which vary from field observations. This soil is not on the hydric soil list.

Relatively weak hydric soil indicators occur in the sediment throughout the study area, regardless of the plant community present. For example, redox dark surface occurs in areas with dogbane and wild licorice at WDDF 2, 3 and 6. However, redox concentrations are significantly more distinct in the area at WDDF 12, which is dominated by upland weeds (see Photos 9 compared to 19). This suggests that the sediment in the study area is not a good indicator of the presence of wetlands.

As discussed previously, RMR is in a relatively dry basin, and most of the water in the reservoir comes from the Hay Gulch and Redmesa Supply Ditches, both of which divert from the La Plata River. There is no evidence of shallow groundwater or lateral flow into the reservoir, so that the sole water supply for the vegetation in the reservoir is likely from surface water.

Aerial photographs so show the reservoir to be full or close to full during the growing season in some years. They also show the reservoir with very little water and most of the bottom as exposed

sediment. It is not known whether the study area is inundated or has saturated soil 51 or more out of 100 years (probability of > 50 percent), as required by the delineation manual.

In summary, and as shown in Table 2, there is a total of 1.752 acres of areas within the study area that technically meet the criteria for wetland, per the delineation manual. However, the sediment in the reservoir is not a good indicator of wetlands; and it is assumed that the hydrology parameter is met. Lastly, these areas are dominated by the FAC species dogbane, which is poisonous, and wild licorice, which is weedy; other species present are upland weeds and no other hydrophytes exist. In addition, if the "prevalence index" is used to assess the plant community, the hydrophytic vegetation test is not met (see WDDF2). These factors suggest that these areas provide minimal to no aquatic functions.

#### 7.0 References

- "A Field Guide to the Identification of the Ordinary High Water Mark in the Arid West Region of the Western United States" (Corps 2008).
- "A Guide to Ordinary High Water Mark Delineation for Non-Perennial Streams...." (Corps 2014).
- "Field Indicators of Hydric Soils in the United States (Version 8.1)" (USDA and NRCS 2017)
- Google Earth.
- Munsell Soil Color Charts. Kollmorgen Instruments Corp.
- National Wetland Plant List 2016.
- "Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)" (Corps 2010).
- NRCS WebSoil Survey.
- "Weeds of the West", T.D. Whitson, et al, 1991. Western Society of Weed Science.

# **Tables**

<u>Table 1. List of Plant Species Found in Study Area</u>
<u>Table 2. Description of Aquatic Resources within Study Area</u>

## Table 1. List of Plant Species in Study Area Redmesa Reservoir Bottom, La Plata County, Colorado

Common Name	Scientific Name	Indicator Status (Mountain West)	Stratum
Absinth wormwood	Artemesia absinthium	NR**	Herb
Field bindweed	Convolvulus arvensis	FACU**	Herb
Dogbane	Apocynum cannabinum	FAC	Herb
Leafy spurge	Euphorbia esula	FACU**	Herb
Reed canary grass	Phalaris arundincea	FACW	Herb
Spikerush	Eleocharis spp.	OBL	Herb
Plains cottonwood	Populus deltoides	FACW	Herb
Yellow Sweetclover	Meliltotus offincinalis	FACU**	Herb
Wild Licorice	Glycyrrhiza lepidota	FAC	Herb
Sandbar willow	Salix exigua	FACW	Shrub

NR=not rated (assumed to be FACU)

<sup>\*\*</sup> Listed noxious weed in La Plata County.

Highlighted cells indicate dominant species.

## Table 2. Description of Wetlands and Aquatic Resources<sup>(1)</sup> Redmesa Reservoir Bottom, La Plata County, Colorado

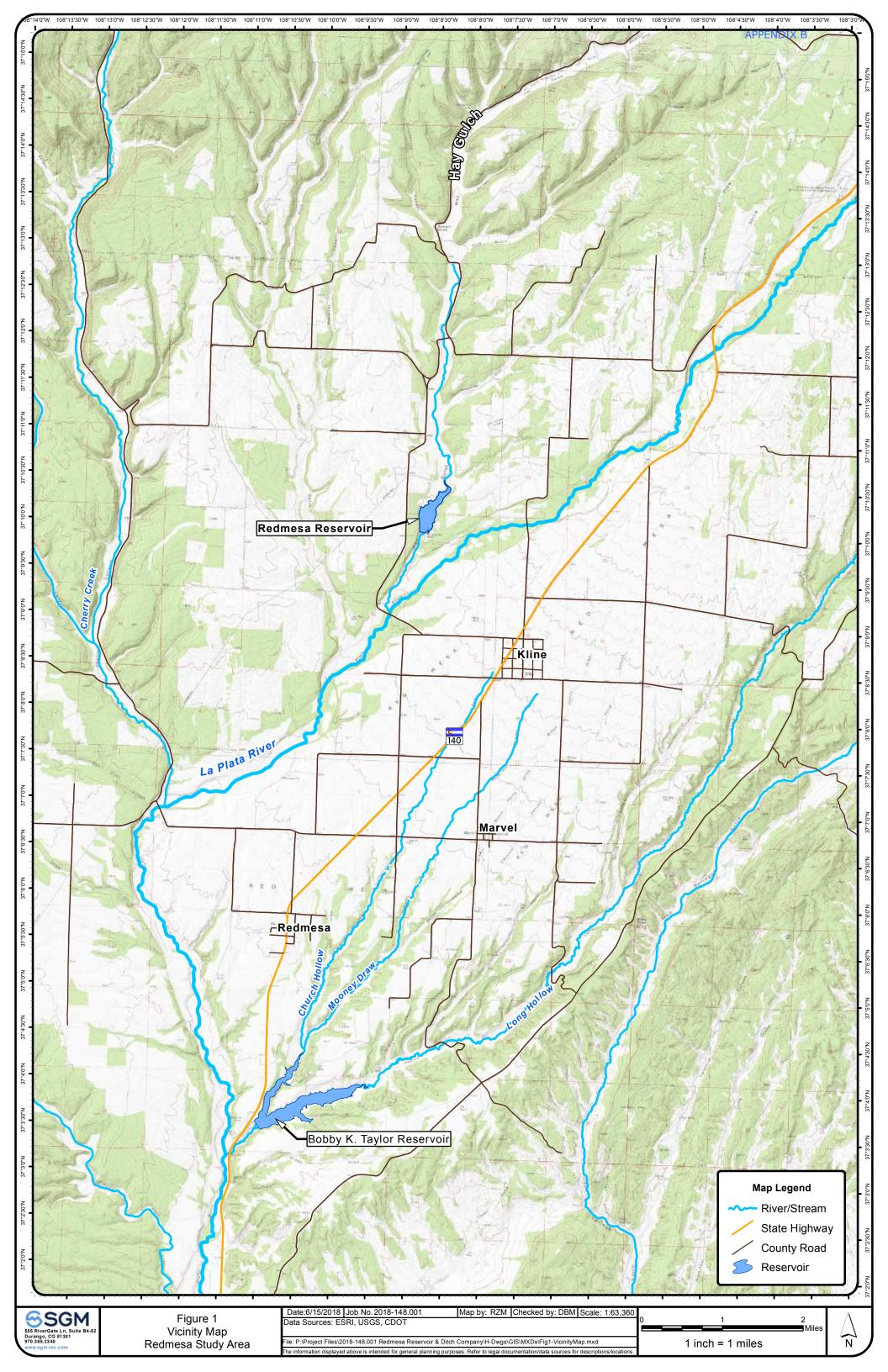
Label	Type <sup>(2)</sup>	Latitude/ Longitude	Acres	Notes
Bottom	LUB3K	37°10'6.48"N 108° 8'30.88"W	52.34	Sediment, intermittently flooded. The extent of exposed sediment varies each year depending on hydrologic conditions.
Fringe Emergent	R2EM3	37°10'19.61"N 108° 8'19.88"W	0.002	Small fringe along Hay Gulch
Channel	R2UB5	37°10'13.60"N 108° 8'25.25"W	3,955 L.F.	Hay Gulch channel within reservoir
Emergent	PEMK	37°10'19.47"N 108° 8'20.69"W	1.10	Dominated by dogbane which is poisonous. Of questionable aquatic resource value.
Emergent	PEMK 37°10'20.06"N 108° 8'20.93"W		0.65	Dominated by wild licorice. Of questionable aquatic resource value.
Total Wetlands and Aquatic Resources in Study Area			54.092	

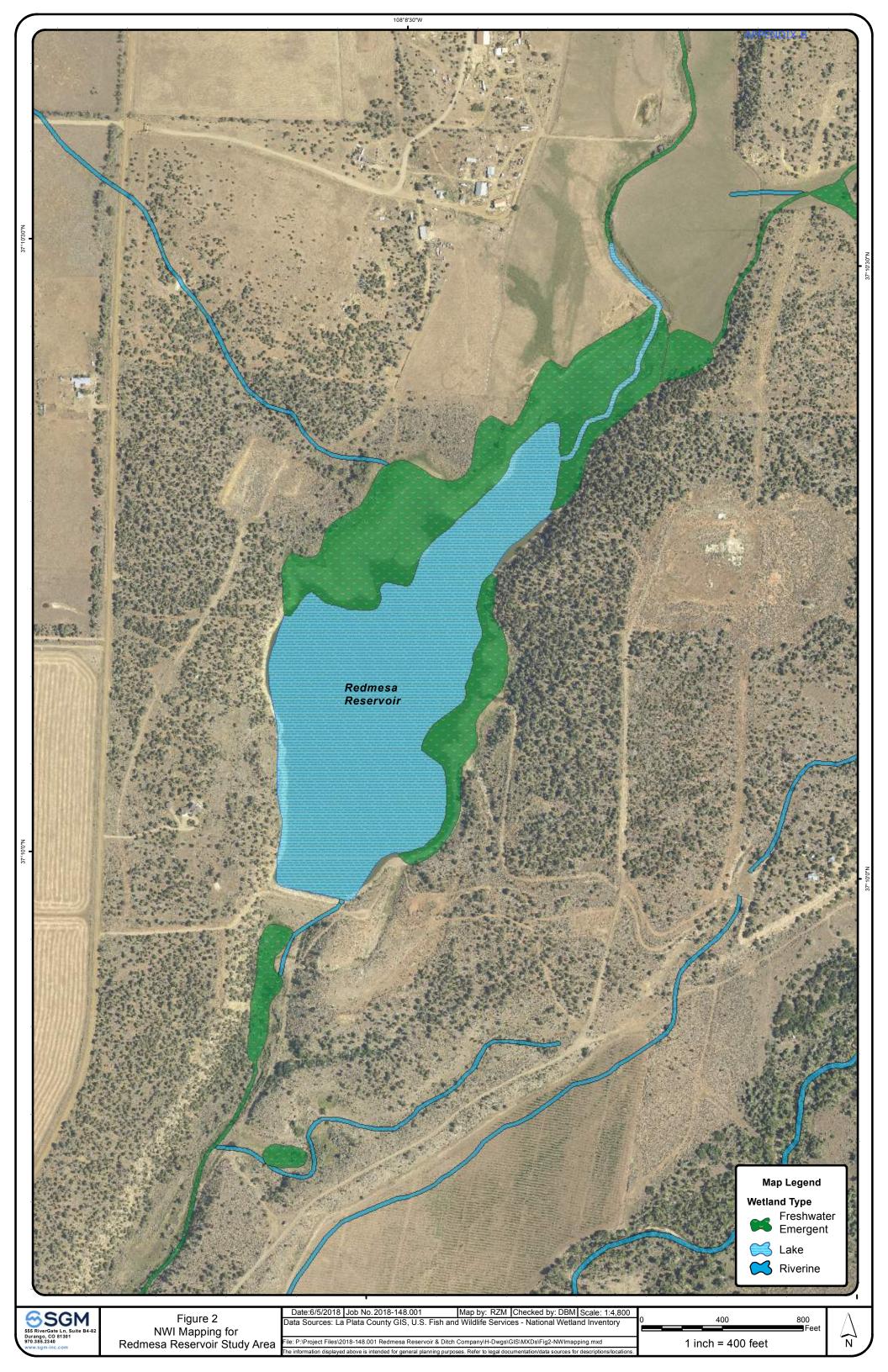
#### Footnotes:

- 1) See Figure 4 for locations.
- 2) Per Cowardin et al, 1979.

# **Figures**

Figure 1. Vicinity Map Figure 2. National Wetland Inventory Mapping Figure 3. USDA Soils Mapping Figure 4. Wetland Delineation





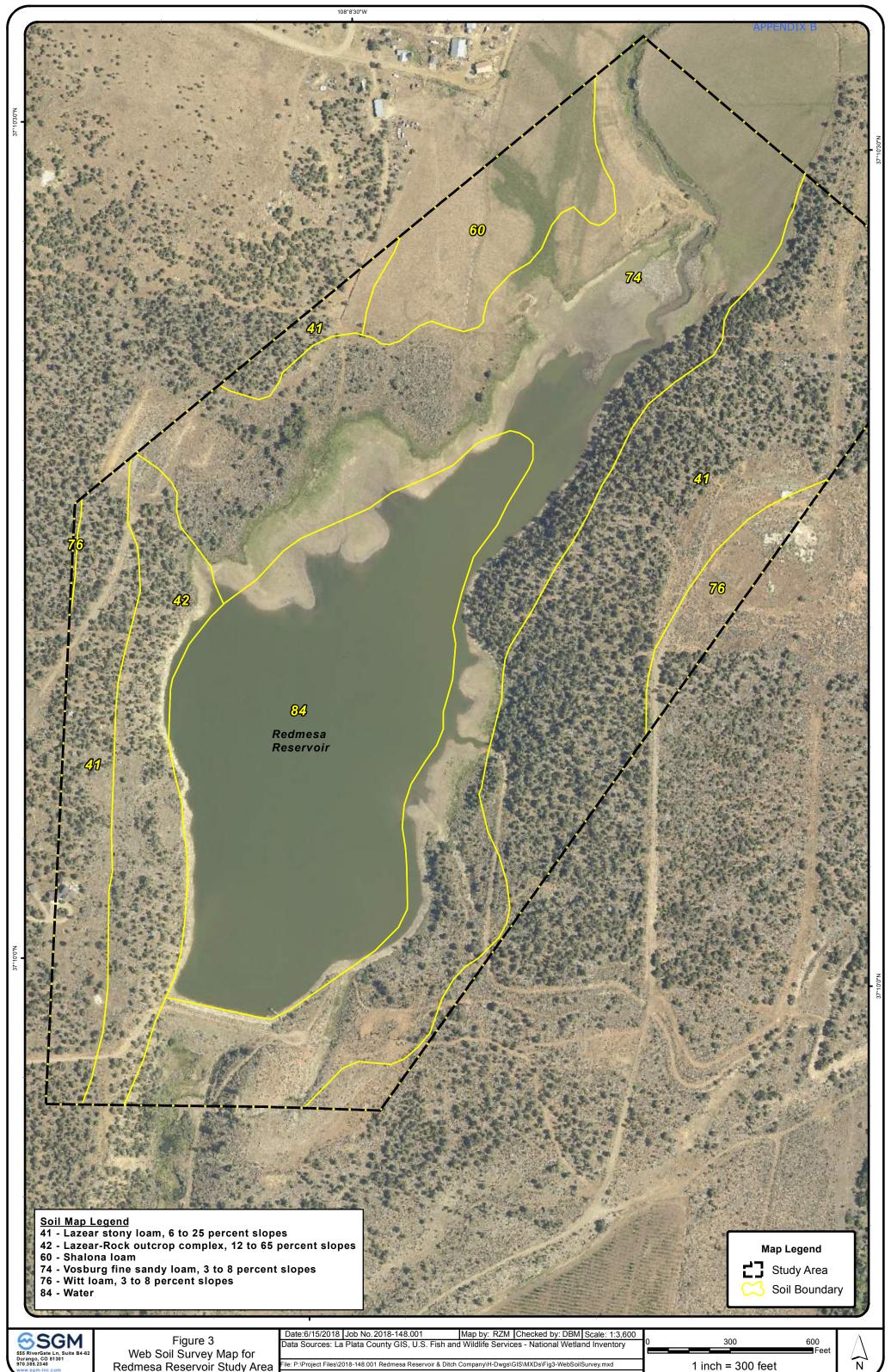
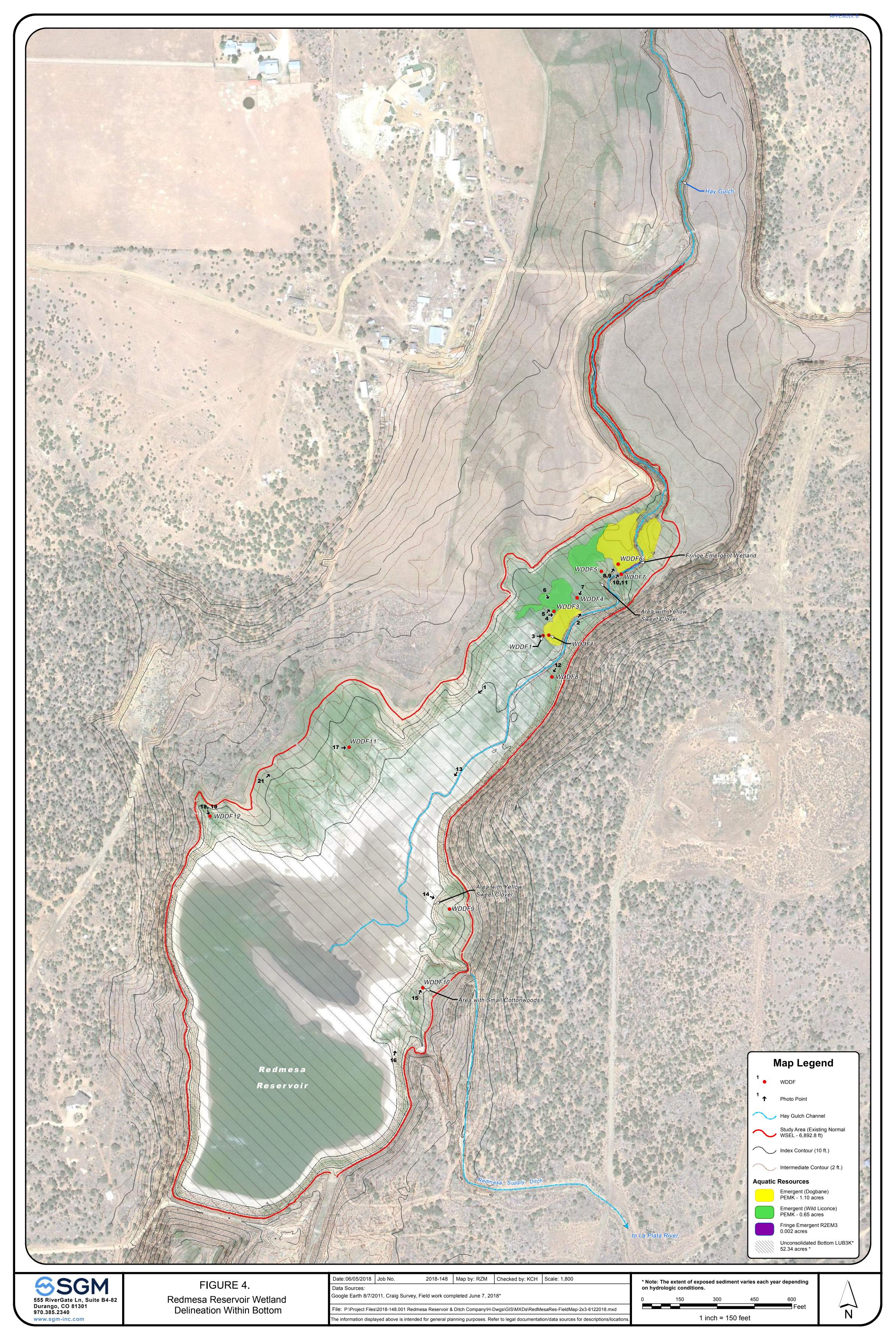


Figure 3 Web Soil Survey Map for Redmesa Reservoir Study Area

1 inch = 300 feet





# Appendix A

Wetland Determination Data Forms

#### WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

			,	
Project/Site: REAMSSA RESERVOID	(	City/County	: <u>[ [                                 </u>	Plata COUNTY Sampling Date: 6/7/36/2
Applicant/Owner: Kid MSSA KGS. COM	PANZ			State:O Sampling Point:
Investigator(s): MEHAN HAVN	<u>'</u>	Section, To	wnship, Ra	inge:
Landform (hillslope, terrace, etc.): bothom of	E SEI VOIC	Local relief	(concave.	convex. none): Slope (%):
Subregion (LRR):	Lat: 37	70100	8"	convex, none): Slope (%): Long: 108 08 3 1" Datum: NMPM
Soil Map Unit Name: VOShUIG FINE SA.	N(1)	la (lo		NWI classification: 13 EM h
Are climatic / hydrologic conditions on the site typical for t	bio timo of vo	2r2 Van	N.A.	(If no explain in Remarks )
Are Vegetation, Soil, or HydrologyV				"Normal Circumstances" present? Yes No
Are Vegetation, Soil, or Hydrology	naturally pro	blematic?	(If ne	eeded, explain any answers in Remarks.)
SUMMARY OF FINDINGS – Attach site map	showing	samplin	g point l	ocations, transects, important features, etc.
Hydrophytic Vegetation Present? Yes	No V			,
Hydric Soil Present? Yes	No/_		e Sampled in a Wetla	
Wetland Hydrology Present? Yes		With	iiis a vvetiai	ndr fes No y
Remarks: DIONELT YEAR COND	MINIT!			
			-	
VEGETATION – Use scientific names of pla	nts.			
Tree Stratum (Plot size:)	Absolute % Cover			Dominance Test worksheet:
1	<u>% Cover</u>			Number of Dominant Species That Are OBL, FACW, or FAC:(A)
2				That Are OBL, FACW, or FAC: (A)
3.				Total Number of Dominant Species Across All Strata: (B)
4.				
		= Total Co	ver	Percent of Dominant Species That Are OBL, FACW, or FAC: (A/B)
Sapling/Shrub Stratum (Plot size:)				Prevalence Index worksheet:
1				Total % Cover of: Multiply by:
2				OBL species x 1 =
3				FACW species x 2 =
4				FAC species x 3 =
5		T-1-10-		FACU species x 4 =
Herb Stratum (Plot size:)		. = Total Co /	ver	UPL species x 5 =
1. CONVOLVY/US OITSNESS	2-8	V	FALL	Column Totals: (A) (B)
2. Artemesia absinthlum			FACE	Prevalence Index = B/A =
3.				Hydrophytic Vegetation Indicators:
4				1 - Rapid Test for Hydrophytic Vegetation
5				2 - Dominance Test is >50%
6				3 - Prevalence Index is ≤3.0¹
7				4 - Morphological Adaptations (Provide supporting
8	<del></del>		F	data in Remarks or on a separate sheet)
9				5 - Wetland Non-Vascular Plants <sup>1</sup>
10				Problematic Hydrophytic Vegetation¹ (Explain)
11				¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
Woody Vine Stratum (Plot size:)	40	= Total Co	ver	
1				Undranhutia
2.				Hydrophytic Vegetation
		= Total Co	ver	Present? Yes No
% Bare Ground in Herb Stratum/ 🖰			·	
Remarks:				

								APPENDIX B
SOIL								Sampling Point:
Profile Des	scription: (Describe	to the dep	th needed to docun	nent the	indicator	or confirm	n the absence	e of indicators.)
Depth	Matrix			x Feature	8			
(inches)	Color (moist)	%	Color (moist)	%	_Type'			Remarks
>-14	104N3/2	<u>98</u>	SYN 5/8	_2_		Δ_	<u> </u>	ZOWE NOTIPHITY
Hydric Soi Histose Histic I Black I Hydrog Deplet Thick I Sandy	Epipedon (A2) Histic (A3) gen Sulfide (A4) ed Below Dark Surfac Dark Surface (A12) Mucky Mineral (S1)	cable to all	LRRs, unless other Sandy Redox (\$ Stripped Matrix Loamy Mucky M Loamy Gleyed I Depleted Matrix Redox Dark Su Depleted Dark \$	wise not (S5) (S6) Aineral (F Matrix (F2 (F3) rface (F6) Surface (I	(ed.)  1) (except 2)  -7)		Indicate	ocation: PL≒Pore Lining, M≔Matrix.  ors for Problematic Hydric Soils³:  m Muck (A10) d Parent Material (TF2) ry Shallow Dark Surface (TF12) ner (Explain in Remarks)  fors of hydrophytic vegetation and and hydrology must be present,
	Gleyed Matrix (S4) Layer (if present):		Redox Depress	ions (F8)			unie	ss disturbed or problematic.
• • • •	nches):						Hydric Soi	il Present? Yes No 📈
Remarks:							1.,,	
		1540	5 lake 5 X feathres	5 ( <	251	): 2. 1/1 &	Vollabi	lmy, Sporodic
YDROL								
	ydrology Indicators		ato a la carto a de esta en el					on demands after the control of the
	ficators (minimum of o	one require						ondary Indicators (2 or more required)
	e Water (A1)		Water-Sta			xcept	'	Water-Stained Leaves (B9) (MLRA 1, 2
	Vater Table (A2)			1, 2, 4A,	and 4B)		_	4A, and 4B)
	tion (A3)		Salt Crust					Drainage Patterns (B10)
_	Marks (B1)		Aquatic In					Dry-Season Water Table (C2)
	ent Deposits (B2)		Hydrogen				1 - 8	Saturation Visible on Aerial Imagery (C
	eposits (B3)		Oxidized F					Geomorphic Position (D2)
	Mat or Crust (B4)		Presence		-	-		Shallow Aquitard (D3)
Iron D	ononito (DE)		Dogant Iro	n Doduct	ion in Tillo	d Soile (C)	ልነ ፣	FAC-Neutral Test (D6)

Surface vvaler (A1)	vvaler-Stattled Leaves (DS) (excep	vvaler-Stained Leaves (D8) (WILKA 1, 2,
High Water Table (A2)	MLRA 1, 2, 4A, and 4B)	4A, and 4B)
Saturation (A3)	Salt Crust (B11)	Drainage Patterns (B10)
Water Marks (B1)	Aquatic Invertebrates (B13)	Dry-Season Water Table (C2)
Sediment Deposits (B2)	Hydrogen Sulfide Odor (C1)	Saturation Visible on Aerial Imagery (C9)
Drift Deposits (B3)	Oxidized Rhizospheres along Livin	g Roots (C3) 🖊 Geomorphic Position (D2)
Algal Mat or Crust (B4)	Presence of Reduced Iron (C4)	Shallow Aquitard (D3)
Iron Deposits (B5)	Recent Iron Reduction in Tilled Soi	ils (C6) FAC-Neutral Test (D5)
Surface Soil Cracks (B6)	Stunted or Stressed Plants (D1) (L	RR A) Raised Ant Mounds (D6) (LRR A)
Inundation Visible on Aerial Imagery (B7)	Other (Explain in Remarks)	Frost-Heave Hummocks (D7)
Sparsely Vegetated Concave Surface (B8)		
Field Observations:	/	
Surface Water Present? Yes No	Depth (inches):	
Water Table Present? Yes No	//	j
Saturation Present? Yes No	1/	Wetland Hydrology Present? Yes No
(includes capillary fringe)		
Describe Recorded Data (stream gauge, monitor	oring well, aerial photos, previous inspecti	ions), if available:
Remarks:	1 1 1 1	dry, Frequency or imundation
	Soil relotikely	JUN LISCHENCY CL. IMMODITION
	1 - 5011	<i>J</i>
	assume 1 - 00%.	
t .		

#### WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: REDMISSA RESERVOIN		City/Co	ounty: <u>L</u> A	Plata COUNTY Sampling Date: 6/7/2012
Applicant/Owner: KED MSSA MSS. COM	1			
Investigator(s): MEHAN HAVN				inge:
Landform (hillslope, terrace, etc.): <u>「とないりい」                                   </u>	<u> </u>	Local	relief (concave,	convex(none)
Subregion (LRR):	Lat: <u>3</u>	7 ° ( (	08"	Long: 108 08 3 / " Datum: NM PM
Soil Map Unit Name: Vosburg Fine SAM	udza la	Onn	-	NWI classification: PEM h
Are climatic / hydrologic conditions on the site typical for the	f			
Are Vegetation, Soil, or Hydrology				"Normal Circumstances" present? Yes No
	-			
Are Vegetation, Soil, or Hydrology			•	eeded, explain any answers in Remarks.) ocations, transects, important features, etc.
1		Sam	pinig point i	ocations, transects, important leatures, etc.
	/o		Is the Sampled	i Area
Hydric Soil Present?  Wetland Hydrology Present?  Yes V 1	No		within a Wetlar	1.2
Demode	¥0			
Remarks: dry NEAT.				
,				
VEGETATION – Use scientific names of plan	nts.			
T. O. I. ADLI.	Absolute		inant Indicator	Dominance Test worksheet:
Tree Stratum (Plot size:)			ies? Status	Number of Dominant Species
1				That Are OBL, FACW, or FAC: (A)
2				Total Number of Dominant
3				Species Across All Strata: (B)
4				Percent of Dominant Species
Continue (Obstanta Obstanta Ob		_ = Tota	al Cover	That Are OBL, FACW, or FAC: / 0 (A/B)
Sapling/Shrub Stratum (Plot size:)				Prevalence Index worksheet:
1				Total % Cover of: Multiply by:
2				OBL species O x1=
3				FACW species  x2=
4	<del></del>			FAC species FO x3=
5				FACU species 30 x 4 =
Harb Cirotum /Diet einer		_ = Tota	al Cover	UPL species x 5 =
Herb Stratum (Plot size:)	60	/	FAC	Column Totals: 1/ 0 (A) (B)
1. Apocywan connabinum		_ <u>-</u> _	<u> </u>	Column Totals. 1770 (A)
2. Elychorhisa Epidota	- <u> </u>			Prevalence Index = B/A =
3. CONVOIVU/US 10 (V EN SIG	20		- Facu	Hydrophytic Vegetation Indicators;
4. DHEMESIA AbsiNthing	/_()		<u>FACU</u>	1 - Rapid Test for Hydrophytic Vegetation
5				2 - Dominance Test is >50%
6				3 - Prevalence Index is ≤3.0¹ (3, 3)
7				4 - Morphological Adaptations (Provide supporting
8				data in Remarks or on a separate sheet)
9				5 - Wetland Non-Vascular Plants <sup>1</sup>
10				Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
11,				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
	110		ıl Cover	be present, unless disturbed of problematic.
Woody Vine Stratum (Plot size:)			122	
1				Hydrophytic
2				Vegetation   Present?   Yes   No
% Bare Ground in Herb Stratum		_= Tota	ıl Cover	100
Remarks:				
- MARC NOT	a tarm	AVSI	IENCE ZN	idex for hydrophytic
IKKE HATIAN	i -		~	7 1
V CO V				

SOI	L
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	~
Sampling Point:	

Profile Description: (Describe Depth Matrix			x Features	3			
(inches) Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	_Loc2	<u>Texture</u>	Remarks
)-12 10/03/2	75 1	COYR 3/8	_5_	<u></u>	$M_{-}$	<u> </u>	
<b>Y</b>	, ,						
						-	
,	·		· ———				
							p
						. 2.	
Type: C=Concentration, D=Dep					d Sand Gr		ation: PL=Pore Lining, M=Matrix. 's for Problematic Hydric Soils <sup>3</sup> :
Hydric Soil Indicators: (Applic	able to all Li			ea.)			•
Histosol (A1)	-	_ Sandy Redox ( _ Stripped Matrix					Muck (A10) Parent Material (TF2)
Histic Epipedon (A2) Black Histic (A3)	_	_ Sinpped Mainx _ Loamy Mucky N		() (evcen	MI DA 4)		Shallow Dark Surface (TF12)
Black Fishe (A3) Hydrogen Sulfide (A4)	_	Loamy Gleyed			WILINA I)		r (Explain in Remarks)
Depleted Below Dark Surfac	e (A11)	Depleted Matrix		,		0	, (Explain), (Containe)
Thick Dark Surface (A12)		Redox Dark Su				<sup>3</sup> Indicator	rs of hydrophytic vegetation and
Sandy Mucky Mineral (S1)		Depleted Dark		7)			nd hydrology must be present,
Sandy Gleyed Matrix (S4)		_ Redox Depress	ions (F8)			untess	s disturbed or problematic.
Restrictive Layer (if present):							
Type:		<del></del>					
Depth (inches):						Hydric Soil	Present? Yes V No
		Late	2569	im = N	1.		
Remarks:		Late	- 5E9	Memi	1.		
Remarks: YDROLOGY Wetland Hydrology Indicators:				imap	1.		
Remarks: YDROLOGY Wetland Hydrology Indicators:				im=N	<b>.</b>	Secon	dary Indicators (2 or more required)
YDROLOGY  Vetland Hydrology Indicators:  Primary Indicators (minimum of o		check all that appl Water-Sta	y) ined Leav	es (B9) (e			ater-Stained Leaves (B9) (MLRA 1, 2,
Remarks: YDROLOGY Vetland Hydrology Indicators: Primary Indicators (minimum of d		check all that appl Water-Sta	у)	es (B9) (e		w	ater-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
YDROLOGY  Vetland Hydrology Indicators:  Primary Indicators (minimum of o  Surface Water (A1)  High Water Table (A2)  Saturation (A3)		check all that appl Water-Sta MLRA Salt Crust	y) ined Leave 1, 2, 4A, a (B11)	es (B9) (e and 4B)		W	ater-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) rainage Patterns (B10)
YDROLOGY  Vetland Hydrology Indicators:  Primary Indicators (minimum of o  Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)		check all that appl Water-Sta MLRA Salt Crust Aquatic In	y) ined Leav 1, 2, 4A, a (B11) vertebrate	es (B9) (c and <b>4B)</b> s (B13)		W Di	ater-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) rainage Patterns (B10) ry-Season Water Table (C2)
YDROLOGY  Vetland Hydrology Indicators:  Primary Indicators (minimum of o  Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)		check all that appl  Water-Sta  MLRA Salt Crust  Aquatic In  Hydrogen	y) ined Leave 1, 2, 4A, a (B11) vertebrate Sulfide Or	es (B9) (c and <b>4B</b> ) s (B13) dor (C1)	xcept	W Di Di	dater-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) rainage Patterns (B10) ry-Season Water Table (C2) aturation Visible on Aerial Imagery (C9
YDROLOGY  Vetland Hydrology Indicators:  Primary Indicators (minimum of of the content of the co		check all that appl  Water-Sta  MLRA  Salt Crust  Aquatic In  Hydrogen  Oxidized F	y) ined Leave 1, 2, 4A, a (B11) vertebrate Sulfide Or Rhizosphe	es (B9) (e and <b>4B</b> ) s (B13) dor (C1) res along	xcept		fater-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) rainage Patterns (B10) ry-Season Water Table (C2) aturation Visible on Aerial Imagery (C9 eomorphic Position (D2)
YDROLOGY  Vetland Hydrology Indicators:  Primary Indicators (minimum of of the control of the co		check all that appl  Water-Sta  MLRA  Salt Crust  Aquatic In  Hydrogen  Oxidized F	y) ined Leave 1, 2, 4A, a (B11) vertebrate Sulfide Or Rhizosphe of Reduce	es (B9) (e and 4B) s (B13) dor (C1) res along dd Iron (C-	xcept Living Roo	Di Di Si ts (C3) Si	rater-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) rainage Patterns (B10) ry-Season Water Table (C2) aturation Visible on Aerial Imagery (C9 eomorphic Position (D2) nallow Aquitard (D3)
YDROLOGY  Vetland Hydrology Indicators:  Primary Indicators (minimum of of of of surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)		check all that appl  Water-Sta  MLRA  Salt Crust  Aquatic In  Hydrogen  Oxidized F  Presence  Recent Iro	y) ined Leav 1, 2, 4A, a (B11) vertebrate Sulfide Or Rhizosphe of Reduce on Reducti	es (B9) (e and 4B) s (B13) dor (C1) res along ad Iron (Co on in Tille	xcept Living Roo  i) d Soils (C6	W Di Si Si Si Fi	rater-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) rainage Patterns (B10) ry-Season Water Table (C2) raturation Visible on Aerial Imagery (C9) reomorphic Position (D2) rallow Aquitard (D3) AC-Neutral Test (D5)
YDROLOGY  Wetland Hydrology Indicators:  Primary Indicators (minimum of	ne required;	check all that appl  Water-Sta  MLRA  Salt Crust  Aquatic In  Hydrogen  Oxidized F  Presence  Recent Iro	y) ined Leave 1, 2, 4A, a (B11) vertebrate Sulfide Or Rhizosphe of Reduce on Reducti r Stressed	es (B9) (cand 4B) s (B13) dor (C1) res along do Iron (Con in Tille	xcept Living Roo  i) d Soils (C6	Di Di Si ts (C3) Si Si Fi Ri	rater-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) rainage Patterns (B10) ry-Season Water Table (C2) raturation Visible on Aerial Imagery (C9) reomorphic Position (D2) rallow Aquitard (D3) AC-Neutral Test (D5) raised Ant Mounds (D6) (LRR A)
YDROLOGY  Wetland Hydrology Indicators:  Primary Indicators (minimum of	ne required; Imagery (B7)	check all that appl  Water-Sta  MLRA Salt Crust Aquatic In Hydrogen Oxidized F Presence Recent Iro Stunted of	y) ined Leave 1, 2, 4A, a (B11) vertebrate Sulfide Or Rhizosphe of Reduce on Reducti r Stressed	es (B9) (cand 4B) s (B13) dor (C1) res along do Iron (Con in Tille	xcept Living Roo  i) d Soils (C6	Di Di Si ts (C3) Si Si Fi Ri	rater-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) rainage Patterns (B10) ry-Season Water Table (C2) raturation Visible on Aerial Imagery (C9 reomorphic Position (D2) rallow Aquitard (D3) AC-Neutral Test (D5)
YDROLOGY  Wetland Hydrology Indicators:  Primary Indicators (minimum of of Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Surface Soil Cracks (B6) Inundation Visible on Aerial Sparsely Vegetated Concavers	ne required; Imagery (B7)	check all that appl  Water-Sta  MLRA Salt Crust Aquatic In Hydrogen Oxidized F Presence Recent Iro Stunted of	y) ined Leave 1, 2, 4A, a (B11) vertebrate Sulfide Or Rhizosphe of Reduce on Reducti r Stressed	es (B9) (cand 4B) s (B13) dor (C1) res along do Iron (Con in Tille	xcept Living Roo  i) d Soils (C6	Di Di Si ts (C3) Si Si Fi Ri	rater-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) rainage Patterns (B10) ry-Season Water Table (C2) raturation Visible on Aerial Imagery (C9 reomorphic Position (D2) rallow Aquitard (D3) AC-Neutral Test (D5) raised Ant Mounds (D6) (LRR A)
Process  YDROLOGY  Wetland Hydrology Indicators:  Primary Indicators (minimum of of the surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)  Surface Soil Cracks (B6)  Inundation Visible on Aerial of Sparsely Vegetated Concavers	ne required; Imagery (B7) e Surface (B8	check all that appl  Water-Sta  MLRA  Salt Crust  Aquatic In  Hydrogen  Oxidized F  Presence  Recent Iro  Stunted or  Other (Exp.)	y) ined Leave 1, 2, 4A, a (B11) vertebrate Sulfide Or Rhizosphe of Reduction Reduction Stressed plain in Re	es (B9) (c and 4B) s (B13) dor (C1) res along ed Iron (C on in Tille Plants (C emarks)	xcept  Living Roo i) d Soils (C6	Di Di Si ts (C3) Si Si Fi Ri	rater-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) rainage Patterns (B10) ry-Season Water Table (C2) raturation Visible on Aerial Imagery (C9) reomorphic Position (D2) rallow Aquitard (D3) AC-Neutral Test (D5) raised Ant Mounds (D6) (LRR A)
YDROLOGY  Wetland Hydrology Indicators:  Primary Indicators (minimum of of of surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)  Surface Soil Cracks (B6)  Inundation Visible on Aerial of Sparsely Vegetated Concavers (B1)  Surface Water Present?	ne required; Imagery (B7) e Surface (B8	check all that appl  Water-Sta  MLRA  Salt Crust  Aquatic In  Hydrogen  Oxidized F  Presence  Recent Iro  Stunted or  Other (Exp	y)ined Leave 1, 2, 4A, a (B11) vertebrate Sulfide Or Rhizosphe of Reduce on Reducti r Stressed plain in Re	es (B9) (eand 4B) s (B13) dor (C1) res along d Iron (Con in Tille Plants (Comarks)	xcept Living Roo  i) d Soils (C6 1) (LRR A)	Di Di Si ts (C3) Si Si Fi Ri	rater-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) rainage Patterns (B10) ry-Season Water Table (C2) raturation Visible on Aerial Imagery (C9) reomorphic Position (D2) rallow Aquitard (D3) AC-Neutral Test (D5) raised Ant Mounds (D6) (LRR A)
YDROLOGY  Wetland Hydrology Indicators:  Primary Indicators (minimum of of of surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)  Surface Soil Cracks (B6)  Inundation Visible on Aerial of Sparsely Vegetated Concavers (B1)  Surface Water Present?	Imagery (B7) e Surface (B8 'es No	check all that appl  Water-Sta  MLRA  Salt Crust  Aquatic In  Hydrogen  Oxidized F  Presence  Recent Iro  Stunted or  Other (Exp.)  Depth (in	y) ined Leave 1, 2, 4A, a (B11) vertebrate Sulfide Or Rhizosphe of Reduce on Reducti r Stressed plain in Re	es (B9) (cand 4B) s (B13) dor (C1) res along d Iron (Con in Tille Plants (Comarks)	xcept  Living Roo  i) d Soils (C6 1) (LRR A)	W Di Si Si Si Fi Fr	rater-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) rainage Patterns (B10) ry-Season Water Table (C2) raturation Visible on Aerial Imagery (C9) reomorphic Position (D2) rallow Aquitard (D3) AC-Neutral Test (D5) raised Ant Mounds (D6) (LRR A) rost-Heave Hummocks (D7)
YDROLOGY  Wetland Hydrology Indicators:  Primary Indicators (minimum of of of surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)  Surface Soil Cracks (B6)  Inundation Visible on Aerial of Sparsely Vegetated Concavers (B1)  Surface Water Present?	Imagery (B7) e Surface (B8 'es No	check all that appl  Water-Sta  MLRA  Salt Crust  Aquatic In  Hydrogen  Oxidized F  Presence  Recent Iro  Stunted or  Other (Exp	y) ined Leave 1, 2, 4A, a (B11) vertebrate Sulfide Or Rhizosphe of Reduce on Reducti r Stressed plain in Re	es (B9) (cand 4B) s (B13) dor (C1) res along d Iron (Con in Tille Plants (Comarks)	xcept  Living Roo  i) d Soils (C6 1) (LRR A)	W Di Si Si Si Fi Fr	rater-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) rainage Patterns (B10) ry-Season Water Table (C2) raturation Visible on Aerial Imagery (C9) reomorphic Position (D2) rallow Aquitard (D3) AC-Neutral Test (D5) raised Ant Mounds (D6) (LRR A)
Primary Indicators (minimum of of of surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)  Surface Soil Cracks (B6)  Inundation Visible on Aerial of Sparsely Vegetated Concavers (B4)  Field Observations:  Surface Water Present?  Water Table Present?	Imagery (B7) e Surface (B8 'es No 'es No	check all that appl  Water-Sta MLRA Salt Crust Aquatic In Hydrogen Oxidized F Presence Recent Iro Stunted or Other (Expanse)  Depth (in Depth (in	y) ined Leave 1, 2, 4A, a (B11) vertebrate Sulfide Or Rhizosphe of Reduce on Reducti r Stressed plain in Re ches): ches): ches):	es (B9) (eand 4B) s (B13) dor (C1) res along ed Iron (Con in Tille Plants (Con in Tille	xcept  Living Roo  i) d Soils (C6 1) (LRR A)	W Di Si Si Fi Fr	rater-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) rainage Patterns (B10) ry-Season Water Table (C2) raturation Visible on Aerial Imagery (C9 reomorphic Position (D2) rallow Aquitard (D3) AC-Neutral Test (D5) raised Ant Mounds (D6) (LRR A) rost-Heave Hummocks (D7)
Primary Indicators (minimum of of of surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)  Surface Soil Cracks (B6)  Inundation Visible on Aerial in Sparsely Vegetated Concavers (B4)  Surface Water Present?  Water Table Present?  Saturation Present?	Imagery (B7) e Surface (B8 'es No 'es No	check all that appl  Water-Sta MLRA Salt Crust Aquatic In Hydrogen Oxidized F Presence Recent Iro Stunted or Other (Expanse)  Depth (in Depth (in Depth (in	y) ined Leave 1, 2, 4A, a (B11) vertebrate Sulfide Or Rhizosphe of Reduce on Reducti r Stressed plain in Re ches): ches): photos, pr	es (B9) (e and 4B) s (B13) dor (C1) res along do Iron (Con in Tille Plants (Comarks)	Living Roo  i) d Soils (C6 1) (LRR A)  Wetla pections),	Di Di Si ts (C3) Si Si Ri Ri Fr and Hydrology	rater-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) rainage Patterns (B10) ry-Season Water Table (C2) raturation Visible on Aerial Imagery (C9) reomorphic Position (D2) rallow Aquitard (D3) AC-Neutral Test (D5) raised Ant Mounds (D6) (LRR A) rost-Heave Hummocks (D7)
Primary Indicators (minimum of of surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)  Surface Soil Cracks (B6)  Inundation Visible on Aerial Sparsely Vegetated Concave Field Observations:  Surface Water Present?  Water Table Present?  Yellonder Capillary fringe)  Describe Recorded Data (stream	Imagery (B7) e Surface (B8 'es No 'es No	check all that appl  Water-Sta MLRA Salt Crust Aquatic In Hydrogen Oxidized F Presence Recent Iro Stunted or Other (Expanse)  Depth (in Depth (in Depth (in	y) ined Leave 1, 2, 4A, a (B11) vertebrate Sulfide Or Rhizosphe of Reduce on Reducti r Stressed plain in Re ches): ches): photos, pr	es (B9) (e and 4B) s (B13) dor (C1) res along do Iron (Con in Tille Plants (Comarks)	Living Roo  i) d Soils (C6 1) (LRR A)  Wetla pections),	Di Di Si ts (C3) G Si Pr Ri Fr and Hydrology	rater-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) rainage Patterns (B10) ry-Season Water Table (C2) raturation Visible on Aerial Imagery (C9 reomorphic Position (D2) rallow Aquitard (D3) AC-Neutral Test (D5) raised Ant Mounds (D6) (LRR A) rost-Heave Hummocks (D7)

#### WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: REAMSSA RESS	rvoir		City/Co	ounty: <u>L</u> A	Plata COUNTY Sampling Da	ate: <u>6/7/2016</u>
Applicant/Owner: Kid MSSA A	4S. COMP	~ Na!			State: <u>CO</u> Sampling Po	oint:
	NUAL	1		n, Township, Ra		
Landform (hillslope, terrace, etc.): _ [ \( \) \( \) \( \)					<u> </u>	Slope (%):)
		1 2 2 2	7 6 ( (	POS"	Long: -108 °08' 3   "	510pe (78)
Subregion (LRR):		Lat: 6	, IV		_ Long:	rv   Datom: <u>"∧∧ [N] (~1 ∧)</u>
		,			NWI classification: <u>PE/</u>	<u> 1 M</u>
Are climatic / hydrologic conditions on the					(If no, explain in Remarks.)	
Are Vegetation, Soil, or H	ydrology	significantly	disturb	ed? Are	"Normal Circumstances" present? Yes	3 <u>/</u> No
Are Vegetation, Soil, or H	ydrology	naturally pro	blemat	tic? (If n	eeded, explain any answers in Remark	3.)
SUMMARY OF FINDINGS – Att			sam	pling point l	locations, transects, importar	ıt features, etc.
Hydrophytic Vegetation Present?	Yes N					
Hydric Soil Present?		No		Is the Sampled within a Wetla		
Wetland Hydrology Present?	Yes <u>//</u> N	<u> </u>		within a wetia	ndr res No	<u> </u>
Remarks:						
VEGETATION – Use scientific :	names of plar	ıts.				
		Absolute		inant Indicator	Dominance Test worksheet:	
Tree Stratum (Plot size:				ies? Status	Number of Dominant Species	1
1					That Are OBL, FACW, or FAC:	(A)
2					Total Number of Dominant	2 (1)
3					Species Across All Strata:	(B)
4			 = Tota	al Cover	Percent of Dominant Species That Are OBL, FACW, or FAC:	(A/B)
Sapling/Shrub Stratum (Plot size:					Prevalence Index worksheet:	
1					Total % Cover of:M	ultiply by:
2					OBL species x 1 =	
3					FACW species x 2 =	
4				<u>·</u>	FAC species x 3 =	<u> </u>
5					FACU species x 4 =	
Herb Stratum (Plot size:	. )	····	_= 100	al Cover	UPL species x 5 =	
1. Glycyrhien Epidot	<u>A</u> .	60		FAC	Column Totals: (A)	(B)
2. CONVOIVALAS OIVENSES		20	V	racy	Prevalence Index = B/A =	
3.					Hydrophytic Vegetation Indicators	
4						
5					2 - Dominance Test \$350%	· ·
6					3 - Prevalence Index is ≤3.0¹	
7					4 - Morphological Adaptations <sup>1</sup> (	Provide supporting
8,					data in Remarks or on a sepa	arate sheet)
9					5 - Wetland Non-Vascular Plant	
10					Problematic Hydrophytic Vegeta	
11					<sup>1</sup> Indicators of hydric soil and wetland be present, unless disturbed or prob	
		100			be present, unless disturbed of prob	emanc.
Woody Vine Stratum (Plot size:				1/21		
1.					Hydrophytic	./
2					Vegetation   Present? Yes N	lo
% Bare Ground in Herb Stratum			_= 10ta	d Cover		
Remarks:					1	
				•		

S	О	l	L
•	•	B	

Sampling	Point:	3	

Depth Matrix Redox Features		n the absence o	•
	Loc²	Touture	Domorko
		Texture	Remarks
0-12 10923/2 90 542 8/6 10 C	<u> </u>	21	
		<u></u>	
Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Co	ated Sand G	rains. <sup>2</sup> Loca	ition: PL=Pore Lining, M=Matrix.
Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)			s for Problematic Hydric Soils <sup>3</sup> :
Histosol (A1) Sandy Redox (S5)		2 cm	Muck (A10)
Histic Epipedon (A2) Stripped Matrix (S6)			Parent Material (TF2)
Black Histic (A3) Loamy Mucky Mineral (F1) (exc	ept MLRA 1)		Shallow Dark Surface (TF12)
Hydrogen Sulfide (A4) Loamy Gleyed Matrix (F2)		Other	(Explain in Remarks)
Depleted Below Dark Surface (A11)  Depleted Matrix (F3)  Thick Park Surface (A42)		3(	a at leased as the search of the search
Thick Dark Surface (A12)  Sandy Mucky Mineral (S1)  Pedox Dark Surface (F6)  Depleted Dark Surface (F7)			s of hydrophytic vegetation and dhydrology must be present,
Sandy Gleyed Matrix (S4) Redox Depressions (F8)			disturbed or problematic.
Restrictive Layer (if present):		unicas	distance of problematic.
Type:			
Depth (inches):		Hydric Soil F	Present? Yes V No No
Remarks:		Tiyuno don i	1636Ht. 163HO
YDROLOGY			
Wetland Hydrology Indicators:		Canan	lon, Indicators (2 or more required)
Primary Indicators (minimum of one required; check all that apply)			lary Indicators (2 or more required)
Surface Water (A1) Water-Stained Leaves (B9)			eter-Stained Leaves (B9) (MLRA 1, 2,
High Water Table (A2)  MLRA 1, 2, 4A, and 4B	)		
			4A, and 4B)
Saturation (A3) Salt Crust (B11)		Dr	ainage Patterns (B10)
Water Marks (B1) Aquatic Invertebrates (B13)	)	Dr	ainage Patterns (B10) y-Season Water Table (C2)
Water Marks (B1) Aquatic Invertebrates (B13] Sediment Deposits (B2) Hydrogen Sulfide Odor (C1	) )	Dr. Dr. \$a	ainage Patterns (B10) y-Season Water Table (C2) turation Visible on Aerial Imagery (C9)
Water Marks (B1) Aquatic Invertebrates (B13) Sediment Deposits (B2) Hydrogen Sulfide Odor (C1 Drift Deposits (B3) Oxidized Rhizospheres alo	) ) ng Living Ro	Dr. Dr. Sa ots (C3)/ Ge	ainage Patterns (B10) y-Season Water Table (C2) turation Visible on Aerial Imagery (C9) comorphic Position (D2)
Water Marks (B1) Aquatic Invertebrates (B13) Sediment Deposits (B2) Hydrogen Sulfide Odor (C1 Drift Deposits (B3) Oxidized Rhizospheres alo Algal Mat or Crust (B4) Presence of Reduced Iron	) ) ng Living Roo (C4)	Dr. Dr. Sa Sh Sh	ainage Patterns (B10) y-Season Water Table (C2) turation Visible on Aerial Imagery (C9) comorphic Position (D2) allow Aquitard (D3)
Water Marks (B1) Aquatic Invertebrates (B13) Sediment Deposits (B2) Hydrogen Sulfide Odor (C1 Drift Deposits (B3) Oxidized Rhizospheres alo Algal Mat or Crust (B4) Presence of Reduced Iron Iron Deposits (B5) Recent Iron Reduction in T	) ) ng Living Roi (C4) illed Soils (C6	Dr. Dr. Se ots (C3)/ Ge Sh 5) FA	ainage Patterns (B10) y-Season Water Table (C2) turation Visible on Aerial Imagery (C9) comorphic Position (D2) allow Aquitard (D3) ,C-Neutral Test (D5)
Water Marks (B1) Aquatic Invertebrates (B13) Sediment Deposits (B2) Hydrogen Sulfide Odor (C1 Drift Deposits (B3) Oxidized Rhizospheres alo Algal Mat or Crust (B4) Presence of Reduced Iron Iron Deposits (B5) Recent Iron Reduction in T Surface Soil Cracks (B6) Stunted or Stressed Plants	) ng Living Rod (C4) illed Soils (Cd (D1) (LRR A	Dr. Dr. Se ots (C3) Se Sh 6) FA s) Re	ainage Patterns (B10) y-Season Water Table (C2) turation Visible on Aerial Imagery (C9) comorphic Position (D2) allow Aquitard (D3) C-Neutral Test (D5) ised Ant Mounds (D6) (LRR A)
Water Marks (B1) Aquatic Invertebrates (B13) Sediment Deposits (B2) Hydrogen Sulfide Odor (C1 Drift Deposits (B3) Oxidized Rhizospheres alo Algal Mat or Crust (B4) Presence of Reduced Iron Iron Deposits (B5) Recent Iron Reduction in T Surface Soil Cracks (B6) Stunted or Stressed Plants Inundation Visible on Aerial Imagery (B7) Other (Explain in Remarks)	) ng Living Rod (C4) illed Soils (Cd (D1) (LRR A	Dr. Dr. Se ots (C3) Se Sh 6) FA s) Re	ainage Patterns (B10) y-Season Water Table (C2) turation Visible on Aerial Imagery (C9) comorphic Position (D2) allow Aquitard (D3) ,C-Neutral Test (D5)
Water Marks (B1) Aquatic Invertebrates (B13) Sediment Deposits (B2) Hydrogen Sulfide Odor (C1 Drift Deposits (B3) Oxidized Rhizospheres alo Algal Mat or Crust (B4) Presence of Reduced Iron Iron Deposits (B5) Recent Iron Reduction in T Surface Soil Cracks (B6) Stunted or Stressed Plants Inundation Visible on Aerial Imagery (B7) Other (Explain in Remarks) Sparsely Vegetated Concave Surface (B8)	) ng Living Rod (C4) illed Soils (Cd (D1) (LRR A	Dr. Dr. Se ots (C3) Se Sh 6) FA s) Re	ainage Patterns (B10) y-Season Water Table (C2) turation Visible on Aerial Imagery (C9) comorphic Position (D2) allow Aquitard (D3) C-Neutral Test (D5) ised Ant Mounds (D6) (LRR A)
Water Marks (B1) Aquatic Invertebrates (B13) Bediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Presence of Reduced Iron Iron Deposits (B5) Recent Iron Reduction in T Stunted or Stressed Plants Inundation Visible on Aerial Imagery (B7) Sparsely Vegetated Concave Surface (B8) Field Observations:	) ng Living Roo (C4) illed Soils (C0 (D1) (LRR A	Dr. Dr. Se ots (C3) Se Sh 6) FA s) Re	ainage Patterns (B10) y-Season Water Table (C2) turation Visible on Aerial Imagery (C9) comorphic Position (D2) allow Aquitard (D3) C-Neutral Test (D5) ised Ant Mounds (D6) (LRR A)
Water Marks (B1) Aquatic Invertebrates (B13) Sediment Deposits (B2) Hydrogen Sulfide Odor (C1 Drift Deposits (B3) Algal Mat or Crust (B4) Presence of Reduced Iron Iron Deposits (B5) Recent Iron Reduction in T Surface Soil Cracks (B6) Stunted or Stressed Plants Other (Explain in Remarks) Sparsely Vegetated Concave Surface (B8) Surface Water Present? Yes No Depth (inches):	) ng Living Roo (C4) illed Soils (C6 (D1) (LRR A	Dr. Dr. Se ots (C3) Se Sh 6) FA s) Re	ainage Patterns (B10) y-Season Water Table (C2) turation Visible on Aerial Imagery (C9) comorphic Position (D2) allow Aquitard (D3) C-Neutral Test (D5) ised Ant Mounds (D6) (LRR A)
Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Surface Soil Cracks (B6) Inundation Visible on Aerial Imagery (B7) Sparsely Vegetated Concave Surface (B8) Field Observations: Surface Water Present? Water Table Present?  Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1 Oxidized Rhizospheres alo Presence of Reduced Iron Recent Iron Reduction in T Stunted or Stressed Plants Other (Explain in Remarks) Depth (inches):  Depth (inches):	) ng Living Roo (C4) illed Soils (C6 (D1) (LRR A	Dr Sa ols (C3) \( \subseteq \text{ Ge} \) Sh FA Fre	ainage Patterns (B10) y-Season Water Table (C2) turation Visible on Aerial Imagery (C9) comorphic Position (D2) allow Aquitard (D3) C-Neutral Test (D5) ised Ant Mounds (D6) (LRR A) ost-Heave Hummocks (D7)
Water Marks (B1) Aquatic Invertebrates (B13] Sediment Deposits (B2) Hydrogen Sulfide Odor (C1 Drift Deposits (B3) Oxidized Rhizospheres alo Algal Mat or Crust (B4) Presence of Reduced Iron Iron Deposits (B5) Recent Iron Reduction in T Surface Soil Cracks (B6) Stunted or Stressed Plants Inundation Visible on Aerial Imagery (B7) Other (Explain in Remarks) Sparsely Vegetated Concave Surface (B8)  Field Observations: Surface Water Present? Yes No Depth (inches): Water Table Present? Yes No Depth (inches): Depth (inches): Depth (inches):	) ng Living Roo (C4) illed Soils (C6 (D1) (LRR A	Dr. Sa ots (C3)	ainage Patterns (B10) y-Season Water Table (C2) turation Visible on Aerial Imagery (C9) comorphic Position (D2) allow Aquitard (D3) C-Neutral Test (D5) ised Ant Mounds (D6) (LRR A)
Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Surface Soil Cracks (B6) Inundation Visible on Aerial Imagery (B7) Sparsely Vegetated Concave Surface (B8) Field Observations: Water Table Present? Yes No Depth (inches): Depth (inches): Depth (inches):	) ng Living Roo (C4) illed Soils (C6 (D1) (LRR A	Dr. Sa ots (C3)	ainage Patterns (B10) y-Season Water Table (C2) turation Visible on Aerial Imagery (C9) comorphic Position (D2) allow Aquitard (D3) C-Neutral Test (D5) ised Ant Mounds (D6) (LRR A) ost-Heave Hummocks (D7)
Water Marks (B1) Aquatic Invertebrates (B13) Sediment Deposits (B2) Hydrogen Sulfide Odor (C1 Drift Deposits (B3) Oxidized Rhizospheres alo Algal Mat or Crust (B4) Presence of Reduced Iron Iron Deposits (B5) Recent Iron Reduction in T Surface Soil Cracks (B6) Stunted or Stressed Plants Inundation Visible on Aerial Imagery (B7) Other (Explain in Remarks) Sparsely Vegetated Concave Surface (B8) Other (Explain in Remarks) Surface Water Present? Yes No Depth (inches): Depth (inches): Depth (inches): Depth (inches): Depth (inches): Depth (inches): Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous	) ng Living Roo (C4) illed Soils (C6 (D1) (LRR A	Dr. Sa ots (C3)	ainage Patterns (B10) y-Season Water Table (C2) turation Visible on Aerial Imagery (C9) comorphic Position (D2) allow Aquitard (D3) C-Neutral Test (D5) ised Ant Mounds (D6) (LRR A) ost-Heave Hummocks (D7)
Water Marks (B1) Aquatic Invertebrates (B13] Sediment Deposits (B2) Hydrogen Sulfide Odor (C1 Drift Deposits (B3) Oxidized Rhizospheres alo Algal Mat or Crust (B4) Presence of Reduced Iron Iron Deposits (B5) Recent Iron Reduction in T Surface Soil Cracks (B6) Stunted or Stressed Plants Inundation Visible on Aerial Imagery (B7) Other (Explain in Remarks) Sparsely Vegetated Concave Surface (B8)  Field Observations: Surface Water Present? Yes No Depth (inches): Water Table Present? Yes No Depth (inches): Depth (inches): Depth (inches):	) ng Living Roo (C4) illed Soils (C6 (D1) (LRR A	Dr. Sa ots (C3)	ainage Patterns (B10) y-Season Water Table (C2) turation Visible on Aerial Imagery (C9) comorphic Position (D2) allow Aquitard (D3) C-Neutral Test (D5) ised Ant Mounds (D6) (LRR A) ost-Heave Hummocks (D7)
Water Marks (B1) Aquatic Invertebrates (B13) Sediment Deposits (B2) Hydrogen Sulfide Odor (C1 Drift Deposits (B3) Oxidized Rhizospheres alo Algal Mat or Crust (B4) Presence of Reduced Iron Iron Deposits (B5) Recent Iron Reduction in T Surface Soil Cracks (B6) Stunted or Stressed Plants Depth (inches): Sparsely Vegetated Concave Surface (B8)  Field Observations: No Depth (inches): Depth (inches): Depth (inches): Depth (inches): Depth (inches): Depth (inches): Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous	) ng Living Roo (C4) illed Soils (C6 (D1) (LRR A	Dr. Sa ots (C3)	ainage Patterns (B10) y-Season Water Table (C2) turation Visible on Aerial Imagery (C9) comorphic Position (D2) allow Aquitard (D3) C-Neutral Test (D5) ised Ant Mounds (D6) (LRR A) ost-Heave Hummocks (D7)

#### WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: REDMISSA RESERVOIS	C	ty/County LA	Plata COUNTY Sampling Date: 6/7/2018
Applicant/Owner: Kid MSSA Kgs. Com	ealls.	tyroddiny.	State: CO Sampling Point: 4
Investigator(s): MEHAN HANN	j		
- · · · · · · · · · · · · · · · · · · ·			Range:
Landform (hillslope, terrace, etc.): (85& Var 601)	7/7 L	ocal relief (concave	s, convex (none): Slope (%): 1
	Lat: <u> /</u>	10 00	Long: 108 08 3 1" Datum: NMPM
			NWI classification: PEM h
Are climatic / hydrologic conditions on the site typical for t	his time of year	? Yes No	(If no, explain in Remarks.)
Are Vegetation, Soil, or Hydrology	significantly di	sturbed? Are	e "Normal Circumstances" present? Yes No
Are Vegetation, Soil, or Hydrology	naturally probl	ematic? (If	needed, explain any answers in Remarks.)
		•	locations, transects, important features, etc.
Hydrophytic Vegetation Present? Yes			
Hydric Soil Present? Yes V	No	Is the Sample	ed Area
Wetland Hydrology Present? Yes	No	within a Wetl	and? YesNo
Remarks:			
VEGETATION – Use scientific names of pla			
Tree Stratum (Plot size:)		Dominant Indicator Species? Status	
1			Number of Dominant Species That Are OBL, FACW, or FAC:  (A)
2			Total Number of Dominant
3			_ Species Across All Strata;(B)
4		Total Cover	Percent of Dominant Species
Sapling/Shrub Stratum (Plot size:)		- Total Cover	That Are OBL, FACW, or FAC: (A/B)
1			Prevalence Index worksheet:
2	·		Total % Cover of: Multiply by:
3			OBL species x1=
4			FACW species x 2 = FAC species x 3 =
5	<del></del> -		FACU species x 4 =
Hada Okuduwa (Dialaina)		= Total Cover	UPL species x 5 =
Herb Stratum (Plot size:)  1. MEN SUIN ABSUMANUM	7.5	V MCU	
2. CONVOLVANION ALCONO 2.	$-\frac{70}{10}$	1/100	-
			Prevalence Index = B/A =
3 4			Hydrophytic Vegetation Indicators:
5.			1 - Rapid Test for Hydrophytic Vegetation
6			·
7			3 - Prevalence Index is ≤3.0¹ 4 - Morphological Adaptations¹ (Provide supporting
8.			data in Remarks or on a separate sheet)
9.			5 - Wetland Non-Vascular Plants¹
10			Problematic Hydrophytic Vegetation¹ (Explain)
11.			¹Indicators of hydric soil and wetland hydrology must
	= 28	Total Cover	be present, unless disturbed or problematic.
Woody Vine Stratum (Plot size:)		47/10	
1			Hydrophytic
2	,		Vegetation Present? Yes No
% Bare Ground in Herb Stratum / \(  \)	=	Total Cover	100 100
Remarks:			

Sampling Point:

	cription: (Describe	to the dept				or confirm	the absence of	of indicators.)
Depth (inches)	Matrix Color (moist)	%	Red Color (moist)	ox Features %	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
V-/2	10 YD 3/2 3/2		5 /2 5/6	<del>2.10</del>	- i Abe		S	Kemany
1 6"	10 11 17 4, 179	10 10	57.5 /%					
	-							
								***************************************
	·			<del></del>				
<sup>1</sup> Type: C=C	Concentration, D=Dep	pletion, RM=	Reduced Matrix, C	S=Covered	or Coate	d Sand Gr		ation: PL=Pore Lining, M=Matrix.
Hydric Soil	Indicators: (Applic	cable to all I	RRs, unless oth	erwise note	ed.)		Indicator	's for Problematic Hydric Soils <sup>3</sup> :
Histoso	l (A1)	-	Sandy Redox				2 cm	Muck (A10)
	pipedon (A2)		Stripped Matri					Parent Material (TF2)
	listic (A3)		Loamy Mucky	•		MLRA 1)		Shallow Dark Surface (TF12)
	en Sulfide (A4)		Loamy Gleyed				Othe	r (Explain in Remarks)
	ed Below Dark Surfac	ce (A11)	Depleted Matr				3 <sub>Indianta-</sub>	en of budranhutia upgatation and
	Park Surface (A12) Mucky Mineral (S1)	•	Redox Dark S Depleted Dark		7\			s of hydrophytic vegetation and nd hydrology must be present,
	Gleyed Matrix (S4)	•	Redox Depres		<i>(</i> )			s disturbed or problematic.
	Layer (if present):		Rodox Depres	3010110 (1 0)			1	o diotario di propreni di di
Туре:	, , ,							
Depth (ir							Hydric Soil	Present? Yes $ u$ No
Remarks:			- rough	<u> </u>				
HYDROLO	DGY	-						
	/drology Indicators	:	•					
	icators (minimum of		: check all that ap	olv)			Secon	dary Indicators (2 or more required)
	e Water (A1)			ained Leave	es (B9) (e	xcept		ater-Stained Leaves (B9) (MLRA 1, 2,
	ater Table (A2)			A 1, 2, 4A, a				4A, and 4B)
	tion (A3)		Salt Crus				Dr	rainage Patterns (B10)
	Marks (B1)		Aquatic I		s (B13)			y-Season Water Table (C2)
	ent Deposits (B2)			n Sulfide Od				aturation Visible on Aerial Imagery (C9)
	eposits (B3)			Rhizosphei		Living Roo		eomorphic Position (D2)
	lat or Crust (B4)		<del></del>	e of Reduce	_	-		nallow Aquitard (D3)
	eposits (B5)		Recent li	ron Reductio	on in Tille	d Soils (C6		AC-Neutral Test (D5)
-	e Soil Cracks (B6)		Stunted	or Stressed	Plants (D	1) (LRR A)	-	aised Ant Mounds (D6) (LRR A)
17	tion Visible on Aerial	Imagery (B7	') Other (E	xplain in Re	marks)		Fr	ost-Heave Hummocks (D7)
Sparse	ly Vegetated Concav	ve Surface (E	38)					
Field Obse	rvations:							
Surface Wa	iter Present?	Yes i	No ${\cal V}_{\perp}$ Depth (i	nches):		_		
Water Table		Yes 1		nches):		<b>I</b>		. /
Saturation I		 Yes 1		inches):			and Hydrology	Present? Yes No
(includes ca	apillary fringe)							
Describe R	ecorded Data (strear	n gauge, mo	nitoring well, aeria	i photos, pr	evious in:	spections),	ıt available:	
Remarks:								

#### WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: REAMSSA RESERVOID	Cit	v/County: LA	Plata COUNTY Sampling Date: 6/7/2013
Applicant/Owner: Kid MSSA KS. COM	PAN).	y, county. <u> </u>	State: CO Sampling Point:
Investigator(s): MEHAN HANN	[ ]		orate. Sampling Form.
- ,,			
Eardiorni (fillisiope, terrace, etc.): 1 (321 VOI) 100	10	$10^{\circ}$	convex, fone): Slope (%): / Long: 108 008 3 / " Datum: NMPM
Soil Map Unit Name: VDShUIG FINE 5/	Lat: <u>5 /</u>	10 00	Long: 105 00 01 Datum: 1/ (1) PJV
Soil Map Unit Name: Vosburg Fine 57  Are climatic / hydrologic conditions on the site typical for	Way lov	11th	NWI classification: 1 6/1 //
Are climatic / hydrologic conditions on the site typical for	this time of year?	Yes No _	(If no, explain in Remarks.)
Are Vegetation, Soil, or Hydrology	_ significantly dis	turbed? Are	"Normal Circumstances" present? Yes No
Are Vegetation, Soil, or Hydrology	_ naturally proble	ematic? (If ne	eeded, explain any answers in Remarks.)
SUMMARY OF FINDINGS - Attach site ma	p showing s	ampling point l	ocations, transects, important features, etc.
Hydrophytic Vegetation Present? Yes	No		
Hydric Soil Present? Yes V	dric Soil Present? Yes No Is the Sam		nd? YesNo/
	No	within a wellar	ndr fes No v
Remarks:			
· VEGETATION – Use scientific names of pl	ants.		
-	Absolute D	Oominant Indicator	Dominance Test worksheet:
Tree Stratum (Plot size:)  1		Species? Status	Number of Dominant Species That Are OBL, FACW, or FAC:  (A)
2			Total Number of Dominant
3			Species Across All Strata: (B)
4		Total Cover	Percent of Dominant Species That Are OBL, FACW, or FAC: (A/B)
Sapling/Shrub Stratum (Plot size:)			Prevalence Index worksheet:
1			Total % Cover of:Multiply by:
2			OBL species x 1 =
3			FACW species x 2 =
5			FAC species x 3 =
		Total Cover	FACU species x 4 =
Herb Stratum (Plot size:)	© 4	/	UPL species x 5 =
1. MELILOTIS OPPICIALIS	<u> </u>	FOCH	Column Totals: (A) (B)
2. CONVOLVULAS OLVENSAS			Prevalence Index = B/A =
3. AMENEGIA ROSINZHIUM	•		Hydrophytic Vegetation Indicators:
4			1 - Rapid Test for Hydrophytic Vegetation
5			2 - Dominance Test is >50%
6			3 - Prevalence Index is ≤3.0 <sup>1</sup>
7			4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
8			5 - Wetland Non-Vascular Plants <sup>1</sup>
10			Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
11.		***************************************	Indicators of hydric soil and wetland hydrology must
	110 =	Total Cover	be present, unless disturbed or problematic.
Woody Vine Stratum (Plot size:)	7.	5/22	
1		,	Hydrophytic
2			Vegetation   Present?   Yes No _//_
% Bare Ground in Herb Stratum		Total Cover	100 <u>µ</u>
Remarks:			

_	_		
c	$\boldsymbol{\cap}$	1	
J	u	1	_

	<u></u>	
Sampling Point:	্ে	

Depth inches)	Matrix			c Features				
i	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture _	Remarks
‡	10Yn312	95	5 yn 5/8			<u>P)</u> .		
								•
		·						
						<del></del>		
	ncentration, D=Dep ndicators: (Applic					d Sand Gra		ion: PL=Pore Lining, M=Matrix. for Problematic Hydric Soils <sup>3</sup> :
_ Histosol (/	• • •	able to all L	_ Sandy Redox (S		au.)			Muck (A10)
-	pedon (A2)	_	Stripped Matrix					arent Material (TF2)
Black Hist		_	Loamy Mucky M	• •	i) (except	MLRA 1)		Shallow Dark Surface (TF12)
	Sulfide (A4)	_	Loamy Gleyed I					(Explain in Remarks)
_ Depleted I	Below Dark Surfac	e (A11)	∠ Depleted Matrix				_	
_	k Surface (A12)		Redox Dark Sur					of hydrophytic vegetation and
	icky Mineral (S1)		Depleted Dark S		7)			hydrology must be present,
	eyed Matrix (S4) ayer (if present):	_	Redox Depress	ions (F8)			uniess i	disturbed or problematic.
Depth (inch			<del></del>				Hydric Soil P	resent? Yes V No
emarks:			Nav tusmi				l 、 -	100011111111111111111111111111111111111
YDROLOG	ЭΥ Y							
Vetland Hydr	rology Indicators:		<u> </u>					
rimary Indica	ators (minimum of o	ne required;	check all that apply	/)			Second	ary Indicators (2 or more required)
Surface V	Vater (A1)		Water-Stai	ned Leav	es (B9) (e	xcept	Wa	ter-Stained Leaves (B9) (MLRA 1, 2
	er Table (A2)			4 0 44 -				
High Wate			MLRA	1, <i>4</i> , 4 <i>1</i> 4, č	and 4B)	-		1A, and 4B)
High Wate Saturation	n (A3)		MLRA : Salt Crust		and 4B)	-		• • •
	•			(B11)	-	·	Dra	1A, and 4B)
Saturatior Water Ma	•		Salt Crust	(B11) /ertebrate	s (B13)	•	Dra Dry	<b>4A, and 4B)</b> inage Patterns (B10) -Season Water Table (C2)
Saturatior Water Ma	arks (B1) t Deposits (B2)		Salt Crust Aquatic Inv Hydrogen	(B11) /ertebrate Sulfide Od	s (B13) dor (C1)	Living Root	Dra Dry Sat	<b>4A, and 4B)</b> inage Patterns (B10) -Season Water Table (C2)
Saturation Water Ma Sediment Drift Depo	arks (B1) t Deposits (B2)		Salt Crust Aquatic Inv Hydrogen	(B11) /ertebrate Sulfide Oo Rhizosphe	s (B13) dor (C1) res along	Living Root	Dra Dry Sat s (C3) Geo	<b>4A, and 4B)</b> inage Patterns (B10) -Season Water Table (C2) uration Visible on Aerial Imagery (C
Saturation Water Ma Sediment Drift Depo	arks (B1) t Deposits (B2) osits (B3) or Crust (B4)		Salt Crust Aquatic Inv Hydrogen Oxidized R	(B11) /ertebrate Sulfide Od Rhizosphe of Reduce	s (B13) dor (C1) res along ed Iron (C4	Living Root	Dra Dry Sat s (C3) Sha	4A, and 4B) inage Patterns (B10) -Season Water Table (C2) uration Visible on Aerial Imagery (Comorphic Position (D2)
Saturation Water Ma Sediment Drift Depo Algal Mat Iron Depo	arks (B1) t Deposits (B2) osits (B3) or Crust (B4)		Salt Crust Aquatic Inv Hydrogen Oxidized R Presence o	(B11) vertebrate Sulfide Oo Rhizosphe of Reducti n Reducti	s (B13) dor (C1) res along d Iron (C4 on in Tilled	Living Root	Dra Dry Sat s (C3) Sha FAG	4A, and 4B) inage Patterns (B10) -Season Water Table (C2) uration Visible on Aerial Imagery (Comorphic Position (D2) illow Aquitard (D3)
Saturation Water Ma Sediment Drift Depo Algal Mat Iron Depo Surface S	arks (B1) t Deposits (B2) osits (B3) t or Crust (B4) osits (B5) Goil Cracks (B6) n Visible on Aerial	0 3 ( )	Salt Crust Aquatic Inv Hydrogen Oxidized R Presence of Recent Iro Stunted or	(B11) vertebrate Sulfide Or Rhizosphe of Reduce n Reducti Stressed	s (B13) dor (C1) res along d Iron (C4 on in Tilled	Living Root I) d Soils (C6)	Dra Dry Sat Sha FAC Rai	4A, and 4B) inage Patterns (B10) -Season Water Table (C2) uration Visible on Aerial Imagery (Comorphic Position (D2) allow Aquitard (D3) C-Neutral Test (D5)
Saturation Water Ma Sediment Drift Depo Algal Mat Iron Depo Surface S	arks (B1) t Deposits (B2) osits (B3) or Crust (B4) osits (B5) Goil Cracks (B6)	0 3 ( )	Salt Crust Aquatic Inv Hydrogen Oxidized R Presence of Recent Iro Stunted or	(B11) vertebrate Sulfide Or Rhizosphe of Reduce n Reducti Stressed	s (B13) dor (C1) res along d Iron (C4 on in Tilled	Living Root I) d Soils (C6)	Dra Dry Sat Sha FAC Rai	4A, and 4B) inage Patterns (B10) -Season Water Table (C2) uration Visible on Aerial Imagery (Comorphic Position (D2) allow Aquitard (D3) C-Neutral Test (D5) sed Ant Mounds (D6) (LRR A)
Saturation Water Ma Sediment Drift Depo Algal Mat Iron Depo Surface S Inundation Sparsely	arks (B1) t Deposits (B2) osits (B3) or Crust (B4) osits (B5) Goil Cracks (B6) n Visible on Aerial I Vegetated Concave ations:	e Surface (B	Salt Crust Aquatic Inv Hydrogen Oxidized R Presence c Recent Iro Stunted or Other (Exp	(B11) vertebrate Sulfide Oo Rhizosphe of Reduce n Reducti Stressed blain in Re	s (B13) dor (C1) res along d Iron (C4 on in Tilled Plants (D emarks)	Living Root I) d Soils (C6) 1) (LRR A)	Dra Dry Sat Sha FAC Rai	4A, and 4B) inage Patterns (B10) -Season Water Table (C2) uration Visible on Aerial Imagery (Ci omorphic Position (D2) allow Aquitard (D3) C-Neutral Test (D5) sed Ant Mounds (D6) (LRR A)
Saturation Water Ma Sediment Drift Depo Algal Mat Iron Depo Surface S Inundation Sparsely	arks (B1) t Deposits (B2) osits (B3) or Crust (B4) osits (B5) Goil Cracks (B6) n Visible on Aerial I Vegetated Concave ations: r Present?	e Surface (Bi	Salt Crust Aquatic Inv Hydrogen Oxidized R Presence of Recent Iro Stunted or Other (Exp 3)  Depth (inc	(B11) vertebrate Sulfide Oc thizosphe of Reduce n Reducti Stressed plain in Re	s (B13) dor (C1) res along d Iron (C4 on in Tilled Plants (D marks)	Living Root I) d Soils (C6) 1) (LRR A)	Dra Dry Sat Sha FAC Rai	4A, and 4B) inage Patterns (B10) -Season Water Table (C2) uration Visible on Aerial Imagery (Ci omorphic Position (D2) allow Aquitard (D3) C-Neutral Test (D5) sed Ant Mounds (D6) (LRR A)
Saturation Water Ma Sediment Drift Depo Algal Mat Iron Depo Surface S Inundation Sparsely Surface Water	arks (B1) t Deposits (B2) posits (B3) t or Crust (B4) posits (B5) Goil Cracks (B6) In Visible on Aerial I Vegetated Concave ations: It Present? Y	e Surface (Ba 'es N 'es N	Salt Crust Aquatic Inv Hydrogen Oxidized R Presence c Recent Iro Stunted or Other (Exp 3) Depth (incomplete in the complete in the com	(B11) vertebrate Sulfide Oc khizosphe of Reduce in Reducti Stressed plain in Re ches): ches):	s (B13) dor (C1) res along d Iron (C4 on in Tilled Plants (D marks)	Living Root i) d Soils (C6) 1) (LRR A)	Dra Dry Sat s (C3) Sha FAC Rai Fro	AA, and 4B) inage Patterns (B10) -Season Water Table (C2) uration Visible on Aerial Imagery (C3 omorphic Position (D2) allow Aquitard (D3) C-Neutral Test (D5) sed Ant Mounds (D6) (LRR A) st-Heave Hummocks (D7)
Saturation Water Ma Sediment Drift Depo Algal Mat Iron Depo Surface S Inundation Sparsely Field Observa Surface Water Vater Table F	arks (B1) t Deposits (B2) posits (B3) or Crust (B4) posits (B5) Goil Cracks (B6) on Visible on Aerial I Vegetated Concave ations: or Present? Present? Y posent? Y	e Surface (Ba 'es N 'es N	Salt Crust Aquatic Inv Hydrogen Oxidized R Presence of Recent Iro Stunted or Other (Exp 3)  Depth (inc	(B11) vertebrate Sulfide Oc khizosphe of Reduce in Reducti Stressed plain in Re ches): ches):	s (B13) dor (C1) res along d Iron (C4 on in Tilled Plants (D marks)	Living Root i) d Soils (C6) 1) (LRR A)	Dra Dry Sat s (C3) Sha FAC Rai Fro	4A, and 4B) inage Patterns (B10) -Season Water Table (C2) uration Visible on Aerial Imagery (Ci omorphic Position (D2) allow Aquitard (D3) C-Neutral Test (D5) sed Ant Mounds (D6) (LRR A)
Saturation Water Ma Sediment Drift Depo Algal Mat Iron Depo Surface S Inundation Sparsely Field Observe Surface Water Water Table F Saturation Preincludes capi	arks (B1) t Deposits (B2) posits (B3) or Crust (B4) posits (B5) Goil Cracks (B6) on Visible on Aerial I Vegetated Concave ations: or Present? Present? Y posent? Y	e Surface (Bi 'es N 'es N	Salt Crust Aquatic Inv Hydrogen Oxidized R Presence of Recent Iro Stunted or Other (Exp 8)  Depth (inco	(B11) vertebrate Sulfide Ochizosphe of Reduce in Reducti Stressed plain in Re ches): ches): ches):	s (B13) dor (C1) res along d Iron (C4 on in Tilled Plants (D	Living Root  Soils (C6)  LICAN  LICAN  Wetla	Sat Dry Sat S (C3) Geo Sha FAC Rai Fro	AA, and 4B) inage Patterns (B10) -Season Water Table (C2) uration Visible on Aerial Imagery (C3 omorphic Position (D2) allow Aquitard (D3) C-Neutral Test (D5) sed Ant Mounds (D6) (LRR A) st-Heave Hummocks (D7)
Saturation Water Ma Sediment Drift Depo Algal Mat Iron Depo Surface S Inundation Sparsely Field Observe Surface Water Water Table F Saturation Preincludes capi	arks (B1) it Deposits (B2) osits (B3) it or Crust (B4) osits (B5) Goil Cracks (B6) in Visible on Aerial I Vegetated Concave ations: ir Present? Present? Y esent? Y illary fringe)	e Surface (Bi 'es N 'es N	Salt Crust Aquatic Inv Hydrogen Oxidized R Presence of Recent Iro Stunted or Other (Exp 8)  Depth (inco	(B11) vertebrate Sulfide Ochizosphe of Reduce in Reducti Stressed plain in Re ches): ches): ches):	s (B13) dor (C1) res along d Iron (C4 on in Tilled Plants (D	Living Root  Soils (C6)  LICAN  LICAN  Wetla	Sat Dry Sat S (C3) Geo Sha FAC Rai Fro	AA, and 4B) inage Patterns (B10) -Season Water Table (C2) uration Visible on Aerial Imagery (C3 omorphic Position (D2) allow Aquitard (D3) C-Neutral Test (D5) sed Ant Mounds (D6) (LRR A) st-Heave Hummocks (D7)
Saturation Water Ma Sediment Drift Depo Algal Mat Iron Depo Surface S Inundation Sparsely Field Observe Surface Water Water Table F Saturation Preincludes capi	arks (B1) it Deposits (B2) osits (B3) it or Crust (B4) osits (B5) Goil Cracks (B6) in Visible on Aerial I Vegetated Concave ations: ir Present? Present? Y esent? Y illary fringe)	e Surface (Bi 'es N 'es N	Salt Crust Aquatic Inv Hydrogen Oxidized R Presence of Recent Iro Stunted or Other (Exp 8)  Depth (inco	(B11) vertebrate Sulfide Ochizosphe of Reduce in Reducti Stressed plain in Re ches): ches): ches):	s (B13) dor (C1) res along d Iron (C4 on in Tilled Plants (D	Living Root  Soils (C6)  LICAN  LICAN  Wetla	Sat Dry Sat S (C3) Geo Sha FAC Rai Fro	AA, and 4B) inage Patterns (B10) -Season Water Table (C2) uration Visible on Aerial Imagery (C3 omorphic Position (D2) allow Aquitard (D3) C-Neutral Test (D5) sed Ant Mounds (D6) (LRR A) st-Heave Hummocks (D7)
Saturation Water Ma Sediment Drift Depo Algal Mat Iron Depo Surface S Inundation Sparsely Field Observation Vater Table F Saturation Preincludes capil	arks (B1) it Deposits (B2) osits (B3) it or Crust (B4) osits (B5) Goil Cracks (B6) in Visible on Aerial I Vegetated Concave ations: ir Present? Present? Y esent? Y illary fringe)	e Surface (Bi 'es N 'es N	Salt Crust Aquatic Inv Hydrogen Oxidized R Presence of Recent Iro Stunted or Other (Exp 8)  Depth (inco	(B11) vertebrate Sulfide Ochizosphe of Reduce in Reducti Stressed plain in Re ches): ches): ches):	s (B13) dor (C1) res along d Iron (C4 on in Tilled Plants (D	Living Root  Soils (C6)  LICAN  LICAN  Wetla	Sat Dry Sat S (C3) Geo Sha FAC Rai Fro	AA, and 4B) inage Patterns (B10) -Season Water Table (C2) uration Visible on Aerial Imagery (Comorphic Position (D2) fillow Aquitard (D3) C-Neutral Test (D5) sed Ant Mounds (D6) (LRR A) st-Heave Hummocks (D7)

#### WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: REDMISSA RESERVOID		City/County: LA	Plata COUNTY Sampling Date: 6/7/2016
Applicant/Owner: Kid MSSA MSS. COM, A	rhas		State: CO Sampling Point:
Investigator(s): MEHAN HAWN	- 1		nge:
Landform (hillslope, terrace, etc.): rcssvar botto	M	Legal relief (conserve	convex,(nonè)/Slope (%):
	1 ats 2	7°10'08"	Long: 108 °O8 3 / " Datum: NM PM
Subregion (LRR):	Lat. O	1000	Long: VIII PIV
Soil Map Unit Name: Vosbuse Fine 544  Are climatic / hydrologic conditions on the site typical for the	7 10	11/1/192	NWI classification: 1 67171
Are climatic / hydrologic conditions on the site typical for the	is time of yea	ar? Yes No _	(If no, explain in Remarks.)
Are Vegetation, Soil, or Hydrology	significantly	disturbed? Are '	"Normal Circumstances" present? Yes V No
Are Vegetation, Soil, or Hydrology	naturally pro	blematic? (If ne	eeded, explain any answers in Remarks.)
SUMMARY OF FINDINGS – Attach site map	showing	sampling point l	ocations, transects, important features, etc.
The second secon	No	1- 4/ 011	
	No	Is the Sampled within a Wetlar	
	No	within a wettar	III 165 NO
Remarks:			
			n 2
VEGETATION – Use scientific names of plan	nts.		
T <sub>a</sub> II	Absolute		Dominance Test worksheet:
<u>Tree Stratum</u> (Plot size:) 1		Species? Status	Number of Dominant Species That Are OBL, FACW, or FAC: (A)
2			Total Number of Dominant
3			Species Across All Strata: (B)
4		= Total Cover	Percent of Dominant Species That Are OBL, FACW, or FAC: (A/B)
Sapling/Shrub Stratum (Plot size:)			Prevalence Index worksheet:
1			Total % Cover of: Multiply by:
2			OBL species x 1 =
3			FACW species x 2 =
4		<del></del>	FAC species x 3 =
5		- Total Causer	FACU species x 4 =
Herb Stratum (Plot size:)	200	= Total Cover	UPL species x 5 =
1. Aporunum CANNALONNIM	90	V FAC	Column Totals: (A) (B)
2. CONVOIVUINI AIVENSIS	10		Prevalence Index = B/A =
3. AxENETY Absinhinm	10		Hydrophytic Vegetation Indicators:
4	469		1 - Rapid Test for Hydrophytic Vegetation
5		-	2 - Dominance Test is >50%
6		X	3 - Prevalence Index is ≤3.0 <sup>1</sup>
7 8			4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
9.			5 - Wetland Non-Vascular Plants <sup>1</sup>
10			Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
11			<sup>1</sup> Indicators of hydric soil and wetland hydrology must
<sup>2</sup>	117	= Total Cover	be present, unless disturbed or problematic.
Woody Vine Stratum (Plot size:)			
1			Hydrophytic
2			Vegetation   Present?   Yes No
% Bare Ground in Herb Stratum	W	= Total Cover	
Remarks:			1

Sampling Point:	6
-----------------	---

ype: C=Con		95	Color (moist) 5/8	5	Type <sup>1</sup>		Texture 5	Remarks
ype: C=Con ydric Soil Inc Histosol (A Histic Epip	centration, D=Depl							
rdric Soil Inc _ Histosol (A _ Histic Epip								
dric Soil Inc Histosol (A Histic Epip								
rdric Soil Inc _ Histosol (A _ Histic Epip								
<b>/dric Soil Inc</b> _ Histosol (A _ Histic Epip								
<b>/dric Soil Inc</b> _ Histosol (A _ Histic Epip								
y <b>dric Soil Inc</b> _ Histosol (A _ Histic Epip								
ydric Soil Ind _ Histosol (A _ Histic Epip								
ydric Soil Ind _ Histosol (A _ Histic Epip						, .		
ydric Soil Ind _ Histosol (A _ Histic Epip								
_ Histosol (A _ Histic Epip	dicators: (Applica		Reduced Matrix, CS			d Sand Grai		tion: PL=Pore Lining, M=Matrix.
_ Histic Epip	model (rippilo	able to all L	RRs, unless other	wise note	d.)			s for Problematic Hydric Soils <sup>3</sup> :
	•	_	_ Sandy Redox (S	-				Muck (A10)
Black Histi	• •		Stripped Matrix	. ,				Parent Material (TF2)
		_	Loamy Mucky M			MLRA 1)		Shallow Dark Surface (TF12)
	Sulfide (A4)	 (A14)	Loamy Gleyed N				Other	(Explain in Remarks)
	Below Dark Surface c Surface (A12)		Depleted Matrix Redox Dark Sur				3Indicators	s of hydrophytic vegetation and
	cky Mineral (S1)	_	Depleted Dark S		7)			d hydrology must be present,
_ •	yed Matrix (S4)	_	Redox Depress	-	′			disturbed or problematic.
	yer (if present):							······································
Туре:								
	es):						Hydric Soil P	Present? Yes / No
DROLOG	Y ology Indicators:							
	· -	ne required;	check all that apply	v)			Second	lary Indicators (2 or more required)
Surface W			Water-Stai		s (B9) (e)	xcept		ater-Stained Leaves (B9) (MLRA 1, 2,
_	r Table (A2)		<del></del>	1, 2, 4A, ar			<del></del>	4A, and 4B)
_ Saturation			Salt Crust		,			ainage Patterns (B10)
_ Water Mar	•		Aquatic Inv		(B13)			/-Season Water Table (C2)
	Deposits (B2)			Sulfide Odd				turation Visible on Aerial Imagery (C9)
_ _ Drift Depos	. ,		— , ,		. ,	Living Roots		omorphic Position (D2)
	or Crust (B4)			of Reduced				allow Aquitard (D3)
_ Iron Depos						d Soils (C6)		C-Neutral Test (D5)
Surface Sc	oil Cracks (B6)		Stunted or	Stressed F	Plants (D′	1) (LRR A)	Rai	ised Ant Mounds (D6) (LRR A)
 Inundation	Visible on Aerial I	magery (B7)	Other (Exp	lain in Ren	narks)		Fro	st-Heave Hummocks (D7)
Sparsely \	egetated Concave	Surface (B8	3)					
eld Observa	tions:							
urface Water	Present? You	es No	o Depth (in:	ches):		_		
later Table Pr	resent? Y	es No	Depth (inc	ches):		_		. )
aturation Pres	sent? Ye	es No	o V Depth (inc	ches):		 Wetlar	nd Hydrology	Present? Yes V No
	lary fringe)							
ncludes capill	rded Data (stream	gauge, mon	itoring well, aerial p	ohotos, pre	vious ins	pections), if	available:	
escribe Reco								
			501 170	d-1.				
escribe Reco			2011 ASIN	d-y				

#### WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: REAMSSA RESERVOID		City/County: LA	Plata COUNTY Sampling Date: 6/7/2018
Applicant/Owner: Kid MSSA MS. Com A	alls.	only occurs.	State: C.O Sampling Baint:
Investigator(s): MEHAN HAVN			•
		Section, Township, Ra	inge:
Landform (hillslope, terrace, etc.): 100 6 No. 100	102	Local relief (concave,	convex; none): Slope (%): Long:
	Lat: <u></u>	1-14 00	Long: -108 008 3 / " Datum: NMPM
Soil Map Unit Name: Vosburg Fine SAN	id vy lo	) A (In)	NWI classification: FEM h
Are climatic / hydrologic conditions on the site typical for thi	is time of ye		
Are Vegetation, Soil, or Hydrology	significantly	disturbed? Are	"Normal Circumstances" present? Yes No
Are Vegetation, Soil, or Hydrology			eeded, explain any answers in Remarks.)
SUMMARY OF FINDINGS - Attach site map	showing	sampling point l	ocations, transects, important features, etc.
Hydrophytic Vegetation Present? Yes N	lo ol		
Hydric Soil Present? Yes V	4o	Is the Sampled	d Area
·	4o	1	nd? Yes No
Remarks: FINGS WEHRAND, TI	compled	by wildlife	E, calle plane Hoy Gulch
VEGETATION Use scientific names of plar	nts.		
-	Absolute	Dominant Indicator	Dominance Test worksheet:
Tree Stratum (Plot size:)  1		Species? Status	Number of Dominant Species That Are OBL, FACW, or FAC:
2			Total Number of Dominant
3			Species Across All Strata: (B)
4		= Total Cover	Percent of Dominant Species That Are OBL, FACW, or FAC: (A/B)
Sapling/Shrub Stratum (Plot size:)			Prevalence Index worksheet:
1			Total % Cover of: Multiply by:
2. 3.			OBL species x 1 =
4			FACW species x 2 =
5.		<del></del>	FAC species x 3 =
0.	- · · · · · · · · · · · · · · · · · · ·		FACU species x 4 =
Herb Stratum (Plot size:)		1	UPL species x 5 =
1. Elsochoria Palystres		N OBL	Column Totals: (A) (B)
2. Pholoris Arkildincen	40	1 FACW	Prevalence Index = B/A =
3			Hydrophytic Vegetation Indicators:
4			1 - Rapid Test for Hydrophytic Vegetation
5		<u> </u>	2 - Dominance Test is >50%
6			3 - Prevalence Index is ≤3.0 <sup>1</sup>
7			4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
9.			5 - Wetland Non-Vascular Plants <sup>1</sup>
10			Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
11	<del></del>		¹Indicators of hydric soil and wetland hydrology must
	80	= Total Cover	be present, unless disturbed or problematic.
Woody Vine Stratum (Plot size:)		. 10(01 00001	
1			Hydrophytic 1
2			Vegetation
	<u> 20</u>	= Total Cover	Present? Yes _/ No
% Bare Ground in Herb Stratum 10 - 25			
Remarks:			·

Profile Description: (Describe to the de	epth needed to document the indicator or confirm	Sampling Point:/
Depth Matrix	Redox Features	the absence of mulcators.)
(inches) Color (moist) %	Color (moist) % Type <sup>1</sup> Loc <sup>2</sup>	Texture Remarks
10 16 Vn 8/1 90		
·		
		<del></del>
	<u> </u>	
	<del></del>	
	M=Reduced Matrix, CS=Covered or Coated Sand Gra	
lydric Soil Indicators: (Applicable to a		Indicators for Problematic Hydric Soils <sup>3</sup> :
Histosol (A1)	Sandy Redox (S5)	2 cm Muck (A10)
Histic Epipedon (A2)	Stripped Matrix (S6)	Red Parent Material (TF2)
Black Histic (A3) Hydrogen Sulfide (A4)	Loamy Mucky Mineral (F1) (except MLRA 1) Loamy Gleyed Matrix (F2)	Very Shallow Dark Surface (TF12) Other (Explain in Remarks)
Depleted Below Dark Surface (A11)	Depleted Matrix (F3)	Other (Explain in Nethalks)
Thick Dark Surface (A12)	Redox Dark Surface (F6)	<sup>3</sup> Indicators of hydrophytic vegetation and
Sandy Mucky Mineral (S1)	Depleted Dark Surface (F7)	wetland hydrology must be present,
Sandy Gleyed Matrix (S4)	Redox Depressions (F8)	unless disturbed or problematic.
Restrictive Layer (if present):		
Туре:	<u> </u>	. ,
Depth (inches):		Hydric Soil Present? Yes No
Remarks: Also Short		
Remarks: Als o Strong		
YDROLOGY		
YDROLOGY Wetland Hydrology Indicators:	(\$ dax rungs	Secondary Indicators (2 or more required
YDROLOGY Vetland Hydrology Indicators: Primary Indicators (minimum of one requi	(\$ dax rungs	
YDROLOGY Vetland Hydrology Indicators: Primary Indicators (minimum of one requi	(\$ 4 @X CWCS	Secondary Indicators (2 or more required
YDROLOGY Vetland Hydrology Indicators: Primary Indicators (minimum of one requi  Surface Water (A1)  High Water Table (A2)	( > 4 @ CW(S  red; check all that apply)  Water-Stained Leaves (B9) (except	Secondary Indicators (2 or more required  Water-Stained Leaves (B9) (MLRA
YDROLOGY Vetland Hydrology Indicators: Primary Indicators (minimum of one requi Surface Water (A1) High Water Table (A2) Saturation (A3)	red; check all that apply)  Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)	Secondary Indicators (2 or more required  Water-Stained Leaves (B9) (MLRA days)
YDROLOGY Vetland Hydrology Indicators: Primary Indicators (minimum of one requi Surface Water (A1) High Water Table (A2) Saturation (A3)	red; check all that apply)  Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)  Salt Crust (B11)  Aquatic Invertebrates (B13)  Hydrogen Sulfide Odor (C1)	Secondary Indicators (2 or more required  Water-Stained Leaves (B9) (MLRA  4A, and 4B)  Drainage Patterns (B10)  Dry-Season Water Table (C2)  Saturation Visible on Aerial Imagery
YDROLOGY  Wetland Hydrology Indicators:  Primary Indicators (minimum of one requi  Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)	red; check all that apply)  Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)  Salt Crust (B11)  Aquatic Invertebrates (B13)  Hydrogen Sulfide Odor (C1)  Oxidized Rhizospheres along Living Roo	Secondary Indicators (2 or more required  Water-Stained Leaves (B9) (MLRA  4A, and 4B)  Drainage Patterns (B10)  Dry-Season Water Table (C2)  Saturation Visible on Aerial Imagery
YDROLOGY  Wetland Hydrology Indicators:  Primary Indicators (minimum of one required Surface Water (A1)  — High Water Table (A2)  — Saturation (A3)  — Water Marks (B1)  — Sediment Deposits (B2)  — Drift Deposits (B3)	red; check all that apply)  Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)  Salt Crust (B11)  Aquatic Invertebrates (B13)  Hydrogen Sulfide Odor (C1)  Oxidized Rhizospheres along Living Roo  Presence of Reduced Iron (C4)	Secondary Indicators (2 or more required  Water-Stained Leaves (B9) (MLRA 4A, and 4B)  Drainage Patterns (B10)  Dry-Season Water Table (C2)  Saturation Visible on Aerial Imagery ts (C3)  Shallow Aquitard (D3)
YDROLOGY  Vetland Hydrology Indicators:  Primary Indicators (minimum of one requi  Surface Water (A1)  /High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)	red; check all that apply)  Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)  Salt Crust (B11)  Aquatic Invertebrates (B13)  Hydrogen Sulfide Odor (C1)  Oxidized Rhizospheres along Living Roo  Presence of Reduced Iron (C4)  Recent Iron Reduction in Tilled Soils (C6	Secondary Indicators (2 or more required  Water-Stained Leaves (B9) (MLRA 4A, and 4B)  Drainage Patterns (B10)  Dry-Season Water Table (C2)  Saturation Visible on Aerial Imagery  (C3) Geomorphic Position (D2)  Shallow Aquitard (D3)  FAC-Neutral Test (D5)
YDROLOGY  Vetland Hydrology Indicators:  Primary Indicators (minimum of one requi  Surface Water (A1)  /High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)  Surface Soil Cracks (B6)	red; check all that apply)  Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)  Salt Crust (B11)  Aquatic Invertebrates (B13)  Hydrogen Sulfide Odor (C1)  Oxidized Rhizospheres along Living Roo  Presence of Reduced Iron (C4)  Recent Iron Reduction in Tilled Soils (C6)  Stunted or Stressed Plants (D1) (LRR A)	Secondary Indicators (2 or more required  Water-Stained Leaves (B9) (MLRA 4A, and 4B)  Drainage Patterns (B10)  Dry-Season Water Table (C2)  Saturation Visible on Aerial Imagery  (C3) Geomorphic Position (D2)  Shallow Aquitard (D3)  FAC-Neutral Test (D5)  Raised Ant Mounds (D6) (LRR A)
YDROLOGY  Wetland Hydrology Indicators:  Primary Indicators (minimum of one requi  Surface Water (A1)  / High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)  Surface Soil Cracks (B6)  Inundation Visible on Aerial Imagery	red; check all that apply)  Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)  Salt Crust (B11)  Aquatic Invertebrates (B13)  Hydrogen Sulfide Odor (C1)  Oxidized Rhizospheres along Living Roo  Presence of Reduced Iron (C4)  Recent Iron Reduction in Tilled Soils (C6)  Stunted or Stressed Plants (D1) (LRR A)	Secondary Indicators (2 or more required  Water-Stained Leaves (B9) (MLRA 4A, and 4B)  Drainage Patterns (B10)  Dry-Season Water Table (C2)  Saturation Visible on Aerial Imagery  (C3) Geomorphic Position (D2)  Shallow Aquitard (D3)  FAC-Neutral Test (D5)
YDROLOGY  Wetland Hydrology Indicators:  Primary Indicators (minimum of one requi Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)  Surface Soil Cracks (B6)  Inundation Visible on Aerial Imagery  Sparsely Vegetated Concave Surface	red; check all that apply)  Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)  Salt Crust (B11)  Aquatic Invertebrates (B13)  Hydrogen Sulfide Odor (C1)  Oxidized Rhizospheres along Living Roo  Presence of Reduced Iron (C4)  Recent Iron Reduction in Tilled Soils (C6)  Stunted or Stressed Plants (D1) (LRR A)	Secondary Indicators (2 or more required  Water-Stained Leaves (B9) (MLRA 4A, and 4B)  Drainage Patterns (B10)  Dry-Season Water Table (C2)  Saturation Visible on Aerial Imagery  (C3) Geomorphic Position (D2)  Shallow Aquitard (D3)  FAC-Neutral Test (D5)  Raised Ant Mounds (D6) (LRR A)
YDROLOGY  Wetland Hydrology Indicators:  Primary Indicators (minimum of one required Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)  Surface Soil Cracks (B6)  Inundation Visible on Aerial Imagery Sparsely Vegetated Concave Surface Field Observations:	red; check all that apply)  Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)  Salt Crust (B11)  Aquatic Invertebrates (B13)  Hydrogen Sulfide Odor (C1)  Oxidized Rhizospheres along Living Roo  Presence of Reduced Iron (C4)  Recent Iron Reduction in Tilled Soils (C6  Stunted or Stressed Plants (D1) (LRR A)  (B7)  Other (Explain in Remarks)  e (B8)	Secondary Indicators (2 or more required  Water-Stained Leaves (B9) (MLRA 4A, and 4B)  Drainage Patterns (B10)  Dry-Season Water Table (C2)  Saturation Visible on Aerial Imagery  (C3) Geomorphic Position (D2)  Shallow Aquitard (D3)  FAC-Neutral Test (D5)  Raised Ant Mounds (D6) (LRR A)
Primary Indicators (minimum of one requirement)  Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)  Surface Soil Cracks (B6)  Inundation Visible on Aerial Imagery  Sparsely Vegetated Concave Surface  Field Observations:  Surface Water Present?  Yes	red; check all that apply)  Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)  Salt Crust (B11)  Aquatic Invertebrates (B13)  Hydrogen Sulfide Odor (C1)  Oxidized Rhizospheres along Living Roo  Presence of Reduced Iron (C4)  Recent Iron Reduction in Tilled Soils (C6)  Stunted or Stressed Plants (D1) (LRR A)  (B7)  Other (Explain in Remarks)  e (B8)	Secondary Indicators (2 or more required  Water-Stained Leaves (B9) (MLRA 4A, and 4B)  Drainage Patterns (B10)  Dry-Season Water Table (C2)  Saturation Visible on Aerial Imagery  (C3) Geomorphic Position (D2)  Shallow Aquitard (D3)  FAC-Neutral Test (D5)  Raised Ant Mounds (D6) (LRR A)
Primary Indicators (minimum of one requirement)  Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)  Surface Soil Cracks (B6)  Inundation Visible on Aerial Imagery  Sparsely Vegetated Concave Surface  Field Observations:  Surface Water Present?  Yes	red; check all that apply)  Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)  Salt Crust (B11)  Aquatic Invertebrates (B13)  Hydrogen Sulfide Odor (C1)  Oxidized Rhizospheres along Living Roo  Presence of Reduced Iron (C4)  Recent Iron Reduction in Tilled Soils (C6)  Stunted or Stressed Plants (D1) (LRR A)  Other (Explain in Remarks)  e (B8)  No Depth (inches):	Secondary Indicators (2 or more required  Water-Stained Leaves (B9) (MLRA 4A, and 4B)  Drainage Patterns (B10)  Dry-Season Water Table (C2)  Saturation Visible on Aerial Imagery  (C3)  Geomorphic Position (D2)  Shallow Aquitard (D3)  FAC-Neutral Test (D5)  Raised Ant Mounds (D6) (LRR A)  Frost-Heave Hummocks (D7)
Wetland Hydrology Indicators:  Primary Indicators (minimum of one required Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)  Surface Soil Cracks (B6)  Inundation Visible on Aerial Imagery of Sparsely Vegetated Concave Surface Field Observations:  Surface Water Present?  Water Table Present?  Yes  Saturation Present?	red; check all that apply)  Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)  Salt Crust (B11)  Aquatic Invertebrates (B13)  Hydrogen Sulfide Odor (C1)  Oxidized Rhizospheres along Living Roo  Presence of Reduced Iron (C4)  Recent Iron Reduction in Tilled Soils (C6)  Stunted or Stressed Plants (D1) (LRR A)  (B7)  Other (Explain in Remarks)  e (B8)  No  Depth (inches):  No  Depth (inches):	Secondary Indicators (2 or more required  Water-Stained Leaves (B9) (MLRA 4A, and 4B)  Drainage Patterns (B10)  Dry-Season Water Table (C2)  Saturation Visible on Aerial Imagery  (C3) Geomorphic Position (D2)  Shallow Aquitard (D3)  FAC-Neutral Test (D5)  Raised Ant Mounds (D6) (LRR A)
Primary Indicators (minimum of one requirement)  Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)  Surface Soil Cracks (B6)  Inundation Visible on Aerial Imagery  Sparsely Vegetated Concave Surface  Field Observations:  Surface Water Present?  Water Table Present?  Yes  Saturation Present?  Yes  (includes capillary fringe)	red; check all that apply)  Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)  Salt Crust (B11)  Aquatic Invertebrates (B13)  Hydrogen Sulfide Odor (C1)  Oxidized Rhizospheres along Living Roo  Presence of Reduced Iron (C4)  Recent Iron Reduction in Tilled Soils (C6  Stunted or Stressed Plants (D1) (LRR A)  (B7) Other (Explain in Remarks)  e (B8)  No Depth (inches):  No Depth (inches):  No Depth (inches):	Secondary Indicators (2 or more required  Water-Stained Leaves (B9) (MLRA 4A, and 4B)  Drainage Patterns (B10)  Dry-Season Water Table (C2)  Saturation Visible on Aerial Imagery  ts (C3)  Geomorphic Position (D2)  Shallow Aquitard (D3)  FAC-Neutral Test (D5)  Raised Ant Mounds (D6) (LRR A)  Frost-Heave Hummocks (D7)
Primary Indicators (minimum of one requirement)  Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)  Surface Soil Cracks (B6)  Inundation Visible on Aerial Imagery  Sparsely Vegetated Concave Surface  Field Observations:  Surface Water Present?  Water Table Present?  Yes  Saturation Present?  Yes  (includes capillary fringe)	red; check all that apply)  Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)  Salt Crust (B11)  Aquatic Invertebrates (B13)  Hydrogen Sulfide Odor (C1)  Oxidized Rhizospheres along Living Roo  Presence of Reduced Iron (C4)  Recent Iron Reduction in Tilled Soils (C6)  Stunted or Stressed Plants (D1) (LRR A)  Other (Explain in Remarks)  e (B8)  No Depth (inches):	Secondary Indicators (2 or more required  Water-Stained Leaves (B9) (MLRA 4A, and 4B)  Drainage Patterns (B10)  Dry-Season Water Table (C2)  Saturation Visible on Aerial Imagery  ts (C3)  Geomorphic Position (D2)  Shallow Aquitard (D3)  FAC-Neutral Test (D5)  Raised Ant Mounds (D6) (LRR A)  Frost-Heave Hummocks (D7)

#### WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: REAMESA RESERVOIS		Citv/Cor	untv: LA	Plata COUNTY Sampling Date: 6/7/2018
Applicant/Owner: Kid MSSA MSS. Con p	alls.	0.1.,7.00	unity:	State: CO Sampling Point: 0
Investigator(s): MEHAN HAVW	1			
	n wa	Section	, rownsnip, ка 	nge:
Landform (hillslope, terrace, etc.): _ ( きいい しゅい しゅい	1017	Local re	elief (concave人 ノス ダ ツ	convex(none): Slope (%): /
Subregion (LRR):	Lat: <u> </u>	/ * I V	00	Long: 108 08 31" Datum: NM PIV
Soil Map Unit Name: VOSbUG FINE SAN	10 m	JAIN		NWI classification: PEM h
Are climatic / hydrologic conditions on the site typical for th	is time of ye	ar? Yes	s No _	(If no, explain in Remarks.)
Are Vegetation, Soil, or Hydrology				'Normal Circumstances" present? Yes No
Are Vegetation, Soil, or Hydrology				eeded, explain any answers in Remarks.)
SUMMARY OF FINDINGS – Attach site map			•	• • •
Hydrophytic Vegetation Present? YesN	10			1
Hydric Soil Present? Yes N	10 <u>/</u>	I	s the Sampled	
Wetland Hydrology Present? Yes N	10	١   ١	within a Wetlar	nd? Yes No
Remarks:				
VEGETATION – Use scientific names of plar	nts.			
	Absolute		nant Indicator	Dominance Test worksheet:
Tree Stratum (Plot size:)			es? Status	Number of Dominant Species
1				That Are OBL, FACW, or FAC: (A)
2.				Total Number of Dominant
3				Species Across All Strata: (B)
4				Percent of Dominant Species
Sapling/Shrub Stratum (Plot size:)	-	_= Tota	l Cover	That Are OBL, FACW, or FAC: (A/B)
1				Prevalence Index worksheet:
2.				Total % Cover of: Multiply by:
3				OBL species x 1 =
4				FACW species x 2 =
5.				FAC species x 3 =
		= Tota	l Cover	FACU species x 4 =
Herb Stratum (Plot size:)	~ \bar{\bar{\bar{\bar{\bar{\bar{\bar{		**************************************	UPL species x 5 =
1. CONVOLVING SURVICE TO THE TOTAL PROPERTY OF THE PROPERTY OF	<u> </u>	<del></del>	FALM	Column Totals: (A) (B)
2. Attemesia absinition	_ <u> </u>		<u> </u>	Prevalence Index = B/A =
3				Hydrophytic Vegetation Indicators:
4				1 - Rapid Test for Hydrophytic Vegetation
5				2 - Dominance Test is >50%
6				3 - Prevalence Index is ≤3.0¹
7				4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
8				5 - Wetland Non-Vascular Plants <sup>1</sup>
9				Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
10				Indicators of hydric soil and wetland hydrology must
11	- 1	7.1.1		be present, unless disturbed or problematic.
Woody Vine Stratum (Plot size:)		_= Total ∕∵	Cover	
1	37/	15		Hydrophytic
2				1
		_= Total	Cover	Present? Yes No
% Bare Ground in Herb Stratum _ $\frac{\partial  \mathcal{C} \cdot  / \cdot}{\partial  \mathcal{C} \cdot  \mathcal{C} \cdot  \mathcal{C}}$				
Remarks:				

Sampling Point: <sup>S</sup>	Sampling	Point:	8	
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Profile Description: (Describe to the depth needed to document th  Depth Matrix Redox Feature		Zimini ule	andonioe of Bit		
inches) Color (moist) % Color (moist) %	Tγpe <sup>1</sup> L	_oc²T	exture	Remark	<s< th=""></s<>
(A)			( )		
-12 byn 3/2			<u> </u>		
16 (070 975				•	
			·····		
	<del></del>		<del></del>		= . =
Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Cove		and Grains.		: PL=Pore Lining	
ydric Soil Indicators: (Applicable to all LRRs, unless otherwise n	ioted.)		Indicators for	Problematic H	ydric Soils*:
Histosol (A1) Sandy Redox (S5)			2 cm Muc		
Histic Epipedon (A2) Stripped Matrix (S6)				nt Material (TF2)	
Black Histic (A3) Loamy Mucky Mineral		LRA 1)		low Dark Surface	
Hydrogen Sulfide (A4) Loamy Gleyed Matrix ( Depleted Below Dark Surface (A11) Depleted Matrix (F3)	(FZ)		Other (Ex	plain in Remarks	5)
Depleted Below Dark Surface (A11) Depleted Matrix (F3) Thick Dark Surface (A12) Redox Dark Surface (F	=6)		3Indicators of I	hydrophytic vege	itation and
Sandy Mucky Mineral (S1) Sepleted Dark Surface				drology must be	
Sandy Gleyed Matrix (S4)  — Redox Depressions (F-			-	urbed or problem	•
estrictive Layer (if present):					
Type:					./
Depth (inches):		H	dric Soil Pres	ent? Yes	No
		'''	, 4.1.5		
Remarks: NO SE DUX FER	25Lufi				
NO redux tien	25\nf				
NO SEDUX TEN	du/85				
NO SEDIM TER	du/8		Secondary	Indicators (2 or r	nore required)
NO パカロン できれ YDROLOGY Vetland Hydrology Indicators: Primary Indicators (minimum of one required; check all that apply)		ept		-	
NO SECULATION  YDROLOGY  Vetland Hydrology Indicators:  Vrimary Indicators (minimum of one required; check all that apply)  Surface Water (A1)  Water-Stained Le	eaves (B9) (exce	ept	Water-	Stained Leaves (	nore required) (B9) (MLRA 1, 2,
NO パカロン できれ /DROLOGY Vetland Hydrology Indicators: rimary Indicators (minimum of one required; check all that apply)	eaves (B9) (exce	ept	Water-	-	(B9) (MLRA 1, 2,
Vetland Hydrology Indicators:  rimary Indicators (minimum of one required; check all that apply)  Surface Water (A1)  High Water Table (A2)  MLRA 1, 2, 44	eaves (B9) (exce A, and 4B)	ept	Water- 4A, Drainag	Stained Leaves ( and 4B)	(B9) (MLRA 1, 2,
/DROLOGY /etland Hydrology Indicators: rimary Indicators (minimum of one required; check all that apply) Surface Water (A1) Water-Stained Le High Water Table (A2)	eaves (B9) (exco A, and 4B) ates (B13)	ept	Water- 4A, Drainad Dry-Se	Stained Leaves ( <b>and 4B)</b> ge Patterns (B10 ason Water Tabl	(B9) (MLRA 1, 2, ) e (C2)
/DROLOGY // Vetland Hydrology Indicators:  // Imary Indicators (minimum of one required; check all that apply)  Surface Water (A1) Water-Stained Le  High Water Table (A2) Saturation (A3) Salt Crust (B11)  Water Marks (B1) Aquatic Invertebra  Sediment Deposits (B2) Hydrogen Sulfide	eaves (B9) (exce A, and 4B) ates (B13) Odor (C1)		Water- 4A, Drainag Dry-Se Saturat	Stained Leaves ( <b>and 4B)</b> ge Patterns (B10 ason Water Tabl	(B9) (MLRA 1, 2, ) e (C2) erial Imagery (C9)
YDROLOGY  Vetland Hydrology Indicators:  rimary Indicators (minimum of one required; check all that apply)  Surface Water (A1)	eaves (B9) (exca A, and 4B) ates (B13) Odor (C1) oheres along Liv		Water	Stained Leaves ( and 4B) ge Patterns (B10 ason Water Tabl ilon Visible on Ae	(B9) (MLRA 1, 2, ) e (C2) erial Imagery (C9)
YDROLOGY  Vetland Hydrology Indicators:  Vimary Indicators (minimum of one required; check all that apply)  Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  NO FE CLEX  NICRA  Water All that apply)  Water Stained Le  MLRA 1, 2, 44  Aquatic Invertebra  Hydrogen Sulfide  Oxidized Rhizosp	eaves (B9) (exce A, and 4B) ates (B13) Odor (C1) oheres along Liv uced Iron (C4)	ing Roots (C	Water 4A, Drainag Dry-Se Satural 3) Geomo	Stained Leaves ( and 4B) ge Patterns (B10 ason Water Tabl ion Visible on Ae rphic Position (D3) v Aquitard (D3)	(B9) (MLRA 1, 2, ) e (C2) erial Imagery (C9)
YDROLOGY  Vetland Hydrology Indicators:  Vimary Indicators (minimum of one required; check all that apply)  Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  NO FE CLEX  NICRA  Water All that apply)  Water Stained Le  MLRA 1, 2, 44  Aquatic Invertebra  Hydrogen Sulfide  Oxidized Rhizosp	eaves (B9) (exce A, and 4B) ates (B13) Odor (C1) wheres along Liv uced Iron (C4) uction in Tilled S	ing Roots (C oils (C6)	Water 4A,     Drainag     Dry-Se     Saturat Gallov     Shallov     FAC-N	Stained Leaves ( and 4B) ge Patterns (B10 ason Water Tabl ion Visible on Ae orphic Position (E	(B9) (MLRA 1, 2, ) e (C2) erial Imagery (C9) (C2)
Vetland Hydrology Indicators:  Inimary Indicators (minimum of one required; check all that apply)  Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)  Wetland Hydrology Indicators:  Water All that apply)  Water Stained Le  MLRA 1, 2, 44  Salt Crust (B11)  Aquatic Invertebra  Hydrogen Sulfide  Oxidized Rhizosp  Presence of Redu	eaves (B9) (exce A, and 4B) ates (B13) Odor (C1) oheres along Liv uced Iron (C4) uction in Tilled S aed Plants (D1) (	ing Roots (C oils (C6)	Water 4A,     Drainag     Dry-Se     Saturat 3)    Geomo     Shallov     FAC-N-     Raised	Stained Leaves ( and 4B) ge Patterns (B10 ason Water Tabl ion Visible on Ae orphic Position (D v Aquitard (D3) eutral Test (D5)	(B9) (MLRA 1, 2, ) e (C2) erial Imagery (C9) (D2)
YDROLOGY  Vetland Hydrology Indicators:  Inimary Indicators (minimum of one required; check all that apply)  Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)  Surface Water (A1)  Presence of Reduction Reduction (B1)  Recent Iron Reduction (B2)  Stunted or Stress	eaves (B9) (exce A, and 4B) ates (B13) Odor (C1) oheres along Liv uced Iron (C4) uction in Tilled S aed Plants (D1) (	ing Roots (C oils (C6)	Water 4A,     Drainag     Dry-Se     Saturat 3)    Geomo     Shallov     FAC-N-     Raised	Stained Leaves ( and 4B) ge Patterns (B10 ason Water Tabl ilon Visible on Ae orphic Position (D v Aquitard (D3) eutral Test (D5) Ant Mounds (D6	(B9) (MLRA 1, 2, ) e (C2) erial Imagery (C9 ) ) (LRR A)
YDROLOGY  Vetland Hydrology Indicators:  Primary Indicators (minimum of one required; check all that apply)  Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)  Surface Soil Cracks (B6)  Surface Soil Cracks (B6)  Inundation Visible on Aerial Imagery (B7)  Other (Explain in Sparsely Vegetated Concave Surface (B8)	eaves (B9) (exce A, and 4B) ates (B13) Odor (C1) oheres along Liv uced Iron (C4) uction in Tilled S aed Plants (D1) (	ing Roots (C oils (C6)	Water 4A,     Drainag     Dry-Se     Saturat 3)    Geomo     Shallov     FAC-N-     Raised	Stained Leaves ( and 4B) ge Patterns (B10 ason Water Tabl ilon Visible on Ae orphic Position (D v Aquitard (D3) eutral Test (D5) Ant Mounds (D6	(B9) (MLRA 1, 2, ) e (C2) erial Imagery (C9) (D2)
YDROLOGY  Vetland Hydrology Indicators:  Primary Indicators (minimum of one required; check all that apply)  Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)  Surface Soil Cracks (B6)  Inundation Visible on Aerial Imagery (B7)  Sparsely Vegetated Concave Surface (B8)	eaves (B9) (exce A, and 4B) ates (B13) Odor (C1) wheres along Liv uced Iron (C4) uction in Tilled S eed Plants (D1) (Remarks)	ing Roots (C oils (C6)	Water 4A,     Drainag     Dry-Se     Saturat 3)    Geomo     Shallov     FAC-N-     Raised	Stained Leaves ( and 4B) ge Patterns (B10 ason Water Tabl ilon Visible on Ae orphic Position (D v Aquitard (D3) eutral Test (D5) Ant Mounds (D6	(B9) (MLRA 1, 2, ) e (C2) erial Imagery (C9) (D2)
YDROLOGY  Vetland Hydrology Indicators:  Primary Indicators (minimum of one required; check all that apply)  Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)  Surface Soil Cracks (B6)  Inundation Visible on Aerial Imagery (B7)  Surface Water Present?  Yes  No  Presence of Reduction (B2)  Other (Explain in Depoting (B3)  Depth (inches):	eaves (B9) (exce A, and 4B) ates (B13) Odor (C1) wheres along Liv uced Iron (C4) uction in Tilled S ed Plants (D1) ( Remarks)	ing Roots (C oils (C6)	Water 4A,     Drainag     Dry-Se     Saturat 3)    Geomo     Shallov     FAC-N-     Raised	Stained Leaves ( and 4B) ge Patterns (B10 ason Water Tabl ilon Visible on Ae orphic Position (D v Aquitard (D3) eutral Test (D5) Ant Mounds (D6	(B9) (MLRA 1, 2, ) e (C2) erial Imagery (C9) (D2)
YDROLOGY  Vetland Hydrology Indicators:  Primary Indicators (minimum of one required; check all that apply)  Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)  Surface Soil Cracks (B6)  Inundation Visible on Aerial Imagery (B7)  Sparsely Vegetated Concave Surface (B8)  Presence Of Redu  Control of Co	eaves (B9) (exce A, and 4B) ates (B13) Odor (C1) oheres along Liv uced Iron (C4) uction in Tilled S and Plants (D1) ( Remarks)	ing Roots (C oils (C6) (LRR A)	Water 4A,     Drainag     Dry-Se     Saturat 3)    Geomo     Shallov     FAC-N-     Raised	Stained Leaves ( and 4B) ge Patterns (B10 ason Water Tablion Visible on Acorphic Position (E) v Aquitard (D3) eutral Test (D5) Ant Mounds (D6) leave Hummock	(B9) (MLRA 1, 2, ) e (C2) erial Imagery (C9) (D2)
YDROLOGY  Vetland Hydrology Indicators:  Primary Indicators (minimum of one required; check all that apply)  Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)  Surface Soil Cracks (B6)  Inundation Visible on Aerial Imagery (B7)  Sparsely Vegetated Concave Surface (B8)  Vater Table Present?  Ves  No  Depth (inches):  Saturation Present?  Ves  No  Depth (inches):  Saturation Present?  Ves  No  Depth (inches):  Saturation Present?  Yes  Depth (inches):  Saturation Present?  Yes  No  No  No  No  No  No  No  No  No  N	eaves (B9) (exce A, and 4B) ates (B13) Odor (C1) oheres along Liv uced Iron (C4) uction in Tilled S ed Plants (D1) ( Remarks)	ing Roots (Cools (C6)	Water- 4A, Drainag Dry-Se Saturat Shallov FAC-N Raised Frost-F	Stained Leaves ( and 4B) ge Patterns (B10 ason Water Tablion Visible on Acorphic Position (E) v Aquitard (D3) eutral Test (D5) Ant Mounds (D6) leave Hummock	(B9) (MLRA 1, 2, ) e (C2) erial Imagery (C9) (C2) (C9) (C9) (C9) (C9) (C9) (C9) (C9)
YDROLOGY  Vetland Hydrology Indicators:  Primary Indicators (minimum of one required; check all that apply)  Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)  Surface Soil Cracks (B6)  Inundation Visible on Aerial Imagery (B7)  Sparsely Vegetated Concave Surface (B8)  Veter Table Present?  Ves No Depth (inches):  Saturation Present? Yes No Depth (inches):  Saturation Present? Yes No Depth (inches):	eaves (B9) (exce A, and 4B) ates (B13) Odor (C1) oheres along Liv uced Iron (C4) uction in Tilled S ed Plants (D1) ( Remarks)	ing Roots (Cools (C6)	Water- 4A, Drainag Dry-Se Saturat Shallov FAC-N Raised Frost-F	Stained Leaves ( and 4B) ge Patterns (B10 ason Water Tablion Visible on Acorphic Position (E) v Aquitard (D3) eutral Test (D5) Ant Mounds (D6) leave Hummock	(B9) (MLRA 1, 2, ) e (C2) erial Imagery (C9) (C2) (C9) (C9) (C9) (C9) (C9) (C9) (C9)
YDROLOGY  Vetland Hydrology Indicators:  Primary Indicators (minimum of one required; check all that apply)  Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)  Surface Soil Cracks (B6)  Inundation Visible on Aerial Imagery (B7)  Sparsely Vegetated Concave Surface (B8)  Field Observations:  Surface Water Present?  Water Table Present?  Yes  No  Depth (inches):  Depth (inches):  Describe Recorded Data (stream gauge, monitoring well, aerial photos,	eaves (B9) (exce A, and 4B) ates (B13) Odor (C1) oheres along Liv uced Iron (C4) uction in Tilled S ed Plants (D1) ( Remarks)	ing Roots (Cools (C6)	Water- 4A, Drainag Dry-Se Saturat Shallov FAC-N Raised Frost-F	Stained Leaves ( and 4B) ge Patterns (B10 ason Water Tablion Visible on Acorphic Position (E) v Aquitard (D3) eutral Test (D5) Ant Mounds (D6) leave Hummock	(B9) (MLRA 1, 2, ) e (C2) erial Imagery (C9) (C2) (C9) (C9) (C9) (C9) (C9) (C9) (C9)
YDROLOGY  Vetland Hydrology Indicators:  Primary Indicators (minimum of one required; check all that apply)  Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)  Surface Soil Cracks (B6)  Inundation Visible on Aerial Imagery (B7)  Sparsely Vegetated Concave Surface (B8)  Vater Table Present?  Ves  No  Depth (inches):  Saturation Present?  Ves  No  Depth (inches):  Saturation Present?  Ves  No  Depth (inches):  Saturation Present?  Yes  Depth (inches):  Saturation Present?  Yes  No  No  No  No  No  No  No  No  No  N	eaves (B9) (exce A, and 4B) ates (B13) Odor (C1) oheres along Liv uced Iron (C4) uction in Tilled S ed Plants (D1) ( Remarks)	ing Roots (Cools (C6)	Water- 4A, Drainag Dry-Se Saturat Shallov FAC-N Raised Frost-F	Stained Leaves ( and 4B) ge Patterns (B10 ason Water Tablion Visible on Acorphic Position (E) v Aquitard (D3) eutral Test (D5) Ant Mounds (D6) leave Hummock	(B9) (MLRA 1, 2, ) e (C2) erial Imagery (C9) (C2) (C) (LRR A) s (D7)
YDROLOGY  Vetland Hydrology Indicators:  Primary Indicators (minimum of one required; check all that apply)  Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)  Surface Soil Cracks (B6)  Inundation Visible on Aerial Imagery (B7)  Sparsely Vegetated Concave Surface (B8)  Field Observations:  Surface Water Present?  Water Table Present?  Yes  No  Depth (inches):  Depth (inches):  Describe Recorded Data (stream gauge, monitoring well, aerial photos,	eaves (B9) (exce A, and 4B) ates (B13) Odor (C1) oheres along Liv uced Iron (C4) uction in Tilled S ed Plants (D1) ( Remarks)	ing Roots (Cools (C6)	Water- 4A, Drainag Dry-Se Saturat Shallov FAC-N Raised Frost-F	Stained Leaves ( and 4B) ge Patterns (B10 ason Water Tablion Visible on Acorphic Position (E) v Aquitard (D3) eutral Test (D5) Ant Mounds (D6) leave Hummock	(B9) (MLRA 1, 2, ) e (C2) erial Imagery (C9) (C2) (C) (LRR A) s (D7)

## WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

			Plata COUNTY Sampling Date: 6/7/2018
Applicant/Owner: Kid MSSA KLS. COM	PANZ		State: CO Sampling Point: / W
Investigator(s): MEHAN HAVN			inge:
Landform (hillslope, terrace, etc.): FSE/VON bOH	Orn	Local relief (concave	convex (none): Slone (%):
Subregion (LRR):	Lat: Z	701008"	Long: -108 °08 3 1" Datum: NM PM
	NON TO	in the	NWI classification: PEM h
	1		/
Are climatic / hydrologic conditions on the site typical for t	,		
Are Vegetation, Soil, or Hydrology/	significantly	disturbed? Are	"Normal Circumstances" present? Yes No
Are Vegetation, Soil, or Hydrology	_ naturally pro	blematic? (If no	eeded, explain any answers in Remarks.)
		sampling point I	ocations, transects, important features, etc.
Hydrophytic Vegetation Present? Yes	No V	la the Cample	1 0 000
Hydric Soil Present?  Wetland Hydrology Present?  Yes  Yes	No1/	is the Sampled within a Wetlan	1 /
	No	Within a Wether	165
Remarks:			
VEGETATION – Use scientific names of pla	ınts.		
Tron Stratum (Diet size:	Absolute		Dominance Test worksheet:
Tree Stratum (Plot size:)		Species? Status	Number of Dominant Species That Are OBL, FACW, or FAC: (A)
1			That Are OBL, FACW, or FAC:(A)
2			Total Number of Dominant
4			Species Across All Strata: (B)
Sapling/Shrub Stratum (Plot size:)		= Total Cover	Percent of Dominant Species That Are OBL, FACW, or FAC: (A/B)
1			Prevalence Index worksheet:
2			Total % Cover of: Multiply by:
3			OBL species x 1 =
4.			FACW species x 2 =
5			FAC species x 3 =
		= Total Cover	FACU species x 4 =
Herb Stratum (Plot size:)			UPL species x 5 =
1. CONVOLVUINS BIVENSIX	<u> 10 </u>	- TACH	Column Totals: (A) (B)
2 MElilotus oppininalis	_ 70_	V u	Prevalence Index = B/A =
3	<del></del>		Hydrophytic Vegetation Indicators:
4			1 - Rapid Test for Hydrophytic Vegetation
5			2 - Dominance Test is >50%
6			3 - Prevalence Index is ≤3.0¹
7			4 - Morphological Adaptations <sup>1</sup> (Provide supporting
8,			data in Remarks or on a separate sheet)
9			5 Wetland Non-Vascular Plants <sup>1</sup>
10		-	Problematic Hydrophytic Vegetation¹ (Explain) ¹Indicators of hydric soil and wetland hydrology must
11	90	= Total Cover	be present, unless disturbed or problematic.
Woody Vine Stratum (Plot size:)	<u> </u>	= Total Cover	,
1.			Hudronhytia
2.			Hydrophytic Vegetation
		= Total Cover	Present? Yes No/
% Bare Ground in Herb Stratum 20	P1-to-		
Remarks:			

c	$\sim$	11	
a	v	ᄔ	

Sampling Point:

epth <u>Matrix</u>	Redox Features	_
nches) Color (moist) %	Color (moist) % Type <sup>1</sup> Loc <sup>2</sup>	
-10 LOVN 3/4 100		_ (obb 1 5)
,		
		2
	RM=Reduced Matrix, CS=Covered or Coated Sand	
ydric Soil Indicators: (Applicable to		Indicators for Problematic Hydric Soils <sup>3</sup> :
_ Histosol (A1)	Sandy Redox (S5)	2 cm Muck (A10)
_ Histic Epipedon (A2)	Stripped Matrix (S6)	Red Parent Material (TF2)  1) Very Shallow Dark Surface (TF12)
_ Black Histic (A3) _ Hydrogen Sulfide (A4)	<ul><li>Loamy Mucky Mineral (F1) (except MLRA</li><li>Loamy Gleyed Matrix (F2)</li></ul>	Other (Explain in Remarks)
_ Prydrogen Sunde (A4) _ Depleted Below Dark Surface (A11)		Other (Explain in Nemarks)
Depleted Below Dark Sunace (ATT)	Redox Dark Surface (F6)	<sup>3</sup> Indicators of hydrophytic vegetation and
Sandy Mucky Mineral (S1)	Depleted Dark Surface (F7)	wetland hydrology must be present,
Sandy Gleyed Matrix (S4)	Redox Depressions (F8)	unless disturbed or problematic.
estrictive Layer (if present):		
Туре:		
Depth (inches):		Hydric Soil Present? Yes No
emarks:		
/DROLOGY		
/DROLOGY /etland Hydrology Indicators:	irodi obook all that apply)	Secondary Indicators (2 or more required)
'DROLOGY fetland Hydrology Indicators: rimary Indicators (minimum of one requ		Secondary Indicators (2 or more required)
'DROLOGY fetland Hydrology Indicators: rimary Indicators (minimum of one requ Surface Water (A1)	Water-Stained Leaves (B9) (except	Water-Stained Leaves (B9) (MLRA 1, 2,
TDROLOGY  Tetland Hydrology Indicators: Timary Indicators (minimum of one requestrates Water (A1)  High Water Table (A2)	Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)	Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
DROLOGY etland Hydrology Indicators: imary Indicators (minimum of one requ Surface Water (A1) High Water Table (A2) Saturation (A3)	Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) Salt Crust (B11)	Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) Drainage Patterns (B10)
DROLOGY  etland Hydrology Indicators:  imary Indicators (minimum of one requ  Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)	<ul><li>Water-Stained Leaves (B9) (except</li><li>MLRA 1, 2, 4A, and 4B)</li><li>Salt Crust (B11)</li><li>Aquatic Invertebrates (B13)</li></ul>	<ul> <li>Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)</li> <li>Drainage Patterns (B10)</li> <li>Dry-Season Water Table (C2)</li> </ul>
TDROLOGY  etland Hydrology Indicators:  imary Indicators (minimum of one requestrate)  Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)	<ul> <li>Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)</li> <li>Salt Crust (B11)</li> <li>Aquatic Invertebrates (B13)</li> <li>Hydrogen Sulfide Odor (C1)</li> </ul>	<ul> <li>Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)</li> <li>Drainage Patterns (B10)</li> <li>Dry-Season Water Table (C2)</li> <li>Saturation Visible on Aerial Imagery (C9)</li> </ul>
TDROLOGY  Tetland Hydrology Indicators:  Timary Indicators (minimum of one requestrate)  Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)	<ul> <li>Water-Stained Leaves (B9) (except</li> <li>MLRA 1, 2, 4A, and 4B)</li> <li>Salt Crust (B11)</li> <li>Aquatic Invertebrates (B13)</li> <li>Hydrogen Sulfide Odor (C1)</li> <li>Oxidized Rhizospheres along Living F</li> </ul>	Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)  Drainage Patterns (B10)  Dry-Season Water Table (C2)  Saturation Visible on Aerial Imagery (C9 Geomorphic Position (D2)
TDROLOGY  Tetland Hydrology Indicators: Timary Indicators (minimum of one requestimated Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)	Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres along Living F Presence of Reduced Iron (C4)	Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) Drainage Patterns (B10) Dry-Season Water Table (C2) Saturation Visible on Aerial Imagery (C9) Geomorphic Position (D2) Shallow Aquitard (D3)
'DROLOGY  'etland Hydrology Indicators: rimary Indicators (minimum of one requ Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5)	Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)  Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres along Living F Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (	Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)  Drainage Patterns (B10)  Dry-Season Water Table (C2)  Saturation Visible on Aerial Imagery (C9)  Geomorphic Position (D2)  Shallow Aquitard (D3)  FAC-Neutral Test (D5)
TDROLOGY  Tetland Hydrology Indicators:  Timary Indicators (minimum of one requestions)  Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)  Surface Soil Cracks (B6)	Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres along Living F Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils ( Stunted or Stressed Plants (D1) (LRR	Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)  Drainage Patterns (B10)  Dry-Season Water Table (C2)  Saturation Visible on Aerial Imagery (C9)  Geomorphic Position (D2)  Shallow Aquitard (D3)  (C6)  FAC-Neutral Test (D5)  RA)  Raised Ant Mounds (D6) (LRR A)
Etland Hydrology Indicators: Imary Indicators (minimum of one requirement) Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Surface Soil Cracks (B6) Inundation Visible on Aerial Imagery	Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)  Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres along Living F Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils ( Stunted or Stressed Plants (D1) (LRF) (B7) Other (Explain in Remarks)	Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)  Drainage Patterns (B10)  Dry-Season Water Table (C2)  Saturation Visible on Aerial Imagery (C9)  Roots (C3)  Geomorphic Position (D2)  Shallow Aquitard (D3)  FAC-Neutral Test (D5)
etland Hydrology Indicators: imary Indicators (minimum of one requirement) Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Surface Soil Cracks (B6) Inundation Visible on Aerial Imagery Sparsely Vegetated Concave Surface	Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)  Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres along Living F Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils ( Stunted or Stressed Plants (D1) (LRF) (B7) Other (Explain in Remarks)	Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)  Drainage Patterns (B10)  Dry-Season Water Table (C2)  Saturation Visible on Aerial Imagery (C9)  Geomorphic Position (D2)  Shallow Aquitard (D3)  (C6)  FAC-Neutral Test (D5)  RA)  Raised Ant Mounds (D6) (LRR A)
POROLOGY  Vetland Hydrology Indicators:  Imary Indicators (minimum of one required in the policy of	Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)  Salt Crust (B11)  Aquatic Invertebrates (B13)  Hydrogen Sulfide Odor (C1)  Oxidized Rhizospheres along Living F  Presence of Reduced Iron (C4)  Recent Iron Reduction in Tilled Soils ( Stunted or Stressed Plants (D1) (LRR (B7))  Other (Explain in Remarks)  (B8)	Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)  Drainage Patterns (B10)  Dry-Season Water Table (C2)  Saturation Visible on Aerial Imagery (C9)  Geomorphic Position (D2)  Shallow Aquitard (D3)  (C6)  FAC-Neutral Test (D5)  RA)  Raised Ant Mounds (D6) (LRR A)
rimary Indicators (minimum of one requestions) Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Surface Soil Cracks (B6) Inundation Visible on Aerial Imagery Sparsely Vegetated Concave Surfactield Observations: urface Water Present? Yes	Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)  Salt Crust (B11)  Aquatic Invertebrates (B13)  Hydrogen Sulfide Odor (C1)  Oxidized Rhizospheres along Living F  Presence of Reduced Iron (C4)  Recent Iron Reduction in Tilled Soils ( Stunted or Stressed Plants (D1) (LRR  (B7)  Other (Explain in Remarks)  De (B8)	Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)  Drainage Patterns (B10)  Dry-Season Water Table (C2)  Saturation Visible on Aerial Imagery (C9)  Geomorphic Position (D2)  Shallow Aquitard (D3)  (C6)  FAC-Neutral Test (D5)  RA)  Raised Ant Mounds (D6) (LRR A)
/DROLOGY /etland Hydrology Indicators: rimary Indicators (minimum of one requestriance Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Surface Soil Cracks (B6) Inundation Visible on Aerial Imagery Sparsely Vegetated Concave Surfactive Indicated Concave Indicated	Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)  Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres along Living F Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils ( Stunted or Stressed Plants (D1) (LRF (B7) Other (Explain in Remarks)  No U Depth (inches): No Depth (inches):	Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)  Drainage Patterns (B10)  Dry-Season Water Table (C2)  Saturation Visible on Aerial Imagery (C9)  Geomorphic Position (D2)  Shallow Aquitard (D3)  (C6)  FAC-Neutral Test (D5)  RA)  Raised Ant Mounds (D6) (LRR A)  Frost-Heave Hummocks (D7)
/DROLOGY /etland Hydrology Indicators: rimary Indicators (minimum of one requestriance Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Aerial Imagery Sparsely Vegetated Concave Surfaction (A) Interpretations: Fourface Water Present? Ves Surface Water Present? Ves Surface Table Present? Ves Surface Surface Surface (Ves Surface Water Present?	Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)  Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres along Living F Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils ( Stunted or Stressed Plants (D1) (LRF (B7) Other (Explain in Remarks)  (B8)  No U Depth (inches): Depth (inches):	Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)  Drainage Patterns (B10)  Dry-Season Water Table (C2)  Saturation Visible on Aerial Imagery (C9)  Geomorphic Position (D2)  Shallow Aquitard (D3)  (C6)  FAC-Neutral Test (D5)  RA)  Raised Ant Mounds (D6) (LRR A)
/ Interpretation of the present?  // Setland Hydrology Indicators:  // Primary Indicators (minimum of one requestion)	Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)  Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres along Living F Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils ( Stunted or Stressed Plants (D1) (LRF (B7) Other (Explain in Remarks)  No U Depth (inches): No Depth (inches): W	Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) Drainage Patterns (B10) Dry-Season Water Table (C2) Saturation Visible on Aerial Imagery (C9 Roots (C3) Geomorphic Position (D2) Shallow Aquitard (D3) (C6) FAC-Neutral Test (D5) R A) Raised Ant Mounds (D6) (LRR A) Frost-Heave Hummocks (D7)  Vetland Hydrology Present? Yes No
/DROLOGY /etland Hydrology Indicators: rimary Indicators (minimum of one requestriance Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Surface Soil Cracks (B6) Inundation Visible on Aerial Imagery Sparsely Vegetated Concave Surfactive Indicated Water Present? Vater Table Present? Ves Includes capillary fringe)	Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)  Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres along Living F Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils ( Stunted or Stressed Plants (D1) (LRF (B7) Other (Explain in Remarks)  No U Depth (inches): No Depth (inches):	Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) Drainage Patterns (B10) Dry-Season Water Table (C2) Saturation Visible on Aerial Imagery (C9 Roots (C3) Geomorphic Position (D2) Shallow Aquitard (D3) (C6) FAC-Neutral Test (D5) R A) Raised Ant Mounds (D6) (LRR A) Frost-Heave Hummocks (D7)  Vetland Hydrology Present? Yes No
/ Interpretation of the present?  // Setland Hydrology Indicators:  // Primary Indicators (minimum of one requestion)	Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)  Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres along Living F Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils ( Stunted or Stressed Plants (D1) (LRF (B7) Other (Explain in Remarks)  (B8)  No U Depth (inches): No Depth (inches): W , monitoring well, aerial photos, previous inspection	Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) Drainage Patterns (B10) Dry-Season Water Table (C2) Saturation Visible on Aerial Imagery (C9 Roots (C3) Geomorphic Position (D2) Shallow Aquitard (D3) FAC-Neutral Test (D5) R A) Raised Ant Mounds (D6) (LRR A) Frost-Heave Hummocks (D7)  //etland Hydrology Present? Yes No
/ Interpretation of the process of t	Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)  Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres along Living F Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils ( Stunted or Stressed Plants (D1) (LRF (B7) Other (Explain in Remarks)  No U Depth (inches): No Depth (inches): W	Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) Drainage Patterns (B10) Dry-Season Water Table (C2) Saturation Visible on Aerial Imagery (C9) Roots (C3) Geomorphic Position (D2) Shallow Aquitard (D3) FAC-Neutral Test (D5) R A) Raised Ant Mounds (D6) (LRR A) Frost-Heave Hummocks (D7)  //etland Hydrology Present? Yes No

## WETLAND DETERMINATION DATA FORM -- Western Mountains, Valleys, and Coast Region

Project/Site: REAMSSA RESERVOID	City/0	County: LA	Plata COUNTY Sampling Date: 6/7/2018
Applicant/Owner: KID MSSA MS. COMP			State: CO Sampling Point: 10
Investigator(s): MEHAN / HANN	f		
			nge:
Landform (hillslope, terrace, etc.): /{S\$(Var both)} Subregion (LRR):	Loca	al relief (concave, o	convex;(none): Slope (%): _1
Subregion (LRR):	Lat: <u></u>	<u>, 00</u>	Long: 108 00 01 Datum: NN PJV
Soil Map Unit Name: VOSburg Fine SAN	10 A 10 A 1	83.	NWI classification: 1 6/1 /N
Soil Map Unit Name: VOS bus Fine SAN  Are climatic / hydrologic conditions on the site typical for thi	is time of year? `	Yes No _	(If no, explain in Remarks.)
Are Vegetation, Soil, or Hydrology s	significantly distu	rbed? Are "	Normal Circumstances" present? Yes No
Are Vegetation, Soil, or Hydrology r	naturally problem	atic? (If ne	eded, explain any answers in Remarks.)
SUMMARY OF FINDINGS – Attach site map	showing sar	npling point le	ocations, transects, important features, etc.
Hydrophytic Vegetation Present? Yes N	10/_		,
Hydric Soil Present?  Wetland Hydrology Present?  Yes N	10 <u>V</u>	Is the Sampled	Area
Wetland Hydrology Present? Yes N	10	within a wettan	nd? Yes No No
Remarks: 5CM	wed om.	notton II.	WOODE IN DESO
	*		,,
VEGETATION – Use scientific names of plan	nts.		
		minant Indicator	Dominance Test worksheet:
Tree Stratum (Plot size:)		ecies? Status	Number of Dominant Species
1			That Are OBL, FACW, or FAC: (A)
2			Total Number of Dominant
3			Species Across All Strata: (B)
4		ntal Cover	Percent of Dominant Species
Sapling/Shrub Stratum (Plot size:)		otal Govel	That Are OBL, FACW, or FAC: (A/B)  Prevalence Index worksheet:
1			Total % Cover of: Multiply by:
2			OBL species x1=
3			FACW species x 2 =
4			FAC species x 3 =
5			FACU species x 4 =
Herb Stratum (Plot size:)	= To	otal Cover	UPL species x 5 =
1. EMphorbin Egula	30	V	Column Totals: (A) (B)
2 CONVOLVALUE ACUENSUS	30	V =	Prevalence Index = B/A =
3. pipular deltorder	10		Hydrophytic Vegetation Indicators:
4			1 - Rapid Test for Hydrophytic Vegetation
5			2 - Dominance Test is >50%
6			3 - Prevalence Index is ≤3.0¹
7			4 - Morphological Adaptations¹ (Provide supporting
8			data in Remarks or on a separate sheet)
9			5 - Welland Non-Vascular Plants <sup>†</sup>
10			Problematic Hydrophytic Vegetation¹ (Explain) ¹Indicators of hydric soil and wetland hydrology must
11,	= To		be present, unless disturbed or problematic.
Woody Vine Stratum (Plot size:)	<u>/                                   </u>		
1			Hydrophytic
2			Vegetation //
% Bare Ground in Herb Stratum	= To	tal Cover	Present? Yes No
76 Bare Orbana in Freib Ottakant			
Remarks:			

S	O	۱	L

	10
Sampling Point:	1 / /

Depth <u>Matrix</u>	Redox Features	_	
inches) Color (moist) %	Color (moist) % Type <sup>1</sup> Loc <sup>2</sup>	Texture	Remarks
-12 5/2 4/4 100		23	
	- ————————————————————————————————————		
<del></del>			
	M=Reduced Matrix, CS=Covered or Coated Sand		on: PL=Pore Lining, M=Matrix.
lydric Soil Indicators: (Applicable to a	all LRRs, unless otherwise noted.)	Indicators	for Problematic Hydric Soils <sup>3</sup> :
Histosol (A1)	Sandy Redox (S5)	2 cm M	luck (A10)
_ Histic Epipedon (A2)	Stripped Matrix (S6)	Red Pa	rent Material (TF2)
Black Histic (A3)	Loamy Mucky Mineral (F1) (except MLRA	1) Very Si	hallow Dark Surface (TF12)
Hydrogen Sulfide (A4)	Loamy Gleyed Matrix (F2)	Other (	Explain in Remarks)
_ Depleted Below Dark Surface (A11)	Depleted Matrix (F3)		
Thick Dark Surface (A12)	Redox Dark Surface (F6)		of hydrophytic vegetation and
Sandy Mucky Mineral (S1)	Depleted Dark Surface (F7)	wetland	hydrology must be present,
Sandy Gleyed Matrix (S4)	Redox Depressions (F8)	unless d	isturbed or problematic.
lestrictive Layer (if present):			
Туре:			
Depth (inches):		Hydric Soil Pr	esent? Yes No
Remarks:	Soil redder b	1313	
YDROLOGY	Soil redder b	1818	
YDROLOGY Vetland Hydrology Indicators:			ry Indicators (2 or more required)
YDROLOGY Vetland Hydrology Indicators: Primary Indicators (minimum of one requi	ired; check all that apply)	Seconda	ry Indicators (2 or more required)
YDROLOGY Vetland Hydrology Indicators: Primary Indicators (minimum of one requi Surface Water (A1)	ired; check all that apply) Water-Stained Leaves (B9) (except	Seconda Wate	er-Stained Leaves (B9) (MLRA 1, 2
YDROLOGY Vetland Hydrology Indicators: Primary Indicators (minimum of one requi Surface Water (A1) High Water Table (A2)	ired; check all that apply) Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)	Seconda Wate	er-Stained Leaves (B9) (MLRA 1, 2 A, and 4B)
YDROLOGY Vetland Hydrology Indicators: Vimary Indicators (minimum of one requi Surface Water (A1) High Water Table (A2) Saturation (A3)	ired; check all that apply) Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) Salt Crust (B11)	Seconda Wate 4 Drai	er-Stained Leaves (B9) (MLRA 1, 2 A, and 4B) nage Patterns (B10)
YDROLOGY Vetland Hydrology Indicators: Primary Indicators (minimum of one requi Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1)	ired; check all that apply)  Water-Stained Leaves (B9) (except  MLRA 1, 2, 4A, and 4B)  Salt Crust (B11)  Aquatic Invertebrates (B13)	Seconda Wate Drai Dry-	er-Stained Leaves (B9) (MLRA 1, 2 A, and 4B) nage Patterns (B10) Season Water Table (C2)
YDROLOGY  Vetland Hydrology Indicators:  Primary Indicators (minimum of one requi  Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)	ired; check all that apply)  Water-Stained Leaves (B9) (except  MLRA 1, 2, 4A, and 4B)  Salt Crust (B11)  Aquatic Invertebrates (B13)  Hydrogen Sulfide Odor (C1)	Seconda Wate 4 Drai Dry Satu	er-Stained Leaves (B9) (MLRA 1, 2 A, and 4B) nage Patterns (B10) Season Water Table (C2) tration Visible on Aerial Imagery (C
YDROLOGY  Vetland Hydrology Indicators:  Primary Indicators (minimum of one requi  Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)	ired; check all that apply)  Water-Stained Leaves (B9) (except	Seconda Wate 4 Drai Dry Satu	er-Stained Leaves (B9) (MLRA 1, 2 A, and 4B) nage Patterns (B10) Season Water Table (C2) Iration Visible on Aerial Imagery (C morphic Position (D2)
YDROLOGY  Vetland Hydrology Indicators:  Primary Indicators (minimum of one requi  Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)	ired; check all that apply)  Water-Stained Leaves (B9) (except	Seconda	er-Stained Leaves (B9) (MLRA 1, 2 A, and 4B) nage Patterns (B10) Season Water Table (C2) tration Visible on Aerial Imagery (C morphic Position (D2)
YDROLOGY  Vetland Hydrology Indicators:  Primary Indicators (minimum of one requi  Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)	ired; check all that apply)  Water-Stained Leaves (B9) (except	Seconda	er-Stained Leaves (B9) (MLRA 1, 2 A, and 4B) nage Patterns (B10) Season Water Table (C2) tration Visible on Aerial Imagery (C morphic Position (D2) llow Aquitard (D3) -Neutral Test (D5)
YDROLOGY  Vetland Hydrology Indicators:  Primary Indicators (minimum of one requi  Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)  Surface Soil Cracks (B6)	ired; check all that apply)  Water-Stained Leaves (B9) (except	Seconda	er-Stained Leaves (B9) (MLRA 1, 2 A, and 4B) nage Patterns (B10) Season Water Table (C2) tration Visible on Aerial Imagery (C morphic Position (D2)
YDROLOGY Vetland Hydrology Indicators: Vrimary Indicators (minimum of one requi  Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)  Surface Soil Cracks (B6)	ired; check all that apply)  Water-Stained Leaves (B9) (except	Seconda Wate A Drai Dry Satu toots (C3) Geo Shal C6) FAC	er-Stained Leaves (B9) (MLRA 1, 2 A, and 4B) nage Patterns (B10) Season Water Table (C2) tration Visible on Aerial Imagery (C morphic Position (D2) llow Aquitard (D3) -Neutral Test (D5)
YDROLOGY Vetland Hydrology Indicators: Vrimary Indicators (minimum of one requi  Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)  Surface Soil Cracks (B6)	ired; check all that apply)  Water-Stained Leaves (B9) (except	Seconda Wate Drai Dry Satu toots (C3) Geo Shal C6) FAC	er-Stained Leaves (B9) (MLRA 1, 2 A, and 4B) nage Patterns (B10) Season Water Table (C2) tration Visible on Aerial Imagery (C morphic Position (D2) Ilow Aquitard (D3) -Neutral Test (D5) ted Ant Mounds (D6) (LRR A)
YDROLOGY Vetland Hydrology Indicators: Primary Indicators (minimum of one requi Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Surface Soil Cracks (B6) Inundation Visible on Aerial Imagery Sparsely Vegetated Concave Surface	ired; check all that apply)  Water-Stained Leaves (B9) (except	Seconda Wate Drai Dry Satu toots (C3) Geo Shal C6) FAC	er-Stained Leaves (B9) (MLRA 1, 2 A, and 4B) nage Patterns (B10) Season Water Table (C2) tration Visible on Aerial Imagery (C morphic Position (D2) Ilow Aquitard (D3) -Neutral Test (D5) ted Ant Mounds (D6) (LRR A)
YDROLOGY Vetland Hydrology Indicators: Primary Indicators (minimum of one requi Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Surface Soil Cracks (B6) Inundation Visible on Aerial Imagery Sparsely Vegetated Concave Surface Sield Observations:	ired; check all that apply)  — Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)  — Salt Crust (B11)  — Aquatic Invertebrates (B13)  — Hydrogen Sulfide Odor (C1)  — Oxidized Rhizospheres along Living R  — Presence of Reduced Iron (C4)  — Recent Iron Reduction in Tilled Soils ( — Stunted or Stressed Plants (D1) (LRR (B7) — Other (Explain in Remarks)  e (B8)	Seconda Wate Drai Dry Satu toots (C3) Geo Shal C6) FAC	er-Stained Leaves (B9) (MLRA 1, 2 A, and 4B) nage Patterns (B10) Season Water Table (C2) tration Visible on Aerial Imagery (C morphic Position (D2) Ilow Aquitard (D3) -Neutral Test (D5) ted Ant Mounds (D6) (LRR A)
YDROLOGY  Vetland Hydrology Indicators:  Primary Indicators (minimum of one requi  Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)  Surface Soil Cracks (B6)  Inundation Visible on Aerial Imagery  Sparsely Vegetated Concave Surface  Surface Water Present?  Yes	ired; check all that apply)  — Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)  — Salt Crust (B11) — Aquatic Invertebrates (B13) — Hydrogen Sulfide Odor (C1) — Oxidized Rhizospheres along Living R — Presence of Reduced Iron (C4) — Recent Iron Reduction in Tilled Soils ( — Stunted or Stressed Plants (D1) (LRR (B7) — Other (Explain in Remarks) e (B8)  No Depth (inches):	Seconda Wate Drai Dry Satu toots (C3) Geo Shal C6) FAC	er-Stained Leaves (B9) (MLRA 1, 2 A, and 4B) nage Patterns (B10) Season Water Table (C2) tration Visible on Aerial Imagery (C morphic Position (D2) Ilow Aquitard (D3) -Neutral Test (D5) ted Ant Mounds (D6) (LRR A)
YDROLOGY  Vetland Hydrology Indicators:  Primary Indicators (minimum of one requi  Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)  Surface Soil Cracks (B6)  Inundation Visible on Aerial Imagery  Sparsely Vegetated Concave Surface  Surface Water Present?  Yes	ired; check all that apply)  — Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)  — Salt Crust (B11) — Aquatic Invertebrates (B13) — Hydrogen Sulfide Odor (C1) — Oxidized Rhizospheres along Living R — Presence of Reduced Iron (C4) — Recent Iron Reduction in Tilled Soils ( — Stunted or Stressed Plants (D1) (LRR (B7) — Other (Explain in Remarks) e (B8)  No Depth (inches):	Seconda	er-Stained Leaves (B9) (MLRA 1, 2 A, and 4B) nage Patterns (B10) Season Water Table (C2) tration Visible on Aerial Imagery (C morphic Position (D2) Ilow Aquitard (D3) -Neutral Test (D5) ted Ant Mounds (D6) (LRR A) tt-Heave Hummocks (D7)
YDROLOGY Vetland Hydrology Indicators: Primary Indicators (minimum of one requi Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Surface Soil Cracks (B6) Inundation Visible on Aerial Imagery Sparsely Vegetated Concave Surface Field Observations: Surface Water Present? Ves Water Table Present? Yes Saturation Present? Yes	ired: check all that apply)  — Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)  — Salt Crust (B11)  — Aquatic Invertebrates (B13)  — Hydrogen Sulfide Odor (C1)  — Oxidized Rhizospheres along Living R — Presence of Reduced Iron (C4)  — Recent Iron Reduction in Tilled Soils ( — Stunted or Stressed Plants (D1) (LRR Other (Explain in Remarks)  e (B8)  No V Depth (inches):	Seconda	er-Stained Leaves (B9) (MLRA 1, 2 A, and 4B) nage Patterns (B10) Season Water Table (C2) tration Visible on Aerial Imagery (C morphic Position (D2) Ilow Aquitard (D3) -Neutral Test (D5) ted Ant Mounds (D6) (LRR A)
VDROLOGY Vetland Hydrology Indicators: Vimary Indicators (minimum of one requi  Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)  Surface Soil Cracks (B6)  Inundation Visible on Aerial Imagery  Sparsely Vegetated Concave Surface (B4)  Surface Water Present?  Ves  Saturation Present?  Yes  Saturation Present?  Yes  Saturation Present?  Yes  Saturation Present?  Yes  Sincludes capillary fringe)	ired; check all that apply)  — Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)  — Salt Crust (B11) — Aquatic Invertebrates (B13) — Hydrogen Sulfide Odor (C1) — Oxidized Rhizospheres along Living R — Presence of Reduced Iron (C4) — Recent Iron Reduction in Tilled Soils ( — Stunted or Stressed Plants (D1) (LRR (B7) — Other (Explain in Remarks) e (B8)  No Depth (inches):	Seconda   Wate   4   Drai   Dry-   Satu   Geo   Shai   C6)	er-Stained Leaves (B9) (MLRA 1, 2 A, and 4B) nage Patterns (B10) Season Water Table (C2) tration Visible on Aerial Imagery (C morphic Position (D2) Ilow Aquitard (D3) -Neutral Test (D5) ted Ant Mounds (D6) (LRR A) tt-Heave Hummocks (D7)
YDROLOGY  Vetland Hydrology Indicators:  Primary Indicators (minimum of one requing a surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)  Surface Soil Cracks (B6)  Inundation Visible on Aerial Imagery  Sparsely Vegetated Concave Surface Field Observations: Surface Water Present? Yes  Saturation Present? Yes  Saturation Present? Yes  includes capillary fringe)  Describe Recorded Data (stream gauge,	ired; check all that apply)  Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)  Salt Crust (B11)  Aquatic Invertebrates (B13)  Hydrogen Sulfide Odor (C1)  Oxidized Rhizospheres along Living R  Presence of Reduced Iron (C4)  Recent Iron Reduction in Tilled Soils ( Stunted or Stressed Plants (D1) (LRR (B7) Other (Explain in Remarks)  e (B8)  No Depth (inches): Water Model of the provious inspections are included in the provious in the provious inspections are included in the provious inc	Seconda	er-Stained Leaves (B9) (MLRA 1, 2 A, and 4B) nage Patterns (B10) Season Water Table (C2) Iration Visible on Aerial Imagery (Comorphic Position (D2) Illow Aquitard (D3) I-Neutral Test (D5) Ired Ant Mounds (D6) (LRR A) It-Heave Hummocks (D7)  Present? Yes No
YDROLOGY Vetland Hydrology Indicators: Primary Indicators (minimum of one requi  Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Surface Soil Cracks (B6) Inundation Visible on Aerial Imagery Sparsely Vegetated Concave Surface Vield Observations: Surface Water Present? Ves Saturation Present? Yes	ired; check all that apply)  Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)  Salt Crust (B11)  Aquatic Invertebrates (B13)  Hydrogen Sulfide Odor (C1)  Oxidized Rhizospheres along Living R  Presence of Reduced Iron (C4)  Recent Iron Reduction in Tilled Soils ( Stunted or Stressed Plants (D1) (LRR (B7) Other (Explain in Remarks)  e (B8)  No Depth (inches): Water Model of the provious inspections are included in the provious in the provious inspections are included in the provious inc	Seconda	er-Stained Leaves (B9) (MLRA 1, 2 A, and 4B) nage Patterns (B10) Season Water Table (C2) Iration Visible on Aerial Imagery (C morphic Position (D2) Illow Aquitard (D3) I-Neutral Test (D5) Ired Ant Mounds (D6) (LRR A) It-Heave Hummocks (D7)
YDROLOGY  Vetland Hydrology Indicators:  Primary Indicators (minimum of one requing a surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)  Surface Soil Cracks (B6)  Inundation Visible on Aerial Imagery  Sparsely Vegetated Concave Surface Field Observations: Surface Water Present? Yes  Saturation Present? Yes  Saturation Present? Yes  includes capillary fringe)  Describe Recorded Data (stream gauge,	ired; check all that apply)  — Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)  — Salt Crust (B11)  — Aquatic Invertebrates (B13)  — Hydrogen Sulfide Odor (C1)  — Oxidized Rhizospheres along Living R — Presence of Reduced Iron (C4)  — Recent Iron Reduction in Tilled Soils ( — Stunted or Stressed Plants (D1) (LRR (B7))  — Other (Explain in Remarks)  e (B8)  — No Depth (inches):  No Depth (inches):  No Depth (inches):  No Depth (inches):	Seconda	er-Stained Leaves (B9) (MLRA 1, 2 A, and 4B) nage Patterns (B10) Season Water Table (C2) Iration Visible on Aerial Imagery (C morphic Position (D2) Illow Aquitard (D3) I-Neutral Test (D5) Ired Ant Mounds (D6) (LRR A) It-Heave Hummocks (D7)
/DROLOGY /etland Hydrology Indicators: rimary Indicators (minimum of one requi _ Surface Water (A1) _ High Water Table (A2) _ Saturation (A3) _ Water Marks (B1) _ Sediment Deposits (B2) _ Drift Deposits (B3) _ Algal Mat or Crust (B4) _ Iron Deposits (B5) _ Surface Soil Cracks (B6) _ Inundation Visible on Aerial Imagery _ Sparsely Vegetated Concave Surface iteld Observations: surface Water Present? Yes vater Table Present? Yes saturation Present? Yes includes capillary fringe) Describe Recorded Data (stream gauge,	ired; check all that apply)  Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)  Salt Crust (B11)  Aquatic Invertebrates (B13)  Hydrogen Sulfide Odor (C1)  Oxidized Rhizospheres along Living R  Presence of Reduced Iron (C4)  Recent Iron Reduction in Tilled Soils ( Stunted or Stressed Plants (D1) (LRR (B7) Other (Explain in Remarks)  e (B8)  No Depth (inches): Water Model of the provious inspections are included in the provious in the provious inspections are included in the provious inc	Seconda	er-Stained Leaves (B9) (MLRA 1, 2 A, and 4B) nage Patterns (B10) Season Water Table (C2) Iration Visible on Aerial Imagery (C morphic Position (D2) Illow Aquitard (D3) I-Neutral Test (D5) Ired Ant Mounds (D6) (LRR A) It-Heave Hummocks (D7)

## WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: RELAMSSA RESERVOID	(	Sity/County: 1	LA 1	Plata COWHY Sampling Date: 6/7/26/2
Applicant/Owner: KID MSSA KS. COM.				
Investigator(s): MEHAN HAVN				nge:
Landform (hillslope, terrace, etc.):	1	l ocal relief (co	oncave c	convex none): Slone (%):
Subregion (LRR):	Lat: 27	10,08	1/	Long: -108 08 31" Datum: WMPM
	NON 10	a fin		NWI classification: PEM h
Are climatic / hydrologic conditions on the site typical for t	7			
Are Vegetation, Soil, or Hydrology	,			1 /
				Normal Circumstances" present? Yes No
Are Vegetation, Soil, or Hydrology				eded, explain any answers in Remarks.)
		sampling p	point lo	ocations, transects, important features, etc.
1/	No	Is the S	Sampled	Area
	No	1	a Wetlan	V
Remarks:	110			
VEGETATION – Use scientific names of pla	ints.			
		Dominant Inc		Dominance Test worksheet:
Tree Stratum (Plot size:)  1		Species? S	Status_	Number of Dominant Species That Are OBL, FACW, or FAC:  (A)
2. 3.			:	Total Number of Dominant Species Across All Strata:(B)
4		= Total Cover		Percent of Dominant Species That Are OBL, FACW, or FAC: (A/B)
Sapling/Shrub Stratum (Plot size:)				Prevalence Index worksheet:
1				Total % Cover of: Multiply by:
2				OBL species x 1 =
3				FACW species x 2 =
4.       5.				FAC species x 3 =
<u> </u>		= Total Cover		FACU species x 4 =
Herb Stratum (Plot size:)	11 10			UPL species x 5 =
1. (ONUIVAINS ANGUENE	<u> 4.5</u>	E	NC4	Column Totals: (A) (B)
			<u>"</u>	Prevalence Index = B/A =
3. Suphorbia Esula			194	Hydrophytic Vegetation Indicators:
4.				1 - Rapid Test for Hydrophytic Vegetation
5.       6.				2 - Dominance Test is >50% 3 - Prevalence Index is ≤3.0¹
7				3 - Prevalence index is ≤3.0 4 - Morphological Adaptations¹ (Provide supporting
8.				data in Remarks or on a separate sheet)
9.				5 - Wetland Non-Vascular Plants <sup>1</sup>
10				Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
11				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
Manda See Olastana (Dialatan		= Total Cover		be present, unless disturbed of problematic.
Woody Vine Stratum (Plot size:)	50/2	ال		
1 2				Hydrophytic Vegetation
· · · · · · · · · · · · · · · · · · ·			·	Present? Yes No No
% Bare Ground in Herb Stratum				
Remarks:				

	- [ '	١
Sampling Point:		١ .

Depth <u>Matrix</u>		x Features			_		
inches) Color (moist) %	Color (moist)		Type <sup>1</sup>	Loc <sup>2</sup>	<u>Texture</u>	R	emarks
10 YN3/3/2 95	5 m 5/8	_5_	<u>C</u>	$\mathcal{M}$			
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	***************************************	•				<del>-</del>	
		- —					
						_	
					. 2		
Type: C=Concentration, D=Depletion, RM				ed Sand Gra		Location: PL=Pore ators for Problema	
lydric Soil Indicators: (Applicable to all			2 <b>u.</b> )				alic nyunc sons :
Histosol (A1)	Sandy Redox (					cm Muck (A10)	/TEO)
Histic Epipedon (A2) Black Histic (A3)	Stripped Matrix Loamy Mucky I		() (avean	+ BAI (DA 41)		ted Parent Material 'ery Shallow Dark S	
Hydrogen Sulfide (A4)				CHILINA I)		ony Shahow Bark C Other (Explain in Re	
Depleted Below Dark Surface (A11)	Loamy Gleyed		,		— `	and texponerin in	
Thick Dark Surface (A12)	Redox Dark St.				<sup>3</sup> Indic	ators of hydrophytic	vegetation and
Sandy Mucky Mineral (S1)	Depleted Dark		7)			tland hydrology mu	
Sandy Gleyed Matrix (S4)	Redox Depress	sions (F8)			ur	less disturbed or pr	oblematic.
testrictive Layer (if present):							
Type:							1/
Depth (inches):					Hydric S	oil Present? Yes	sNo
Remarks:	-1 ( x	١		•			
	VOLIDA	o <b>\</b> €)					
	0.100	018)					
	Λ 23. 1Ωβ	ores					
		<u>~~~</u>					
YDROLOGY	· · · · · · · · · · · · · · · · · · ·						
Vetland Hydrology Indicators:	-						
Vetland Hydrology Indicators: Primary Indicators (minimum of one require	-					•	(2 or more required)
Vetland Hydrology Indicators:	d; check all that app		es (B9) (c	ехсері		•	(2 or more required) aves (B9) (MLRA 1, 2,
Vetland Hydrology Indicators: Primary Indicators (minimum of one require Surface Water (A1)	d; check all that app	ly)		except		•	
Vetland Hydrology Indicators: rimary Indicators (minimum of one require Surface Water (A1)	d; check all that app Water-Sta MLRA	ly) ained Leave 1, 2, 4A, a t (B11)	ınd 4B)	except		Water-Stained Le 4A, and 4B) Drainage Patterns	aves (B9) (MLRA 1, 2,
Vetland Hydrology Indicators:  Primary Indicators (minimum of one require  Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)	ed; check all that app Water-Sta MLRA Salt Crust	ly) nined Leave 1, 2, 4A, a t (B11) nvertebrate	m <b>d 4B)</b> s (B13)	except		Water-Stained Le 4A, and 4B) Drainage Patterns Dry-Season Wate	aves (B9) (MLRA 1, 2, s (B10) r Table (C2)
Vetland Hydrology Indicators:  Primary Indicators (minimum of one require  Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)	d; check all that app Water-Sta MLRA	ly) nined Leave 1, 2, 4A, a t (B11) nvertebrate	m <b>d 4B)</b> s (B13)	except		Water-Stained Le 4A, and 4B) Drainage Patterns Dry-Season Wate Saturation Visible	aves (B9) (MLRA 1, 2, s (B10) r Table (C2) on Aerial Imagery (C9
Vetland Hydrology Indicators:  Primary Indicators (minimum of one require  Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)	od; check all that app — Water-Sta MLRA — Salt Crust — Aquatic Ir — Hydrogen	ly) ained Leave 1, 2, 4A, a t (B11) avertebrate Sulfide Oc	nd 4B) s (B13) dor (C1)	except Living Roo		Water-Stained Le 4A, and 4B) Drainage Patterns Dry-Season Wate	aves (B9) (MLRA 1, 2, s (B10) r Table (C2) on Aerial Imagery (C9
Vetland Hydrology Indicators:  Primary Indicators (minimum of one require Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2)	d; check all that app  Water-Sta  MLRA  Salt Crust  Aquatic Ir  Hydrogen	ly) ained Leave 1, 2, 4A, a t (B11) avertebrate Sulfide Oc	and 4B) s (B13) dor (C1) res along	Living Roo	ts (C3)	Water-Stained Le 4A, and 4B) Drainage Patterns Dry-Season Wate Saturation Visible	aves (B9) (MLRA 1, 2, s (B10) r Table (C2) on Aerial Imagery (C9 tion (D2)
Vetland Hydrology Indicators:  Primary Indicators (minimum of one require  Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)	ed; check all that app Water-Sta MLRA Salt Crust Aquatic Ir Hydrogen Oxidized Presence	ly) ained Leave 1, 2, 4A, a t (B11) avertebrate Sulfide Oc Rhizospher of Reduce	s (B13) dor (C1) res along d Iron (C	Living Roo	ts (C3)	Water-Stained Le  4A, and 4B) Drainage Patterns Dry-Season Wate Saturation Visible Geomorphic Posit	aves (B9) (MLRA 1, 2, s (B10) r Table (C2) on Aerial Imagery (C9 (ion (D2)
Vetland Hydrology Indicators:  Primary Indicators (minimum of one require Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Surface Soil Cracks (B6)	d; check all that app  Water-Sta  MLRA  Salt Crust  Aquatic Ir  Hydrogen  Oxidized  Presence  Recent Ire  Stunted o	ly) nined Leave 1, 2, 4A, a t (B11) nvertebrate Sulfide Oc Rhizosphei of Reduce on Reduction	s (B13) dor (C1) res along d Iron (C- on in Tille	Living Roo 4)	ts (C3)	Water-Stained Le 4A, and 4B) Drainage Patterns Dry-Season Wate Saturation Visible Geomorphic Posit Shallow Aquitard	aves (B9) (MLRA 1, 2, s (B10) r Table (C2) on Aerial Imagery (C9 (ion (D2) (D3) (D5)
Vetland Hydrology Indicators:  Primary Indicators (minimum of one require  Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift Deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)  Surface Soil Cracks (B6)  Inundation Visible on Aerial Imagery (B	ed; check all that app  Water-Sta  MLRA  Salt Crust  Aquatic Ir  Hydrogen  Oxidized to  Presence  Recent Iro  Stunted o	ly) nined Leave 1, 2, 4A, a t (B11) nvertebrate Sulfide Oc Rhizospher of Reduce	s (B13) dor (C1) res along d Iron (C- on in Tille	Living Roo 4) d Soils (C6	ts (C3)	Water-Stained Le 4A, and 4B) Drainage Patterns Dry-Season Wate Saturation Visible Geomorphic Posit Shallow Aquitard FAC-Neutral Test	aves (B9) (MLRA 1, 2, s (B10) r Table (C2) on Aerial Imagery (C9 (D3) (D3) (D5) ds (D6) (LRR A)
Vetland Hydrology Indicators:  Primary Indicators (minimum of one require Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Surface Soil Cracks (B6) Inundation Visible on Aerial Imagery (B	ed; check all that app  Water-Sta  MLRA  Salt Crust  Aquatic Ir  Hydrogen  Oxidized to  Presence  Recent Iro  Stunted o	ly) nined Leave 1, 2, 4A, a t (B11) nvertebrate Sulfide Oc Rhizosphei of Reduce on Reduction	s (B13) dor (C1) res along d Iron (C- on in Tille	Living Roo 4) d Soils (C6	ts (C3)	Water-Stained Le 4A, and 4B) Drainage Patterns Dry-Season Wate Saturation Visible Geomorphic Posit Shallow Aquitard FAC-Neutral Test Raised Ant Mount	aves (B9) (MLRA 1, 2, s (B10) r Table (C2) on Aerial Imagery (C9 (D3) (D3) (D5) ds (D6) (LRR A)
Vetland Hydrology Indicators:  Primary Indicators (minimum of one require Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Surface Soil Cracks (B6) Inundation Visible on Aerial Imagery (B Sparsely Vegetated Concave Surface (Billed Observations:	ed; check all that app  Water-Sta  MLRA  Salt Crust  Aquatic Ir  Hydrogen  Oxidized  Presence  Recent Ire  Stunted o  Other (Ex	ly) nined Leave 1, 2, 4A, a t (B11) nvertebrate Sulfide Oc Rhizosphei of Reduce on Reduction	s (B13) dor (C1) res along d Iron (C- on in Tille	Living Roo 4) d Soils (C6	ts (C3)	Water-Stained Le 4A, and 4B) Drainage Patterns Dry-Season Wate Saturation Visible Geomorphic Posit Shallow Aquitard FAC-Neutral Test Raised Ant Mount	aves (B9) (MLRA 1, 2, s (B10) r Table (C2) on Aerial Imagery (C9 (D3) (D3) (D5) ds (D6) (LRR A)
Vetland Hydrology Indicators:  Primary Indicators (minimum of one require Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Surface Soil Cracks (B6) Inundation Visible on Aerial Imagery (B Sparsely Vegetated Concave Surface of the Concave Surface (B1) Field Observations: Surface Water Present? Yes	d; check all that app  Water-Sta  MLRA  Salt Crust  Aquatic Ir  Hydrogen  Oxidized  Presence  Recent Ira  Stunted o  37)  Other (Ex	ly) nined Leave 1, 2, 4A, a t (B11) nvertebrate Sulfide Oc Rhizosphei of Reduce on Reduction	s (B13) s (B13) dor (C1) res along d Iron (C on in Tille Plants (C marks)	Living Roo 4) ed Soils (C6 01) (LRR A)	ts (C3)	Water-Stained Le 4A, and 4B) Drainage Patterns Dry-Season Wate Saturation Visible Geomorphic Posit Shallow Aquitard FAC-Neutral Test Raised Ant Mount	aves (B9) (MLRA 1, 2, s (B10) r Table (C2) on Aerial Imagery (C9 (D3) (D3) (D5) ds (D6) (LRR A)
Vetland Hydrology Indicators:  Primary Indicators (minimum of one require Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Surface Soil Cracks (B6) Inundation Visible on Aerial Imagery (B Sparsely Vegetated Concave Surface (Billed Observations:	d; check all that app  Water-Sta  MLRA  Salt Crust  Aquatic Ir  Hydrogen  Oxidized  Presence  Recent Ira  Stunted o  Other (Ex	ly) ained Leave 1, 2, 4A, a t (B11) avertebrate Sulfide Oc Rhizospher of Reduce on Reduction Tessed splain in Re	s (B13) dor (C1) res along d Iron (C on in Tille Plants (C marks)	Living Roo 4) d Soils (C6 01) (LRR A)	ts (C3)	Water-Stained Le 4A, and 4B) Drainage Patterns Dry-Season Wate Saturation Visible Geomorphic Posit Shallow Aquitard FAC-Neutral Test Raised Ant Mount	aves (B9) (MLRA 1, 2, s (B10) r Table (C2) on Aerial Imagery (C9 (D3) (D3) (D5) ds (D6) (LRR A)
Vetland Hydrology Indicators:  Primary Indicators (minimum of one require Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Surface Soil Cracks (B6) Inundation Visible on Aerial Imagery (B Sparsely Vegetated Concave Surface (B1) Field Observations: Surface Water Present? Ves Mater Table Present? Ves Saturation Present? Ves Saturation Present? Ves	ed; check all that app  Water-Sta  MLRA  Salt Crust  Aquatic Ir  Hydrogen  Oxidized to  Presence  Recent Ir  Stunted o  Other (Ex  (B8)	ly) nined Leave 1, 2, 4A, a t (B11) nvertebrate Sulfide Oc Rhizosphei of Reduce on Reduction stressed plain in Re	s (B13) dor (C1) res along d Iron (C on in Tille Plants (C marks)	Living Roo 4) d Soils (C6 01) (LRR A)	ts (C3)	Water-Stained Le 4A, and 4B) Drainage Patterns Dry-Season Wate Saturation Visible Geomorphic Posit Shallow Aquitard FAC-Neutral Test Raised Ant Mount	aves (B9) (MLRA 1, 2, 5 (B10) r Table (C2) on Aerial Imagery (C9 (D3) (D5) ds (D6) (LRR A) emocks (D7)
Vetland Hydrology Indicators:  Primary Indicators (minimum of one require Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Surface Soil Cracks (B6) Inundation Visible on Aerial Imagery (B Sparsely Vegetated Concave Surface of the Concave Surface (B5) Surface Water Present? Ves Saturation Present? Ves	d; check all that app  Water-Sta MLRA Salt Crust Aquatic Ir Hydrogen Oxidized Presence Recent Ir Stunted o Other (Ex (B8)  No Depth (ir	ly) nined Leave 1, 2, 4A, a t (B11) nvertebrate Sulfide Oc Rhizospher of Reduce or Reduction r Stressed uplain in Re nches): nches):	s (B13) dor (C1) res along d Iron (C on in Tille Plants (C marks)	Living Roo 4) d Soils (C6 01) (LRR A)	its (C3) )	Water-Stained Le  4A, and 4B) Drainage Patterns Dry-Season Wate Saturation Visible Geomorphic Posil Shallow Aquitard FAC-Neutral Test Raised Ant Mount Frost-Heave Hum	aves (B9) (MLRA 1, 2, 5 (B10) r Table (C2) on Aerial Imagery (C9 (D3) (D5) ds (D6) (LRR A) emocks (D7)
Vetland Hydrology Indicators:  Primary Indicators (minimum of one require Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Surface Soil Cracks (B6) Inundation Visible on Aerial Imagery (B Sparsely Vegetated Concave Surface (B1) Field Observations: Surface Water Present? Ves Mater Table Present? Ves Saturation Present? Ves Saturation Present? Ves	d; check all that app  Water-Sta MLRA Salt Crust Aquatic Ir Hydrogen Oxidized Presence Recent Ir Stunted o Other (Ex (B8)  No Depth (ir	ly) nined Leave 1, 2, 4A, a t (B11) nvertebrate Sulfide Oc Rhizospher of Reduce or Reduction r Stressed uplain in Re nches): nches):	s (B13) dor (C1) res along d Iron (C on in Tille Plants (C marks)	Living Roo 4) d Soils (C6 01) (LRR A)	its (C3) )	Water-Stained Le  4A, and 4B) Drainage Patterns Dry-Season Wate Saturation Visible Geomorphic Posil Shallow Aquitard FAC-Neutral Test Raised Ant Mount Frost-Heave Hum	aves (B9) (MLRA 1, 2, 5 (B10) r Table (C2) on Aerial Imagery (C9 (D3) (D5) ds (D6) (LRR A) emocks (D7)
Vetland Hydrology Indicators:  Primary Indicators (minimum of one require Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Surface Soil Cracks (B6) Inundation Visible on Aerial Imagery (B Sparsely Vegetated Concave Surface of Sield Observations: Surface Water Present? Ves Vater Table Present? Ves Includes capillary fringe) Describe Recorded Data (stream gauge, m	d; check all that app  Water-Sta MLRA Salt Crust Aquatic Ir Hydrogen Oxidized Presence Recent Ir Stunted o Other (Ex (B8)  No Depth (ir	ly) nined Leave 1, 2, 4A, a t (B11) nvertebrate Sulfide Oc Rhizospher of Reduce or Reduction r Stressed uplain in Re nches): nches):	s (B13) dor (C1) res along d Iron (C on in Tille Plants (C marks)	Living Roo 4) d Soils (C6 01) (LRR A)	its (C3) )	Water-Stained Le  4A, and 4B) Drainage Patterns Dry-Season Wate Saturation Visible Geomorphic Posil Shallow Aquitard FAC-Neutral Test Raised Ant Mount Frost-Heave Hum	aves (B9) (MLRA 1, 2, 5 (B10) r Table (C2) on Aerial Imagery (C9 (D3) (D5) ds (D6) (LRR A) emocks (D7)
Vetland Hydrology Indicators:  Primary Indicators (minimum of one require Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Surface Soil Cracks (B6) Inundation Visible on Aerial Imagery (B Sparsely Vegetated Concave Surface of the Concave Surface (B5) Surface Water Present? Ves Saturation Present? Ves	d; check all that app  Water-Sta  MLRA  Salt Crust  Aquatic Ir  Hydrogen  Oxidized I  Presence  Recent Ir  Stunted o  Other (Ex  (B8)  No  Depth (ir  No  Depth (ir  No Depth (ir  No Depth (ir  No Depth (ir  No Depth (ir  No Depth (ir  Depth (	ly) nined Leave 1, 2, 4A, a t (B11) nvertebrate Sulfide Oc Rhizosphet of Reduce on Reduction r Stressed plain in Re nches):	s (B13) s (B13) dor (C1) res along d Iron (C on in Tille Plants (E marks)	Living Roo 4) d Soils (C6 01) (LRR A)	its (C3) )	Water-Stained Le  4A, and 4B) Drainage Patterns Dry-Season Wate Saturation Visible Geomorphic Posil Shallow Aquitard FAC-Neutral Test Raised Ant Mount Frost-Heave Hum	aves (B9) (MLRA 1, 2, 5 (B10) r Table (C2) on Aerial Imagery (C9 (D3) (D5) ds (D6) (LRR A) emocks (D7)
Vetland Hydrology Indicators:  Primary Indicators (minimum of one require Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Surface Soil Cracks (B6) Inundation Visible on Aerial Imagery (B Sparsely Vegetated Concave Surface of Sield Observations: Surface Water Present? Vater Table Present? Vater Table Present? Ves Saturation Present? Ves Saturation Present? Ves Sincludes capillary fringe) Describe Recorded Data (stream gauge, m	d; check all that app  Water-Sta  MLRA  Salt Crust  Aquatic Ir  Hydrogen  Oxidized I  Presence  Recent Ir  Stunted o  Other (Ex  (B8)  No  Depth (ir  No  Depth (ir  No Depth (ir  No Depth (ir  No Depth (ir  No Depth (ir  No Depth (ir  Depth (	ly) nined Leave 1, 2, 4A, a t (B11) nvertebrate Sulfide Oc Rhizospher of Reduce or Reduction r Stressed uplain in Re nches): nches):	s (B13) s (B13) dor (C1) res along d Iron (C on in Tille Plants (E marks)	Living Roo 4) d Soils (C6 01) (LRR A)	its (C3) )	Water-Stained Le  4A, and 4B) Drainage Patterns Dry-Season Wate Saturation Visible Geomorphic Posil Shallow Aquitard FAC-Neutral Test Raised Ant Mount Frost-Heave Hum	aves (B9) (MLRA 1, 2, 5 (B10) r Table (C2) on Aerial Imagery (C9 (D3) (D5) ds (D6) (LRR A) emocks (D7)

## WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: REAMISSA RESERVOID		City/Co	ounty: LA	Plata county s	ampling Date:	2018
Applicant/Owner: Kid MSSA Res. Com	- YUAS			State: CO S	ampling Point:	
Investigator(s): MEHAN HANN		Section	n, Township, Ra	nge:		
Landform (hillslope, terrace, etc.): TESEIVOIT GOTH	2'"	Local	relier (concave,	convex, none):	Slope (%):	2
Subregion (LRR):	Lat: <u>3</u>	7014	08"	Long: -108 °08 °	} / <sup>1</sup> /′ Datum: <u> </u>	Man
Soil Map Unit Name: Voshurg Fine SAM	102 10	) n m		NWI classificati	on: PEM h	•
Are climatic / hydrologic conditions on the site typical for the	is time of ve	ar? Ye	es No <sup>1</sup>	(If no explain in Rem	narke )	
Are Vegetation, Soil, or Hydrology				"Normal Circumstances" pre		
Are Vegetation, Soil, or Hydrology						,
SUMMARY OF FINDINGS – Attach site map				eeded, explain any answers ocations. transects. i	•	s. etc.
Hydrophytic Vegetation Present? Yes	1					,
Hydric Soil Present? Yes	No		Is the Sampled	l Area	. )	
Wetland Hydrology Present?	No		within a Wetlar	nd? Yes	_ No <u>-//</u>	
Remarks:						
VEGETATION – Use scientific names of plan	nts					
	Absolute	Dom	inant Indicator	Dominance Test worksh	oot:	
Tree Stratum (Plot size:)			ies? Status	Number of Dominant Spec	^	
1				That Are OBL, FACW, or		(A)
2				Total Number of Dominan	•	
3				Species Across All Strata:		(B)
4		PA		Descent of Descipent Ones	-1	` '
	A	= Tota	al Cover	Percent of Dominant Spec That Are OBL, FACW, or I		(A/B)
Sapling/Shrub Stratum (Plot size:)				Prevalence Index works		
1				Total % Cover of:	Multiply by:	
2				OBL species		_
3				FACW species		
4				FAC species		
5				FACU species		
Herb Stratum (Plot size:)		_ == 1 Ola	al Cover	UPL species		
1. CONVOLVUIUS APUENSIS	45	V	FOCH	Column Totals:		
2. AMEMESIA ALSHMUM	49	V	- y	Prevalence Index =	D/A ~	
3. Engharbia EsulA	19.		4	Hydrophytic Vegetation	·	
4				1 - Rapid Test for Hyd		
5				2 - Dominance Test is		
6		**		3 - Prevalence Index	•	
7				4 - Morphological Ada	nptations <sup>1</sup> (Provide supp	orting
8				data in Remarks o	r on a separate sheet)	ŭ
9				5 - Wetland Non-Vaso		
10					ytic Vegetation¹ (Explair	′ I
11	<del>- 703 -</del>			<sup>1</sup> Indicators of hydric soil at be present, unless disturb		nust
Woody Vine Stratum (Blat size)	100	_= Tota	l Cover	bo present, unicos disturb	- Problematic.	
Woody Vine Stratum (Plot size:)						
1				Hydrophytic Vegetation	. /	
2			I Cover	Present? Yes_	No <u>/</u>	
% Bare Ground in Herb Stratum		10ta	i COVEI			
Remarks:						

Sampling Point: 12

Depth	Matrix			Redox Feature		······································		
(inches)	Color (moist)	_ <u> </u>	Color (moi		Type <sup>1</sup>	_Loc2	<u>Texture</u>	Remarks
<u>}-1)</u>	10x1/5	<u> 202 </u>	SVR-5/9	) 31	<u> </u>	<u>w</u>	<u>55</u>	
		_						
			_					
			-		· · · · · · · · · · · · · · · · · · ·	harmon and the district	b-1	
			_					
			• •	······································				_
	oncentration, D=D					d Sand Gra		ocation: PL=Pore Lining, M=Matrix.
•	Indicators: (Appl	icable to a	•		ted.)			tors for Problematic Hydric Soils <sup>3</sup> :
Histosol	` '			edox (S5)				cm Muck (A10)
Histic Ep Black Hi	pipedon (A2)			Matrix (S6) lucky Mineral (F	-1\ /ovaont	MAI DA 41		ed Parent Material (TF2) ery Shallow Dark Surface (TF12)
	en Sulfide (A4)			leyed Matrix (F		MLKA 1)		her (Explain in Remarks)
	d Below Dark Surfa	ace (A11)	<i></i>	Matrix (F3)	-,			To (Expair it Noticine)
	ark Surface (A12)	` '		ark Surface (F6	)		³Indica	tors of hydrophytic vegetation and
	lucky Mineral (S1)			Dark Surface (				land hydrology must be present,
	Bleyed Matrix (S4)		Redox De	epressions (F8)	)		unle	ess disturbed or problematic.
	Layer (if present)							
Туре:	••••							1
							l	
Depth (ind Remarks:	ches):		24104Q	18 dox -	Rutur	·U	I	il Present? Yes <u>V</u> No
Depth (inc Remarks: YDROLO	GY		SY1043	1800x -	Postur		I	
Depth (inc Remarks: YDROLO Vetland Hyd	GY drology Indicator	s:	· · · · · · · · · · · · · · · · · · ·		Pootu 1	· W -	Sie b	roto
Depth (inc Remarks: YDROLO Vetland Hyd	GY drology Indicator cators (minimum o	s:	ed; check all tha	at apply)			Sie pl	ondary Indicators (2 or more required)
Depth (inc Remarks: YDROLO Vetland Hyd Primary Indic Surface	GY drology Indicator cators (minimum o Water (A1)	s:	ed; check all tha	at apply) er-Stained Leav	ves (B9) (e		Sie pl	ondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1, 2,
Depth (included in the control of th	GY drology Indicator cators (minimum o Water (A1) ater Table (A2)	s:	ed; check all tha	at apply) er-Stained Leav //LRA 1, 2, 4A,	ves (B9) (e		Sie pl	ondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
Depth (Inc demarks: YDROLO Vetland Hyd Primary India Surface High Wa	GY drology Indicator cators (minimum o Water (A1) ater Table (A2) on (A3)	s:	ed; check all the Wat Salt	at apply) er-Stained Leav ILRA 1, 2, 4A, Crust (B11)	ves (B9) (e and 4B)		SIE pl	ondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1, 2 4A, and 4B) Drainage Patterns (B10)
Primary Indic Surface High Water M	GY drology Indicator cators (minimum o Water (A1) ater Table (A2) on (A3) flarks (B1)	s:	ed; check all the Wat Salt Aqu	at apply) er-Stained Leav //LRA 1, 2, 4A, Crust (B11) atic Invertebrate	ves (B9) (e and 4B) es (B13)		SLE pl	ondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) Drainage Patterns (B10) Dry-Season Water Table (C2)
Depth (Inc. Permarks:  YDROLO  Vetland Hyderimary Indice  — High Water Means Sedimer	GY drology Indicator cators (minimum o Water (A1) ater Table (A2) on (A3)	s:	ed; check all the Wat Salt Aqu Hyd	at apply) er-Stained Leav /ILRA 1, 2, 4A, Crust (B11) atic Invertebrate rogen Sulfide C	ves (B9) (e and 4B) es (B13) Odor (C1)	xcept	SEE pl	ondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) Drainage Patterns (B10) Dry-Season Water Table (C2)
Pepth (included in the control of th	GY drology Indicator cators (minimum o Water (A1) ater Table (A2) on (A3) darks (B1) nt Deposits (B2)	s:	ed; check all the Wat Salt — Aqu — Hyd	at apply) er-Stained Leav //LRA 1, 2, 4A, Crust (B11) atic Invertebrate	ves (B9) (e and 4B) es (B13) odor (C1) eres along	xcept Living Root	Sec	ondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) Drainage Patterns (B10) Dry-Season Water Table (C2) Saturation Visible on Aerial Imagery (C9
Pepth (included in the control of th	GY drology Indicator cators (minimum o Water (A1) ater Table (A2) on (A3) darks (B1) nt Deposits (B2) posits (B3)	s:	ed; check all that Wat Salt Aqu Hyd Oxic	at apply) er-Stained Leav /ILRA 1, 2, 4A, Crust (B11) atic Invertebrate rogen Sulfide C	ves (B9) (e and 4B) es (B13) Odor (C1) eres along ed Iron (C4	xcept Living Root	Sec	ondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) Drainage Patterns (B10) Dry-Season Water Table (C2) Saturation Visible on Aerial Imagery (CS) Geomorphic Position (D2)
Pepth (inc Remarks: YDROLO Yetland Hyd Primary India Surface High Wa Saturatia Water M Sedimer Drift Dep Algal Ma Iron Dep	drology Indicator cators (minimum o Water (A1) ater Table (A2) on (A3) farks (B1) nt Deposits (B2) posits (B3) at or Crust (B4)	s:	ed; check all that  Wat  Salt  Aqu  Hyd  Oxio  Rec	at apply) er-Stained Leav /ILRA 1, 2, 4A, Crust (B11) atic Invertebrate rogen Sulfide C dized Rhizosphe sence of Reduc	ves (B9) (e and 4B) es (B13) Odor (C1) eres along red Iron (C4	xcept Living Root l) 1 Soils (C6)	Sec	ondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) Drainage Patterns (B10) Dry-Season Water Table (C2) Saturation Visible on Aerial Imagery (CS) Geomorphic Position (D2) Shallow Aquitard (D3)
Primary Indices Surface High Water Manage Algal Manage Iron Depute Surface Inundation	drology Indicator cators (minimum o Water (A1) ater Table (A2) on (A3) darks (B1) nt Deposits (B2) posits (B3) at or Crust (B4) posits (B5) Soil Cracks (B6)	s: fone requir	ed; check all that Wat Salt Aqu Hyd Oxio Pres Rec Stur	at apply) er-Stained Leav ILRA 1, 2, 4A, Crust (B11) atic Invertebrate rogen Sulfide C dized Rhizosphe sence of Reduc	ves (B9) (e and 4B) es (B13) Odor (C1) eres along ed Iron (C4 tion in Tilled d Plants (D	xcept Living Root l) 1 Soils (C6)	Sec	ondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) Drainage Patterns (B10) Dry-Season Water Table (C2) Saturation Visible on Aerial Imagery (CS Geomorphic Position (D2) Shallow Aquitard (D3) FAC-Neutral Test (D5)
Primary Indices Surface Water M Sedimer Drift Dep Algal Ma Iron Dep Surface Inundation Sparsely	drology Indicator cators (minimum o Water (A1) ater Table (A2) on (A3) flarks (B1) nt Deposits (B2) posits (B3) at or Crust (B4) posits (B5) Soil Cracks (B6) on Visible on Aeria	s: fone requir	ed; check all that Wat Salt Aqu Hyd Oxio Pres Rec Stur	at apply) er-Stained Leav #LRA 1, 2, 4A, Crust (B11) atic Invertebrate rogen Sulfide Colized Rhizosphe sence of Reducent Iron Reduct	ves (B9) (e and 4B) es (B13) Odor (C1) eres along ed Iron (C4 tion in Tilled d Plants (D	xcept Living Root l) 1 Soils (C6)	Sec	ondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) Drainage Patterns (B10) Dry-Season Water Table (C2) Saturation Visible on Aerial Imagery (C9 Geomorphic Position (D2) Shallow Aquitard (D3) FAC-Neutral Test (D5) Raised Ant Mounds (D6) (LRR A)
Pepth (inc Remarks:  YDROLO  Vetland Hyd Surface High Wa Saturatic Water M Sedimer Drift Dep Algal Ma Iron Dep Surface Inundati Sparsely  Field Obser	drology Indicator cators (minimum o Water (A1) ater Table (A2) on (A3) aters (B1) at Deposits (B2) posits (B3) at or Crust (B4) cosits (B5) Soil Cracks (B6) on Visible on Aericy Vegetated Concavations:	s: f one requir one requir ( one requir one surface	ed; check all the  Wat  Salt  Aqu  Hyd  Oxic  Pres  Rec  Stur  B7)  (B8)	at apply) er-Stained Leav JLRA 1, 2, 4A, Crust (B11) atic Invertebrate rogen Sulfide C dized Rhizosphe sence of Reduct ent Iron Reduct inted or Stressed er (Explain in R	ves (B9) (e and 4B) es (B13) Odor (C1) eres along red Iron (C4 tion in Tilled d Plants (D emarks)	xcept Living Root l) d Soils (C6) 1) (LRR A)	Sec	ondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) Drainage Patterns (B10) Dry-Season Water Table (C2) Saturation Visible on Aerial Imagery (C9 Geomorphic Position (D2) Shallow Aquitard (D3) FAC-Neutral Test (D5) Raised Ant Mounds (D6) (LRR A)
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# Appendix B

Photographs



Photo 1. Unvegetated sediment in reservoir bottom (LUB3K).



Photo 3. Locations of WDDF 1 in foreground and WDDF2 in background.



Photo 2. Hay Gulch channel in upper part of reservoir bottom.



Photo 4. Close-up of patch of dogbane near WDDF2.



Photo 6. Area dominated by wild licorice in foreground and dogbane in background to the right.



Photo 5. Patch of wild licorice at WDDF3.



Photo 7. Relatively large area dominated by absinth woodworm at WDDF4.



Photo 8. Relatively large area of dogbane at WDDF6.



Photo 9. Close-up of soil at WDDF6 showing some redox concentrations and low matrix chroma.



Photo 10. Hay Gulch channel towards upper end of reservoir bottom with narrow band of emergent wetland (at WDDF7).



Photo 11. Distinct hydric soil at WDDF7 where the soil water saturated.



Photo 12. Area dominated by field bindweed and absinth wormwood at WDDF8 (northeast part of reservoir bottom).



Photo 14. Area at WDDF9 dominated by field bindweed and yellow sweet clover.



Photo 13. Unvegetated sediment in reservoir bottom toward the dam (LUB3K).



Photo 15. Area at WDDF10 dominated by leafy spurge, field bindweed with some young cottonwoods.



Photo 16. Southeast side of reservoir dominated by leafy spurge, yellow sweet clover and field bindweed.



Photo 18. WDDF12 dominated by upland weeds with strong hydric soil indicators (see photo 19).

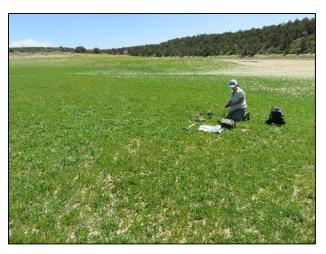


Photo 17. Area at WDDF11 dominated by absinth wormwood.



Photo 19.Distinct redox concentrations at WDDF12 which is dominated by upland weeds.



Photo 20. Broken stem of dogbane showing milky sap.



Photo 21. Area with leafy spurge and bindweed on west side of study area.

# APPENDIX C. PRELIMINARY REDMESA RESERVOIR ENLARGEMENT PLAN AND PROFILE DRAWINGS

