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BIG SANDY WATERSHED LEVEL I STUDY

PREPARED FOR

WYOMING WATER DEVELOPMENT COMMISSION



OCTOBER 2019

FINAL REPORT

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ABBREVIATIONS AND ACRONYMS

ACEC	Area of Critical Environmental Concern			
AML	Appropriate Management Level			
AOI	Area of Influence			
AUM	Animal Unit Month			
BLM	Bureau of Land Management (U.S. Department of the Interior)			
BOR	U.S. Bureau of Reclamation (Department of the Interior)			
CFS	Cubic Feet per Second			
СНРА	Crucial Habitat Priority Area			
DDCT	Density Disturbance Calculation Tool			
DMI	Domestic, Municipal, and Industrial			
EA	Environmental Assessment			
EHPA	Enhancement Habitat Priority Area			
EIS	Environmental Impact Statement			
EPA	Environmental Protection Agency			
ESA	Endangered Species Act			
ESD	Ecological Site Description			
EVIDD	Eden Valley Irrigation and Drainage District			
FEMA	Federal Emergency Management Agency			
GPM	Gallons per Minute			
GRBWC	Green River Basin Wetland Complex			
HUC	Hydrologic Unit Code			
KNWA	Key Nongame Wildlife Area			
мос	Means of Conveyance			
MRLC	Multi-resolution Land Characteristics Consortium			
NLCD	National Land Cover Database			
NOAA	National Oceanic and Atmospheric Association			
NPL	Normally Pressured Lance			
NPS	National Park Service			
NRCS	Natural Resources Conservation Service (U.S. Department of Agriculture)			
NWI	National Wetlands Inventory			
POD	Point of Diversion			
POU	Point of Use			
SCCD	Sublette County Conservation District			
SEO	Wyoming State Engineer's Office			
SGCN	Species of Greatest Conservation Need			
SHP	Strategic Habitat Plan			
SHPO	State Historic Preservation Office			
SNOTEL	Snow Telemetry			

SWAP	State Wildlife Action Plan			
SWCCD	Sweetwater County Conservation District			
SWPP	Small Water Projects Program			
USACE	U.S. Army Corps of Engineers			
USFS	U.S. Forest Service (U.S. Department of Agriculture)			
USFWS	U.S. Fish and Wildlife Service (U.S. Department of the Interior)			
USGS	U.S. Geological Survey (U.S. Department of the Interior)			
WDEQ	Wyoming Department of Environmental Quality			
WGFD	Wyoming Game and Fish Department			
WGS	Wyoming State Geological Survey			
WRDS	Water Resources Data System			
WWCS	Wyoming Wetlands Conservation Strategy			
WWDC	Wyoming Water Development Commission			
WWDO	Wyoming Water Development Office			
WYNDD	Wyoming Natural Diversity Database			

1. INTRODUCTION

1.1 BACKGROUND AND PROJECT PURPOSE

In November 2017, the Sublette County Conservation District (SCCD) and Sweetwater County Conservation District (SWCCD), as joint sponsors, presented a request to the Wyoming Water Development Commission (WWDC) for a Level I Study on the Big Sandy Watershed. This request was born from the apparent need and opportunity to implement improvement projects within the vast rural areas of said Watershed. In contrast to similar Level I studies conducted in the past, the Sponsors also worked with the Wyoming Water Development Office (WWDO/Office) to implement modifications to the historic study format, which includes more substantive emphasis and focus on related water rights and rehabilitation projects. The sponsors end goal is to generate a comprehensive study that will allow vested stakeholders the opportunity to implement projects that improve the overall condition and function of the watershed.

In July 2018, the WWDC subsequently entered into a contract with Rio Verde Engineering (RVE) and its subconsultants, Wenck Associates, Inc. (Wenck) and Western EcoSystems Technology, Inc. (WEST). The evaluation of watershed function, associated resource evaluations, water rights mapping, and identification of improvement opportunities are the key objectives of this level I study. Related information regarding climate, hydrology, surface water, groundwater, geology, land cover, fish and wildlife, and anthropogenic systems are also evaluated and described herein. The following report also includes data and references to past studies conducted within the confines of the Big Sandy Watershed. The majority of those studies have been focused on the Eden Valley Irrigation and Drainage District (EVIDD), centrally located within the confines of the Big Sandy Watershed. The intent of this Level I Study was to compile this existing information and data, effectively carrying out research and additional studies where apparent data/information gaps exist, and creating a composite database that is focused on the natural resources, wildlife, and human influence within the entire Big Sandy Watershed.

Ultimately, the data and accompanying spatial properties gathered during this study were compiled and included within a comprehensive GIS Geodatabase. The construction of said geodatabase was based on the existing WWDC GIS Framework Plan for state-wide integration purposes. This mapping based platform will allow the Sponsor and other interested users to more efficiently conduct research and disseminate the data compiled within the body of this report.

1.2 PROJECT MEETINGS AND PUBLIC PARTICIPATION

Two (2) project meetings were carried out during the course of this study, each held at the Eden Valley Community Center within the town of Farson, WY. Both meetings were advertised in local newspapers and by way of flyer postings, personal phone calls, social media, and the Sublette County Conservation District's website and registered e-mail list. Meeting agendas and copies of the Small Water Projects Program (SWPP) applications were provided at each of the meetings in order to more effectively inform participants and stakeholders about potential funding opportunities, project purpose, and project goals.

The project scoping meeting was held on July 20, 2018 where team members from RVE, Wenck, and WEST conducted a power point presentation outlining the Big Sandy Watershed Study objectives and their proposed strategy to carry out the tasks outlined in the WWDC scope of services. In addition to the project team members, Julie Gondzar (Office project manager) and Michael Henn (SCCD/sponsor) also actively participated in the presentation and Q/A portion of the meeting. The input and participation by stakeholders within the Big Sandy Watershed was invaluable during the course of this study. The majority of proposed projects developed as part of the rehabilitation plan under Task 5 were brought forward at this initial scoping meeting.

On April 17, 2019, a successive public meeting was held to inform stakeholders and interested parties about the progress of the study, specifically identifying work completed, milestones reached, and remaining data gathering efforts required to complete the study objective(s). RVE conducted the meeting with technical input from Wenck and WEST team members. A power point presentation was prepared for graphical representation purposes, followed by a GIS water rights tool demonstration. Much of the discussion with attending stakeholders evolved from this water rights exploration tool. Michael Henn (SCCD) attended and actively participated in the meeting, explaining how the information gathered during the study could potentially benefit the stakeholders, their interests, and the overall health of the watershed. Julie Gondzar (Office project manager) was able to join via telephone.

A transcript of the public meeting minutes can be found in **Appendix A**, along with each respective agenda and attendance sheet. A current copy of the SWPP application can also be found in said appendix.

In addition to the above mentioned public meetings, several unscheduled meetings were held with the project sponsor (SCCD) to discuss potential projects, water rights, and GIS deliverable format related to each. During the course of this study, regular communications with the Office project manager were also conducted regarding progress updates, project qualification and prioritization, and joint scheduling efforts related to meetings. This collaborative effort was a vital component in developing deliverable formats and information that would ultimately meet or exceed the needs of the end user.

1.3 DOCUMENT CONTENT

Each section contained within this study was defined by the WWDC and systematically organized in a logical format. The following list defines each section and provides a brief explanation of each:

- **Section 1 Introduction**: explanation of the background and purpose of the watershed study along with project meetings and public participation
- Section 2 Review of Background Information: a data gathering effort to document past studies and available information to identify existing data gaps and to eliminate the duplication of research efforts
- **Section 3 Watershed Inventory and Descriptions**: the inventory, description, and analysis of the Physical, Biological, and Anthropogenic Systems within the watershed

- **Section 4 Streamflow Hydrology**: use of existing data, hydrologic models, and available streamflow gage data to characterize streamflow within the watershed
- Section 5 Watershed Management and Rehabilitation Plan: the preparation of a management and rehabilitation plan that establishes specific project suggestions to improve watershed condition and function and to provide benefit for wildlife, livestock, and the environment
- Section 6 Cost Estimates: the compilation of cost estimates for those projects identified in Section 5
- Section 7 Economic Analysis: identification of alternative funding sources , application requirements, and eligibility requirements with respect to funding agency criteria and conditions
- **Section 8 Permits**: identify all permits, easements, and clearances necessary for implementation of the projects identified in Section 5
- Section 9 Geographic Information System Deliverables: the organization of mapping features, metadata, and information using the appropriate WWDC GIS Framework Plan

2 REVIEW OF BACKGROUND INFORMATION

2.1 WATER RESOURCES DATA SYSTEM LIBRARY ARCHIVES

As part of the preparatory objective of this report, research was conducted using the Water Resources Data System (WRDS) Library. This web based information hub offers an assortment of valuable data pertaining to the Big Sandy Watershed including relative information regarding climate, weather, drought, articles and publications (past studies), and links to outside agency publications. The information contained in this repository was used extensively to determine initial information data gaps and to supplement the contents of this report. The existing publications primarily deal with water supply systems located within the boundaries of the EVIDD or storage investigations/analysis on the lower portion of the Big Sandy River. The complete report of each referenced study can be found at the following web address:

http://library.wrds.uwyo.edu/wwdcrept/wwdcrept.html

or by following the accompanying links.

Big Sandy Reservoir

Wenck, <u>Big Sandy Reservoir Enlargement Level II Phase I Study, Final Report</u>, Mar, 2017 Wenck, <u>Big Sandy Reservoir Enlargement Level II Phase I Study, Executive Summary</u>, Mar, 2017

Big Sandy River

Rick Blatchley, <u>Class III Archeological Investigations Conducted for the Big Sandy River Unit</u> <u>Desalinization Study Sweetwater County, Wyoming, Draft</u>, Nov, 1982 Greenhorne & O'Mara, Inc., <u>Big Sandy Salinity Control, Design Review and Alternative</u> <u>Investigation</u>, Dec, 1982 State of Wyoming, <u>Big Sandy River Unit</u>, <u>Colorado River Water Quality Improvement</u> <u>Program</u>, Dec, 1982 Fox Consulting Engineers, <u>Lower Big Sandy Reservoir and Dam Geotechnical and Geological</u> <u>Feasibility Investigation</u>, Feb, 1983 Greenhorne & O'Mara, Inc., <u>Big Sandy Salinity Control Reservoir Planning, Final Report</u>, Mar, 1984 Nelson Engineering, <u>Big Sandy Water Supply Project Level II, Final Design Report, Executive</u> <u>Summary</u>, Oct, 1993 Nelson Engineering, <u>Big Sandy Water Supply Project Level II, Final Design Report</u>, Oct, 1993

Eden Valley

Johnson-Fermelia Company, Inc., <u>Eden Valley (Farson) Master Plan Level II Study, Final</u> <u>Report</u>, Oct, 2015 Johnson-Fermelia Company, Inc., <u>Eden Valley (Farson) Master Plan Level II Study, Executive</u> <u>Summary</u>, Oct, 2015 J-U-B Engineers, Inc., <u>Eden Valley Irrigation and Drainage District Master Plan Level I Study</u>, <u>Map Book</u>, Oct, 2017 J-U-B Engineers, Inc., <u>Eden Valley Irrigation and Drainage District Master Plan Level I Study</u>, <u>Final Report</u>, Oct, 2017 J-U-B Engineers, Inc., <u>Eden Valley Irrigation and Drainage District Master Plan Level I Study</u>, <u>Final Report</u>, Oct, 2017 J-U-B Engineers, Inc., <u>Eden Valley Irrigation and Drainage District Master Plan Level I Study</u>, <u>Executive Summary</u>, Oct, 2017 J-U-B Engineers, Inc., <u>Eden Valley Irrigation and Drainage District Master Plan Level I Study</u>, <u>Appendices</u>, Oct, 2017

Farson

Johnson-Fermelia Company, Inc., <u>Farson Water Supply Study, Level I, Final Report</u>, Oct, 1990

Johnson-Fermelia Company, Inc., <u>Farson Water Supply Study, Level I, Executive Summary</u>, Oct, 1990

Johnson-Fermelia Company, Inc., <u>Master Plan for the Farson Water Supply Level I Study</u>, <u>Final Report</u>, Sep, 2012)

Johnson-Fermelia Company, Inc., <u>Master Plan for the Farson Water Supply Level I Study</u>, <u>Executive Summary</u>, Sep, 2012

The WWDC study locations are tabulated in **Table 1** below and graphically depicted in **Figure 1**.

Table 1. Past WWDC studies conducted within the Big Sandy Watershed

PROJECT ID	STUDY NAME	YEAR	LATITUDE	LONGITUDE
1	Class III Archeological Investigations Conducted for the Big Sandy River Unit Desalinization Study Sweetwater County, Wyoming	1982	41°56'44.33"	109°41'23.96"
2	Big Sandy River Unit, Colorado River Water Quality Improvement Program	1982	42°01'45.80"	109°33'41.30"
3-1	Big Sandy Salinity Control, Design Review and Alternative Investigation	1982	41°56'59.73"	109°42'31.33"
3-2	Alternative #2	1982	41°55'15.46"	109°45'40.32"
3-3	Alternative #3	1982	41°56'33.66"	109°43'23.40"
3-4	Alternative #4	1982	41°56'33.66"	109°43'23.40"
3-5	Alternative #5	1982	41°56'21.49"	109°37'22.32"
4	Lower Big Sandy Reservoir and Dam Geotechnical and Geological Feasibility Investigation	1983	41°56'46.73"	109°43'04.61"
5-1	Big Sandy Salinity Control Reservoir Planning	1984	41°57'00.44"	109°42'39.89"
5-2	Alternative #2	1984	41°58'02.38"	109°41'53.23"
5-3	Alternative #3		41°55'14.49"	109°45'43.31"
5-4	Alternative #4		41°53'37.97"	109°46'06.08"
5-5	Alternative #5	1984	41°52'18.53"	109°46'30.60"
5-6	Alternative #6	1984	41°54'13.66"	109°43'20.87"
5-7	Alternative #7	1984	41°51'03.92"	109°46'06.83"
6	Farson Water Supply Study, Level I	1990	42°04'52.14"	109°26'34.41"
7	Big Sandy Water Supply Project Level II	1993	42°08'57.74"	109°25'07.12"
8	Master Plan for the Farson Water Supply Level I Study	2012	42°06'22.18"	109°26'39.94"
9	Eden Valley (Farson) Master Plan Level II Study		42°07'49.88"	109°26'28.12"
10	Big Sandy Reservoir Enlargement Level II Phase I Study		42°14'56.04"	109°25'44.73"
11	Eden Valley Irrigation and Drainage District Master Plan Level I Study	2017	42°08'57.35"	109°23'58.09"



Figure 1. Past WWDC study locations within the Big Sandy Watershed

2.2 EXISTING GIS PRODUCTS AND METADATA

Technological advances in micro processing and GIS based programs have resulted in a rapidly expanding field of spatial inventory through data collection efforts made by multiple agencies and organizations. As an initial step in the study process, the project team collaborated to identify relative GIS information sources regarding the Big Sandy Watershed. Types of existing information available include transportation routes, ownership and parcel boundaries, FEMA flood zones, National Wetlands Inventory (NWI), conservation easements, oil and gas leases, zoning district boundaries, aerial imagery, grazing allotments, wildlife migration routes, biological assessments, cultural resource products, and other related data. In addition to the GIS information available from the WWDC studies listed above (2012 – 2017), a specific list of other outside agency resources is more particularly listed below.

- Sublette County Mapserver
 - o https://maps.greenwoodmap.com/sublette/mapserver/
- Sweetwater County Mapserver
 - o <u>https://maps.greenwoodmap.com/sweetwater/mapserver/</u>
- Fremont County Mapserver
 - o <u>https://maps.greenwoodmap.com/fremontwy/</u>
- USDA U.S. Forest Service
- USDA Natural Resources Conservation Service
- USDI Bureau of Land Management
- Wyoming Oil and Gas Conservation Commission
 - o http://wogccms.state.wy.us/flexviewers/unitmap/
- Wyoming Geospatial Hub (WYGISC)
 - o <u>https://geospatialhub.org/</u>
- Wyoming Association of Conservation Districts (SuiteWater)
 - o <u>https://suitewater.wygisc.org/</u>

3 WATERSHED INVENTORY AND DESCRIPTIONS

The Big Sandy Watershed is located in southwestern Wyoming and encompasses a total tributary area of 1,793 square miles, which includes land within three (3) counties; Sweetwater (54%), Sublette (42%), and Fremont (4%) (**Figure 2**). The Big Sandy Watershed is more particularly defined by the U.S. Geological Survey's (USGS) 8-digit hydrologic unit code (HUC) 14040104. The Big Sandy River and Little Sandy Creek are the two (2) main tributaries within said watershed and originate on the continental divide in the Wind River Mountains. Notably, each of these drainages begins in proximity to Wind River Peak (13,192 ft.), Temple Peak (12,972 ft.), and East Temple Peak (12,590 ft.). The Big Sandy River falls approximately 6,000 feet in the first 25 miles and then flows an additional 72 miles to its confluence with the Green River at an elevation of 6,245 ft.

The following section of the Watershed Study describes the Physical, Biological, and Anthropogenic Systems that are interactive in characterizing the Big Sandy Watershed. The Physical Systems analyzed in this document include surface water, geology, and climate. Similarly, the Biological Systems that are characterized herein include Fish and Wildlife as well as Land Cover. Lastly, this document will describe the Anthropogenic Systems, also being described as systems that are created or impacted by human activity.



Figure 2. Big Sandy Watershed Study Area

3.1 PHYSICAL SYSTEMS

3.1.1 Surface Water

The Big Sandy Watershed headwaters originate in the Wind River Mountains. This portion of the watershed, located above 8,000 feet in elevation and encompassing approximately 6% of the overall tributary area, provides the majority of all surface water utilized within the watershed. Big Sandy River and Little Sandy Creek, the two largest streams in the watershed, are both principally fed by snowmelt. Average monthly flow in Big Sandy River and Little Sandy Creek, respectively, peaks at 405 cfs (24,100 acre-feet) in June and 76.6 cfs (4,560 acre-feet) in June. The months of May and June combine to account for 60% of the annual flow volume in Big Sandy River and 48% in Little Sandy Creek.

Due to the seasonal nature of surface water availability in the watershed, reservoirs are a key component of watershed infrastructure. The Big Sandy River Watershed contains two large reservoirs – Big Sandy Reservoir and Eden Irrigation and Land Company No. 1 (Eden No. 1) Reservoir. The Big Sandy Reservoir was constructed in 1952 and has a storage capacity of 39,700 acre-feet. Eden No. 1 Reservoir was constructed in 1907 and has a record storage capacity of 18,489.93 acre-feet. Together, these reservoirs provide storage water to about 16,885 adjudicated acres. Both reservoirs typically impound water during April and May and then release storage water to irrigators during July, August, and September.

3.1.1.1 Hydrography

3.1.1.1.1 Hydrologic Units

The United States Geologic Service (USGS) identifies and classifies watersheds using a six-level numeric system. Each level is designated by a two-digit number which, in series, divide a large watershed into discreet hydrologic units (HUC) (**Figure 2**). The Big Sandy River Watershed is cataloged by the USGS as an 8-digit HUC – 14040104. The four two-digit pairs indicate the region, subregion, basin, and subbasin of the Big Sandy River Watershed. The Big Sandy River is in the Upper Colorado Region, Great Divide-Upper Green Subregion, Upper Green Basin, and Big Sandy Subbasin. The Big Sandy River subbasin is further subdivided into six 10-digit HUCs as shown in **Table 2** and **Figure 3**. Each 10-digit HUC is further divided into 12-digit HUCs. The 12-digit HUCs are displayed here for reference but are not analyzed in this report.

Level	Unit	Digits	Code	Name
First	Region	2-digit	14	Upper Colorado
Second	Subregion	4-digit	1404	Great Divide-Upper Green
Third	Basin	6-digit	140401	Upper Green
Fourth	Subbasin	8-digit	14040104	Big Sandy River

Table 2. Hydrologic Unit Code of the Big Sandy River
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Level	Unit	Digits	Code	Name
Fifth	Watershed	10-digit	1404010401	Upper Big Sandy
			140401040101	Black Joe Creek-Big Sandy River
			140401040102	Squaw Creek
			140401040103	Long Draw-Big Sandy River
			140401040104	Blue Pit Reservoir
			140401040105	Water Hole Draw-Big Sandy River
			140401040106	Bull Draw-Big Sandy River
Sixth	Subwatershed	12-digit	140401040107	Mud Hole Draw
			140401040108	Poston Reservoir
			140401040109	Long Draw
			140401040110	Big Sandy Reservoir-Big Sandy River
			140401040111	Little Sandy Reservoir Number 2
			140401040112	Unnamed
Fifth	Watershed	10-digit	1404010402	Little Sandy Creek
			140401040201	Upper Little Sandy Creek
			140401040202	Mitchell Slough
Sixth	Subwatershed	12-digit	140401040203	Lower Little Sandy Creek
SIXII		- aigit	140401040204	Upper Dry Sandy Creek
			140401040205	Lower Dry Sandy Creek
			140401040206	Juel Creek
Fifth	Watershed	10-digit	1404010403	Pacific Creek
Sixth	Subwatershed	12-digit	140401040301	Upper Pacific Creek
			140401040302	Alkali Creek
			140401040303	Middle Pacific Creek
			140401040304	Upper Jack Morrow Creek
			140401040305	Rock Cabin Creek
			140401040306	Lower Jack Morrow Creek

Level	Unit	Digits	Code	Name
			140401040307	Lower Pacific Creek
Fifth	Watershed	10-digit	1404010404	Lower Big Sandy River
			140401040401	Eden Reservoir-Big Sandy River
			140401040402	Carlson Draw-Big Sandy River
			140401040403	Simpson Gulch
Sixth	Subwatershed	12-digit	140401040404	Stagecoach Draw
			140401040405	Unnamed
			140401040406	Starvation Wash
			140401040407	Big Bend-Big Sandy River
Fifth	Watershed	10-digit	1404010405	Bone Draw
			140401040501	Washington Draw
Sixth	Subwatershed	12-digit	140401040502	Sixmile Draw
			140401040503	Bone Draw
Fifth	Watershed	10-digit	1404010406	Sublette Flats
			140401040601	Jonah Gulch
			140401040602	Haystack Butte-Sublette Flats
Sixth	Subwatershed	12-digit	140401040603	Teakettle Butte
		5	140401040604	Little Colorado Well No 9
			140401040605	Simpson Gulch
			140401040607	Unnamed



Figure 3. 10-digit Hydrologic Units within the Big Sandy River Watershed

3.1.1.1.2 Stream Types

The Big Sandy Watershed can be divided into three general areas with distinct flow patterns: the northern mountains, the eastern hills, and high desert in the south and west. Streams originating in the northern mountains are perennial streams and are the most important streams in the watershed. Streams with headwaters in the eastern hills flow intermittently and are generally dry during the late summer and winter. Streams with headwaters in the west or south of the watershed are ephemeral streams, which flow in response to precipitation events (**Figure 4**).

The two most important streams in the Big Sandy River Watershed are the Big Sandy River and Little Sandy Creek. Originating in the northern mountains, Big Sandy River and the Little Sandy Creek are the only streams in the watershed that flow year-round. These two streams provide water to agricultural and municipal users and they supply Big Sandy Reservoir and Eden Reservoir.

The Big Sandy River originates from Big Sandy Lake which collects water from the convergence of Lost Creek, North Creek, Black Joe Creek and Rapid Creek converge. From Big Sandy Lake, the Big Sandy River flows southwest collecting flow from Iron Creek, South Temple Creek, Driveway Creek, Aspen Creek, and Dutch Joe Creek before reaching Big Sandy Reservoir. Approximately 12 miles downstream of Big Sandy Reservoir, near Farson, WY, the Big Sandy River confluences with Little Sandy Creek. Downstream of Little Sandy Creek, no other named tributaries confluence with the Big Sandy River.

Little Sandy Creek originates in the valley west of Temple Peak and flows South collecting tributary waters from Chicken Creek before leaving the mountains. Before confluence with the Big Sandy River, Little Sandy Creek collects flow from two intermittent streams – Dry Sandy Creek and Pacific Creek.



Figure 4. Perennial, Intermittent, and Ephemeral Streams in the Big Sandy Watershed

The Big Sandy River watershed contains three notable intermittent streams: Pacific Creek, Dry Sandy Creek, and Jack Morrow Creek. All three streams originate in hills along the eastern watershed boundary and flow westward to Little Sandy Creek. All three streams begin as intermittent streams, then transition to perennial for a short distance, and then return to intermittent before reaching Little Sandy Creek. The USGS operated streamgage 09215000 on Pacific Creek from October 1971 to September 1973 and then reactivated the gage in November 2016. Based on this period of record, Pacific Creek typically flows from March to July and is Dry from August to February (**Table 3**). Because Jack Morrow Creek and Dry Sandy Creek originate in similar headwater areas, they share this general flow pattern.

	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Years with Data	21	21	21	22	22	22	21	21	21	21	22	21
Dry Years	18	16	2	0	1	3	10	14	11	13	11	15
Percent Dry Years	86%	76%	10%	0%	5%	14%	48%	67%	52%	62%	50%	71%

 Table 3. Frequency of flow in Pacific Creek

Streams originating in the western and southern portions of the Big Sandy Watershed are ephemeral and unnamed. Most of the draws and channels are hydrologically connected to a perennial or intermittent stream but some dissipate before reaching a named stream.

3.1.1.1.3 Streamflow Gages

Streamflow data in the Big Sandy River Watershed is available at nine locations, of which three (092103500, 09214500, and 09215000) are currently active (**Table 4**, **Figure 5**, and **Figure 6**). Five of the eight locations are natural flow gages: 09212500, 09213500, 09214000, 09214500, and 09215000. Natural flow gages are located upstream of diversions, irrigation return flows, or other human influences and therefore capture natural hydrologic activity. Gages 09215550, 09216000, and 09216060 are located downstream of Big Sandy Reservoir, Eden Reservoir, and the Eden Valley Irrigation and Drainage District (EVIDD). As a result, the streamflow measured at these three locations is influenced by human activities.

All eight gages were originally installed and operated by the USGS. Two gages – 09213500 and 09214500 – are now operated by the Wyoming State Engineer's Office (SEO). The full period of record at gage 09213500 is available through the USGS website¹. At gage 09214500 streamflow data from 1954 to 1981 is available from USGS website and the remainder is available from the WYSEO². Streamflow for the remaining six sites was downloaded from the USGS website.

The longest and most complete period of record is available from gage 09213500, a natural flow gage. When in operation, 09213500 recorded year-round flow until 1971 and then seasonal data from 1972 to present (**Figure 5**). USGS gage 09212500 recorded year-round data from 1939 to 1971 and then seasonal data from 1972 to 1984. USGS gage 09214500 recorded year-round data from 1955 to 1981 and then seasonal data from 1982 to present. All other gages recorded year-round data during their entire period of record.

Site Number	Site Name	Active	Agency
09216050	BIG SANDY RIVER AT GASSON BRIDGE, NR EDEN, WY	No	USGS
09216000	BIG SANDY RIVER BELOW EDEN, WY	No	USGS
09215550	BIG SANDY RIVER BELOW FARSON, WY	No	USGS
09215000	PACIFIC CREEK NEAR FARSON, WY	Yes	USGS
09214500	LITTLE SANDY CREEK ABOVE EDEN, WY	Yes	USGS/WYSEO
09214000	LITTLE SANDY CREEK NEAR ELKHORN, WY	No	USGS
09213500	BIG SANDY RIVER NEAR FARSON, WY	Yes	USGS/WYSEO
09212500	BIG SANDY R AT LECKIE RANCH, NR BIG SANDY, WY	No	USGS

Table 4. USGS Streamflow Gage Numbers and Names within the Big Sandy Watershed

¹ United States Geologic Service. "USGS Surface-Water Daily Data for the Nation." *National Water Information System: Web Interface*, United States Geologic Service,

https://nwis.waterdata.usgs.gov/nwis/dv/?referred_module=sw. Accessed: August 30, 2018.

² Wyoming State Engineer's Office. "Realtime Streamflow Data." Wyoming State Engineer's Office, <u>http://seoflow.wyo.gov/</u>. Accessed: August 30, 2018.



Figure 5. Period of record for active and historic USGS Streamgages in the Big Sandy River Watershed. When in operation, streamgages recorded year-round data unless otherwise noted. Seasonal data typically Includes the months of April to September.



Figure 6. Streamgages and water sampling points in the Big Sandy Watershed. The Period of record is displayed only for streamgages.

3.1.1.2 Water Quality

3.1.1.2.1 Stream Classifications

The Wyoming Department of Environmental Quality classifies streams based on water quality, quantity, and appropriate uses. Stream classifications in the Big Sandy River watershed range from Class 1 (outstanding water quality) to Class 3 (generally good water quality). The Big Sandy River and Little Sandy Creek headwater areas, which are in the Bridger Wilderness, are classified as Class 1, Outstanding Waters.³ The Wyoming Department of Environmental Quality (WDEQ) defines Class 1 streams as:

Class 1 waters are those surface waters in which no further water quality degradation by point source discharges other than from dams will be allowed. Nonpoint sources of pollution shall be controlled through implementation of appropriate best management practices. Pursuant to Section 7 of these regulations, that water quality and physical and biological integrity which existed on the water at the time of designation will be maintained and protected. In designation Class 1 waters, the Environmental Quality Council (Council) shall consider water quality, aesthetic, scenic, recreational, ecological, agricultural, botanical, zoological, municipal, industrial, historical, geological, cultural, archaeological, fish and wildlife, the presence of significant quantities of developable water, and other values of present and future benefit to the people.

Outside of the Bridger Wilderness, the Big Sandy River and Little Sandy Creek are classified as 2AB streams. In addition, Bone Draw and Pacific Creek are classified as 2AB streams as well. Big sandy Reservoir and Eden Reservoir are classified as 2AB waterbodies. Jack Morrow Creek is classified as a 2C stream. The WDEQ defines 2AB waters and 2C waters as:

Class 2AB waters are those known to support game fish populations or spawning and nursery areas at least seasonally and all their perennial tributaries and adjacent wetlands and where a game fishery and drinking water use is otherwise attainable. Class 2AB waters include all permanent and seasonal game fisheries and can be either "cold water" or "warm water" depending upon the predominance of cold water or warm water species present. All Class 2AB waters are designated as cold water game fisheries unless identified as a warm water game fishery by a "ww" notation in the Wyoming Surface Water Classification List. Unless it is shown otherwise, these waters are presumed to have sufficient water quality and quantity to support drinking water supplies and are protected for that use. Class 2AB waters are also protected for nongame fisheries, fish consumption, aquatic life other than fish, recreation, wildlife, industry, agriculture, and scenic value uses. **Class 2C** waters are designated as warmwater fisheries.

³ Wyoming Department of Environmental Quality, 2013. "Wyoming Surface Water Classification List" Wyoming Department of Environmental Quality.

Outside of the Bridger Wilderness area, tributaries to Big Sandy River, Little Sandy Creek, Pacific Creek, and Bond Draw are Class 3 streams. Class 3 streams include Simpson Gulch, Rock Cabin Creek, La Fonte Canyon Cr, Whitehorse Creek, Dry Sandy Creek, Juel Creek, and Hay Creek. The WDEQ defines Class 3 streams as:

Class 3 – Aquatic Life Other than Fish. Class 3 waters are water, other than those designated as Class 1, that are intermittent, ephemeral, or isolated waters, and because of natural habitat conditions, do not support nor have the potential to support fish populations or spawning, or certain perennial waters which lack the natural water quality to support fish (e.g. geothermal areas). Class 3 waters provide support for invertebrates, amphibians, or other flora and fauna that inhabit waters of the state at some stage of their life cycles. Uses designated on Class 3 waters include aquatic life other than fish, recreation, wildlife, industry, agriculture, and scenic value. Generally, waters suitable for this classification have wetland characteristics; these characteristics will be a primary indicator used in identifying Class 3 waters.

3.1.1.2.2 Clean Water Act

Impairments

In 2012 and 2014, Little Sandy Creek was listed as *impaired* under Section 303 d of the Clean Water Act. The impairment cause is listed as sediment/siltation from three probable sources: habitat modification, rangeland grazing, and wildlife other than waterfoul. The impaired segment (WYGR140401040203_01) stretches 17.7 miles from the northern boundary of Section 33, Township 28 North, Range 104 West downstream to the Sublette/Sweetwater County line.⁴ The impairment affects two designated uses: Aquatic Life Other Than Fish and Cold Water Fishery. At this time, no total daily maximum discharge limit has been set for this impairment.

In 1998, a 35-mile stretch of the Big Sandy River was evaluated for impairments. No physical or chemical water quality criteria were exceeded within this reach. No other segments of the Big Sandy River have been evaluated for impairments. No impaired segments of Big Sandy River have been identified.

No other streams in the Big Sandy River Watershed, have been evaluated for impairments. Evaluated reaches in the Big Sandy Watershed are depicted in **Figure 7**.

⁴ Wyoming Department of Environmental Quality Water Quality Division. "Wyoming's Final 2016/2018 Integrated 305(b) and 303(d) Report." Wyoming Department of Environmental Quality. Online, Accessed: July 2019, http://sgirt.webfactional.com/media/attachments/Water%20Quality/Water%20Quality%20Assessment/Reports/20 16-2018_Integrated-305b-and-303d-Report_EPA-Submit_2018-0815.pdf.



Figure 7. Stream Reaches in the Big Sandy Watershed Evaluated for Impairment. Figure prepared by Wyoming Department of Environmental Quality for *Wyoming's Final 2016/2018 Integrated 305(b) and 303(d)* Report.

Pollution Discharge and Elimination Permits

Two Wyoming Pollution Elimination and Discharge (WYPDES) Permits were identified in the Big Sandy Watershed using the EPA ECHO interactive map⁵ (**Table 5**). Two search parameters were applied: the data type was set to "Water" and geographic location was limited to the Big Sandy River HUC code (14040104). Neither facility has recorded violation within the past three years (as of July 2019).

	Applequest Pit	Eden Valley Landfill and Transfer Station
NPDES ID	WYR320407	WYR001324
FRS ID	110055168811	110055207761
Quarter with Noncompliance (3 years)	0	0
Effluent Violations (3 years)	0	0
Industry	Construction Sand and Gravel	Refuse Systems

Table 5. WYPDES Permits Identified in the Big Sandy River Watershed

⁵ United States Environmental Protection Agency. "Enforcement and Compliance History Online: Facility Search – Enform cent and Compliance Data." United States Environmental Protection Agency. Online, Accessed: July 29, 2019. https://echo.epa.gov/facilities/facility-search.

Latitude	42.089442	42.098372
Longitude	-109.470728	-109.43765

3.1.1.2.3 Colorado River Compact

Located in the Upper Colorado River Basin, the Big Sandy River is ultimately governed by the Colorado River Compact and associated laws and agreements. The Colorado River Basin Salinity Act, passed by the United States Congress in 1974 and amended in 1984 and 1995, is one such law. The Colorado River Basin Salinity Act requires implementation of measures to reduce salinity in the Colorado River and its tributaries.⁶ To this end, the U.S. Bureau of Reclamation funded repairs and upgrades to the EVIDD system to reduce salt loading.⁷

According to a 2017 Colorado River Basin Salinity Control Program update,⁸ the Big Sandy River contributes 164,000 tons of salt loading to the Colorado River, which equates to 1.8% of the total estimated salt load of the Colorado River (8,724,000 tons). Since 1988, approximately 13,500 acres have been treated with salinity control measures, 86% of the planned treatment acres. Currently installed treatments have reduced salt loading by 58,180 tons (70% of the project goal) at a cost of \$13,844,400.

Salinity control measures implemented in the Big Sandy Watershed are focused on agricultural actives. Implemented control measures include replacing unlined ditches with pipe and installing sprinkler irrigation systems. Most recently, the NRCS funded a project to replace 24 miles of earthen irrigation ditches with pipe. Completed in 2014, the project is estimated to reduce annual salt loading by 6,594 tons.¹⁰ While, salinity control remains an issue in the Big Sandy River Watershed, no active salinity control projects were identified.

3.1.1.2.4 Water Quality Sampling Sites

The USGS conducted water quality sampling in the Big Sandy River Watershed at 11 locations between 1976 and 1986 (**Table 6** and **Figure 8**). Parameters measured by the USGS at each site are listed in **Table 7**.

⁶ United States Bureau of Reclamation. "Colorado River Basin Salinity Control Program." United States Bureau of Reclamation. Online, Accessed: October 5, 2018. https://www.usbr.gov/uc/progact/salinity/.

⁷ Klajic, Leisl A., 2000. "The Eden Project." United States Bureau of Reclamation. Online, Accessed October 5, 2018 https://www.usbr.gov/projects/pdf.php?id=114.

⁸ United States Bureau of Reclamation, 2017. "Quality of Water Colorado River Basin – Progress Report No. 25." United States Bureau of Reclamation. Online, Accessed: July 30, 2019.

http://www.coloradoriversalinity.org/docs/Progress%20Report%2025%20-%20Reclamation.pdf

Site Number	Site Name	Parameters Measured	Sampling Events
9213705	BIG SANDY R BEL B SANDY RES WY	29	24
9213800	BIG SANDY R AT FARSON WY	29	25
9214955	JACK MORROW CR NR FARSON WY	27	7
9215500	LITTLE SANDY CR AT FARSON WY	29	24
420205108551001	JACK MORROW C NR STEAMBOAT MTN NR FARSON WY	32	3
420630108584001	JACK MORROW C AB PARNELL C NR FARSON WY	33	3
420630108584002	PARNELL C AT MOUTH NR FARSON WY	32	3
420650108594001	ROCK CABIN C AT MOUTH NR FARSON	50	4
421040109140001	JACK MORROW C AT MOUTH NR FARSON WY	43	7
421140109124001	PACIFIC C AB JACK MORROW C NR FARSON WY	43	5
421200109124001	N PACIFIC C NR FARSON WY	50	2

Table 6. USGS Water Quality Sampling Sites and Period of Record



Figure 8. USGS water quality sampling sites and period of record

Table 7. Water quality parameters measured at USGS sampling sites

	09213705	09213800	09214955	09215500	420205108551001	420630108584001	420630108584002	420650108594001	421040109140001	421140109124001	421200109124001
Number of Measurements	24	25	7	24	3	3	3	4	7	5	2
Temperature, water, degrees Celsius	Х	Х	X	X	Х	X	X	X	Х	X	Х
Discharge, instantaneous, cubic feet per second	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х
Turbidity, water, unfiltered, Jackson Turbidity Units					Х	Х	Х	Х	Х	Х	Х
Specific conductance, water, unfiltered, microsiemens per centimeter at 25 degrees Celsius					х	х	x	х	х	х	х
Hydrogen ion, water, unfiltered, calculated, milligrams per liter					Х	Х	Х	Х	Х	Х	Х
pH, water, unfiltered, field, standard units					Х	X	X	X	Х	Х	Х
Carbon dioxide, water, unfiltered, milligrams per liter					Х	Х	Х	Х	Х	Х	X
Acid neutralizing capacity, water, unfiltered, fixed endpoint (pH 4.5) titration, field, milligrams per liter as calcium carbonate					Х	Х	Х	Х	Х	Х	х
Bicarbonate, water, unfiltered, fixed endpoint (pH 4.5) titration, field, milligrams per liter	X	X	X	X	X	X	X	X	X	X	X
Carbonate, water, unfiltered, fixed endpoint (pH 8.3) titration, field, milligrams per liter	Х	X	X	X	X	X	X	X	х	X	x

	09213705	09213800	09214955	09215500	420205108551001	420630108584001	420630108584002	420650108594001	421040109140001	421140109124001	421200109124001
Number of Measurements	24	25	7	24	3	3	3	4	7	5	2
Nitrate plus nitrite, water, filtered, milligrams per liter as nitrogen	Х	Х	Х	Х	Х	Х	X	Х	Х	Х	Х
Hardness, water, milligrams per liter as calcium carbonate	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х
Noncarbonate hardness, water, unfiltered, field, milligrams per liter as calcium carbonate	Х	х	х	Х	х	х	х	Х	х	х	х
Calcium, water, filtered, milligrams per liter	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х
Magnesium, water, filtered, milligrams per liter	Х	Х	х	Х	Х	Х	х	Х	Х	х	Х
Sodium, water, filtered, milligrams per liter	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х
Sodium adsorption ratio (SAR), water, number	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х
Sodium fraction of cations, water, percent in equivalents of major cations	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х
Potassium, water, filtered, milligrams per liter	Х	X	Х	Х	X	Х	Х	Х	Х	X	X
Chloride, water, filtered, milligrams per liter	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х
Sulfate, water, filtered, milligrams per liter	X	X	X	X	X	X	X	X	X	X	X

	09213705	09213800	09214955	09215500	420205108551001	420630108584001	420630108584002	420650108594001	421040109140001	421140109124001	421200109124001
Number of Measurements	24	25	7	24	3	3	3	4	7	5	2
Fluoride, water, filtered, milligrams per liter	Х	Х	Х	X	Х	Х	Х	Х	Х	Х	
Silica, water, filtered, milligrams per liter as SiO2	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х
Boron, water, filtered, micrograms per liter					Х	Х	Х	Х	Х	Х	
Iron, water, filtered, micrograms per liter					Х	Х	Х	Х	Х	Х	Х
Discharge, instantaneous, cubic meters per second	Х	Х	Х	X	Х	Х	Х	Х	Х	Х	Х
Dissolved solids, water, filtered, sum of constituents, milligrams per liter	Х	X	Х	X	Х	Х	X	Х	Х	X	X
Dissolved solids, water, short tons per day	Х	Х	X	Х	X	Х	Х	Х	Х	Х	Х
Dissolved solids, water, filtered, short tons per acre-foot	Х	X	X	X	X	X	X	X	X	X	X
Suspended sediment, sieve diameter, percent smaller than 0.0625 millimeters					Х	Х	Х	Х	Х	Х	Х
Suspended sediment, fall diameter (deionized water), percent smaller than 0.0625 millimeters						X			х	Х	
Suspended sediment concentration, milligrams per liter					Х	X	Х	Х	Х	Х	Х
Suspended sediment discharge, short tons					X	X	Х	Х	Х	Х	Х

	09213705	09213800	09214955	09215500	420205108551001	420630108584001	420630108584002	420650108594001	421040109140001	421140109124001	421200109124001
Number of Measurements	24	25	7	24	3	3	3	4	7	5	2
per day											
Total nitrogen [nitrate + nitrite + ammonia + organic-N], water, unfiltered, milligrams per liter								Х	Х	х	х
Total nitrogen [nitrate + nitrite + ammonia + organic-N], water, filtered, milligrams per liter								Х	Х	X	х
Ammonia plus organic nitrogen, water, filtered, milligrams per liter as nitrogen								Х	Х	Х	Х
Ammonia plus organic nitrogen, suspended sediment, total, milligrams per liter as nitrogen								Х	Х	х	х
Ammonia plus organic nitrogen, water, unfiltered, milligrams per liter as nitrogen								Х	Х	Х	Х
Orthophosphate, water, filtered, milligrams per liter as PO4								Х	Х	х	Х
Phosphorus, water, unfiltered, milligrams per liter as phosphorus	Х	Х	Х	х				Х	Х	х	Х
Orthophosphate, water, filtered, milligrams per liter as phosphorus								Х	X	X	X
Bed sediment, fall diameter (deionized water), percent smaller than 0.0625 millimeters								X			X

Number of Magauramenta	09213705	09213800	09214955	09215500	420205108551001	420630108584001	420630108584002	420650108594001	421040109140001	421140109124001	421200109124001
Number of Measurements	24	25	/	24	3	3	3	4	/	5	2
Bed sediment, fall diameter (deionized water), percent smaller than 0.125 millimeters								Х			Х
Bed sediment, fall diameter (deionized water), percent smaller than 0.25 millimeters								Х			Х
Bed sediment, fall diameter (deionized water), percent smaller than 0.5 millimeters								Х			Х
Bed sediment, fall diameter (deionized water), percent smaller than 1 millimeter								Х			Х
Bed sediment, sieve diameter, percent smaller than 2 millimeters								Х			Х
Bed sediment, sieve diameter, percent smaller than 4 millimeters								Х			Х
Bed sediment, sieve diameter, percent smaller than 8 millimeters								Х			Х
Bed sediment, sieve diameter, percent smaller than 16 millimeters								Х			Х
Bed sediment, sieve diameter, percent smaller than 32 millimeters								X			X
Suspended sediment, fall diameter (deionized water), percent smaller than 0.004 millimeters									Х	Х	
	09213705	09213800	09214955	09215500	420205108551001	420630108584001	420630108584002	420650108594001	421040109140001	421140109124001	421200109124001
--	----------	----------	----------	----------	-----------------	-----------------	-----------------	-----------------	-----------------	-----------------	-----------------
Number of Measurements	24	25	7	24	3	3	3	4	7	5	2
Suspended sediment, fall diameter (deionized water), percent smaller than 0.016 millimeters									х	х	
Bed sediment, sieve diameter, percent smaller than 64 millimeters											Х
Bed sediment, sieve diameter, percent smaller than 128 millimeters											Х
Temperature, air, degrees Celsius	X	Х	X	X							
Agency analyzing sample, code	Х	Х	X	X							
pH, water, unfiltered, laboratory, standard units	X	Х	Х	Х							
Phosphorus, water, unfiltered, milligrams per liter as PO4	Х	Х		Х							
Sampling method, code	Х	Х		Х							
Specific conductance, water, unfiltered, laboratory, microsiemens per centimeter at 25 degrees Celsius	х	х	х	х							
Acid neutralizing capacity, water, unfiltered, fixed endpoint (pH 4.5) titration, laboratory, milligrams per liter as calcium carbonate	X	X	x	x							

3.1.1.3 Wetlands

According to National Wetlands Inventory (NWI) conducted by the United States Fish and Wildlife Service, the Big Sandy River watershed contains 17,099 acres of wetlands (**Figure 9**). The NWI indicates the existence of five wetland classes that are present within the Big Sandy River watershed: Freshwater Emergent Wetland, Freshwater Forested/Shrub Wetland, Freshwater Pond, Lake, and Riverine. Lake and Riverine classes are deep waterbodies that are flooded year-round (i.e lakes, reservoirs, and stream channels), therefore, these classes are excluded from the following analysis. Excluding Lake and Riverine classes, 11,182 acres of wetlands are present in the Big Sandy River watershed.

Emergent wetlands are the dominant wetland class in the Big Sandy Watershed, accounting for 80% of all wetlands (8,991 acres) (**Table 8**). Wetlands classified as scrub-shrub account for 12% of all wetlands (1,315 acres). Aquatic bed, unconsolidated bottom, and unconsolidated shore, respectively, account for 5%, 1%, and 1% of wetlands. The dominant water regimes in the Big Sandy Watershed are seasonally flooded which, respectively, account for 28% and 62% of wetlands. Temporarily flooded wetlands are submerged briefly during the growing season but are dry most of the growing season. Seasonally flooded wetlands are submerged for extended portions of the growing season but typically dry before the growing season ends. Reported acreages were calculated in ArcGIS from the 2016 National Wetlands Inventory shapefile of wetlands within the Big Sandy Watershed.⁹ In total, wetlands comprise approximately 1% of the total watershed area.

Wetland Type	Acres	% Total Wetlands	% Total Watershed
Freshwater Emergent Wetland	8,991	80%	0.8%
Freshwater Forested/Shrub Wetland	1,334	12%	0.1%
Freshwater Pond	857	8%	0.1%
Total:	11,182	-	1.0%

Table 8. Wetland types and acreage

Wetlands are further classified by special modifiers, which indicate wetlands resulting from natural or manmade landscape alterations. Most wetlands – 90% (10,093 acres) – are not assigned a special modifier. The most common modifiers are diked/impounded and excavated which, respectively, account for 7% (827 acres) and 2% (212 acres) of wetlands; both modifiers indicate human landscape alterations. The only special modifier that indicates natural modifications is beaver, which accounts for <1% of wetlands (50 acres).

⁹ United States Fish and Wildlife Service. "National Wetlands Inventory." United States Fish and Wildlife Service, https://www.fws.gov/wetlands/data/Mapper.html. Accessed October 15, 2018

The acreages listed under wetland class, subclass, water regime and special modifiers listed in **Table 9** are aggregated. Refer to **Table 10** for an individual listing of wetland area by unique classification codes.



Figure 9. Wetlands in the Big Sandy Watershed

System ¹	Class ²	Subclass ³	Water Regime ⁴	Special Modifiers ⁵
acres	acres	acres	acres	acres
Р	EM/US	1	A	b
11,182	2	9,009	3,152	50
	EM	n/a	В	h
	8,990	2,173	66	827
	FO		С	x
	1		6,979	212
	SS/EM		F	n/a
	18		811	10,093
	SS		G	
	1,315		51	
	AB		Н	
	583		122	
	UB			-
	126			
	US			
	148			

Table 9. Wetland habitat classification and acreage

 $^{1}P = Palustrine$

 $^{2}AB = Aquatic Bed$, EM = Emergent, FO = Forested, SS = Scrub-Shrub, UB = Unconsolidated Bottom,

US = Unconsolidated Shore³1 = Persistent, n/a = no subclass code

⁴A = Temporarily Flooded, B = Saturated, C = Seasonally Flooded, F = Semipermanently Flooded, G = Intermittently Flooded, H = Permanently Flooded
 ⁵b = Beaver, h = Diked/Impounded, x = Excavated, n/a = No Special Modifier Assigned

Attribute Code	Acreage	System ¹	Class ²	Subclass ³	Water Regime ⁴	Special Modifiers ⁵
PEM1/USA	2	Р	EM/US	1	А	
PEM1A	2,062	Р	EM	1	А	
PEM1Ah	244	Р	EM	1	А	h
PEM1B	56	Р	EM	1	В	
PEM1C	6,004	Р	EM	1	С	
PEM1Ch	276	Р	EM	1	С	h
PEM1Cx	73	Р	EM	1	С	х
PEM1F	215	Р	EM	1	F	
PEM1Fh	48	Р	EM	1	F	h
PEM1Fx	13	Р	EM	1	F	х
PFOA	1	Р	FO		А	
PSS/EM1A	16	Р	SS/EM	1	А	
PSS/EM1C	2	Р	SS/EM	1	С	
PSSA	752	Р	SS		А	
PSSB	11	Р	SS		В	
PSSC	552	Р	SS		С	
PABF	262	Р	AB		F	
PABFh	169	Р	AB		F	h
PABFx	100	Р	AB		F	х
PABGb	50	Р	AB		G	b
PABGh	1	Р	AB		G	h
PUBFx	4	Р	UB		F	х
PUBH	122	Р	UB		Н	
PUSA	21	Р	US		А	
PUSAh	53	Р	US		А	h
PUSAx	2	Р	US		A	X
PUSC	15	Р	US		С	
PUSCh	37	Р	US		С	h
PUSCx	20	Р	US		С	x

Table 10. Acreage, Percent Wetland Area, and Percent of Watershed Area by Wetland Classification

 $^{1}P = Palustrine$

 ^{2}AB = Aquatic Bed, EM = Emergent, FO = Forested, SS = Scrub-Shrub, UB = Unconsolidated Bottom, US = Unconsolidated Shore³1 = Persistent, n/a = no subclass code

 ^{4}A = Temporarily Flooded, B = Saturated, C = Seasonally Flooded, F = Semipermanently Flooded, G = Intermittently Flooded, H = Permanently Flooded

 ^{5}b = Beaver, h = Diked/Impounded, x = Excavated, n/a = No Special Modifier Assigned

3.1.2 Geology

The purpose of this section is to present current geologic conditions within the Big Sandy Watershed. The watershed encompasses nearly 1,150,000 acres and spans portions of Sublette, Fremont, and Sweetwater Counties.

3.1.2.1 Topography

The topography of the Big Sandy Watershed varies from high alpine peaks to desert plains. The basin generally decreases in elevation moving from the northeast to the southwest. At an elevation of 13,192-feet, Wind River Peak is the highest point in the watershed. The lowest point in the watershed is approximately 6,250 feet at the confluence of the Big Sandy River and Green River.

Major topographic features include the Wind River Mountains to the north, Antelope Hills to the east, and Sublettes Flat to the west. The watershed boundary follows the continental divide from Warrior Peak in the north (12,406-feet elevation) to Steamboat Mountain in the southwest (8,684-feet elevation). Big Sandy River and Little Sandy Creek bisect the watershed as they flow from their headwaters in the Wind River Mountains to the Green River Confluence in the southwest. Little Sandy Creek joins Big Sandy River near the center of the basin, not far from Big Sandy and Eden Reservoirs.

3.1.2.2 Regional Geology

The Big Sandy Watershed has its headwaters in the Wind River Range on the northeast side of the watershed. The Wind River Range is an asymmetric anticline consisting of Precambrian age, plutonic rock (greater than 540 million-year-old). The range runs northwest to southeast and was formed by thrusting southwest over sedimentary rocks of the Green River Basin. From the Wind River Mountains, the watershed descends to the southwest into the Green River Basin, which is a portion of the Wyoming Basin Provence. The Green River Basin is generally composed of continental sandstone, siltstone, and shale of Tertiary age (66 to 2.6 million-year-old).¹⁰

3.1.2.3 Structural Geology

Several faults have been identified in the Big Sandy Watershed by the USGS and Wyoming State Geological Survey (WGS) (**Figure 10**). Faults in the watershed generally follow a northwest to southeast alignments along the thrust line between the Wind River Range and the Green River Basin.¹¹ While most of the mapped faults are believed to be dormant, several Quaternary-age faults (active within the last 2.6 million years) are present. The Quaternary fault located in the north of the watershed (Leckie Fault) has a southwest dip direction while those located in the east have a

¹⁰ United States Geologic Survey, 2005. "Chapter 2: The Southwestern Wyoming Province – Introduction to a Geologic Assessment of Undiscovered Oil and Gas Resources." United States Geologic Service.

https://pubs.usgs.gov/dds/dds-069/dds-069-d/REPORTS/69_D_CH_2.pdf. Accessed: 10/18/2018. ¹¹ State of Wyoming Geologic Survey. "GIS Data: Wyoming Faults." Wyoming State Geologic Survey. http://www.wsgs.wyo.gov/pubs-maps/gis. Accessed: 10/17/2018.

north slip direction. All Quaternary Faults have a slip rate of less than 0.2 mm/year, normal slipsense, and are Class B.¹² Class B faults are defined by the USGS¹³ as:

Class A Geologic evidence demonstrates the existence of a Quaternary fault of tectonic origin, whether the fault is exposed for mapping or inferred from liquefaction or other deformational features.

Class B Geologic evidence demonstrates the existence of a fault or suggests Quaternary deformation, but either (1) the fault might not extend deeply enough to be a potential source of significant earthquakes, or (2) the currently available geologic evidence is too strong to confidently assign the feature to Class C but not strong enough to assign it to Class A.

Class C Geologic evidence is insufficient to demonstrate (1) the existence of tectonic fault, or (2) Quaternary slip or deformation associated with the feature.

Class D Geologic evidence demonstrates that the feature is not a tectonic fault or feature; this category includes features such as demonstrated joints or joint zones, landslides, erosional or fluvial scarps, or landforms resembling fault scarps, but of demonstrable non-tectonic origin.

¹² United States Geologic Survey, 2006. "Quaternary Fault and Fold Database of the United States." https://earthquake.usgs.gov/arcgis/rest/services/haz/qfaults/MapServer. Accessed: 10/17/2018.

¹³ A.J. Crone and R.L. Wheeler, 2000. "Data for Quaternary Faults, Liquefaction Features, and Possible Tectonic Features in the Central and Eastern United States, East of the Rocky Mountain Front. United States Geologic Service.



Figure 10. Faults within and near the Big Sandy River Watershed

3.1.2.4 Surficial Materials

The most common surficial soils in the Green River Basin portion of the watershed are residuum, eolian, slopewash, bedrock, and grus (**Figure 11**). Surficial geology data mapped in **Figure 11** was downloaded from the Wyoming State Geologic Survey at a 1:500,000 scale.¹⁴ In the Wind River Range, bedrock with grus, colluvium and glacial deposits are the dominant surficial soils. In the Green River Basin, residuum, eolian, and alluvium are the most common surficial soils. Surficial material unit definitions are also provided in **Figure 11**. Surface soil materials are often co-occurring and most mapped surficial geology in the watershed contains more than one type of surface material. General definitions of common surficial materials are provided in the following paragraphs.

Alluvium is a loose, unconsolidated deposit of clay, silt, sand, and gravel transported and deposited by flowing streams and deposited in non-marine setting. Soils are termed alluvial when the deposition cannot be attributed to a specific deposition process such as fluvial (river sediments), or glacial till. Because alluvium is unconsolidated, it is generally geologically young, often Quaternary in age.

¹⁴ State of Wyoming Geologic Survey. "GIS Data: Wyoming Surficial Geology." Wyoming State Geologic Survey. http://www.wsgs.wyo.gov/pubs-maps/gis. Accessed: 10/17/2018.





Figure 11. Surficial geology and unit descriptions

Colluvium is similar to, but distinct from, Alluvium. Colluvium is loosely consolidated weathered soil or rock particles deposited at the bottom of steep slopes by creep, slide, or local wash. In contrast to alluvium, which is fine grained and often well sorted, colluvium is typically a heterogeneous mixture of rock fragments and sediments. Colluvium is generally found in gently sloping aprons or fans accumulated at the base of drainage channels on hills or mountains.

Slopewash is material transported downslope by rain and non-channelized flows such as sheet flow. In contrast to Colluvium, slopewash accumulates at the base of hills or mountains where well-defined drainage channels are absent.

Eolian soils are those soils transported and deposited by wind actions and are most commonly found in arid environments. Eolian soils are transported by wind through suspension, saltation, and creep, and are often deposited in dunes or loess blankets on the surface.

Grus is accumulated coarse, angular, granular material resulting from disintegration of crystalline rocks through mechanical and chemical weathering. Grus is most commonly found in arid and semi-arid climates.

Residuum is unconsolidated, weathered – or partly weathered – mineral material that disintegrated in place and has not been transported. Residuum and associated soils are typically produced by chemical weathering and are mineralogically similar to underlying bedrock. While residuum is mereologically similar to underlying bedrock, its structural features and details are unique. In temperate climates, residuum is most often found in thin layers above bedrock.

3.1.2.5 Bedrock

The most common forms of bedrock in the Big Sandy Watershed are Green River Formation, Oligocene, upper and middle Eocene Rocks, Wasatch Formation, and Granitic rocks of 2,600-Ma age group. Bedrock geology data mapped in **Figure 12** was downloaded from the Wyoming State Geologic Survey at a 1:500,000 scale.¹⁵ Bedrock material unit definitions are also provided in **Figure 12**.

In the Wind River Range, granitic rocks of 2,600-Ma age group, Granite Gneiss, and Granodiorite of the Louse Lake Pluton, are the dominant bedrock types. These granitic bedrocks are generally Precambrian-age – greater than 540 million years old.

In the Green River Basin, the Green River Formation, Wasatch Formation, Oligocene, and upper and middle Eocene Rocks are the dominant bedrock types. These formations are generally flat lying or shallow dipping sedimentary bedrocks of Tertiary-age (66 to 2.6 million-year-old) or steeply dipping Paleozoic- and Mesozoic-age (540 to 66 million-year-old) sedimentary bedrocks.

¹⁵ State of Wyoming Geologic Survey. "GIS Data: Wyoming Bedrock Geology." Wyoming State Geologic Survey. http://www.wsgs.wyo.gov/pubs-maps/gis. Accessed: 10/17/2018.



Figure 12. Bedrock geology of the Big Sandy Watershed and unit descriptions

3.1.2.6 Soils

Soil data was downloaded from the National Resources Conservation Service (NRCS) web portal¹⁶ and soil groups are shown in **Figure 13**. NRCS soil group numbers are shown in the following figure (**Figure 14**) and descriptions of each soil group are contained in **Appendix G**. No digital soil group data is available in much of the watershed – data is especially sparse in Sweetwater County and some data is missing in eastern Sublette County.



Figure 13. NRCS soil units in the Big Sandy Watershed

¹⁶ National Resource Conservation Council. "Web Soil Survey." National Resource Conservation Council. https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx. Accessed: 10/19/2018.

NRC	S So	il Classif	icatio	on														
	1000	157		2122	2314		414	5341	55	504	64	74		77		84		9332
	104	158		214	2332		4201	5342	55	507	65	7401		7701		8401		94
	105	162		217	2344		4602	5343	55	521	66	7402		78		85		9402
	1100	163		218	235		463	5344	55	531	67	7403		7801		86		9405
	1101	166		2202	240		467	5345	56	6	68	75		7802		87		9408
	1109	167		2203	2416		50	54	56	501	69	7501		7805		88		9409
	111	169		2205	2436		51	5402	56	502	70	7502		7806		89		9419
	1114	1701		2207	2443		52	5405	56	604	7038	7503		7809		90		9504
	1115	171		2208	246		5203	5409	56	808	71	7504		7810		91		9507
	1116	172		2213	246		5204	5412	56	520	7111	7511		7815		9114		9519
	116	1801		2215	2468		53	5415	57	7	7112	76		7816		92		9601
	117	184		2216	2511		5303	5417	57	702	72	7601		7817		9202		9702
	119	189		2218	260		5313	5418	57	703	7201	7602		7818		9203		DA
	1205	198		2219	2602		5322	5419	57	705	7202	7602SU		79		9207	//////	NOTCOM
	128	202		2221	2641		5326	5425	57	706	7222	7603		80		9213		W
	131	204		2227	3203		5328	5430	57	707	7241	7604		8002		9215		
	132	206		2243	3303		5331	5437	58	3	7251	7621		8003		9216		
	134	2101		228	340		5332	5438	59	9	73	7632		8004		93		
	138	211		2304	3410		5333	5439	60)	7331	7641		81		9308		
	139	2114		2305	360		5334	5440	61	1	7341	7642		82		9321		
	140	2117		2308	370		5336	55	62	2	7342	7644		83		9325		
	155	2121		231	400		5337	5501	63	3	7343	7645		8302		9331		
			WYC	MING	WATER DE	/ELOPN	IENT C	OMMISSION				WENCK			NC	OV 2018		
					NRCS Soi	Classit	fication					Responsive	e partner. E	xceptional out	tcomes.		F	igure 1

Figure 14. NRCS soil unit codes

3.1.2.7 Geologic Hazards

Within the Big Sandy River Watershed, the possible primary geologic hazards include, landslides, karst, ground-shaking, and liquification. Karst is topography formed by dissolution of soluble rocks that can result in sinkholes and underground drainage systems. Ground-shaking is an earthquake caused geologic hazard that can trigger geologic hazards such as landslides and liquefaction.

3.1.2.7.1 Landslides

Landslides are the downslope movement of soil, rock, debris, and organic matter due to gravity and the resulting landforms.¹⁷ Landslides can occur as sudden, rapid downslope movement of debris or as gradual events spanning days to years. In the Big Sandy River watershed, landslides are most likely on steep slopes where thick glacial deposits, colluvium, and/or grus are present (**Figure 15**).

¹⁷ Highland, L.M. and Bobrowsky, P., 2008. "The landslide Handbook – A Guide to Understanding Landslides." United States Geologic Survey. https://pubs.er.usgs.gov/publication/cir1325. Accessed: 10/22/18.



Figure 15. Known landslide Areas

3.1.2.7.2 Karst

Karst is created when surface or groundwater passes through soluble rock, dissolving the stone and carrying it away in solution.¹⁸ The resulting common subsurface geologic formations include caves, drainage channels, and sinkholes; common surface geologic formations include Lapiés, haystack hills, and natural bridges. Bedrock formations in the Big Sandy River watershed that are susceptible to karst formation include: Fontanelle Tongue Member of the Green River Formation and the New Fork Range Member of the Wasatch Formation.

3.1.2.7.3 Ground Shaking

Ground shaking is an earthquake caused geologic hazard. The USGS documented four earthquakes with magnitude \geq 2.5 within the Big Sandy Watershed between 1900 and June 2019.¹⁹ The earthquakes ranged from magnitude 2.9 to 3.7 with the largest occurring in 1996.

Earthquakes can be naturally occurring or induced by human activities. Earthquakes can be induced by human activities including oil and gas extraction, injection into deep disposal wells,

¹⁸ Alpha, T.R., Galloway, J.P., Tinsley III, J.C. "Karst Topography – Teacher's Guide and Paper Model." United States Geologic Survey. https://geomaps.wr.usgs.gov/parks/cave/karst.html. Accessed: 10/22/18.

¹⁹ United States Geologic Survey. "Earthquake Hazards Program: Search Earthquake Catalog." United States Geological Survey. Online, Accessed July 2019. https://earthquake.usgs.gov/earthquakes/search/.

hydraulic fracturing, and construction of very large reservoirs.²⁰ Generally, induced earthquakes are of low magnitude, but powerful induced earthquakes have been observed. Both naturally occurring and induced earthquakes are possible in the Big Sandy Watershed.

The USGS releases updated earthquake hazard forecasts on approximately 6-year intervals. The last update was performed in 2014 and the next update is expected in 2020.²¹ Recently, the USGS incorporated induced earthquakes into the earthquake hazard forecast. The frequency, location, and magnitude of induced earthquakes can vary greatly from year-to-year as oil and gas or deep injection well operation changes. Therefore, the ground shaking hazard discussed may change in response to future oil and gas production operations in the Pinedale Anticline.

Ground shaking hazard can be defined in terms of peak ground acceleration (PGA). Earthquakes generate acceleration along both vertical and horizontal axis and PGA is defined as the largest absolute acceleration at a specific location. Earthquake engineering is often defined in terms of PGA,²² which is dependent on the intensity and proximity of an earthquake. Like flood events, PGA can be estimated for a variety of event occurrence intervals. PGA is commonly presented as a decimal fraction of Earth's gravitational acceleration (g) and is the nomenclature used in this document. For instance, a PGA of 0.3 is equivalent to 30% of Earth's gravitational acceleration.

The Big Sandy Watershed is subject to relatively minor ground shaking hazard (**Figure 16**). Estimates published by the USGS indicate that in a single year, there is 1% probability of an earthquake causing PGA between 0.02 to 0.06 (100-yr seismic event) in the Big Sandy Watershed (**Figure 17**). National and international design standards require evaluation of seismic events expected to occur less frequently than once every 100-years. The PGA of three additional return intervals was determined at three locations in the Big Sandy Watershed using the USGS Unified Hazard Tool²³:

- 10% chance of exceedance in 50-years (475-year return interval)
- 5% chance of exceedance in 50-years (975-year return interval)
- 2% chance of exceedance in 50-years (2,475-year return interval)

Site*	Lat	Long	PGA Chance of Exceedance in 50-years							
	Lat	Long	2%	5%	10%					
1	42.657	-109.214	0.201	0.108	0.067					
2	42.525	-109.290	0.200	0.107	0.067					
3	42.161	-109.406	0.194	0.104	0.065					
Average	-	-	0.198	0.106	0.066					

*See Figure 17 for site locations

²⁰ Hough, S. and Page, M., 2015. "A Century of Induced Earthquakes in Oklahoma?" Seismological Society of America. Volume 106, Issue 6.

²¹ United States Geologic Survey. "Earthquake Hazards Program: Induced Earthquakes, Hazard Estimation. United States Geologic Survey. Online, Accessed July 2019. https://earthquake.usgs.gov/research/induced/hazards.php

²² World Nuclear Association. "Nuclear Power Plants and Earthquakes." World Nuclear Association. Online, Accessed July 2019.

https://www.world-nuclear.org/information-library/safety-and-security/safety-of-plants/nuclear-power-plants-and-earthquakes.aspx ²³ United States Geologic Survey. "Earthquake Hazards Program: Unified Hazard Tool" United States Geologic Survey. Online, Accessed July 2019. https://earthquake.usgs.gov/hazards/interactive/

PGAs less than 0.001 are generally not perceptible by people while PGAs of 0.02 generally enough to cause people to lose balance. A PGA of 0.5 is very high and structures must be well designed to withstand this level of ground shaking.²⁴



Figure 16. Predicted peak ground acceleration with 1% probability in 1-year

²⁴ Lorant, G., 2010. "Seismic Design Principles." Whole Building Design Guide. National Institute of Building Sciences. Online, Accessed July 2019. http://www.wbdg.org/resources/seismic-design-principles



Figure 17. Recorded earthquake magnitude and predicted Peak Ground Acceleration with 1% probability in 1year

3.1.2.7.4 Liquification

Liquefaction is a situation in which solid material behaves like a liquid in response to an applied stress. Soil liquification can occur due to sudden singular changes in stress or cyclic stress such as those caused by ground shaking. Loose saturated granular soils are susceptible to liquefaction during ground shaking because they tend to decrease in volume, temporarily razing the pore pressure. If the pore pressure is sufficient to carry an applied load, the load is transferred from the soil matrix to the water.

During earthquakes, soil liquefaction can cause structures to sink into the soil or cause the soil to flow downslope.²⁵ The result of soil liquification can be catastrophic causing structures to experience a sudden loss of support. Buried utilities can float to the surface and crack due to irregular settlement. Earthen reservoir embankments can fail due to cracking or slumping.

Soils in the basin potentially susceptible to liquefaction include alluvium, alluvial fans, eolian deposits, landslide deposits, glacial deposits, and other loose, saturated soils. Locations where thin layers of soils not susceptible to liquification overlay susceptible soils also pose risk to structures.

²⁵ Institute of Professional Engineers of New Zealand. "IPE NV Liquefaction Fact Sheet." Institute of Professional Engineers of New Zealand. Online, Accessed July 2019. https://web.archive.org/web/20110505003900/http://www.ipenz.org.nz/ipenz/forms/pdfs/ChChFactSheets-Liquefaction.pdf

3.1.3 Climate

Climatic conditions in the Big Sandy Watershed range from wet alpine forests in the north to semiarid scrub is the central and southern areas. High alpine areas receive nearly 40 inches of precipitation annually and experience average monthly high temperatures ranging between 70degrees and 26-degrees Fahrenheit. The semi-arid scrub receives less than 8 inches of average annual rainfall and experiences average monthly highs ranging between 83-degrees and 26-degrees Fahrenheit.

3.1.3.1 Climate Stations

Four climate stations were identified in the Big Sandy River watershed: Farson 2NNE, Big Sandy Opening, Dutch Joe, and Superior 38.0 (**Table 11**). All four stations have daily precipitation data, three have daily air temperature data, two have record snow depth, and one has daily evaporation data (**Table 12**). None of the stations have solar radiation data. Two climate stations - Big Sandy Opening and Dutch Joe – are in the northern mountains and the other two climate stations – Farson 2NNE and Superior 38.0 – are in the arid south (**Figure 18**).

Dutch Joe recorded climate data for 50% of days between December 1st, 1915 and October 28th, 1926; principally from May through October. Average monthly climate data for Dutch Joe is only reported here between May and October because little daily data is available during winter months.

Big Sandy Opening began recording daily precipitation data on September 30th, 1978 and is currently active. While Big Sandy Opening is near Dutch Joe, the climate stations are analyzed separately because of the long gap between the data collection.

Climate data from Superior 38.0 is not tabulated or displayed because the coverage is insufficient to determine average daily, monthly, or annual values.

Complete data for all four climate stations was downloaded through the National Climatic Data Center webpage.²⁶ Average monthly climate data was calculated in TSTool v09.09.00 for months missing ten or fewer days of data. TSTool is a time series processing software program developed by the State of Colorado as part of the Colorado Decision Support Software package.

²⁶ National Centers for Environmental Information. "Data Tools: Find a Station." *National Climatic Data Center*, National Ocean and Atmospheric Administration, <u>www.ncdc.noaa.gov/cdo-web/datatools/findstation</u>. Accessed: August 30, 2018.

Stat	ion	Period o	f Record	C
Name	ID	Beginning	Ending	Coverage
Farson 2 NNE	USC00483170	01/01/1915	Present	82%
Superior 38.0	US1WYSW0007	01/17/2006	05/18/2018	5%
Big Sandy Opening	USS0009G09S	09/30/1978	Present	98%
Dutch Joe	USC00482780	01/12/1915	10/28/1926	50%

Table 11. Climate stations in the Big Sandy Watershed

Table 12. Daily data types recorded by climate stations

Station	Daily Data Types Recorded										
51411011	Precipitation	Air Temperature	Snow Depth	Evaporation							
Farson 2 NNE	Х	Х	Х	Х							
Superior 38.0	Х										
Big Sandy Opening	Х	Х	Х								
Dutch Joe	Х	Х									



Figure 18. Climate Station locations in the Big Sandy Watershed

3.1.3.2 Air Temperature

In an average year, air temperatures in the northern mountains peak in July; fluctuating between an average daily high of 72 and a low of 40 degrees Fahrenheit (**Figure 19** and **Table 13**). During

December, the coldest month, the average daily temperature ranges between a high of 27 and a low of zero degrees Fahrenheit.

In the southern lowlands, daily average temperatures range between a high of 83 degrees and a low of 44 degrees Fahrenheit during July. During January, the average daily temperature ranges between a high of 26 degrees and a low of 2 degrees Fahrenheit.

It is worth noting that during summer months, the southern lowlands experience both warmer days and nights than the northern mountains. However, from September to February, the average daily minimum temperature observed in the lowlands is nearly identical to the daily minimum temperature observed in the northern mountains. Additionally, during January and February, the average daily maximum temperature observed in the lowlands is nearly identical to the daily maximum temperature observed in the northern mountains.



Figure 19. Average daily maximum and minimum air temperature

Farson 2 NNE (483170)													
Period of Record	d: 01/	01/19	15 to I	Presen	nt			Lat:	42.13	98	Long	-109	.4309
											:		
	Jan	Feb	Mar	Apr	Ма	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
	<u> </u>	Ļ	<u> </u>	<u> </u>	У								
Average Max. Temperature (F)	26.3	31.3	41.1	53.5	64.8	74.8	83.4	80.7	71.6	59.4	41.5	29.7	54.8
Average Min. Temperature (F)	-5.6	-0.6	12.2	22.4	30.9	38.6	44.3	41.9	32.8	22.1	9.4	-1.8	20.5
Average Total Precipitation	0.4	0.4	0.4	0.7	1.1	0.9	0.6	0.7	0.7	0.6	0.4	0.3	7.2
(in.)													
Big Sandy Opening (USS0009G09S)													
Period of Record	$d \cdot 01/$	10/19	80 to 1	Preser	nt			Lat.	42.65 Long -109.26			26	
	<i>A</i> . 01,	10, 17,		10001	rt -								
	Jan	Feb	Mar	Apr	Ма	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
		Í			у			5					
Average Max. Temperature (F)	27.6	29.9	38.5	45.7	53.6	63.4	72.1	70.1	59.9	46.1	33.0	26.0	47.2
Average Min. Temperature (F)	0.3	0.8	7.7	16.6	26.4	33.7	39.6	37.9	31.5	22.5	8.0	0.1	18.9
Average Total Precipitation	2.1	2.2	2.2	2.5	2.7	1.8	1.2	1.2	2.0	1.9	2.2	2.3	21.9
(in.)		Í											
			-	<u>.</u>	•	•						•	
			Dutch	Joe	(USCO	0482	780)				-		
Period of Record:	12/01	/1916	to 10	/28/19	926			Lat:	42.61	67	Long :	-109	.25
	Jan	Feb	Mar	Apr	Ма	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
				· ·	У			,					
Average Max. Temperature (F)	-	-	-	35.5	56.1	66.6	75.4	73.5	62.6	47.7	-	-	-
Average Min. Temperature (F)	-	-	-	11.8	29.0	36.4	41.8	40.1	32.3	21.6	-	-	-
Average Total Precipitation	_	-	-	2.5	1.5	1.1	0.8	1.5	2.2	1.5	-	-	-
(in.)							0.0						

Table 13. Average monthly precipitation, maximum air temperature, and minimum air temperature

Note: Average monthly values calculated by Wenck Associates from data downloaded from National Oceanic and Atmospheric Association climate data search. Accessed August 2018. Available at https://www.ncdc.noaa.gov/cdo-web/search. For precipitation, months missing 10 or more daily measurements were excluded when calculating the monthly average.

3.1.3.3 Precipitation

Average annual precipitation in the Big Sandy River Watershed varies widely between the Wind River Mountains in the north and semi-arid scrub lands in the South. High alpine areas receive nearly 40-inches of precipitation annually while the semi-arid scrub lands receive fewer than 8-inches (**Figure 20**). Annual precipitation recorded at Big Sandy Opening and Farson 2 NNE are displayed in **Figure 21** for years with complete monthly data (i.e. no month is missing more than 10 days of data).

In the northern mountains, April and May are the highest precipitation months, respectively receiving an average of 2.5 and 2.7 inches at Big Sandy Opening (**Figure 21** and **Figure 22**). The lowest precipitation months are July and August, which both deliver an average of 1.2 inches at Big Sandy Opening. Average precipitation during the remaining eight months is relatively constant, ranging between 1.8 inches and 2.2 inches. On average, Big Sandy Opening records 21.9 inches of annual rainfall.

Average monthly precipitation at the Dutch Joe climate station generally agrees with precipitation recorded at Big Sandy Opening. Both indicate average monthly precipitation decreasing from May to July and then increasing again in the fall. The Big Sandy Opening period of record is longer, more recent, and more complete, therefore data from Dutch Joe should be viewed as supplemental to data from Big Sandy Opening.

At lower elevations (Farson 2 NNE), precipitation principally arrives between April and June, with peak precipitation occurring in May (**Figure 22**). Approximately three-quarters of an inch of precipitation falls each month from July to October and winter months see the least precipitation. On average, Farson 2 NNE records 7.3 inches of rainfall, approximately one-third the amount of rainfall recorded at Big Sandy Opening.



Figure 20. Average annual precipitation in the Big Sandy Watershed



Figure 21. Annual precipitation at Big Sandy Opening and Farson 2 NNE for years with complete monthly data (an incomplete month is missing more than 10 daily data entries). The period of record at Dutch Joe climate station does not include any years with complete monthly data.



Figure 22. Average Monthly Precipitation

3.2 BIOLOGICAL SYSTEMS

This section summarizes biological resources within the watershed. Primary biological resources addressed in this report include fisheries, wildlife, and vegetation. This report focuses on wildlife issues most likely to affect projects in the watershed, including presence of federally listed threatened, endangered and proposed species, big game crucial ranges, greater sage-grouse *(Centrocercus urophasianus)* core areas and leks, species listed as Wyoming Species of Greatest Conservation Need and other sensitive species identified by the Bureau of Land Management (BLM), U.S. Forest Service (USFS) and Wyoming Natural Diversity Database (WYNDD). Of particular relevance to planning in the watershed is the presence of two fish species that may become federally listed in the future, the flannelmouth sucker (*Catostomus discobolus*). Vegetation resources of primary importance are riparian areas and wetlands.

3.2.1 Fish and Wildlife

3.2.1.1 Fisheries

The rivers, lakes and reservoirs in the Big Sandy Watershed support a diverse population of fish. Non-native species include brook trout (*Salvelinus fontinalis*), brown trout (*Salmo trutta*), rainbow trout (*Oncorhynchus mykiss*), grayling (*Thymallus thymallus*), lake chub (*Couesius plumbeus*) and longnose sucker (*Catostomus catostomus*) (WGFD 2017). Many of these non-native species have been introduced as game fish in reservoirs and alpine lakes within the watershed. Burbot (*Lota lota*) is listed as a SGCN by WGFD; however, it was introduced illegally to the Big Sandy Watershed and is not native to the basin. Native fish species include bluehead sucker, flannelmouth sucker, roundtail chub (*Gila robusta*), and Colorado River cutthroat trout (*Oncorhynchus clarkia pleuriticus*), all of which are listed as *sensitive* by the USFS and BLM, and as SGCN Tier 1 or Tier 2 by the WGFD.

Bluehead and flannelmouth suckers are imperiled Colorado River Basin fish. Bluehead suckers currently occupy 50% of their historic range in the Upper Colorado River Basin. Hybridization with native and non-native sucker species poses the greatest risk to the persistence of populations in Wyoming. Bluehead suckers occupy the mainstream and tributaries of large rivers, and are more frequently found in headwaters than are flannelmouth suckers (WGFD 2017). The flannelmouth sucker currently occupies only 45% of its historic range within the Colorado River Basin. The primary reason for their decline in Wyoming is hybridization with non-native sucker species. The preferred habitat is large rivers with deep riffles and runs, although it can sometimes be found in lakes. In the Big Sandy Watershed, both species occur in the Big Sandy River and Little Sandy Creek, both of which have been designated as priority subdrainages for conservation of the species (WGFD 2017). To assist with maintaining populations of both bluehead and flannelmouth sucker in the Big Sandy Watershed, chemical treatments were conducted to remove nonnative species in the Big Sandy River, Sculpin Creek, and Long Draw. In addition, fish barriers have been constructed on the Big Sandy River just upstream of Big Sandy Reservoir to prevent recolonization of treated stream reaches by nonnative fish (WGFD 2017). Additional fish barriers have been constructed on Long Draw in the Little Sandy drainage and on Sculpin Creek in the Big Sandy drainage to isolate

the tributaries and facilitate chemical treatments which have eliminated significant source populations of non-native species that are impacting native suckers.

Fisheries resources within the Big Sandy Watershed have been classified by WGFD based on the productivity of trout per mile measured in each segment. Five classifications are used to describe the quality of each stream or river that has been assessed (**Figure 25**):

- Blue Ribbon: National importance; premium trout waters and fisheries with trout production greater than 600 pounds of trout per mile
- Red Ribbon: Statewide importance; very good trout waters and fisheries with trout production of 300 600 pounds of trout per mile
- Yellow Ribbon: Regional importance; important trout waters and fisheries with trout production of 50 300 pounds of trout per mile
- Green Ribbon: Local importance; low production waters and fisheries with trout production of less than 50 pounds of trout per mile
- Orange Ribbon: Any cool- or warm-water fish present
- Clear: No trout present

There are no Blue or Red Ribbon stream segments within the watershed. There are several smaller tributaries within the higher elevations of the Wind River Range and a small portion of the lower Big Sandy River that are classified as Yellow Ribbon (**Figure 23**). The watershed consists mostly of Green Ribbon stream segments, which is indicative of low fish production. There are no Orange Ribbon stream segments. The two reservoir fisheries in the watershed include Big Sandy and Eden Valley reservoirs. According to the WGFD fishing guide (WGFD 2015b), the primary fish species in Big Sandy reservoir are brown trout, rainbow trout, and burbot. Eden Valley Reservoir is not included in the WGFD fishing guide nor has it been stocked with any fish over the last two years (WGFD 2018, WGFD 2019), indicating this reservoir is not an important fishery.

The lower Big Sandy River, from the confluence with Little Sandy Creek to the Green River (approximately 35 miles), has been rated as Class 2AB waters by the Wyoming Department of Environmental Quality (WDEQ) Water Quality Division (WDEQ 2013). Class 2AB waters are designated to be used for drinking water, game fish, non-game fish, fish consumption, other aquatic life, recreation, wildlife, agriculture, industry and scenic value. Class 2AB waters are considered to have cold water fisheries. Other water quality ratings within the watershed include Class 2C and Class 3B. Class 2C waters have much the same designated uses as Class 2AB, but they do not include drinking water or game fish use. Class 2C waters are considered to have warm water fisheries. Class 3B waters include nearly the same designated uses as Class 2C, but they do not include non-game fish or fish consumption use; they are typically intermittent or ephemeral but have hydrologic conditions necessary to support invertebrate populations, amphibians, and obligate or facultative wetland plant species. Class 3B waters are not considered to have any fisheries resources.

In 1986, the State of Wyoming enacted legislation defining "instream flow" as a beneficial use of water. The law allows for instream flow water rights to be filed and granted on unappropriated water originating as natural flow or from storage in existing or new reservoirs (Tyrell 2001). There are no instream flow water rights within the Big Sandy Watershed (WWDO 2019).



Figure 23. Trout stream classification within the Big Sandy Watershed

3.2.1.2 Wildlife

Federally listed species and other species of concern within the Big Sandy Watershed were identified through queries of the U.S. Fish and Wildlife Service (USFWS) *Information, Planning and Consultation System* (IPAC, online database), the Wyoming Natural Diversity Database (WYNDD), and the Wyoming Game and Fish Department (WGFD) State Wildlife Action Plan (SWAP; WGFD 2017). Additional information regarding species of concern was obtained from the USFS and BLM. Information on big game (including ranges, parturition areas, major migration routes and known migration barriers), greater sage-grouse (including lek occupancy, core areas, and winter concentration areas), critical habitat areas, and fisheries was obtained from WGFD. Information on species ranges was obtained from the WYNDD Data Explorer web application and the Cornell Lab of Ornithology eBird database (eBird 2019).

3.2.1.2.1 Big Game

1. Pronghorn Antelope

A large portion of the Big Sandy Watershed is considered habitat for pronghorn antelope (*Antilocapra americana*; **Figure 24**). Much of the lower elevations of the basin are designated *crucial winter/yearlong* range; most of this crucial range is surrounded by a buffer designated as *winter/yearlong* range. Higher elevation areas in the east and north portions of the watershed are not considered pronghorn antelope habitat. There are no defined parturition areas within the watershed. Several pronghorn migration routes exist within the watershed, although U.S. Highway 191 and State Highway 28 are known migration barriers in the watershed.



Figure 24. Pronghorn antelope ranges, parturition areas, and migration routes within the Big Sandy Watershed

2. Mule Deer

Mule deer (*Odocoileus hemionus*) habitat is present within much of the lower elevations of the Big Sandy Watershed, including areas along waterways, floodplains and agricultural areas (**Figure 25**). Parts of the north-central, southeast, and an area along the Big Sandy River in the central and southwest portions of the watershed are designated as *severe winter relief* areas. Smaller portions of the central basin are designated as *crucial winter* and *winter* range. Small areas near the northern and southeast portions of the watershed are designated *crucial winter/yearlong* range. There are small areas designated as *parturition* areas at the watershed boundaries in the southeast and east, and within the far northern area of the watershed in the lower mountains of the southern Wind River Range. There are no designated *yearlong* ranges within the basin. The most notable migration routes within the basin are in the north-central area, mainly along the foothills of the Wind River Range; there are no know migration barriers.



Figure 25. Mule deer ranges, parturition areas and migration routes within the Big Sandy Watershed

3. Elk

Elk (*Cervus canadensis*) habitat is present in higher elevation areas within the Big Sandy Watershed (**Figure 26**). An area in the southeast of the basin at the watershed boundary is designated as *crucial winter/yearlong* range, with a surrounding buffer of *yearlong* range. In the northeastern part of the basin, along the watershed boundary, small areas are designated as *crucial winter* and *severe winter relief* areas. Buffering these ranges is an area of *winter range*; there is also a swath along the

Big Sandy River near the center of the basin designated as *winter range*. The mid-elevation areas of the southeast and northeast portions of the basin have designated *parturition* areas. Migration routes occur in the southeast and northeast areas of the basin; there are no known migration barriers within the study area.



Figure 26. Elk ranges, parturition areas, and migration routes within the Big Sandy Watershed

4. Moose

Moose (*Alces alces*) habitat within the Big Sandy Watershed is limited to riparian waterways and mid-elevations of the Wind River Range (**Figure 27**). Areas along the upper Big Sandy River and upper Little Sandy Creek near the foothills of the southern Wind River Range have been designated *crucial winter/yearlong* range. There are areas of designated *winter/yearlong* range along the lower Big Sandy River in the far southwest portion of the basin, in the upper Big Sandy River in the central and north part of the basin, and in the northern basin near the foothills of the Wind River Range. There are designated winter ranges along portions of Little Sandy Creek and the Big Sandy River in the central part of the basin. There are no *parturition* areas designated in the basin. Migration routes are localized to the northern part of the watershed; there are no known migration barriers.



Figure 27. Moose ranges, parturition areas, and migration routes within the Big Sandy Watershed

3.3.1.2.2 Greater Sage-Grouse

In 2015 the Governor of Wyoming issued Executive Order (EO) 2015-4 mandating that new developments within greater sage-grouse Core Population Areas should be authorized or conducted only when it can be demonstrated that the activity will not cause declines in greater sage-grouse populations. During the later stages of preparing this final report, said EO 2015-4 was revised and re-issued by Governor Gordon on August 21, 2019 (EO 2019-3). It should be noted that this revision should be used in place of any references to EO 2015-4 that may appear within the body of this report.

Approximately 992,000 acres (86.4%) of the Big Sandy Watershed are within the Greater South Pass Core Population Area (**Figure 28**). Based on 2018 survey data from the WGFD, 116 sage-grouse leks have been identified in the watershed, including 66 occupied, 49 unoccupied, and one with undetermined status. Most of the occupied leks are concentrated in the north-central part of the watershed (**Figure 28**).

EO 2019-3 contains several stipulations that may affect development activities in the watershed. Those stipulations that may affect water development activities are as follows:

- Surface disturbance will be limited to 5% of suitable greater sage-grouse habitat per an average of 640 acres over the entire assessment area, based on a density disturbance calculation (DDCT) tool.
- No surface occupancy within 0.6 miles of the perimeter of occupied greater sage-grouse leks in core areas or within 0.25 miles of the perimeter of occupied greater sage-grouse leks in non-core areas.
- No activities will be allowed from March 14 to July 1 outside of the 0.6-mile perimeter of an occupied lek in core areas where breeding, nesting and early brood-rearing habitat is present.
- In non-core habitat, no activity will be allowed from March 14 to July 1 outside of the 0.25mile perimeter of an occupied lek. A 2-mile seasonal buffer from March 15 to June 30 will apply to occupied leks where breeding, nesting and early brood-rearing habitat is present.
- In winter concentration areas, no activities will be allowed between December 1 and March 14.
- New project noise levels should not exceed 10 decibels above baseline noise at the perimeter of a lek from 6:00 pm to 8:00 am from March 1 to May 15.
- All vegetation removal and topsoil stripping in suitable habitat is prohibited from March 14 to July 1 in areas that are within 4 miles of an occupied lek.
- Reclamation should re-establish native grasses, forbs and shrubs during interim and final reclamation to achieve cover, species composition, and life form diversity commensurate with the surrounding plant community or desired ecological condition to benefit greater sage-grouse.
- Proponents of new projects are expected to coordinate with the permitting agency and local WGFD biologist to determine which leks need to be monitored and what data should be reported by the proponent. If declines in affected leks are determined to be caused by the project, the operator will propose adaptive management responses to increase the number of birds.



Figure 28. Greater sage-grouse core areas within the Big Sandy Watershed

3.2.1.2.3 Sensitive Species

1. Wildlife

The IPAC database indicates there are three species listed as threatened that may occur within the watershed, including Canada lynx (*Lynx canadensis*), grizzly bear (*Ursus arctos*) and western yellow-billed cuckoo (*Coccyzus americanus*). The USFWS Area of Influence (AOI) data shows the areas within the watershed where projects may result in impacts to the species (**Figure 29**). No AOI is available for the grizzly bear. The AOI does not define the potential species range, only the areas that may have direct or indirect effects on each individual species. Most important, if a project occurs outside of the AOI range, the target species does not need to be evaluated. In addition, one species proposed for listing as threatened (North American wolverine [*Gulo gulo*]) may occur. The whooping crane (*Grus americana*) is listed as experimental, non-essential; however, all whooping cranes previously occurring in western Wyoming were from a reintroduction effort at Grays Lake National Wildlife Refuge in Idaho which was considered a failure and terminated in 1989. The last whooping crane was observed in the region in 2002 (International Crane Foundation 2019). There is no designated Critical Habitat for any listed species within the watershed; however designated critical habitat for western yellow-billed cuckoo occurs along the Green River just downstream of the watershed.

Four species of fish listed as endangered do not occur within the Big Sandy Watershed but occur downstream in the Colorado River system and could be affected by water depletions within the Big Sandy Watershed (Table 14). As such, the USFWS AOI for these species spans the entire watershed. These species include humpback chub (*Gila cypha*), bonytail chub (*Gila elegans*), Colorado pikeminnow (*Ptychocheilus lucius*), and razorback sucker (*Xyrauchen texanus*). Any water storage project in the Big Sandy Watershed would be subject to the guidelines established under the Upper Colorado River Endangered Fish Recovery Program (Program). This program is a partnership between state, federal, and private entities to recover these four fish species in the Colorado River system. The Program has adopted a de Minimis policy which states that waterrelated activities in the Upper Colorado River Basin that result in less than 0.1 acre-foot per year of depletions in flow have no effect on the Colorado River endangered fish species and their critical habitat, and thus do not require consultation for potential effects on those species and critical habitat. The USFWS considers the yield of a new reservoir or an increase in yield associated with enlarging an existing reservoir when determining losses to the Upper Colorado River Basin. Any losses greater than 0.1 acre-foot per year will require a one-time fee be paid to the Upper Colorado River Endangered Fish Recovery Program. For fiscal year 2019, the depletion fee is \$21.61 per average annual acre-foot (Lynn Gemlo, USFWS, pers. comm.)

Common	-	USFWS	-	Potential Occurrence within
Name	Scientific Name	Status	Habitat Requirements	Watershed
Yellow-billed Cuckoo	Coccyzus americanus	Threatened	Mature riparian forest with multiple vegetative structures	High - Habitat is typically associated with river/stream systems; critical .habitat is identified downstream of watershed.
Canada Lynx	Lynx canadensis	Threatened	Mature forest in areas where snow cover is abundant.	Low – not commonly associated with water.
Grizzly Bear	Ursus arctos	Threatened	Habitat generalist, but commonly associated with forested areas around the greater Yellowstone area.	Moderate – may forage in river systems.
Humpback Chub	Gila cypha	Endangered	Upper Colorado and Green Rivers. Requires swift, turbid waters.	Low – not known to occur in watershed, but potential impacts to downstream populations of Colorado River Basin.
Bonytail Chub	Gila elegans	Endangered	Upper and Lower Colorado River. Preferred habitat unknown.	Low – not known to occur in watershed, but potential impacts to downstream populations of Colorado River Basin.
Colorado Pikeminnow	Ptychocheilus lucius	Endangered	Upper Colorado and Green Rivers. Adapted to warm rivers and requires uninterrupted passage with large spring peaks and stable base flows.	Low – not known to occur in watershed, but potential impacts to downstream populations of Colorado River Basin.
Razorback Sucker	Xyrauchen texanus	Endangered	Upper Colorado River. Requires high spring flows, cobble bars for spawning, and connected floodplains.	Low – not known to occur in watershed, but potential impacts to downstream populations of Colorado River Basin.

Table 14. US Fish and Wildlife Service (USFWS) Threatened and Endangered Species

The WGFD State Wildlife Action Plan maintains a list of Species of Greatest Conservation Need (SGCN) as a tool to identify species in the state in need of conservation and management actions. SGCN species that are known or likely to occur within the Big Sandy Watershed include 51 avian species, 23 mammal species, 3 amphibian species, 3 reptile species, 5 species of fish, and 23 species of mollusks (**Table 15**).

The BLM maintains a list of species of concern, which includes 27 species that are known or likely to occur within the study area. The USFS maintains a list of sensitive species at the regional level. There are 31 USFS sensitive species listed within Regions 2 and 4 that are known or are suspected to occur in the Big Sandy Watershed. BLM and USFS species of concern are also included in **Table 15**.



Figure 29. USFWS area of Influence for listed wildlife species within the Big Sandy Watershed
Class	Common Name	Scientific Name	G Rank	S Rank	USFWS	USFS	BLM	WGFD
Amphibians	Western Toad	Anaxyrus boreas	G4	S1		R4 Sensitive	Sensitive	Tier I
Amphibians	Northern Leopard Frog	Lithobates pipiens	G5	S3	NW	R2 Sensitive	Sensitive	Tier II
Amphibians	Great Basin Spadefoot	Spea intermontana	G5	S3			Sensitive	Tier II
Birds	Northern Goshawk	Accipiter gentilis	G5	S2BS3N	NW	R4 Sensitive	Sensitive	Tier I
Birds	Clark's Grebe	Aechmophorus clarkii	G5	S1B				Tier II
Birds	Western Grebe	Aechmophorus occidentalis	G5	S4B				Tier II
Birds	Boreal Owl	Aegolius funereus	G5	S2		R4 Sensitive		Tier II
Birds	Grasshopper Sparrow	Ammodramus savannarum	G5	S4		R2 Sensitive		Tier II
Birds	American Pipit	Anthus rubescens	G5	S5B				Tier III
Birds	Golden Eagle	Aquila chrysaetos	G5	S4BS4N				Tier II
Birds	Black-chinned Hummingbird	Archilochus alexandri	G5	S1B				Tier II
Birds	Sagebrush Sparrow	Artemisiospiza nevadensis	G5	S3		R2 Sensitive	Sensitive	Tier II
Birds	Short-eared Owl	Asio flammeus	G5	S2				Tier II
Birds	Burrowing Owl	Athene cunicularia	G4	S4B		R2 Sensitive	Sensitive	Tier I
Birds	American Bittern	Botaurus lentiginosus	G4	S3B		R2 Sensitive		Tier II
Birds	Ferruginous Hawk	Buteo regalis	G4	S4BS5N	NW	R2 Sensitive	Sensitive	Tier II
Birds	Swainson's Hawk	Buteo swainsoni	G5	S4B				Tier II
Birds	Canyon Wren	Catherpes mexicanus	G5	S2S3				Tier III

Table 15. Wildlife species listed as endangered, threatened or species of concern with known or suspected occurrence within the Big Sandy Watershed

Class	Common Name	Scientific Name	G Rank	S Rank	USFWS	USFS	BLM	WGFD
Birds	Greater Sage-Grouse	Centrocercus urophasianus	G3G4	\$3\$4	NW	R4 Sensitive	Sensitive	Tier II
Birds	Black Tern	Chlidonias niger	G4	S1		R2 Sensitive		Tier II
Birds	Common Nighthawk	Chordeiles minor	G5	S5BS5N				Tier III
Birds	Yellow-billed Cuckoo	Coccyzus americanus	G5	S1	LT			Tier II
Birds	Trumpeter Swan	Cygnus buccinator	G4	S3BS3N	NW	R4 Sensitive	Sensitive	Tier II
Birds	Bobolink	Dolichonyx oryzivorus	G5	S2				Tier II
Birds	Snowy Egret	Egretta thula	G5	S3B				Tier II
Birds	Willow Flycatcher	Empidonax traillii	G5	S4B				Tier III
Birds	Merlin	Falco columbarius	G5	S3BS4N				Tier III
Birds	Peregrine Falcon	Falco peregrinus	G4	S2	DM	R4 Sensitive	Sensitive	Tier II
Birds	American Kestrel	Falco sparverius	G5	S5B				Tier III
Birds	Common Loon	Gavia immer	G5	S1BS2N		R4 Sensitive		Tier I
Birds	MacGillivray's Warbler	Geothlypis tolmeiei	G5	S5BS5N				Tier II
Birds	Common Yellowthroat	Geothlypis trichas	G5	S4BS4N				Tier III
Birds	Bald Eagle	Haliaeetus leucocephalus	G5	S3BS5N	DM	R4 Sensitive	Sensitive	Tier II
Birds	Loggerhead Shrike	Lanius ludovicianus	G4	S3		R2 Sensitive	Sensitive	Tier II
Birds	Franklin's Gull	Leucophaeus pipixcan	G4G5	SHB				Tier II
Birds	Black Rosy-Finch	Leucosticte atrata	G4	S1BS2N				Tier II
Birds	Red Crossbill	Loxia curvirostra	G5	S5BS5N				Tier II

Class	Common Name	Scientific Name	G Rank	S Rank	USFWS	USFS	BLM	WGFD
Birds	Lewis's Woodpecker	Melanerpes lewis	G4	S2		R2 Sensitive		Tier II
Birds	Clark's Nutcracker	Nucifraga columbiana	G5	S5BS5N				Tier II
Birds	Long-billed Curlew	Numenius americanus	G5	S3B		R2 Sensitive	Sensitive	Tier II
Birds	Black-crowned Night- Heron	Nycticorax nycticorax	G5	S3B				Tier II
Birds	Sage Thrasher	Oreoscoptes montanus	G5	S5			Sensitive	Tier II
Birds	Virginia's Warbler	Oreothlypis virginiae	G5	S1				Tier II
Birds	American White Pelican	Pelecanus erythrorhynchos	G4	S1B				Tier II
Birds	White-faced Ibis	Plegadis chihi	G5	S1B			Sensitive	Tier II
Birds	Blue-gray Gnatcatcher	Popioptila caerulea	G5	S3?B				Tier III
Birds	Bushtit	Psaltriparus minimus	G5	S1				Tier II
Birds	McCown's Longspur	Rhynchophanes mccownii	G4	S2		R2 Sensitive		Tier II
Birds	Calliope Hummingbird	Selasphorus calliope	G5	S3				Tier II
Birds	Rufous Hummingbird	Selasphorus rufus	G5	S2B				Tier II
Birds	Black-throated Gray Warbler	Setophaga nigrescens	G5	S2				Tier II
Birds	Williamson's Sapsucker	Sphyrapicus thyroideus	G5	S2				Tier II
Birds	Brewer's Sparrow	Spizella breweri	G5	S5		R2 Sensitive	Sensitive	Tier II
Birds	Forster's Tern	Sterna forsteri	G5	S1				Tier II
Birds	Great Gray Owl	Strix nebulosa	G5	S2		R4 Sensitive		Tier II

Class	Common Name	Scientific Name	G Rank	S Rank	USFWS	USFS	BLM	WGFD
Fishes	Bluehead Sucker	Catostomus discobolus	G4	S3		R2 Sensitive	Sensitive	Tier I
Fishes	Flannelmouth Sucker	Catostomus latipinnis	G3G4	S3		R2 Sensitive	Sensitive	Tier I
Fishes	Roundtail Chub	Gila robusta	G3	S3		R2 Sensitive	Sensitive	Tier I
Fishes	Burbot	Lota lota	G5	S3S4				Tier II
Fishes	Colorado River Cutthroat Trout	Oncorhynchus clarkii pleuriticus	G4T3	S1	NW	R4 Sensitive	Sensitive	Tier II
Mammals	Moose	Alces americanus	G5	S5				Tier II
Mammals	Pallid Bat	Antrozous pallidus	G5	S1				Tier II
Mammals	Pygmy Rabbit	Brachylagus idahoensis	G4	S1	NW	R4 Sensitive	Sensitive	Tier II
Mammals	Townsend's Big-eared Bat	Corynorhinus townsendii	G3G4	S2		R4 Sensitive	Sensitive	Tier II
Mammals	White-tailed Prairie Dog	Cynomys leucurus	G4	S3	NW	R2 Sensitive	Sensitive	Tier II
Mammals	Northern Flying Squirrel	Glaucomys sabrinus	G5	S4				Tier II
Mammals	North American Wolverine	e Gulo gulo luscus	G4T4	S2	PT			Tier II
Mammals	Sagebrush Vole	Lemmiscus curtatus	G5	S5				Tier II
Mammals	Canada Lynx	Lynx canadensis	G5	S1	LT			Tier I
Mammals	Water Vole	Microtus richardsoni	G5	S1		R2 Sensitive		Tier II
Mammals	Western Small-footed Myotis	Myotis ciliolabrum	G5	S3B				Tier II
Mammals	Long-eared Myotis	Myotis evotis	G5	S4			Sensitive	Tier III
Mammals	Little Brown Myotis	Myotis lucifugus	G3	S3	UR			Tier II

Class	Common Name	Scientific Name	G Rank	S Rank	USFWS	USFS	BLM	WGFD
Mammals	Fringed Myotis	Myotis thysanodes	G4	S2		R2 Sensitive	Sensitive	Tier II
Mammals	Long-legged Myotis	Myotis volans	G5	S3B				Tier III
Mammals	Yuma Myotis	Myotis yumanensis	G5	S1				Tier III
Mammals	American Pika	Ochotona princeps	G5	S2	NW			Tier II
Mammals	Olive-backed Pocket Mouse	Perognathus fasciatus	G5	S4				Tier III
Mammals	Great Basin Pocket Mouse	Perognathus mollipilosus	G5	S2				Tier III
Mammals	Dwarf Shrew	Sorex nanus	G4	S4				Tier II
Mammals	Western Spotted Skunk	Spilogale gracilis	G5	S2?				Tier III
Mammals	Uinta Chipmunk	Tamias umbrinus	G5	S4S5				Tier III
Mammals	Idaho Pocket Gopher	Thomomys idahoensis	G4	S2			Sensitive	Tier II
Mammals	Grizzly Bear	Ursus arctos	G4	S1				
Mammals	Swift Fox	Vulpes velox	G3	S2	NW	R2 Sensitive	Sensitive	Tier II
Reptiles	Northern Rubber Boa	Charina bottae	G5	S2				Tier II
Reptiles	Greater Short-horned Lizard	Phrynosoma hernandesi	G5	S4				Tier II
Reptiles	Great Basin Gophersnake	Pituophis catenifer deserticolo	a G5T5	S3				Tier II
Mollusks	Marsh Rams-horn	Planorbella trivolvis	G5	S4				Tier III
Mollusks	Umbilicate Sprite	Promenetus umbilicatellus	G4	S3				Tier III
Mollusks	Western Glass-snail	Vitrina pellucida	G5	SNR				Tier III

Class	Common Name	Scientific Name	G Rank	S Rank	USFWS	USFS	BLM	WGFD
Mollusks	Quick Gloss	Zonitoides arboreus	G5	SNR				Tier III
Mollusks	Slope Ambersnail	Catinella wandae	G2	SNR				
Mollusks	Striate Disc	Discus shimekii	G5	S3				
Mollusks	Forest Disc	Discus whitneyi	G5	SNR				Tier III
Mollusks	Creeping Ancylid	Ferrissia rivularis	G5Q	S4				Tier III
Mollusks	Ashy Pebblesnail	Fluminicola fuscus	G2	SNR				
Mollusks	Prairie Fossaria	Fossaria bulimoides	G5	SNR				Tier III
Mollusks	Dusky Fossaria	Fossaria dalli	G5	S4				Tier III
Mollusks	Great Basin Rams-horn	Helisoma newberryi	G1Q	S1	NW			
Mollusks	Keeled Mountain Snail	Oreohelix carinifera	G1	SU	NW			Tier I
Mollusks	Rocky Mountain Mountainsnail	Oreohelix strigosa	G5Q	S2				Tier I
Mollusks	Berry's Mountainsnail	Oreohelix strigosa berryi	G5QT2	SH				Tier I
Mollusks	A Mountainsnail	Oreohelix strigosa depressa	G5QT5	SNR				Tier I
Mollusks	Bear Lodge Mountainsnail	Oreohelix strigosa ssp. 1	G5QTU	S2				Tier I
Mollusks	A Mountainsnail	Oreohelix subrudis	G5	SNR				Tier I
Mollusks	Rotund Physa	Physella columbiana	G2	S3				
Mollusks	Bear Lake Springsnail	Pyrgulopsis pilsbryana	G2	SNR				
Mollusks	Fat-whorled Pondsnail	Stagnicola bonnevillensis	G3	SH	NW			
Mollusks	Callused Vertigo Snail	Vertigo arthuri	G5	S3				

Class	Common Name	Scientific Name	G Rank	S Rank	USFWS	USFS	BLM	WGFD
Mollusks	Cylindrical Vertigo	Vertigo binneyana	G1	SNR				
Mollusks	Mystery Vertigo	Vertigo paradoxa	G4G5Q	S3				

G = Global rank: range-wide probability of extinction assigned by NatureServe (1 = critically imperiled, 2 = imperiled, 3 = vulnerable, 4 = apparently secure, 5 = secure)

S = State rank: range-wide probability of extinction assigned by WYNDD (1 = critically imperiled, 2 = imperiled, 3 = vulnerable, 4 = apparently secure, 5 = secure)

T = Trinomial rank: range-wide probability of extinction for a subspecies or variety (1 = critically imperiled, 2 = M imperiled, 3 = vulnerable, 4 = apparently secure, 5 = secure)

Rank modifiers: B = Breeding rank: status of migratory species during breeding season, N = Non-breeding rank: indicates the status of a migratory species during the nonbreeding season H = possibly extinct or extirpated, Q = questions exist regarding taxonomic validity of species or subspecies, NR = not ranked, U = unrankable, X = presumed extirpated, ? = questions exist regarding assigned numerical score.

USFWS: DM = delisted/formally monitored, LE = Listed Endangered, LT = Listed threatened, NW = not warranted, PT = proposed threatened, UR = petition under review

USFS: R2 = region 2, R4 = region 4

WGFD: SGCN = species of greatest conservation need, NSS: native species status rank (1 being most important, see WGFD matrix table at:

http://www.uwyo.edu/wyndd/codes-and-definitions/state-status/)

2. Plants

One species listed as Threatened by the USFWS, Ute Ladies'-tresses (*Spiranthes diluvialis*), has the potential to occur within the watershed (USFWS 2019). Ute Ladies'-tresses is known to occur near the base of the eastern slope of the Rocky Mountains in southeastern Wyoming; in north-central and central Colorado; in the upper Colorado River basin, particularly in the Uinta Basin; and in the Bonneville Basin along the Wasatch Front. The USFWS AOI data shows there is potential for impacts to the species along multiple drainages within the basin (**Figure 30**). The species occurs along riparian edges, gravel bars, old oxbows, high flow channels, and moist to wet meadows along perennial streams. It typically occurs in areas associated with old landscape features within historical floodplains of major rivers. It is also found in wetlands near freshwater lakes or springs. In Wyoming, populations have been documented in Goshen, Laramie, Niobrara, and Converse Counties. Although suitable habitat for the species is present in the watershed, there are no records of the species within the Big Sandy Watershed.

One USFWS candidate species, whitebark pine (*Pinus albicaulus*), has the potential to occur within the study area (USFWS 2019). The USFWS AOI data are mapped in the northern (Forest Service managed lands) portions of the watershed (**Figure 30**). Whitebark pine has a range that extends from mountains of northwestern Wyoming, south to the Wyoming Range and along the crest of the Wind River Range, where it reaches the edge of its distribution. Whitebark pine is a tree of high elevation ecosystems. It dominates many subalpine communities, and at mid-elevations, whitebark pine communities merge into mixed-conifer forest. Whitebark pine is known to occur in Fremont, Hot Springs, Lincoln, Park, Sublette and Teton Counties.

There are 40 plant species designated by the Wyoming Natural Diversity Database (WYNDD) as sensitive plant species that have known occurrences within the watershed (**Table 16**; WYNDD 2018). Twenty-nine of these species are listed as critically imperiled in the state of Wyoming, as indicated in **Table 16** with State Rank classification of S1. Three species are designated as sensitive by the USFS and an additional two species are designated as sensitive by the BLM.

Tuble 1011 Julie species of coned		ced becamence	within the	Big Sallay Waters	
Species Scientific Name			State		BLM
[synonym]	Common Name	Global Rank	Rank	USFS Sensitive	Sensitive
Abies concolor	White fir	G5	\$1	No	No
Artemisia biennis var. diffusa	Mystery wormwood	G5T1Q	S1	No	No
Asclepias uncialis	Wheel milkweed	G3G4	SH	Yes	No
Astragalus coltonii var. moabensis	Moab milkvetch	G4T3?	S2	No	No
Atriplex wolfii var. tenuissima [Atriplex tenuissima]	Wolf's orache	G3G4TNR	S1	No	No

Table 16. Plant species of concern with known or suspected occurrence within the Big Sandy Watershed

Creation Coloratific Norre	-	-	Chata	-	DIAA
[synonym]	Common Name	Global Rank	State Rank	USFS Sensitive	BLIVI Sensitive
Boechera gracilenta [B. selbyi ; Arabis selbyi; B. perennans and Arabis perennans; misappl.]	Dainty rockress	G4?Q	S1	No	No
Carex lenticularis var. dolia	Enander's sedge	G5T3Q	S1	No	No
Carex luzulina var. atropurpurea	Black and purple woodrush sedge	G5T3	S2	Yes	No
Ceanothus martinii	Martin's ceanothus	G4	S1	No	No
Chamaechaenactis scaposa [C. s. var. parva]	Fullstem	G4	S1S2	No	No
Cirsium pulcherrimum var. aridum [C. aridum]	Cedar Rim thistle	G5T2	S2	No	Yes
Cryptantha rollinsii	Rollin's cryptantha	G3	S1	No	No
Cuscuta californica var. breviflora [C. occidentalis]	Chaparral dodder	G4G5TNR	S1	No	No
Descurainia incisa var. paysonii [D. pinnata var. paysonii]	Payson's tansymustard	G5T3?	S2	No	No
Draba fladnizensis [D. f. var. pattersonii]	Austrian draba	G4	S2	No	No
Elymus simplex var. luxurians [Leymus simplex var. luxurians]	Long-awned alkali wildrye	G4?QTNR	S1S2	No	Yes
Ephedra cutleri [E. viridis var. viscida]	Cutler's jointfir	G5	S1	No	No
Eriogonum divaricatum	Divergent buckwheat	G4G5	S1	No	No
Eriogonum hookeri	Hooker's buckwheat	G5	S1	No	No
Eriophorum callitrix [E. c. var. callitrix]	Arctic cottongrass	G5	S1	No	No
Festuca viviparoidea var. krajinae [F. vivipara - misappl.]	Northern fescue	G4G5TNR	S1	No	No
Glossopetalon spinescens var. meionandrum [Forsellesia meionandra]	Spiny greasebush	G5T3	51	No	No
Ipomopsis polycladon [Gilia polycladon]	Many-branched ipomopsis	G4	S1	No	No

Species Scientific Name [synonym]	Common Name	Global Rank	State Rank	USFS Sensitive	BLM Sensitive
Juncus vaseyi	Vasey's rush	G5	S1	No	No
Koenigia islandica	Koenigia	G4	S1	No	No
Loeflingia squarrosa [Incl. var. artemisiarum and var. texanum]	Spreading pygmyleaf	G5	S1	No	No
Oxytheca dendroidea ssp. dendroidea	Narrowleaf oxytheca	G4	SH	No	No
Papaver radicatum ssp. kluane [P. kluanense; P. lapponicum var. occidentale]	Alpine poppy	G5T4	S2	No	No
Parrya rydbergii [P. nudicaulis, misappl.]	Rydberg's parrya	GNR	S2	Yes	No
Penstemon scariosus var. garrettii	Garrett's beardtongue	G4T3	S1	No	No
Phacelia demissa var. demissa [Incl. var. knightii]	Intermountain phacelia	G5T3?Q	S1	No	No
Phacelia demissa var. minor	Small intermountain phacelia	G5T3?Q	S1	No	No
Phacelia salina	Bitter Creek phacelia	G3?Q	S2	No	No
Philadelphus microphyllus var. occidentalis	Littleleaf mockorange	G5?T3T4	S1	No	No
Physocarpus alternans	Dwarf ninebark	G4	S1	No	No
Potentilla multisecta [P. diversifolia var. multisecta]	Featherleaf cinquefoil	GNR	S1	No	No
Potentilla subgorodkovii [P. uniflora]	One-flower cinquefoil	G5	S2	No	No
Sabulina macrantha [Arenaria filiorum; A. rubella var. filiorum, incl. Minuartia macrantha]	Thread-branch stitchwort	G3	S1	No	No
Sambucus nigra ssp. cerulea [S. cerulea var. cerulea]	Blue elderberry	G5T5	S1?	No	No
Silene uralensis ssp. uralensis	Nodding catchfly	G5TNR	S1	No	No

Species Scientific Name	-	-	State	-	BLM
[synonym]	Common Name	Global Rank	Rank	USFS Sensitive	Sensitive

G = Global rank: range-wide probability of extinction assigned by NatureServe (1 = critically imperiled, 2 = imperiled, 3 = vulnerable, 4 = apparently secure, 5 = secure)

S = State rank: range-wide probability of extinction assigned by WYNDD (1 = critically imperiled, 2 = imperiled, 3 = vulnerable, 4 = apparently secure, 5 = secure)

T = Trinomial rank: range-wide probability of extinction for a subspecies or variety (1 = critically imperiled, 2 = M imperiled,

3 = vulnerable, 4 = apparently secure, 5 = secure)

Rank modifiers: H = possibly extinct or extirpated, Q = questions exist regarding taxonomic validity of species or subspecies, NR = not ranked, ? = questions exist regarding assigned numerical score



Figure 30. USFWS area of influence for listed plant species within the Big Sandy Watershed

3.2.2 Habitat Priority Areas

WGFD provides oversight and management for natural resources in Wyoming. WGFD has prepared a Strategic Habitat Plan (SHP; WGFD 2015a) which identifies five goals including conservation and management, enhancement, increased recreation, increased public awareness, and promotions of collaborative efforts. Two types of habitat priority areas are defined by WGFD; *Crucial Habitat Priority Areas* (CHPA) and *Enhancement Habitat Priority Areas* (EHPA). Each of the two types of priority areas are farther divided into Aquatic, Terrestrial or Combined. In addition to CHPA and EHPA, WGFD has designated *Crucial Stream Corridors* and *Key Nongame Wildlife Areas*. The BLM also has designated *Areas of Critical Environmental Concern* within the watershed (**Figure 31**).

3.2.2.1 Crucial Habitat Priority Areas

According to WGFD, CHPA "are based on significant biological or ecological values. These are areas that need to be protected or managed to maintain viable healthy populations of terrestrial and aquatic wildlife for the present and future. They represent habitat values and identify where those values occur on the landscape. Examples of values include crucial winter range, sage grouse core area seasonal habitats, Species of Greatest Conservation Need (SGCN) diversity and uniqueness, quality and condition of vegetative communities, movement corridors, quality of watershed hydrologic function, etc...." CHPA have been identified as "crucial" for maintaining habitat for wildlife. A large portion of the upper Big Sandy River and upper Little Sandy Creek, including their tributaries, are designated CHPA.

3.2.2.2 Enhancement Habitat Priority Areas

According to WGFD, EHPA "represent those with a realistic potential to address wildlife habitat issues and to improve, enhance, or restore wildlife habitats. These areas offer potential for improving habitat and focusing Department habitat efforts. They may overlap crucial areas or be distinct from them. Enhancement areas are based on habitat issues. Like crucial areas where values are key, issues were identified by regional personnel and used to select enhancement habitat areas. Examples of issues include loss of aspen communities, habitat fragmentation, development, loss of connectivity, water quality effects, water quantity limitations, beetle killed conifer, lack of fish passage, loss of fish to diversions, degraded habitat, etc." EHPA have been identified as having been degraded and have potential for "enhancement" of habitat for wildlife. Most of the lower Big Sandy River, below the junction of Little Sandy Creek, is designated as an EHPA.

3.2.2.3 Crucial Stream Corridors

WGFD has defined Crucial Stream Corridors as river segments that have been identified to be unique, have high species richness, lack migration barriers, remain in relatively natural conditions, and provide connectivity between sources and sink locations. The corridors include main stem, side channels, and braided channel areas. Most of the Big Sandy River above Big Sandy Reservoir is a designated Crucial Stream Corridor.



Figure 31. Habitat Priority Areas within the Big Sandy Watershed

3.2.2.4 Key Nongame Wildlife Areas

WGFD has identified Key Nongame Wildlife Areas (KNWA) as habitat that supports birds and mammals classified as SGCN. These areas contain high densities of wildlife, high species richness, and unique habitat characteristics with low habitat fragmentation. A small area along the lower Big Sandy River, above the junction with the Green River, is designated as a KNWA.

3.2.2.5 Areas of Critical Environmental Concern - BLM

The BLM, in their Green River Resource Management Plan, designates Areas of Critical Environmental Concern (ACEC) "where special management attention is needed to protect important historical, cultural, and scenic values, or fish and wildlife or other natural resources." Four ACEC are located within the southeastern portion of the study area: Greater Sand Dunes, Oregon Buttes, South Pass Historic Landscape, and Steamboat Mountain.

3.2.3 Land Cover

The National Land Cover Database (NLCD) is a nationwide spatial dataset based on Landsat satellite data that provides a generalized characterization of land surface classes at a 30-meter resolution. NLCD products are created through a cooperative project conducted by the Multi-Resolution Land

Characteristics (MRLC) Consortium, which is a partnership of the U.S. Geological Survey, the National Oceanic and Atmospheric Administration, the BLM, the U.S. Environmental Protection Agency, the U.S. Department of Agriculture, LANDFIRE, the USFS, the National Park Service, the National Agricultural Statistics Service, and the USFWS.

Ecological Site Descriptions, produced by the Natural Resources Conservation Service (NRCS), were used to provide an inventory and analysis of landscapes. An ecological site is defined as "*a distinctive kind of land with specific characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation.*"

3.2.3.1 Plant Communities

Land cover within the Big Sandy Watershed is dominated by shrub-scrub communities, which compose 81.5% of the study area. Herbaceous grassland communities compose 11.0% of the study area and occur primarily at lower elevations (NLCD 2011; **Figure 32**). At high elevations, the study area is dominated by evergreen forest communities, with a transition to perennial snow/ice at the very highest elevations of the Wind River Range in the northernmost part of the watershed. Hay/pasture comprises less than 2% of the study area. All other land cover types each compose less than 1% of the study area. **Table 17** provides a description of all land cover types found within the watershed.



Figure 32. NLCD Land Cover types within the Big Sandy Watershed.

Table 17. NLCD Land Cover Classes within the Big Sandy Watershed (NLCD 2011)

			Percent
Land Cover Class	Description	Size in Acres	Composition
	Areas dominated by shrubs; less than 5 meters tall with shrub canopy typically greater than 20%		
Shrub/Scrub	of total vegetation. This class includes true shrubs, young trees in an early successional stage or	935,648	81.5
	trees stunted from environmental conditions.		
	Areas dominated by graminoid or herbaceous vegetation, generally greater than 80% of total		
Herbaceous	vegetation. These areas are not subject to intensive management such as tilling, but can be used	126,242	11.0
	for grazing.		
	Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total		
Evergreen Forest	vegetation cover. More than 75% of the tree species maintain their leaves all year. Canopy is	35,758	3.1
	never without green foliage.		
	Areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the		
Hay/Pasture	production of seed or hay crops, typically on a perennial cycle. Pasture/hay vegetation accounts	17,969	1.6
	for greater than 20% of total vegetation.		
Emergent Herbaceous	Areas where perennial herbaceous vegetation accounts for greater than 80% of vegetative cover	7,457	0.6
wetlands	and the soil or substrate is periodically saturated with or covered with water.		
Darran Land	Areas of bedrock, desert pavement, scarps, talus, slides, volcanic material, glacial debris, sand	F 071	0.5
Barren Lanu	dunes, sinp mines, gravel pits and other accumulations of earthen material. Generally, vegetation	5,871	0.5
	Accounts for less than 15% of total cover.		
Deciduous Forest	vegetation cover. More than 75% of the tree species shed foliage simultaneously in response to	5 324	0.5
Deciduous i orest	seasonal change	5,524	0.5
	Areas with a mixture of some constructed materials, but mostly vegetation in the form of lawn		
	grasses. Impervious surfaces account for less than 20% of total cover. These areas most		
Developed, Open Space	commonly include large-lot single-family housing units, parks, golf courses, and vegetation	4,759	0.4
	planted in developed settings for recreation, erosion control, or aesthetic purposes.		
Open Water	Areas of open water, generally with less than 25% cover of vegetation or soil.	3,541	0.3
) A / a a du i) A / a t l a ia d a	Areas where forest or shrubland vegetation accounts for greater than 20% of vegetative cover	2 002	0.2
woody wetlands	and the soil or substrate is periodically saturated with or covered with water.	3,092	0.3
	Areas with a mixture of constructed materials and vegetation. Impervious surfaces account for		
Developed, Low Intensity	y 20% to 49% percent of total cover. These areas most commonly include single-family housing	1,626	0.1
	units.		
	Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total		
Mixed Forest	vegetation cover. Neither deciduous nor evergreen species are greater than 75% of total tree	226	<0.1
	cover.		

		-	Percent
Land Cover Class	Description	Size in Acres	Composition
	Areas used for the production of annual crops, such as corn or wheat, and also perennial woody		
Cultivated Crops	crops such as orchards and vineyards. Crop vegetation accounts for greater than 20% of total vegetation. This class also includes all land being actively tilled.	151	<0.1
Developed, Medium Intensity	Areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50% to 79% of the total cover. These areas most commonly include single-family housing units.	55	<0.1
Perennial Snow/Ice	Areas characterized by a perennial cover of ice and/or snow, generally greater than 25% of total cover.	12	<0.1
Developed, High Intens	Highly developed areas where people reside or work in high numbers. Examples include ityapartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80% to 100% of the total cover.	2	<0.1

3.2.3.2 Ecological Dynamics

Over 80% of the Big Sandy Watershed is dominated by shrub-scrub communities, mostly in the lower elevations, and includes mixed sagebrush/grass and rabbitbrush communities. These scrub-shrub communities include thickspike wheatgrass (*Elymus lanceolatus*), needle-and-thread grass (*Hesperostipa comata*), Indian ricegrass (*Oryzopsis hymenoides*), bluebunch wheatgrass (*Pseudoroegneria spicata*), prairie junegrass (*Koeleria macrantha*), and bottlebrush squirreltail (*Elymus elymoides*). Other grasses occurring may include sandberg bluegrass (*Poa secunda*), threadleaf (*Carex filif*olia) and needleleaf sedge (*Carex duriuscula*), and plains reedgrass (*Calamagrostis montanensis*). Wyoming big sagebrush (*Artemisia tridentata wyomingensis*) is the dominant woody plant in these communities. Other woody species may include green rabbitbrush (*Chrysothamnus viscidiflorus*), bud sagebrush (*Artemisia spinescens*), shadscale (*Atriplex confertifolia*), spiny hopsage (*Grayia spinosa*), and winterfat (*Krascheninnikovia lanata*). The overstory of sagebrush and understory of grass and forbs in this community is a diverse plant community that provides forage for domestic livestock and several wildlife species, including mule deer and pronghorn. This plant community is extremely stable and well adapted to the variable climatic conditions of a desert environment, including periods of drought.

Disturbance of scrub-shrub communities can lead to changes in the vegetation structure and overall function of the community. Disturbance due to grazing can lead to changes in the understory, with less-palatable grasses such as thickspike wheatgrass, Letterman needlegrass (*Achnatherum lettermanii*), and bluegrasses becoming dominant as more palatable plants such as bluebunch wheatgrass, Indian ricegrass, and needle-and-thread become less abundant. Wyoming big sagebrush and rabbitbrush continue to dominate the overstory, which allows the biotic integrity of the plant community and associated watershed to remain intact. However, under high grazing pressure the function of the community to provide forage for wildlife may decrease and wildlife values may shift toward different species. Sagebrush-steppe communities exposed to severe disturbance, such as brush management or wildfire, are often reestablished by green rabbitbrush, rhizomatous wheatgrasses, low growing bunchgrasses such as sandberg bluegrass, and unpalatable annual and perennial forbs. Severe disturbance can result in an increase in bare ground, which leads to unstable soils and increased erosion. This leads to decreased biotic integrity and the function of the associated watershed can be at risk.

Disturbance can also affect the vegetation structure and function of herbaceous grassland communities, which make up 11% of the watershed. These communities are mostly intermixed with scrub-shrub in the lower elevations and are frequently influenced by grazing practices. In lightly grazed areas, dominant grasses include basin wildrye (*Leymus cinereus*), Nebraska sedge (*Carex nebrascensis*), tufted hairgrass (*Deschampsia cespitosa*), and western wheatgrass (*Pascopyrum smithii*). Other grasses and grass-like plants may include Baltic rush (*Juncus balticus*), tall mannagrass (*Glyceria elata*), bluejoint (*Calamagrostis canadensis*) and northern reedgrass (*Calamagrostis stricta*), Nuttall's alkaligrass (*Puccinellia nuttalliana*), alkali sacaton (*Sporobolus airoides*), mat muhly (*Muhlenbergia richardsonis*), inland sedge (*Carex interior*), and slender wheatgrass (*Elymus trachycaulus*). Willows (*Salix* spp.) and a variety of woody plants may be present in low densities, and include buffaloberry (*Shepherdia canadensis*), wildrose (*Rosa* spp.), rubber rabbitbrush (*Ericameria nauseosa*), and shrubby cinquefoil (*Dasiphora fruticosa*). The

diversity in plant species results in a stable environment and a reliable water table, which allows for high drought resistance. In areas of moderate continuous grazing pressure, redtop (*Agrostis* spp.), Kentucky bluegrass (*Poa pratensis*), bearded wheatgrass (*Elymus caninus*), spike sedge (*Carex nardina*) and Baltic rush often become dominant species. Mature and/or decadent willows usually persist in the overstory, but woody plants become lacking in a diversity of age classes. Stability in these areas is moderate. The biotic integrity is somewhat compromised by a shift in species composition toward introduced and less palatable plants, and the watershed is usually functioning, but at risk.

In grassland communities subject to heavy grazing pressure, alteration of vegetation types can result in degradation of soil and water. As drier conditions develop, plant species requiring high levels of moisture are often outcompeted by drought-tolerant species such as Kentucky bluegrass, rhizomatous wheatgrasses, rubber rabbitbrush, American licorice (*Glycyrrhiza lepidota*) and herbaceous cinquefoils (*Potentilla* spp.). Over time, willows disappear due to a lack of replacement seedlings and saplings, which leads to unstable soils and increased erosion. Increased bare ground provides opportunity for noxious weeds to dominate in areas with heavy grazing. Drier conditions can lead to a reduced water table and a decrease in riparian vegetation, which often results in erosion of stream banks. This degradation of herbaceous habitats results in a decrease in biotic integrity and ecosystem function of the herbaceous community and associated watershed.

Evergreen forest communities compose just 3% of the watershed and are confined to the high elevations in the north end of the study area. Generally, Douglas fir (*Pseudotsuga menziesii*) dominates the canopy at lower mountain elevations, lodgepole pine (*Pinus contorta*) dominates at mid elevations, and Engelmann spruce (*Picea engelmannii*), subalpine fir (*Abies lasiocarpa*), and whitebark pine co-dominate at higher elevations. In the montane and subalpine environment, evergreen forests are interspersed with montane grasslands and meadows, aspen (*Populus tremuloides*) groves, wetlands, riparian areas, lakes and streams. Vegetation is largely influenced by climatic conditions, including low temperatures and a short, often dry growing season which limits photosynthesis, and frosts are possible throughout the year. Vegetation structure is heavily influenced by elevation, aspect, soil type, snow accumulation, and major disturbances such as fire, windstorms, insect outbreaks, and human activities such as logging. Due to solar effects, south slopes are generally warmer and drier, which provide conditions for aspen stands and sparse conifers, as well as montane shrubs. North slopes are generally cooler and more mesic, conditions which favor large stands of conifers and a denser canopy cover.

Hay and pasture land cover compose less than 2% of the watershed. Hay and pasture production is confined mainly to areas adjacent to perennial creeks of the lower watershed, where surface water is used for irrigation. A number of ditches supply water from Big Sandy Reservoir and Eden Reservoir, mainly to supply irrigation water to areas around Farson and Eden.

Deciduous forest covers less than 1% of the watershed. These forests include cottonwood (*Populus* spp.) riparian areas and successional aspen meadows among evergreen forests of the Wind River Range.

Emergent herbaceous wetlands and woody wetlands combined cover less than 1% of the watershed. These land cover types are discussed in greater detail in the wetlands section of this report.

Open water and barren areas cover less than 1% of the watershed. Big Sandy Reservoir and Eden Reservoir are the two largest bodies of water within the watershed. Other land cover types within the watershed include mixed forest (<0.1%), cultivated crop (<0.1), perennial snow/ice (<0.1) and less than 1% total of various intensity developed land (developed/open space, 0.4%; developed/low intensity, 0.1%; developed/medium intensity, <0.1%; and developed/high intensity, <0.1%).

3.2.3.3 Riparian Areas

Riparian areas are lands immediately adjacent to creeks, streams and rivers. Riparian areas provide a buffer between aquatic and terrestrial ecosystems. Riparian areas compose less than 4% of Wyoming's land area yet provide habitat for over 80% of vertebrate species in the state. Riparian areas support critical ecological functions including buffering water loss from upland drainages, filtering chemicals and organic waste, trapping sediment, reducing soil erosion, building and maintaining stream banks, influencing stream channel dynamics, moderating stream temperatures, providing foraging and nesting habitat for a variety of species, serving as movement corridors for wildlife, and providing habitat for terrestrial invertebrates that are a key component of stream food webs. Riparian areas also provide water for agricultural, recreational and water development use.

Riparian areas were defined based on land cover data from the GAP Analysis Program (GAP), administered by the U.S. Geological Service (USGS). The GAP uses satellite imagery to create a national land cover map at a 30-meter resolution. The map legend is based on NatureServe's Ecological Systems Classification, and includes data on vegetation and land use patterns.

Riparian areas cover just 2.3% of the watershed, composed of six different classes (US Geological Survey 2011 [**Figure 33**]). **Table 18** summarizes the riparian classes within the watershed.

Ecological Riparian System ¹	Acres in Watershed	% of Watershed Basin
Introduced Riparian and Wetland Vegetation	24,036	2.1
Northern Rocky Mountain Lower Montane Riparian Woodland and Shrubland	1450	0.1
Rocky Mountain Lower Montane Riparian Woodland and Shrubland	213	<0.1
Rocky Mountain Subalpine-Montane Riparian Shrubland	188	<0.1
Rocky Mountain Subalpine-Montane Riparian Woodland	95	<0.1
Western Great Plains Riparian Woodland and Shrubland	42	<0.1

Table 18. Ecological riparian systems within Big Sandy Watershed



Figure 33. Riparian systems of the Big Sandy Watershed

Introduced Riparian and Wetland Vegetation within the Big Sandy Watershed refers to those areas that have been established due to agricultural activities such as upland irrigation. These areas have not historically been identified to support riparian and wetland vegetation communities.

3.2.3.4 Wetlands

Wetlands are defined as areas inundated or saturated at a frequency and duration sufficient to support a prevalence of hydrophytic vegetation typically adapted for wet soil conditions. Like riparian areas, wetlands serve as a buffer between aquatic and terrestrial systems, and provide many of the same ecological functions as riparian areas. In 2010, the Wyoming Joint Ventures Steering Committee (currently Wyoming Bird Habitat Conservation Partnership) published the Wyoming Wetlands Conservation Strategy (WWCS), which identifies important wetland and riparian habitat areas throughout Wyoming (Wyoming Joint Ventures Steering Committee 2010). Nine priority wetland complexes were identified based on the important habitat they provide for wildlife. One of these, the Green River Basin Wetland Complex (GRBWC), includes 262,723 acres adjacent to the Big Sandy River and Little Sandy Creek within the study area (**Figure 34**). The

GRBWC has been rated by WWCS as "high" in vulnerability, "high" in biodiversity, "medium" in ecological condition, and "high" for density of wetlands.

Wetlands in the Big Sandy Watershed were identified by reviewing data from the USFWS *National Wetland Inventory* (NWI). The NWI relies on trained image analysts to identify and classify wetlands and deepwater habitats from aerial imagery. Large-scale (1:24K scale) maps have become the standard product delivered by NWI. NWI mapping provides the most comprehensive spatial dataset for wetland distribution in the study area; however, in the absence of site-specific ground-truthing efforts, it is not feasible to determine the accuracy of NWI mapping. NWI data should be considered a conservative estimate of wetlands, and ground surveys are considered warranted for site-specific wetland mapping.

According to NWI, two wetland types occur in the watershed: freshwater emergent wetland and freshwater forested/scrub wetland (Cowardin et al. 1979; **Figure 34**). Additional areas defined as freshwater pond, lake and riverine occur in the basin. **Table 19** provides a description of the wetland and deepwater types found within the watershed.



Figure 34. Wetland types within the Big Sandy watershed

Wetland Type	General Description	Acres	% of Watershed Basin
Freshwater Emergent Wetland	Herbaceous marsh, fen, swale, and wet meadow	8,991	0.8
Freshwater Forested/Shrub Wetland	Woody wetlands; forested swamp, shrub bog	1,334	0.1
Freshwater Pond	Pond	857	<0.1
Lake	Lake or reservoir basin	4,344	0.4
Riverine	River or stream channel	10,073	0.9

Table 19. Wetland types within the Big Sandy Watershed

Source: US Fish and Wildlife Service 2016

1. Wetland Condition Assessment

Wetlands are dynamic systems that provide many important ecological functions. They are important landscape features because they hold and slowly release flood water and snow melt, recharge groundwater, filter water impurities, recycle nutrients, and provide recreation and wildlife viewing opportunities. Not all wetlands perform all functions, and not all functions are performed equally among wetlands. The various function of each wetland influences the biological, chemical and physical integrity of the watershed. Various protocols have been developed to assess wetland conditions (EPA National Wetland Condition Assessment, Montana Wetland Assessment Method, Functional Assessment of Colorado Wetlands Methodology, etc.). Though most of these protocols were developed for regulatory use, they are often used to aid decision making processes for wetland management and in the design of mitigation and monitoring projects. A detailed assessment of wetland condition and function has not been conducted in the Big Sandy Watershed.

2. Wetland Mitigation

The importance of wetlands has long been recognized and they are protected under the Environmental Protection Agency's (EPA) Clean Water Act of 1972. Congress enacted the Clean Water Act as the primary federal law that protects waters, including lakes, rivers, coastal areas and wetlands. The EPA and the U.S. Army Corps of Engineers (USACE) jointly oversee permitting and enforcement of the Section 404 law, which does not allow discharge of dredged or fill material into waters of the U.S. without a permit. USACE permit review and issuance encourages avoidance and minimization of wetland impacts. If impacts exceed certain thresholds, permit issuance requires mitigation to compensate for unavoidable impacts to the aquatic environment. In order to comply with the Clean Water Act, impacts to wetlands may require mitigation. Wetland mitigation in Wyoming typically involves excavation in uplands on flat benches adjacent to permanent streams in areas with shallow groundwater tables. Numerous suitable wetland mitigation sites likely occur adjacent to permanent streams in the watershed.

3.3 ANTHROPOGENIC SYSTEMS

This section of the document describes those systems affected by or resulting from the influence of human activity. These systems are more particularly defined as Agricultural Land Use, Domestic/ Municipal/Industrial (DMI) Water Use, and Land. Each component referenced here has been inventoried and further analyzed to define the inherently complex effects that human activity has had on relative physical systems within the Big Sandy Watershed.

3.3.1 Agricultural Water Use

Agricultural Water Use is the primary focus of many past studies that have been conducted within the Big Sandy Watershed. The majority of irrigation occurs in the arid desert environment located within the EVIDD boundaries. The lifeline for most of these productive lands is strictly linked to two (2) reservoirs that were constructed as part of the U.S. Department of the Interior Bureau of Reclamation's (BOR) Eden Project. The Big Sandy Reservoir (P947.0R) and Eden Irrigation and Land Company No. 1 (Eden No. 1) Reservoir (P818.0R) were each constructed to capture snow melt runoff that annually occurs in the headwaters of the watershed within the Wind River Range. Alternatively, the remaining irrigated lands located outside of the EVIDD are supplied from one or more tributaries that are contained within the watershed. These lands are generally situated in proximity to their respective points of diversion, due primarily to cost of conveyance. For similar reasons, stock water supply reservoirs, spring developments, and stock water well developments are widely used within this watershed. Due to the arid climate and short growing season, these watering sources are extremely important to livestock and crop producers alike.

A full inventory of existing adjudicated water rights within the watershed was conducted as part of this study. Regarding surface water rights, the inventory and mapping includes sources of original supply, supplemental supply, and secondary supply. RVE used the Tabulation of Adjudicated Water Rights of the State of Wyoming – Water Division Number IV, updated in February 2016, as the primary index for completing the associated surface water rights research (See **Appendix B**). A total of 62 tributaries of the Big Sandy River contain permitted water rights, not including the Big Sandy River itself. Additionally, the place of use for all water rights outside of the EVIDD boundaries were mapped according to the original application maps and certificate records, which were used in combination to determine what specific lands in each aliquot part have been adjudicated. This gathered information has been manually re-tabulated (See **Appendix C**) to calculate individual tributary adjudications and to track any changes made since the referenced February 2016 update was completed by the State of Wyoming. It should be noted that few differences were encountered during the research and mapping process.

Regarding groundwater irrigation supply, the inventory and mapping includes sources of original supply and additional supply. RVE used the SEO e-Permit System as the primary application for completing the associated groundwater rights research. The following sections will more fully

describe the varying water system supplies, their physical properties, affected lands, beneficial use, and location within the Big Sandy Watershed.

3.3.1.1 Irrigated Lands

3.3.1.1.1 Surface Water

Within the Big Sandy Watershed as a whole, there are approximately 25,550 acres having adjudicated original supply, with a permitted diversion rate of 557.51 cubic feet per second (cfs). Additionally, there are 1,870.90 acres permitted for supplemental supply and 33,784.60 acres permitted for secondary supply. The location of all adjudicated surface water rights within the watershed is more particularly depicted below under **Figure 35**. See **Appendix C** for information on each individual permit and total adjudication amounts by tributary.



Figure 35. Adjudicated surface water rights within the Big Sandy Watershed

3.3.1.1.2 Irrigation District

The Eden Valley Irrigation and Drainage District (EVIDD) is the sole irrigation district located within the Big Sandy Watershed – see **Figure 36**. The largest source of original supply within the EVIDD is permitted under P5718.0D, delivered through the Means Canal, providing 242.61 cfs of flow to 16,953.76 adjudicated acres. There is also a permitted delivery of 55.20 acres of supplemental supply under P5718.0D within the bounds of the EVIDD.



Figure 36. EVIDD conveyance systems and points of diversion

Two main sources of secondary supply exist within the bounds of the EVIDD and are more particularly known as the Big Sandy Reservoir and the Eden Irrigation and Land Company No. 1 (Eden No. 1) Reservoir. 39,700 acre-feet of water stored within the Big Sandy Reservoir (P947.0R) provides secondary supply to a total of 16,885.60 adjudicated acres. The majority of this supply is

conveyed under P21403.0D, through the Means Canal (16,842.64 acres). The remainder of the secondary supply is permitted under two (2) successive enlargements of the Means Canal (P7751.0E and P7651.0E).

Similarly, 18,489.93 acre-feet of water stored within the Eden Irrigation and Land Company No. 1 Reservoir (P818.0R) provides secondary supply to a total of 16,885.46 adjudicated acres. The majority of this supply is conveyed under P16814.0D, through the Eden No. 1 Canal (16,848.96 acres). Like the Big Sandy Reservoir, the remainder of the secondary supply delivered is permitted under two (2) successive enlargements of the Eden No. 1 Canal (P7752.0E and P7650.0E).

As part of the research to document the adjudicated water rights within the Big Sandy Watershed, all individual permit maps and associated certificate records were downloaded and organized for geo-referencing purposes. The individual certificate records and application maps are included as part of the GIS deliverable of this report, and linked to each place of use. These original permit maps and certificate records were instrumental in developing the actual place of use mapping product, identified by aliquot part in each respective section, township, and range. This documentation will be very useful for land owners to determine what their adjudication is and where each adjudications lies in relation to their actual irrigated lands. Additionally, this compiled information clearly documents what the respective priority dates are and what amounts of appropriation (cfs/acre-feet) land owners are entitled to, relative to each individual permit.

The mapping and tabulation products developed as part of this report depict actual permitted place of use (POU) for all lands outside of the EVIDD. Generally, all lands within the EVIDD were mapped by aliquot part only, due to the large number of individual permits, time constraints, and budget. However, many of the original supply water right POU's were mapped accurately within the EVIDD, as depicted in **Figure 37**.



Figure 37. Permitted surface water rights within the EVIDD boundary

The SEO e-Permit System was the primary research tool utilized to compile the original permit maps, certificate records, means of conveyance (MOC) identification, point of diversion (POD) identification, and place of use (POU) identification. This information retrieval was performed during November and December of 2018. It should be noted that the developed water rights database should be continually updated to track changes that occur within the subject watershed annually.

3.3.1.1.3 Trans-Watershed Diversions

There are seven (7) trans-watershed diversions that impact the Big Sandy Watershed. One (1) diversion from the Sweetwater River supplies supplemental supply to 320 acres within the bounds of the subject watershed. The six (6) remaining diversions combine to deliver 22.33 cfs to 1,556.5 acres outside of the watershed (**Table 20** and **Figure 38**).

PERMIT #	FACILITY NAME	PRIORITY	USE	C.F.S. / AF	ACRES	PROOF #	C.R. #	IN/OUT
P4500.0E	HAY ENL. OF THE McDOWELL	8/14/1926	SUP		320.0	26063	CR CC65/028	IN
			TOTAL:		320.0			

Table 20	. Trans-watershed	diversions
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P3566.0D	TUNNEL DITCH ACT BIG SANDY DITCH	11/25/1901	IRR_SW	5.00	350.0	8387, 8997	CR CC66/333	OUT
P3918.0D	CONTINENTAL DIVIDE DITCH	5/19/1902	IRR_SW	6.60	455.0	16252	CR CC69/435	OUT
P1427.0E	7.0E ENL. JOHNSON & GASSWINT DITCH ACT BIG SANDY DITCH		IRR_SW	2.00	140.0	11224, 11225	CR CC68/100	OUT
P1427.0E	ENL. JOHNSON & GASSWINT DITCH ACT BIG SANDY DITCH	9/4/1905	IRR_SW	0.11	7.5	24656	CR CC70/081	OUT
P1427.0E	ENL. JOHNSON & GASSWINT DITCH ACT BIG SANDY DITCH	9/4/1905	IRR_SW	2.22	156.0	19198	CR CC45/205	OUT
P1422.0E	ENL. CONTINENTAL DIVIDE DITCH	9/7/1905	IRR_SW	0.90	63.0	9343	CR CC69/024	OUT
P1422.0E	ENL. CONTINENTAL DIVIDE DITCH	9/7/1905	IRR_SW	2.93	205.0	9343	CR CC69/026	OUT
P3100.0E	ENL. BIG SANDY DITCH	1/6/1915	IRR_SW	0.29	20.0	15417	CR CC68/101	OUT
P9230.0D	230.0D ROSCOE D. MACK DITCH		IRR_SW	2.28	160.0	15284	CR CC39/324	OUT

TOTAL: 22.33 1556.50



Figure 38. Trans-Watershed Diversion locations that impact the Big Sandy Watershed

3.3.1.1.4 Groundwater

Regarding adjudicated groundwater sources for irrigation supply, there are 20.00 acres permitted for original supply and 644.34 acres permitted for additional supply. In terms of irrigation use, the total appropriation for groundwater is 1,320 gallons per minute (GPM). Alternatively, two (2) permits allocate restrictive volume, which totals 323 acre-feet (Ac-Ft). See **Table 21** and **Figure 39** below for the tabulation of adjudicated groundwater sources used for irrigation (original/additional supply) within the Big Sandy Watershed.

PERMIT No.	PRIORITY DATE	APPLICANT: COMPANY/LAST NAME	FACILITY NAME	ADJUDICATED ACREAGE RECEIVING ADDITIONAL SUPPLY	ADJUDICATED ACREAGE RECEIVING ORIGINAL SUPPLY	APPROPRIATED FLOW (GPM or *AC-FT)	CERTIFICATE RECORD
P10062.0W	8/16/1971	HADLEY	HADLEY NO. 2 WELL	32	0	150	CR UW 01/186
P10746.0W	10/13/197 1	DELAMBERT	DELAMBERT NO. 1 WELL	23.44	0	20	CR UW 22/152
P144060.0W	3/4/2002	MURDOCK	PREMIER #2	199.58	0	225	CR UW 22/155
P145937.0W	7/23/2002	BLAIR & HAY LAND AND LIVESTOCK COMPANY	MIDDLE RANCH WELL NO. 1	65	0	400	CR UW 15/210
P185192.0W	2/8/2008	MIDLAND LIVESTOCK COMPANY	MIDLAND NO. 6 WELL	147	20	125	CR UW 22/062
P201027.0W	8/27/2013	MURDOCK	2ND ENL. WHALE FEDERAL 13-16 WW	76.32	0	*268	CR UW 22/156
P201989.0W	3/24/2014	MIDLAND LIVE STOCK COMPANY	ENL. MIDLAND NO. 6 WELL	40	0	*55	CR UW 22/063
P143289.0W	11/16/201 6	MURDOCK	WHALE FEDERAL 13- 16 WW	61	0	400	CR UW 22/154
			TOTAL:	644.34	20	1320	
						*323	

Table 21. Adjudicated groundwater sources for irrigation use within the Big Sandy Watershed

The eight (8) permits shown in **Table 21** are adjudicated. Within the Big Sandy Watershed, there are 12 other permitted wells for irrigation use; two (2) that are unadjudicated and ten (10) that are listed as incomplete wells. These wells are included within the GIS database and **Figure 39** below.



Figure 39. Permitted groundwater POD locations for irrigation use within the Big Sandy Watershed

3.3.1.2 Irrigation Systems

As part of the research and mapping process mentioned above, POD and MOC information was also compiled, checked for geographic accuracy, and included as part of the GIS deliverable of this Level I study. Initially, all POD's and MOC's were mapped using the existing SEO e-Permit database, utilizing the ArcGIS Tool developed by the WWDC. The imported data was then cross-examined for accuracy and modified to reflect the actual situation on the ground. An example of this modification involves POD mapping where an original diversion permit and subsequent enlargements of that specific diversion were imported and graphically depicted as having different geographic coordinates. As a result of the verification process, the POD coordinate for each ditch (original and successive enlargements, where applicable) were modified to reflect one geographic coordinate – see **Figure 40** below. This type of database amendment was conducted in order to accurately reflect actual field conditions and to aid in successive water rights research by the end user(s).



Figure 40. POD mapping verification example

In addition to the SEO e-Permit database, past studies conducted in the Eden-Farson area were also valuable sources of information relative to conveyance networks. In particular, the Eden Valley Irrigation & Drainage District Master Plan - Level I Study was extensively utilized to determine means of conveyance (piped, open channel, lined, etc.) throughout the EVIDD. The information developed during that report has been included within the GIS database of this Level I Study.

The areas where pivot irrigation methods are utilized were also mapped. Pivot irrigation is extensively utilized within the EVIDD boundary, whereas the majority of lands outside of the District are irrigated using conventional flood irrigation methods.



Figure 41. Pivot irrigation within the Big Sandy Watershed

3.3.2 Domestic, Municipal, and Industrial (DMI) Water Use

3.3.2.1 Potable Water Systems

The Big Sandy Watershed is largely defined as being rural and sparsely populated. The exception to this generalization involves the Farson-Eden area where small retail stores, gas stations, restaurants, a community center, and Farson School building exist. This ranching/farming community is located in the heart of the Big Sandy Watershed and includes the majority of the population therein. Due to increasing population and limited potable supply and distribution systems within this area, the Wyoming Water Development Commission entered into a contract with Johnson-Fermelia Company, Inc. (JFC) in June of 2013 to determine what new development scenarios could be implemented to offset known limitations.

In 2015, JFC completed the Eden Valley (Farson) Master Plan Level II Study. This Study was completed in order to develop a refined potable water distribution plan in the Farson-Eden area. As part of that study, community input was gathered and an evaluation of the existing water supply and distribution system(s) was performed. Water quality within the existing aquifers was also analyzed.

Ultimately, three (3) distribution systems were evaluated under two (2) scenarios, more particularly defined as 1.) Small System Scenario with Full Participation, 2.) Large System Scenario with Partial Participation, and 3.) Large System Scenario with Full Participation. Based heavily on cost to implement any of the three alternative scenarios and public opinion, JFC recommended that no water distribution system should be pursued at the time said study was completed in 2015. For the full report, see the following link:

Eden Valley (Farson) Master Plan Level II Study, Final Report

Outside the confines of the Farson-Eden community where several public water systems are employed, individual wells are the main source of domestic water supply. Many of the permitted wells have multiple beneficial uses, including Domestic and/or Stock, Irrigation, Municipal, Industrial, Miscellaneous, Monitoring, or Test Well use. For the purposes of this section of the watershed study, RVE tabulated the existing permitted wells into three (3) categorical uses; Domestic, Miscellaneous, and Industrial. Due to the previously stated fact that many wells have multiple uses, they are listed in two or more of these categorical tabulations. The intent of this compilation is to identify how groundwater is utilized within the watershed and to what extent.

It should be noted here that there are no permitted wells for Municipal Use that exist within the Big Sandy Watershed. This is more fully analyzed in the Eden Valley (Farson) Master Plan Level II Study referenced above.

Within the Big Sandy Watershed as a whole, there are 249 permitted wells for Domestic Use (**Table 22**), 24 completed/adjudicated wells for Miscellaneous Use (**Table 23**), and 3 permitted wells for Industrial Use (**Table 24**).

PERMIT No.	PRIORITY DATE	APPLICANT: COMPANY/ LAST NAME	FACILITY NAME	USE
P11393.0P	12/31/1907	WEBSTER	WEBSTER #1	DOM_GW; STK
P11394.0P	12/31/1907	WEBSTER	WEBSTER #2	DOM_GW
P20205.0P	12/31/1920	BLAIR & HAY LAND & L S CO.	HAY MIDDLE RANCH	DOM_GW; STK
P19302.0P	12/31/1921	HAWLEY	HAWLEY #2	DOM_GW
P19304.0P	12/31/1928	HAWLEY	HAWLEY #4	DOM_GW; STK
P19305.0P	12/31/1928	HAWLEY	HAWLEY #5	DOM_GW
P23118.0P	6/30/1930	TOMICH	TOMICH #2	DOM_GW; STK
P16354.0P	12/31/1930	DEARTH	DEARTH #1	DOM_GW; STK
P18382.0P	12/31/1930	BURTON	SISK #1	DOM_GW
P20204.0P	12/31/1930	BLAIR & HAY LAND & L S CO.	FARSON FARM	DOM_GW; STK
P23135.0P	9/30/1935	MCMURRY	MCMURRY #4	DOM_GW
P17353.0P	12/31/1935	KILLION	KILLION #1	DOM_GW; STK
P23911.0P	12/31/1935	STRINGER	STRINGER #1H	DOM_GW; STK
P23912.0P	12/31/1935	STRINGER	STRINGER #2B	DOM_GW; STK
P23117.0P	5/31/1936	TOMICH	TOMICH #1	DOM_GW; STK
P18359.0P	7/31/1940	MITCHELSON	MITCH #2	DOM_GW; STK
P20214.0P	5/25/1946	HARRISON	HARRISONS	DOM_GW; STK
P18378.0P	5/10/1947	BURTON	BURTON #1	DOM_GW
P9026.0P	12/31/1948	BELL	VIGIL #1	DOM_GW; STK
P6435.0P	12/21/1949	SELLERS	SELLERS #1	DOM_GW; STK
P18360.0P	6/30/1950	MITCHELSON	MITCH #3	DOM_GW; STK
P23119.0P	6/30/1950	TOMICH	TOMICH #3	DOM_GW; STK
P16355.0P	3/31/1952	BUCHANAN	BUCHANAN #1	DOM_GW; STK
P9951.0P	12/21/1952	HARNS	HARNS #1	DOM_GW; STK
P20761.0P	12/31/1952	MC MURRY	ANGIE MC MURRY 1	DOM_GW; STK
P11757.0P	6/10/1956	RAMSAY	RAMSAY #2	DOM_GW
P19017.0P	6/15/1956	MATILAINEN	MATILAINEN #1	DOM_GW; STK
P23134.0P	9/30/1956	MCMURRY	MCMURRY #3	DOM_GW; STK
P11400.0P	6/30/1957	RAMSAY	RAMSAY #1	DOM_GW
P17026.0P	6/30/1957	HODDER	HODDER RANCH #1	DOM_GW; STK
P19796.0P	7/21/1958	HERBST	EDEN AGRICULTURAL SUBSTATION #1	DOM_GW; STK
P9960.0P	6/30/1959	GRIFFIN JR.	GRIFFIN #1	DOM_GW
P20211.0P	5/31/1960	BOX R RANCHES	BOX R #1	DOM_GW; STK
P878.0W	7/2/1962	USDI - Bureau of Reclamation	EDEN #1	DOM_GW
P16090.0P	12/31/1964	MILLER	DON #2	DOM_GW
P17025.0P	7/31/1965	Wyo State Dept. of Transportation	FARSON #2	DOM_GW

 Table 22. Domestic Use - Completed wells within the Big Sandy Watershed

P13928.0P	4/12/1966	STOUT	SANDY #1	DOM_GW; STK
P20203.0P	8/15/1967	BLAIR & HAY LAND & L S CO.	RED'S WELL	DOM_GW; STK
P18381.0P	6/30/1968	BURTON	BURTON #4	DOM_GW
P20762.0P	9/30/1968	MC MURRY	ANGIE MC MURRY 2	DOM_GW; STK
P18391.0P	4/30/1969	DAHLIN	DEWS #1	DOM_GW; STK
P6567.0W	8/28/1970	SELLERS	SELLERS #2	DOM_GW; STK
P9341.0W	6/16/1971	EDWARDS	EDWARDS #1	DOM_GW
P9959.0W	8/2/1971	GRANDY-X BAT T CATTLE COMPANY	GRANDY #1	DOM_GW; STK
P9966.0W	8/11/1971	RADOSEVICH	RADOSEVICH #1	DOM_GW; STK
P10061.0W	8/16/1971	OLSON	OLSON #1	DOM_GW; STK
P10135.0W	8/18/1971	COWAN	STAR #7	DOM_GW; STK
P10300.0W	9/7/1971	MCMURRY	BOB MCMURRY #1	DOM_GW; STK
P10433.0W	9/20/1971	MC MURRY	OASIS I	DOM_GW; STK
P12401.0W	12/10/1971	TOMICH	ED TOMICH #1	DOM_GW; STK
P13932.0W	5/15/1972	JAMIESON	JAMIESON #1	DOM_GW; STK
P13980.0W	5/16/1972	MARTIN	MARTIN #1	DOM_GW; STK
P14554.0W	7/3/1972	MIDLAND LIVESTOCK CO.	MIDLAND-EDEN #1	DOM_GW; STK
P14952.0W	8/7/1972	Big Sandy Livestock Co.	BIG SANDY #1	DOM_GW; STK
P14953.0W	8/7/1972	Big Sandy Livestock Co.	BIG SANDY #2	DOM_GW; STK
P16082.0W	10/26/1972	MILLER	DON #1	DOM_GW; STK
P17506.0W	12/26/1972	MITCHELSON	MITCH #1	DOM_GW; STK
P23120.0W	12/29/1972	TOMICH	TOMICH #4	DOM_GW; STK
P22178.0P	3/30/1973	MARSCHALK	AGUIRRE BROTHERS #1	DOM_GW; STK
P23897.0P	4/23/1973	LITTLE SANDY GRAZING ASSOC.	LITTLE SANDY #3	DOM_GW; STK
P23898.0P	4/23/1973	LITTLE SANDY GRAZING ASSOC.	LITTLE SANDY #4	DOM_GW
P26536.0W	4/25/1974	JONES	JONES #1	DOM_GW; STK
P27318.0W	6/28/1974	TAUCHER	TAUCHER #1	DOM_GW; STK
P29309.0W	3/13/1975	MCCARTY	MCCARTY #1	DOM_GW; STK
P29871.0W	5/8/1975	JONES	JONES #2	DOM_GW; STK
P29943.0W	5/28/1975	HAWLEY	TOM HAWLEY #1	DOM_GW
P31286.0W	9/30/1975	GAULT	GAULT #1	DOM_GW; STK
P31310.0W	10/24/1975	HARNS	HARNS #2	DOM_GW; STK
P31311.0W	10/28/1975	MINES	MINES #1	DOM_GW; STK
P32552.0W	3/26/1976	FRANKS	FRANKS #1	DOM_GW; STK
P32548.0W	3/29/1976	WATTERSON	WATTERSON #1	DOM_GW; STK
P33544.0W	4/5/1976	MCCRACKEN	MCCRACKEN #1	DOM_GW; STK
P33545.0W	4/5/1976	MCCRACKEN	MCCRACKEN #3	DOM_GW; STK
P33553.0P	5/17/1976	MCCRACKEN	MCCRACKEN #3	DOM_GW; STK
P35401.0W	11/9/1976	CLARK	CLARK #2	DOM_GW; STK
P37223.0W	2/9/1977	GERKEN	WOOD #1	DOM_GW; STK
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P36411.0W	3/4/1977	MCCARTY	MCCARTY #2	DOM_GW; STK
P37461.0W	4/13/1977	RIDDLE	RIDDLE #1	DOM_GW
P37950.0W	5/23/1977	SKORCZ	SKORCZ #1	DOM_GW; STK
P39468.0W	7/25/1977	APPLEQUIST	APPLEQUIST #1	DOM_GW; STK
P39934.0W	9/2/1977	JONES	T JONES #1	DOM_GW
P42410.0W	3/16/1978	APPLEQUIST	APPLEQUIST #2	DOM_GW; STK
P42411.0W	3/16/1978	APPLEQUIST	APPLEQUIST #3	DOM_GW; STK
P44056.0W	6/28/1978	HADLEY	HADLEY #1	DOM_GW
P44532.0W	7/27/1978	APPLEQUIST	APPLEQUIST 4	DOM_GW; STK
P45832.0W	11/8/1978	WILSON	WILSON #1	DOM_GW; STK
P49005.0W	4/5/1979	SANDY CROSSING ENTERPRISES INC.	SANDY WELL #S-3	DOM_GW
P47512.0W	4/11/1979	STOUT	SHANE #1	DOM_GW
P52609.0W	4/30/1979	STANHOPE	STANHOPE WELL #1	DOM_GW; STK
P49097.0W	7/13/1979	GRIFFIN	GRIFFIN #5	DOM_GW; STK
P49284.0W	7/31/1979	JONES	V B JONES #1	DOM_GW; STK
P51476.0W	8/7/1979	BIRD	BIRD #1	DOM_GW
P49534.0W	8/21/1979	MCGOWAN	BANKS #1	DOM_GW
P50384.0W	10/22/1979	MINES	MINES #1	DOM_GW; STK
P52895.0W	7/8/1980	ABRAHAMSON	ABES #1	DOM_GW
P53213.0W	7/19/1980	MCWHORTER	MCWHORTER #1	DOM_GW
P53341.0W	8/18/1980	GOODEN	GOODEN #1	DOM_GW
P53371.0W	8/25/1980	8 H RANCH	8 H RANCH #1	DOM_GW; STK
P53372.0W	8/25/1980	8 H RANCH	8 H RANCH #2	DOM_GW
P53466.0W	9/3/1980	MCCLARY	MCCLARY #2 (DEEPENED)	DOM_GW
P54673.0W	11/20/1980	ROBBINS	ROBBINS #1	DOM_GW
P58469.0W	10/16/1981	MAYO	MAYO #1	DOM_GW; STK
P61248.0W	6/9/1982	GRANDPRE	JOJO #1	DOM_GW; STK
P61906.0W	8/26/1982	JUEL	JUEL #1	DOM_GW
P62419.0W	10/21/1982	THOMAS	D THOMAS	DOM_GW
P62521.0W	10/28/1982	DACK	DACK #1	DOM_GW
P63299.0W	2/11/1983	ALBERTINI	ALBERTINE #2	DOM_GW
P64014.0W	5/2/1983	GOICOECHEA	GOICOECHEA #1	DOM_GW
P64015.0W	5/2/1983	GOICOECHEA	GOICOECHEA #2	DOM_GW
P63894.0W	5/4/1983	DELAMBERT	DELAMBERT #2	DOM_GW; STK
P64050.0W	5/16/1983	GRANDY-X BAT T CATTLE COMPANY	GRANDY #4	DOM_GW; STK
P65650.0W	9/28/1983	ROBINS	R & R #1	DOM_GW
P67864.0W	7/2/1984	PRESTON	PRESTON #1	DOM_GW
P69797.0W	4/15/1985	DAVIS	DAVIS #	DOM_GW
P70592.0W	7/2/1985	WILLIS	WILLIS #1	DOM_GW

P70577.0W	7/3/1985	MINES	MINES #1	DOM_GW
P70579.0W	7/3/1985	SMITH	DC SMITH #1 MINES	DOM_GW
P70935.0W	8/19/1985	GRIFFIN	GRIFFINSVILLE #4	DOM_GW
P71408.0W	10/28/1985	SIMNACHER	SIMNACHER #1	DOM_GW; STK
P72714.0W	6/10/1986	HAWS	HAWS 1	DOM_GW
P72715.0W	6/12/1986	INGABRAND	INGABRAND #1	DOM_GW
P72741.0W	6/13/1986	FRERICKS	FRERICKS #1	DOM_GW
P73609.0W	10/30/1986	LUPCHO	LUPCHO #1	DOM_GW; STK
P73703.0W	11/20/1986	LACEY	LACEY #1	DOM_GW
P76484.0W	3/10/1988	KELSEY	SAVAGE #1	DOM_GW
P77109.0W	5/26/1988	GRIFFIN	GRIFFIN #1	DOM_GW
P77015.0W	5/27/1988	FOSTER	FOSTER #1	DOM_GW
P77111.0W	6/3/1988	LUDWIG	LUDWIG #1	DOM_GW
P77405.0W	6/28/1988	PARSONS	PARSONS #1	DOM_GW; STK
P77622.0W	7/22/1988	HODDER	HODDER H #1	DOM_GW
P77903.0W	9/6/1988	ETCHEVERRY	SUNSET RANCH #1	DOM_GW; STK
P78082.0W	9/30/1988	BIG SANDY RANCH	BIG SANDY #1	DOM_GW
P79427.0W	4/6/1989	RADOSEVICH	SIMS #1	DOM_GW; STK
P79642.0W	5/1/1989	HARNS	STEVEN #1	DOM_GW; STK
P80102.0W	6/21/1989	SCHULZ	SCHULZ #1	DOM_GW
P81428.0W	11/20/1989	Schneider	S AND H #1	DOM_GW; STK
P82337.0W	4/27/1990	TAUCHER	TAUCHER #2	DOM_GW; STK
P85764.0W	7/29/1991	HUECKSTAEDT	HUECKSTAEDT #1	DOM_GW
P86399.0W	10/7/1991	PEDEN	PEDEN #1	DOM_GW; STK
P87266.0W	3/2/1992	MINES & SONS, INC.	MINES & SONS #1	DOM_GW; STK
P88865.0W	7/15/1992	JUEL	JUEL #3	DOM_GW; STK
P89199.0W	8/14/1992	HILL	HILL #1	DOM_GW
P90078.0W	10/22/1992	GRIFFIN	J. GRIFFIN #2	DOM_GW
P91786.0W	4/21/1993	GERKEN	GERKEN #2	DOM_GW; STK
P92125.0W	6/21/1993	DAVIS	WAPAHOE #1	DOM_GW; STK
P92536.0W	8/19/1993	EATON	EATON #3	DOM_GW; STK
P93176.0W	9/13/1993	BROWN	PREMIER #1	DOM_GW
P93038.0W	9/20/1993	PECENKA	LANSBERRY #1	DOM_GW; STK
P95360.0W	5/12/1994	WEBSTER	WEBSTER #1	DOM_GW; STK
P95592.0W	5/25/1994	PRATER	PRATER #1	DOM_GW
P95929.0W	6/27/1994	HANSEN	HANSEN #1	DOM_GW; STK
P97352.0W	9/16/1994	BROADHEAD	BROADHEAD 1	DOM_GW; STK
P97310.0W	10/4/1994	SWEAT	SHERRI 1	DOM_GW; STK
P99283.0W	5/16/1995	RANTA	RANTA #1	DOM_GW; STK
P99437.0W	6/5/1995	TOMICH	T & T #1	DOM_GW
P99891.0W	7/31/1995	MCGUIRE	MCGUIRE #11	DOM_GW

P100741.0W	10/16/1995	LANSBERRY	LANSBERRY #2	DOM_GW; STK
P101822.0W	3/22/1996	MCCALLISTER	AARON MCCALLISTER #1	DOM_GW; STK
P103700.0W	9/5/1996	TAYLOR	TAYLOR #1	DOM_GW
P104396.0W	10/29/1996	SMITH	GRANDY-SMITH #1	DOM_GW
P106405.0W	6/11/1997	PAULSON	PAULSON #1	DOM_GW; STK
P106719.0W	7/10/1997	MCGUIRE	MCGUIRE #12	DOM_GW; STK
P107223.0W	8/21/1997	PFEILER	PFEILER #1	DOM_GW; STK
P107273.0W	8/22/1997	WHICKER	WHICKER #1	DOM_GW
P107841.0W	9/22/1997	COLLINS	COLLINS #1	DOM_GW
P108749.0W	1/28/1998	SCHMIDT	SCHMIDT #1	DOM_GW
P114471.0W	2/26/1999	JONES	JONES #1	DOM_GW; STK
P115320.0W	4/19/1999	HICKS	HFD #1	DOM_GW; STK
P118806.0W	8/9/1999	STEINBACH	Steinbach #1	DOM_GW
P118363.0W	8/30/1999	APPLEQUIST	APPLEQUIST 9	DOM_GW; STK
P121570.0W	12/28/1999	HALE	HALE #2	DOM_GW; STK
P126314.0W	6/14/2000	SABOURIN	SABOURIN #1	DOM_GW; STK
P126612.0W	6/26/2000	EATON	EATON NO. 2	DOM_GW; STK
P128339.0W	8/14/2000	PENNOCK	PENNOCK #1	DOM_GW
P132946.0W	3/5/2001	CHENEVERT	PEWTRESS WELL # 1	DOM_GW; STK
P133128.0W	3/19/2001	KUHL	KUHL # 1	DOM_GW
P143136.0W	3/13/2002	MCGUIRE	MCGUIRE #13	DOM_GW; STK
P143137.0W	3/13/2002	MCGUIRE	MCGUIRE #14	DOM_GW; STK
P144148.0W	4/3/2002	AARON'S WATER SERVICE	ENL. AARON'S WELL # 2	DOM_GW; MIS; STK
P144135.0W	4/29/2002	RYAN	RYAN # 1	DOM_GW; STK
P144583.0W	5/20/2002	SHORES	SUZANNE #1	DOM_GW
P144596.0W	5/22/2002	BURNETT	BURBETT # 1	DOM_GW
P145556.0W	6/28/2002	SMITH	HV SMITH 31	DOM_GW; STK
P145681.0W	7/5/2002	LYTLE	LYTLE #1	DOM_GW; MIS
P145992.0W	7/18/2002	WEBSTER	ENL.OF WEBSTER #1	DOM_GW; STK
P151863.0W	6/9/2003	SELLERS	SELLERS #3	DOM_GW; STK
P153654.0W	8/27/2003	ZIEGLER	ZIEGLER #1	DOM_GW; STK
P153839.0W	9/2/2003	HAWS	STACKYARD #1	DOM_GW; STK
P154358.0W	10/10/2003	WILKINS	WILKINS #1	DOM_GW
P154653.0W	10/17/2003	CANNON	CANNON #1	DOM_GW
P155142.0W	11/17/2003	MORRELL	SCARLETT V	DOM_GW
P158378.0W	4/19/2004	MORRELL	MORRELL #1	DOM_GW
P158762.0W				
	5/6/2004	JOHNSON	BIG SANDY #1	DOM_GW; STK
P159162.0W	5/6/2004 5/21/2004	JOHNSON	BIG SANDY #1 NIX #1	DOM_GW; STK
P159162.0W P165649.0W	5/6/2004 5/21/2004 3/10/2005	JOHNSON NIX GRANDY	BIG SANDY #1 NIX #1 EDEN #1	DOM_GW; STK DOM_GW; STK DOM_GW
P159162.0W P165649.0W P166075.0W	5/6/2004 5/21/2004 3/10/2005 3/23/2005	JOHNSON NIX GRANDY TIRRE	BIG SANDY #1 NIX #1 EDEN #1 SCHMIDT #1	DOM_GW; STK DOM_GW; STK DOM_GW DOM_GW

P167741.0W	5/13/2005	PITT	PITT NO. 1	DOM_GW
P168963.0W	7/15/2005	PRATHER	WYATT #1	DOM_GW
P169288.0W	7/27/2005	JONES	JONES #1	DOM_GW; STK
P172933.0W	1/26/2006	FREIMUTH	FREIMUTH #1	DOM_GW
P173630.0W	3/22/2006	STEVE MINES RANCH	STEVE #1	DOM_GW
P174628.0W	5/12/2006	MACK	MACK #1	DOM_GW
P176203.0W	7/31/2006	BIRD	#1 BIRD	DOM_GW
P176945.0W	8/31/2006	ROACH	ROACH #1	DOM_GW; STK
P177977.0W	10/26/2006	BLAIR AND HAY LAND AND LIVESTOCK	BANANA #2	DOM_GW; STK
P181006.0W	4/12/2007	MCGUIRE	MCGUIRE 25	DOM_GW
P181371.0W	5/10/2007	BERG	HAYSTACK BUTTE #1	DOM_GW
P183212.0W	8/20/2007	TOMICH	TOMICHSON #1	DOM_GW
P183386.0W	9/17/2007	ETCHEVERRY	ETCHEVERRY WELL #2	DOM_GW; STK
P183373.0W	9/24/2007	DELAMBERT	SECORA #3	DOM_GW
P183377.0W	9/26/2007	HARNS	WILLIAM #1	DOM_GW
P183712.0W	10/29/2007	SCHEER	DARIN NUMBER TWO	DOM_GW; STK
P184694.0W	1/28/2008	IRWIN	TOM #1	DOM_GW
P187220.0W	7/2/2008	SMITH	COREY #1	DOM_GW
P189925.0W	3/11/2009	LUX	FARM WELL #1	DOM_GW; STK
P191116.0W	7/21/2009	G & E LIVESTOCK, INC.	DREAM HOME WELL	DOM_GW
P193215.0W	5/24/2010	HERING	PHK #1	DOM_GW
P193321.0W	7/2/2010	GOICOLEA	EUSKADI 1	DOM_GW
P195058.0W	2/23/2011	SMITH	J SMITH NO 1	DOM_GW; STK
P197275.0W	1/23/2012	PARAVICINI	PARAVICINI #1	DOM_GW
P201950.0W	4/28/2014	DRAYCOTT	DRAYCOTT #1	DOM_GW
P202024.0W	5/5/2014	КОВВЕ	KOBBE RANCH WELL #2	DOM_GW; STK
P202087.0W	5/21/2014	PARAVICINI	PARAVICINI #2	DOM_GW
P203228.0W	12/15/2014	BURTON	BURTON #1	DOM_GW; STK
P203862.0W	5/11/2015	WRIGHT	WRIGHT #1	DOM_GW
P204168.0W	7/10/2015	SUMMERS	SUMMERS #1	DOM_GW
P204469.0W	8/27/2015	JONES	JONES #1	DOM_GW;STK
P204886.0W	11/10/2015	DUNTON SHEEP COMPANY	MACK FLAT 2015 WELL	DOM_GW; STK
P205515.0W	4/28/2016	DELAMBERT	ENL. DE LAMBERT NO. 1 WELL	DOM_GW; STK
P205588.0W	5/18/2016	MISNER	MISNER #1	DOM_GW
P205655.0W	6/6/2016	MINES	MINES #4	DOM_GW
P206152.0W	9/1/2016	LAZY S RANCH	GENTIAN 3	DOM_GW; STK
P207926.0W	7/20/2017	NELSON	NELSON #1	DOM_GW
P207744.0W	7/31/2017	HANSEN	HANSEN #1	DOM_GW
P209352.0W	7/6/2018	BURNETT	KAYLEE #1	DOM_GW
P209786.0W	9/28/2018	BURRIS	BURRIS#1	DOM_GW; STK

PERMIT No.	PRIORITY DATE	APPLICANT: COMPANY/LAST NAME	FACILITY NAME	APPROPRIATED FLOW (GPM)	ORDER RECORD No.	CERTIFICATE RECORD No. / PERMIT No.	USE
P878.0W	7/2/1962	US DEPARTMENT OF INTERIOR	EDEN NO. 1 WELL	100	OR 19/586	CR UW 01/303	MIS
P30087.0W	5/9/1975	COUNTY OF SWEETWATER	WEED & PEST WELL NO. 1	15	OR 27/249	CR UW 04/221	MIS
P37498.0W	4/4/1977	UNIVERSITY OF WYOMING	SWEETWATER CO. NO. 1 WELL	15	OR 23/050	CR UW 03/224	MIS
P60586.0W	11/20/1981	SWEETWATER COUNTY SCHOOL DISTRICT NO 1	EDEN-FARSON SCHOOL WELL NO. 1	25	OR 83/081	CR UW 19/073	MIS
P66905.0W	4/9/1984	SWEETWATER COUNTY - EDEN-FARSON FIRE PROTECTION	FIRE HOUSE NO. 1 WELL	30	OR 32/044	CR UW 05/312	MIS
P90037.0W	4/8/1992	SWEETWATER COUNTY RECREATION BOARD	BIG SANDY PARK NO. 2 WELL	45	OR 45/388	CR UW 09/383	MIS
P92388.0W	10/12/1992	SWEETWATER COUNTY RECREATION BOARD	BIG SANDY PARK NO. 1 WELL	16	OR 45/388	CR UW 09/384	MIS
P141914.0W	5/25/2001	McMURRY ENERGY COMPANY	ANTELOPE # 14-22W	60		P141914.0W	MIS
P163911.0W	10/8/2003	ARAMBEL	SAGEBRUSH 14-20 WW	30		P163911.0W	MIS
P169882.0W	8/3/2005	USDI - BLM	JONAH FIELD OFFICE	25		P169882.0W	MIS
P173377.0W	3/3/2006	JONAH ENERGY LLC	SHB 4-36 W	150		P173377.0W	MIS
P181071.0W	4/18/2007	LITTLE SANDY GRAZING ASSOCIATION	MCPHEE WELL	10		P181071.0W	MIS
P183417.0W	8/31/2007	OFFICE OF STATE LANDS AND INVESTMENTS	ARAMBEL RESERVOIR WELL NO. 1	27	OR 87/296	CR UW 19/303	MIS
P183477.0W	10/3/2007	EDEN/FARSON FIRE DISTRICT	FARSON FIRE HALL NO. 1 WELL	20	OR 83/081	CR UW 19/074	MIS
P184882.0W	2/6/2008	ENCANA OIL AND GAS	WAGON ROAD 1-26 WELL	20	OR 86/121	CR UW 20/179	MIS
P187090.0W	5/5/2008	JONAH ENERGY LLC	ENCANA WORKFORCE FACILITY	56		P187090.0W	MIS
P189402.0W	10/3/2008	BP AMERICA PRODUCTION CO.	CABRITO 9-25	150		P189402.0W	STK; MIS
P193708.0W	8/12/2010	JONAH ENERGY LLC	CABRITO 13-19W	150		P193708.0W	MIS
P196774.0W	9/19/2011	EDEN/FARSON FIRE DISTRICT	ENL. FARSON FIRE HALL NO. 1 WELL	50	OR 83/081	CR UW 19/075	MIS
P198779.0W	8/21/2012	ENCANA OIL AND GAS	ENL WAGON ROAD 1-26 WELL	0	OR 86/121	CR UW 20/180	MIS
P200780.0W	7/23/2013	JONAH ENERGY LLC	RAINBOW 15-32	1		P200780.0W	STK; MIS
P200682.0W	7/12/2013	JONAH ENERGY LLC	CABRITO 15-25	85		P200682.0W	MIS; STK
P200683.0W	7/12/2013	JONAH ENERGY LLC	CABRITO 3-31	30		P200683.0W	MIS; STK
P200684.0W	7/12/2013	JONAH ENERGY LLC	CABRITO 19F	100		P200684.0W	MIS; STK
			TOTAL:	1210			

Table 23. Miscellaneous Use - Adjudicated/Completed wells within the Big Sandy Watershed

Note: Items highlighted in orange above are completed wells without adjudication.

The three (3) wells listed in **Table 24** below are permitted for Industrial Use. Each well is listed as being incomplete in the SEO e-Permit database.

PERMIT No.	PRIORITY DATE APPLICANT: COMPANY/LAST NAME FACILITY N/		FACILITY NAME	APPROPRIATED FLOW (GPM)	USE
P113.0G	8/14/1951	USDI - BLM	PATRICK S. MCDERMOTT SODIUMPROSPECTING PERMIT	400	DOM_GW; IND_GW; IRR_GW; STK
P67.0G	3/3/1950	MCDERMOTT	PATRICIA S. MCDERMOTT #1	450	IND_GW; IRR_GW; STK
P24632.0W	9/18/1973	PACIFIC ENTERPRISES OIL CO (USA)	PACIFIC #1 WSW	37	IND_GW; STK
			TOTAL:	887	

 Table 24. Industrial Use – Incomplete wells permitted within the Big Sandy Watershed

Based on the compiled information in the above tables, it is apparent that groundwater is highly depended upon by residents within the Big Sandy Watershed. In particular, groundwater is the primary source for potable water throughout.

3.3.3 Water Storage

Permitted stock reservoir storage totals 116.60 acre-feet while all other adjudicated reservoirs contain a total of 63,636.31 acre-feet of water, combined. Two major reservoirs are located within the Big Sandy River watershed: Big Sandy Reservoir and Eden No. 1 Reservoir. The Big Sandy Reservoir is an on-channel reservoir on the Big Sandy River 10.5 miles north of Farson, WY. Eden No. 1 Reservoir is an off-channel reservoir located 8.5 miles northwest of Farson, WY. Both reservoirs were constructed as part of the Eden Project²⁷, are operated by the EVIDD, and together provide irrigation water to 16,877 assessed acres.²⁸

²⁷ United States Bureau of Reclamation. "Projects and Facilities." United States Bureau of Reclamation, https://www.usbr.gov/projects/index.php?id=515._Accessed: October 3, 2018.

²⁸ Wenck Associates, Inc. *Big Sandy Reservoir Enlargement Level II, Phase I Study*. Wyoming Water Development Commission. March 2017.



Figure 42. Plan view of Big Sandy and Eden No. 1 Reservoirs (Sheet E-8, P21403.0D)

3.3.3.1 Big Sandy Reservoir

Originally constructed in 1952, the Big Sandy Reservoir is permitted to store 39,700 acre-feet behind an 85-foot-high, 2,350-foot-long zoned earth embankment. An earthen dike extends for 8,300 feet along the eastern reservoir rim, reaching a maximum height of 18 feet. The reservoir is equipped with three outlets: a principal, an irrigation discharge outlet, and an auxiliary spillway. The principal spillway (620 cfs capacity) is a concrete conduit that discharges to Big Sandy River via the Means Canal and is controlled by two high pressure slide gates. A second controlled outlet allows release of storage water to the Big Sandy Feeder Canal for irrigation and delivery to Eden No. 1 Reservoir. The auxiliary spillway is a concrete lined channel located near the south embankment abutment; the spillway invert elevation is 6,757.5 feet above mean sea level and the spillway capacity is 7,350 cfs.

In 2009, the Wyoming Water Development Commission (WWDC) entered into a Technical Service Agreement with the Bureau of Reclamation (Reclamation). The Technical Service Agreement authorized a Level I study to investigate the feasibility of enlarging Big Sandy Reservoir. The Level I study concluded that the Big Sandy River watershed hydrology could support an 11,000 acre-foot expansion. Subsequently, the WWDC commissioned a Level II Phase I study to evaluate the technical, environmental, and economic feasibility of enlarging Big Sandy Reservoir. The Level II Phase I study, completed in 2017, recommended a 12,944 acre-foot enlargement of Big Sandy Reservoir. Following the Level II Phase I study, the project advanced to permitting and a draft environmental assessment was released for public comment in September of 2017. Permitting efforts are ongoing with construction estimated to begin in Fall of 2020.

USGS gage number 09213700 records the storage in Big Sandy Reservoir with a period of record extending from 1987 to present. Historic data indicates that storage in Big Sandy Reservoir was completely depleted in 1988, 2000, and 2001 (**Figure 43**). Big Sandy Reservoir filled completely in 10 years between 1987 and 2018; approximately one-third of years. Average monthly storage in Big Sandy Reservoir peaks in June at 31,100 acre-feet and is lowest in September at 12,300 acre-feet (**Figure 44**).



Figure 43. Big Sandy Reservoir daily storage volume for the USGS period of record (1987 to 2018)



Figure 44. Average monthly storage in Big Sandy Reservoir calculated from USGS period of record (1987 to 2018).

3.3.3.2 Eden No. 1 Reservoir

Originally constructed in 1907, Eden No. 1 Reservoir is an 18,489.93 acre-foot, off-channel reservoir located 8.5 miles northwest of Farson, WY. Eden No. 1 reservoir is supplied with water from Little Sandy Creek via the Little Sandy Feeder Canal and Big Sandy River via Big Sandy Reservoir and the Big Sandy Feeder Canal. Eden No. 1 Reservoir is formed by a series of irregular dikes on the reservoir's southwest, west, and northwest perimeter. The reservoir is equipped with two co-located outlets: a concrete lined tunnel controlled by constant head orifice gates and an uncontrolled concrete overflow structure.

Intermittent reservoir water surface elevation for Eden reservoir is available from the Eden Valley Irrigation District between 1974 and 1999. Historic data indicates that storage in Eden Reservoir fell below 20% (2,880 acre-feet) in at least 7 years between 1974 and 1999 (**Figure 45**). The reservoir filled completely in at least two years between 1974 and 1999. Average monthly storage in Eden No. 1 Reservoir peaks in June at 9,900 acre-feet and is lowest in November at 5,000 acre-feet (**Figure 46**).



Figure 45. Eden No. 1 Reservoir end-of -month storage volume for the USGS period of record (1974 to 1999).



Figure 46. Average end-of-month storage in Eden No. 1 Reservoir for BOR period of record (1974 to 1999)

3.3.3.3 Other Reservoirs

A review of storage permits in the Big Sandy River watershed revealed 26 additional reservoirs with active irrigation storage rights (**Table 25**, **Figure 47**). Most of these reservoirs are small, storing less than 300 acre-feet, however, five (5) have storage capacities exceeding 500 acre-feet. In addition to the described Big Sandy Reservoir and Eden No. 1 Reservoir above, these permitted reservoirs are more particularly identified as Elkhorn Reservoir (P1205.0R), Pacific No. 2 Reservoir (P4026.0R), and Black Joe Lake Reservoir (P5397.0R).

PERMIT No.	FACILITY NAME	APPROPRIATOR	PRIORITY	Ac-Ft	CR No.
P818.0R	EDEN IRRIGATION AND LAND CO NO 1 RESERVOIR	EDEN IRRIGATION AND LAND CO;	12/30/1905	18489.93	CR CR44/752
P947.0R	EDEN NO. 2 RESERVOIR ACT BIG SANDY RESERVOIR	BUREAU OF RECLAMATION; EDEN VALLEY IRRIGATION DISTRICT;	11/9/1906	39700.00	CR CR09/072
P1025.0R	ELKHORN RESERVOIR	JOE THOMPSON JR. LIVESTOCK CO.;	7/23/1906	1450.00	CR CR01/342
P1216.0R	ZEMBA RESERVOIR	MIDLAND LIVESTOCK COMPANY;	1/24/1908	87.00	CR CR40/650
P1675.0R	PROSPECT NO. 1 RESERVOIR	CHRIS JUEL; ROSE JUEL;	12/17/1909	187.00	CR CR44/213
P2010.0R	DUNTON NO. 1 RESERVOIR	T. TALIAFERRO;	10/9/1907	0.50	CR CR38/316
P2011.0R	DUNTON NO. 2 RESERVOIR	T. TALIAFERRO J;	2/4/1909	0.50	CR CR38/317
P2012.0R	DUNTON NO. 3 RESERVOIR	T. TALIAFERRO J;	2/4/1909	0.50	CR CR38/318
P2015.0R	TALIAFERRO NO. 3 RESERVOIR	WALTER DUNTON;	2/4/1909	0.50	CR CR34/384
P2863.0R	DRY CREEK RESERVOIR	JOHN HAY;	11/28/1911	4.00	CR CR41/393
P3328.0R	JONAH STOCK WATER RESERVOIR	ALONZO POSTON;	6/19/1916	22.68	CR CR40/652
P3339.0R	SQUARETOP RESERVOIR	MIDLAND LIVE STOCK CO.;	6/19/1916	16.00	CR CR40/651
P3467.0R	DEER SPRING RESERVOIR	WILLIAM LEWIS;	3/16/1918	4.20	CR CR42/435
P4025.0R	PACIFIC NO. 1 RESERVOIR	BLAIR HAY LAND AND LIVESTOCK COMPANY;	8/14/1926	106.91	CR R-2/192
P4026.0R	PACIFIC NO. 2 RESERVOIR	BLAIR HAY LAND AND LIVESTOCK COMPANY;	8/14/1926	1394.21	CR R-2/193
P4464.0R	BOWEN RESERVOIR	RALPH BOWEN;	7/17/1931	30	CR CR01/178
P5397.0R	BLACK JOE LAKE RESERVOIR	UNITED STATES OF AMERICA;	3/21/1935	1101.80	CR CR01/316
P5398.0R	CLEAR LAKE RESERVOIR	UNITED STATES OF AMERICA;	3/21/1935	318.60	CR CR01/317
P6320.0R	ERRAMOUSPE STOCK RESERVOIR	G AND E LIVESTOCK, INC.;	12/22/1955	346.30	CR CR08/485
P10077.0R	CHUCK WAGON RESERVOIR	RICHARD SMITH;	6/23/1993	3.00	CR CR14/428
P10078.0R	CONESTOGA RESERVOIR	RICHARD SMITH;	6/23/1993	4.14	CR CR14/429
P10079.0R	BUCKBOARD RESERVOIR	RICHARD SMITH;	6/23/1993	3.05	CR CR14/430
P10455.0R	JIMMY CREEK RESERVOIR	RICHARD SMITH;	11/1/1996	4.71	CR CR15/204
P10591.0R	GERKEN RESERVOIR	STEWART GERKEN;	8/15/1997	8.64	CR CR15/384
P10945.0R	S. MINES WILDLIFE RESERVOIR	STEVEN MINES;	11/22/1999	3.58	CR CR16/224
P12537.0R	JOHN ARAMBEL RESERVOIR	OFFICE OF STATE LANDS & INVESTMENTS;	11/7/2005	343.60	CR CR24/080
P12581.0R	MINES IRRIGATION RESERVOIR	RODNEY J MINES LIVING TRUST;	3/31/2003	3.76	CR CR23/350
P13818.0R	JACK'S RESERVOIR	JACK V MCMURRY REVOCABLE TRUST; MERIAM M MCMURRY REVOCABLE TRUST;	9/28/2010	1.20	CR CR23/349

 Table 25. Adjudicated reservoirs within the Big Sandy Watershed

TOTAL: 63636.31



Figure 47. Reservoirs permitted for irrigation within the Big Sandy Watershed

Elkhorn Reservoir (P1205.0R - also known as Little Sandy Lake) has a record capacity of 1,450 acre-feet for irrigation, stock, and domestic uses. Based on available records, the outlet works and

dam were completed in or around 1911 and includes a 2 foot x4 foot outlet box made out of wooden planks. The earth fill dam is protected with rock rip-rap on the 3:1 water face (**Figure 48**). Records also indicate that a 40 foot wide by 5 foot deep waste way (spillway) has been cut into solid rock northeasterly of the south abutment of the dam. This reservoir is located within Bridger Wilderness and no motorized access route exists. Per the SEO e-Permit database, this reservoir supplies water for diversion and conveyance through the Elkhorn Ditch (P7704.0D), adjudicated under amended CR 69, Page 105. All 280 acres of irrigated lands under this permit lie within the Little Sandy Creek HUC10 subbasin-1404010402. Based on aerial photography, it appears that the principal spillway is impaired and that storage within the lake is not actively regulated.



Figure 48. Elkhorn Reservoir (P1205.0R) – 2018 Aerial Image and Permit Drawing

Pacific No. 2 Reservoir (P4026.0R) is supplied by water from Pacific Creek (P17140.0D – reservoir supply only) and from the Sweetwater River (P4500.0E – reservoir supply and supplemental supply) by cross-basin diversion via the Hay Enlargement of McDowell Ditch. The reservoir also conveys supplemental supply through the White Horse Ditch (P17138.0D – no reservoir supply).

The Hay Enlargement of McDowell Ditch diverts water from both the Sweetwater River and Pacific Creek whereas White Horse Ditch diverts water from White Horse Draw. All supplemental supplies denoted herein are utilized on lands with an original supply under P8091.0D for 320 acres within Section 30, T26N, R103W. All irrigated lands under these permits lie within the Pacific Creek HUC10 subbasin-1404010403.

The combined storage water from all sources is limited to 1,394.21 acre-feet annually and is used for irrigation and stock use. Based on available records, the outlet works and dam were completed in or around 1926. The dam was constructed using traditional earth fill. A 12 inch iron pipe fitted with a manual gate valve is utilized as the water control device. The dam is approximately 15 feet tall with 5 feet of freeboard capacity (**Figure 49**). Records also indicate that a 400 foot wide by 5 foot deep natural emergency spillway exists in proximity to the southerly dam abutment. The supplies for this reservoir are only permitted when excess water is available and all senior water rights have been fulfilled. Due to these conditions and relative location in the watershed, the filling of this reservoir is extremely dependent on precipitation events.



Figure 49. Pacific No. 2 Reservoir (P4026.0R) – 2014 Aerial Image and Permit Drawing

Black Joe Lake Reservoir (P5397.0R) is supplied by water from Black Joe Creek, tributary of Big Sandy Creek and is situated in a remote portion of the Wind River Mountains at an elevation of 10,280 feet. The storage is limited to 1,101.8 acre-feet annually and is allocated for irrigation use

only. Based on available records, the dam was completed on August 31, 1936 and built using sod lined timber cribs and rock fill. Based on that inspection report conducted in 1944 by David P. Miller (Water Division No. 4 Superintendent), the emergency spillway is 20 feet wide and 5 feet deep. At its maximum section, the dam measures 14 feet high (5 feet of freeboard) and the dam crest is 20 feet in width (**Figure 50**). Like the Elkhorn Reservoir described previously, this reservoir is also located within Bridger Wilderness and no motorized access route exists. Based on aerial photography, it appears that the principal spillway has deteriorated and that storage within the lake is not actively regulated.



Figure 50. Black Joe Lake Reservoir (P5397.0R) – 2018 Aerial Image and Permit Drawing

3.3.3.4 Upland Water Storage

There are 18 permitted stock water reservoirs within the Big Sandy Watershed (**Table 26**). The total storage of all stock reservoirs combined is 116.6 acre-feet. It should be noted that eight (8) of these reservoirs have not been adjudicated. The location of each is also graphically depicted in **Figure 51**.

PERMIT No.	FACILITY NAME	APPROPRIATOR	PRIORITY	Ac-Ft	CR No.
P152.0S	ERRAMOUSPE NO. 1 STOCK RESERVOIR	STATE BOARD OF LAND COMMISSIONERS; G AND E LIVESTOCK, INC.;	1/14/1949	18.84	CR CR08/483
P153.0S	ERRAMOUSPE NO. 2 STOCK RESERVOIR	STATE BOARD OF LAND COMMISSIONERS; G AND E LIVESTOCK, INC.;	1/14/1949	10.20	CR CR08/484
P3276.0S	ED TOMICH STOCK RESERVOIR	STEVEN E AND DEBRA TOMICH;	5/18/1960	3.20	CR CR21/321
P4993.0S	CANAL DAM # 3-A STOCK RESERVOIR	USDI, BUREAU OF LAND MANAGEMENT;	8/12/1963	4.94	
P7894.0S	SAGEBRUSH NO. 260 STOCK RESERVOIR	USDI, BUREAU OF LAND MANAGEMENT;	9/3/1974	2.50	CR CR08/082
P8301.0S	SQUARETOP PIT NO. 10-1862 STOCK RESERVOIR	USDI, BUREAU OF LAND MANAGEMENT;	4/11/1977	1.86	CR CR08/590
P9362.0S	SHEEP CAMP NO. 1 STOCK RESERVOIR	USDI, BUREAU OF LAND MANAGEMENT;	4/3/1984	0.70	CR CR10/313
P9363.0S	LOST MOUNTAIN STOCK RESERVOIR	USDI, BUREAU OF LAND MANAGEMENT;	4/3/1984	14.00	CR CR10/312
P10840.0S	BOZNER NO. 1 STOCK RESERVOIR	FRANK BOZNER;	1/10/1990	0.30	
P10517.0S	ETCHEVERRY STOCK RESERVOIR	ALBERT ETCHEVERRY;	12/16/1988	0.26	
P10833.0S	ROD MINES STOCK RESERVOIR	ROD MINES AND JAMES MINES AND SONS, INC.;	1/2/1990	19.00	CR CR13/139
P11192.0S	BOBCAT PIT STOCK RESERVOIR	USDI, BUREAU OF LAND MANAGEMENT;	2/7/1991	1.52	
P11193.0S	EAGLE PIT STOCK RESERVOIR	USDI, BUREAU OF LAND MANAGEMENT;	2/7/1991	1.52	
P11378.0S	BIG SANDY STOCK RESERVOIR	PETER FLANIGAN;	5/13/1991	1.76	CR CR13/238
P13490.0S	JACK AND MERIAM MCMURRY STOCK RESERVOIR	JACK V AND MERIAM M MCMURRY;	6/1/1999	5.63	CR CR15/385
P15559.0S	SUNNY HOLE STOCK RESERVOIR	RICK SCHNEIDER;	2/2/2004	5.78	
P19835.0S	MAASBERG STOCK RESERVOIR	ROBERT MAASBERG;	8/19/2003	4.59	
P20368.0S	BIG SANDY DUNTON SHEEP COMPANY STOCK RESERVOIR	WYOMING GAME & FISH COMMISSION	10/3/2016	20.00	
			TOTAL:	116.6	

Table 26. Permitted Stock Reservoirs within the Big Sandy Watershed



Figure 51. Reservoirs permitted for Stock Use within the Big Sandy Watershed

In addition to permitted stock reservoirs, there are a total of 278 groundwater sources that are currently permitted for stock use within the Big Sandy Watershed, per SEO e-Permit database records. These permitted sources are either for stock use only or in combination with other beneficial uses. The following **Figure 52** identifies the geographic location of each. A tabulated list of each well being permitted for stock water use is included in **Appendix D**.



Figure 52. Groundwater sources permitted for stock use within the Big Sandy Watershed

3.3.4 Land

The following section describes land attributes related to land use, land ownership, jurisdictional boundaries, land management, and upland water resources.

3.3.4.1 Land Use

The Big Sandy Watershed (8-digit HUC – 14040104) includes land coverage in three (3) counties located in southwest Wyoming; Sweetwater County, Sublette County, and Fremont County. The overall watershed contains 1,793 square miles (mi²). The majority of said watershed lies in

Sweetwater County (967 mi²), followed by Sublette County (744 mi²). Fremont County covers the balance of the watershed (82 mi²).

Each of the counties noted above governs private land use individually. As such, permitted zoning district boundary definitions and descriptions vary from one to the next (**Figure 53**). The following **Table 27** defines the applicable zoning definitions that exist in Sweetwater and Sublette County, as they apply to private lands inside the Big Sandy Watershed. There are no zoning regulations within Fremont County.

COUNTY	ZONING CLASSIFICATION	ZONING DEFINITION	PERMITTED USES
	А	AGRICULTURAL	This district is intended to reflect the County's vast open spaces with large tracts of undeveloped land, and recognize the various uses that occur there. By nature, the majority of the County falls within this zone. Dominant land uses in this district include traditional open range livestock grazing and trailing; oil, gas and mineral exploration and extraction and cultivated agriculture. Most utilities and County provided services are limited or unavailable.
RR R-1 R-2 R-2/S	RR	RURAL RESIDENTIAL	This district is intended to accommodate large lot residential development that is semi-rural in nature. This district may be located in areas without established public water and sewer systems.
	R-1	SINGLE FAMILY RESIDENTIAL	This district is intended to accommodate single family subdivisions. Due to its urban density, an R-1 district shall typically be located within or adjacent to established communities or developed areas where urban services are available or readily accessible.
	R-2	MIXED RESIDENTIAL	This district is intended to accommodate existing residential development and associated land uses that were previously permitted on lots considered too small for the occurring uses. It is not the intent of Sweetwater County to designate additional areas R-2.
	R-2/SF	SINGLE FAMILY RESIDENTIAL	This district is intended to accommodate single family subdivisions with lot sizes of one acre or greater.
SWEETW	R-3	MULTI-FAMILY RESIDENTIAL	This district is intended to accommodate mixed residential opportunities (single- family through multi-family housing) in an organized and well-developed manner. The R-3 district should be applied judiciously where urban conveniences and services are available or readily accessible.
	с	COMMERCIAL	This district is intended to accommodate commercial and retail uses. This zone and associated uses are most applicable where convenient access, infrastructure and services are available; however, it is not intended to be applied as a narrow commercial strip on each side of an important highway.
	CRS	COMMERCIAL & RECREATIONAL SERVICES	This district is intended to accommodate recreation specific uses and development. Good access and exposure to major routes is important for many of the uses. The zone district should be kept compact. The district is appropriate for application near natural recreational areas and near major highways. It should not be applied in such a manner that it would infringe on residential districts.
	l-1	LIGHT INDUSTRIAL	This district is intended to accommodate manufacturing and light industrial land uses which require adequate services and infrastructure. These uses should be located adjacent to existing communities or in other areas where services are or can be provided. This district is intended to provide a transition between commercial and heavy industrial uses.
	MD-1	MINERAL DEVELOPMENT	This district is intended to accommodate all mineral extraction or production and ancillary facilities.

 Table 27. Zoning district boundaries within the Big Sandy Watershed

	МН	MOBILE HOME	This district is intended to accommodate the development of well-designed mobile home subdivisions where each mobile unit is placed on its own designated lot.
	A-1	AGRICULTURAL	This district maintains and continues the existing agricultural land use in the county.
₽	R-R 10	RURAL RESIDENTIAL (10 ACRE)	This district provides areas in the rural portions of the County for residential development and uses. A ten (10) acre minimum parcel is required.
JBLET	I-L	LIGHT INDUSTRIAL	This district provides areas for safe, non-nuisance causing industrial use.
SUB	RC	RESOURCE CONSERVATION DISTRICT	This district protects and conserves environmentally sensitive areas where development must be limited to prevent degradation of the areas.

SOURCE:

SWEETWATER COUNTY - 2015 ZONING RESOLUTION WITH AMENDMENTS AS OF OCTOBER 16, 2018

SUBLETTE COUNTY - 1978 ZONING AND DEVELOPMENT REGULATIONS RESOLUTION WITH AMENDMENTS AS OF APRIL, 2018



Figure 53. Zoning district boundaries within the Big Sandy Watershed

The vast majority of the watershed is composed of undeveloped land, primarily under Bureau of Land Management jurisdiction. At the northern extent of the watershed, the land is primarily

forested, located within the Bridger National Forest and Bridger Wilderness. Except for riparian areas and irrigated lands along the previously defined perennial streams and the agricultural area within Eden Valley, the remainder of the watershed is dominated by shrub-scrub communities, which compose 81.5% of the study area (see **3.2.3** Land Cover).

The lands within this subject study area are primarily used for farming and ranching operations. Private lands are used extensively for these operations, with few exceptions. The vast open spaces, largely owned by federal entities, have been historically used for livestock grazing during the summer and fall months. The first settlers that came to the area (like much of western Wyoming) homesteaded lands along the river and stream corridors throughout. Based on this physical characteristic and documented water use in the previous sections of this report, it is apparent that water is an extremely valuable commodity within this watershed. Groundwater is the primary source for domestic and stock water use whereas surface water is the primary source utilized for agricultural production.

Two established natural gas fields exist within the Big Sandy Watershed. A portion of the Pinedale Anticline Field and the Jonah Field are situated in proximity to the northwestern boundary thereof (**Figure 54**). This portion of the watershed is extensively used for industrial related use. Natural gas is the primary focus of the producers which, due to exploration/drilling, production, transmission, and measurement of the product, provides many employment opportunities for residents. In addition to these opportunities, the royalties generated from the gas reserves indirectly impacts all individuals.

It should also be noted that a new field, known as the Normally Pressured Lance Natural Gas Development Area (NPL), is being proposed for that area immediately south and west of the existing Jonah Filed (entirely within the bounds of the subject watershed). Currently, an Environmental Impact Statement (EIS) is being processed with the lead agency (BLM). If completed, the 140,850 acre natural gas field will largely impact current livestock grazing operations, wildlife habitat, and recreational use of the area. Based on publicly available information, the proposed project includes the addition of 3,500 directionally drilled wells, completed over a ten year period.



Figure 54. Oil and gas well locations within the Big Sandy Watershed

3.3.4.2 Land Ownership

The ownership distribution across the watershed is as following (Figure 55, Figure 56):

- Bureau of Land Management (BLM): 1391 mi²
- U.S. Forest Service (USFS): 98 mi²
- Bureau of Reclamation (BOR): 127 mi²
- State of Wyoming (State): 85 mi²
- Private: 92 mi²



Figure 55. Land ownership distribution within the Big Sandy Watershed

The vast majority of the watershed is under BLM jurisdiction (78%). The USFS administers 5% of the overall study area, locally concentrated within the northern reaches of the watershed. The BOR administers 7% of the land which is concentrated around the EVIDD, and both private and State owned lands equal 5% of the overall watershed. Most of the private lands within the Big Sandy Watershed are located at the lower elevations and in proximity to water sources.



Figure 56. Land ownership location within the Big Sandy Watershed

3.3.4.3 Land Management and Upland Water Resources

Land management is highly dependent on the location and productivity of existing upland water resources within the Big Sandy Watershed. As documented under **Section 3.3.3.4** Upland Water Storage of this report, substantial effort has been made by local livestock companies and associated land administrators to adequately sustain grazing operations. This has been accomplished by strategically developing water sources within each respective grazing allotment. Due to the arid

environment that exists at lower elevations, particularly those lands below 7,500 feet, water availability severely impacts livestock grazing patterns and how the watershed is impacted due to livestock pressure.

The following information (**Table 28** and **Table 29**) identifies the grazing allotments that are permitted by the BLM and USFS, respectively. The BLM allotment information was obtained from <u>https://reports.blm.gov/report/RAS/3/Authorization%20Use%20by%20Allotment/</u> on July 18, 2019 and includes information obtained from both the Rock Springs Field (LLWYD04000) and Pinedale Field (LLWYD01000) authorizing offices. The USFS allotment information was obtained from Dave Booth, Natural Resource Specialist for Bridger-Teton National Forest, Pinedale Ranger District. The geographic location of each allotment is depicted in **Figure 57** below.

ALLOTMENT #	ALLOTMENT NAME	CLASS	ALLOTMENT SIZE (Ac)	ACTIVE AUM'S	ACRES / AUM	ACRES WITHIN WATERSHED	% WITHIN WATERSHED
13008	Bar X	С	7308	468	16	7308	100%
13024	Big Sandy	C, S	60024	3480	17	60024	100%
3304	Big Sandy Ranch	С	1986	20	99	1986	100%
13026	Boundary	S	33551	2996	11	33551	100%
13020	Buckskin Sandy	S	9674	687	14	5096	53%
13013	Bush Rim	C, S	98854	3277	30	43144	44%
13114	Chilton Place	С	219	15	15	219	100%
13011	Continental Peak	C, S	88417	5769	15	88417	100%
13106	Dewey Place	С	621	9	69	621	100%
13103	Eaton Place	С	520	10	52	520	100%
3028	Eden Project	С, Н	60810	2605	23	60810	100%
13017	Eighteen Mile	C, S	245722	18994	13	68887	28%
13105	Erramouspe	С	2289	86	27	2289	100%
3016	Fourth of July	С	24548	836	29	24548	100%
3000	Gold Creek	С	25171	2501	10	25171	100%
3204	Grass Creek	С	2733	220	12	2733	100%
3307	Hay Meadow Place	С	738	91	8	738	100%
13025	Highway Gasson	C, S	100049	5208	19	72783	73%
3303	Jensen Meadows	С	1761	97	18	718	41%
3214	Johnson Place	С	89	10	9	89	100%
13002	Little Prospect	C, S	83025	6009	14	75762	91%
13003	Little Sandy	C, S	113533	7725	15	108744	96%
13022	Lombard	C, S	94541	6643	14	14012	15%
13104	Long Draw	С	3190	208	15	3190	100%
13021	Mack Flat	S	4256	77	55	986	23%
13102	McCann Ranch	S	33	2	16	32.6	100%

Table 28. BLM grazing allotments within the Big Sandy Watershed

13107	Middle Hay	С	561	16	35	561	100%
12123	NW Square Top	С	7199	800	9	7199	100%
13007	Pacific Creek	C, S	197415	8949	22	197415	100%
13005	Poston	C, S, H	51147	3418	15	51147	100%
13004	Prospect Mountain	C, S	48233	4255	11	48233	100%
3206	Pulley Place	С	557	2	279	557	100%
13006	Reservoir	S	36259	1857	20	36259	100%
13018	Rock Springs	C, S, H	2185958	107991	20	3.1	0%
2156	Sand Draw Allotment	С	31850	2324	14	7723	24%
13015	Sands	C, S	110430	4239	26	44003	40%
13019	Sandy Pasture	С	2363	180	13	2337	99%
3203	Spicer Group	С	847	29	29	847	100%
2051	Square Top Com	С, Н	39881	3862	10	8765	22%
13014	Steamboat Mountain	C, S	34201	928	37	24863	73%
12008	Stud Horse Com	С	15641	1729	9	11265	72%
13027	Sublette	C,S	72004	6072	12	59771	83%
13001	White Acorn	C, S	47012	3355	14	27233	58%

NOTE: AUM = animal unit month; C = cattle; S = Sheep; H = Horses

ALLOTMENT #	ALLOTMENT NAME	CLASS	ALLOT SIZE (Ac)	ACTIVE AUM'S	ACRES / AUM	ACRES WITHIN WATERSHED	% WITHIN WATERSHED
7024	IRISH CANYON	C,S,H	9430	1366	7	967	10%
7017	BUNION CREEK	-	16523	CLOSED	-	7174	43%
7040	TEMPLE CREEK	-	23997	CLOSED	-	23997	100%
7025	LAMREAUX MEADOW	C,S,H	7982	1993	4	4862	61%
7031	MUDDY CANYON	S, H	4595	457	10	0.6	0%
7072	BLAIR CREEK (VACANT)	-	20588	VACANT	-	302	1%
7015	BLUCHER CREEK	С	11550	886	13	4698	41%
7044	WEST SQUAW CREEK	C,S,H	3830	706	5	3830	100%
7028	LOWER DUTCH JOE	C,S,H	6912	1828	4	6912	100%
7022	EAST SQUAW CREEK	С	5088	838	6	5088	100%

Table 29. USFS	grazing allotments	within the Big	Sandy Watershed
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NOTES: AUM = animal unit month; C = cattle; S = Sheep; H = Horses

*The season of use for Blucher and East Squaw is limited to 63 days between July 10 and October 1.

*The permitted use on Irish Canyon, Lamreaux, Lower Dutch, and West Squaw is limited to either cattle or sheep, not both.



Figure 57. Grazing allotments within the Big Sandy Watershed

Wild Horses - Local livestock producers within the watershed are naturally subject to grazing competition with wild horses. Over the past decade, wild horse numbers within the watershed have substantially increased. The politically charged disagreement between advocates and ranchers regarding the management of wild horses is an ever-growing issue. Based on information received from the BLM Rock Springs Filed Office, an area located in proximity to the depicted

Boundary Allotment currently sustains approximately 400 wild horses. The determined Appropriate Management Level (AML) that the BLM seeks to maintain is 69-100 horses. Management strategies are currently limited due to congressional deadlock. The effects of overgrazing and damage to riparian areas where water sources are limited pose a concern for the BLM and producers alike. The health of the Big Sandy Watershed is dependent upon future congressional action and alteration of current management practices.

3.3.4.4 Cultural Resources

Per a phone conversation with Dr. Dave Rapson, archaeologist employed by the Wyoming Cultural Records Office (WYCRO), specific information about individual cultural resource status (CRS) and location is not available to the public. However, non-specific CRS sites are graphically depicted in **Figure 58** on the following page, retrieved from the Natural Resource and Energy Explorer (NREX). The legend indicates a number of known cultural resource sites by aliquot part within the Big Sandy Watershed. Known sites are more concentrated in the Jonah Field area and along the Sublette Cutoff Trail, due to energy development and known historical significance, respectively.

The Parting of the Ways, located approximately 15 miles northeast of Farson, is the only documented monument within the National Register of Historic Places (see **Figure 58**). Per records obtained from NREX, there are also three (3) historic trails that exist within the bounds of the Big Sandy Watershed, more particularly identified as the Bryan South Pass Road, Lander Road, and Sublette Cutoff. These trails are also depicted on the following page.

The mapping product obtained from NREX indicates known sites. This does not indicate that archeological and cultural sites don't exist in those portions of the watershed that aren't identified as having known or eligible sites. For watershed improvement projects that are located on federal lands (BLM and USFS) and depending on scope of those projects, cultural inventories may be required prior to construction. This inventory requirement will be contingent upon the application for specific project and an official review has been conducted by the governing entity.



Figure 58. Significant cultural sites and places within the Big Sandy Watershed

4 STREAMFLOW HYDROLOGY

4.1 WET / NORMAL / DRY PATTERN

Streamflow can be characterized by dividing years into wet, normal, and dry years based on cumulative streamflow at a selected location. For this analysis, dry years are defined as the 20% of analyzed years with the lowest cumulative annual streamflow; wet years are defined as the 20% of analyzed years with the greatest cumulative annual streamflow; and normal years are defined as the remaining 60% of years.

The period of record selected for streamflow analysis in this report extends from 1954 to 2018. In the case of this 65-year study period, there are 13 dry, 39 normal, and 13 wet years. Cumulative streamflow in this analysis is calculated based on water year, which runs from October 1st to September 30th.

Wet, normal, and dry years were determined at gage 09213500, a natural flow gage located on the Big Sandy River. This gage is upstream of significant irrigation diversions, irrigation return flow, or other human activities and is representative of natural basin hydrology. Average monthly streamflow was calculated in TSTool v.09.09.00 for months missing 10 or fewer daily streamflow measurements (**Table 30**). TSTool is a time series processing software program developed by the State of Colorado as part of the Colorado Decision Support Software package.

Between water year 1954 and water year 1971, the average monthly flow rate is year-round and continuous. However, between water year 1972 and present, monthly average flow rates are missing for winter months (October to March) and no data is available in the 2017 calendar year. The absence of winter flow data between 1972 and present is problematic because it complicates determination of wet/average/dry years.

In years with winter flow data, 10% of total streamflow occurs during October through March. Therefore, the bulk (90%) of annual streamflow occurs from April to September and is captured by seasonal data recorded from 1972 to present. Using only summer-time flow to determine wet/average/dry years would produce a reasonable accurate result but may mis-classify some border years. To estimate the effect of missing winter flow data on wet/average/dry flow applications, missing monthly data was filled by regression. Regression calculations were performed in TSTool v.09.09.00 using a unique equation for each month.

A portion of missing monthly data was filled by regression to 09214500, a natural flow gage on Little Sandy Creek. The drainage areas of 09213500 and 09214500 are highly similar – both originate in the Wind River Mountains and flow similar distances before reaching the gaged location (**Figure 6**). Regression to 09214500 filled missing monthly winter flows from November 1971 to March of 1981; April 2013; and May to November 2017 (**Table 31**). No additional winter flow data was recorded at a natural flow gage after the winter of 1981/1982. To fill remaining data gaps, gage 092104500 was regressed to gage 09216050. Winter flow was recorded at gage 09216050 from 1972 to 2006 but no winter flow was recorded after 2006. Winter flows at 09216050 between 2006 and present were filled by regression to gage 09205000, which is located on the New Fork River near its mouth. Gages 09216050 and 09205000 have similar tributary areas – the headwaters of both are in the Wind River Mountains; are downstream of large irrigated areas that are supplied by direct flow and reservoir storage; and show similar flow patterns during winter months. After filling winter flows at 09216050 by regression to 09205000, gage 09213500 was filled by regression to 09216050 (**Table 32**).

Two wet/average/dry flow patterns were developed from the fully filled monthly average flow data at gage 09213500 (**Table 32**). One pattern was developed using year-round flow data, and the other was developed using only summer flow data (**Table 33**). The two year-round and seasonal data sets produced nearly identical wet/normal/dry patterns, showing differences in only 1955/1966 and 1969/1980. Three of these years – 1955, 1966, and 1969 – occurred when full year-round data was available at 09213500 (i.e. no filling was required). Year-round flow data in 1980 was filled by regression to gage 09214500, which is a headwater gage on Little Sandy Creek.

Comparing the two patterns, it is clear that the pattern developed from filled year-round flow should be used. Of the four differences between the two patterns, three occur in years when no filling was required. This indicates that excluding winter flow from the wet/normal/dry pattern introduces more error than filling missing monthly flow data. Therefore, the wet/normal/dry pattern developed from year-round flow was selected for analysis of HUC10 hydrology in wet, normal, and dry years (**Table 33**).

Year	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1953										974	869	799	
1954	738	889	1,107	2,908	21,023	15,578	9,703	2,354	1,268	1,537	874	430	58,409
1955	185	333	1,353	2,380	14,212	15,733	4,665	2,112	726	1,105	1,075	974	44,853
1956	771	628	990	3,051	19,551	25,278	6,347	2,239	857	924	688	368	61,692
1957	307	389	1,230	2,452	11,175	37,427	22,834	4,864	2,263	2,678	1,813	799	88,230
1958	615	684	1,081	1,339	20,863	14,152	3,199	1,045	635	758	771	706	45,848
1959	676	611	1,071	2,975	6,609	19,075	4,753	1,644	1,007	1,910	1,081	185	41,598
1960	18	6	517	4,011	8,967	9,906	2,815	713	830	1,779	546	490	30,596
1961	81	28	184	2,394	10,039	10,731	1,710	734	1,852	2,303	1,339	456	31,850
1962	922	948	1,031	7,644	18,028	24,359	10,259	2,460	734	1,069	801	498	68,754
1963	246	641	1,254	1,577	12,294	26,775	7,563	1,932	3,691	1,870	1,331	547	59,721
1964	388	349	749	3,481	12,885	20,279	12,419	1,811	650	584	595	880	55,071
1965	1,067	644	1,137	3,697	9,469	41,963	24,234	6,008	3,743	2,654	1,355	1,091	97,062
1966	1,059	787	1,995	3,979	15,083	11,728	3,945	1,746	1,642	1,890	1,245	486	45,586
1967	374	413	2,870	3,124	14,484	39,476	25,571	3,618	2,378	3,959	1,962	1,311	99,539
1968	1,093	976	1,446	3,221	8,575	36,185	9,174	5,834	2,717	2,767	2,003	1,335	75,325
1969	1,406	1,442	1,206	8,672	26,775	23,996	10,832	2,825	1,057	1,547	835	663	81,256
1970	491	603	857	1,428	11,659	21,900	6,938	1,458	1,061	988	823	471	48,677
1971	586	964	1,712	2,664	11,895	33,610	13,254	3,578	1,904	2,414			72,581
1972				4,739	18,443	46,755	12,097	3,489	2,834				88,357
1973				7,940	17,229	22,106	8,384	2,684	4,844				63,187
1974				3,392	19,518	32,527	8,162	2,866	808				67,273
1975				1,313	9,148	32,244	28,184	3,957	1,069				75,915
1976				3,979	18,181	24,877	13,714	4,346	1,525				66,622
1977				3,309	5,681	9,249	3,664	2,283	1,523				25,708
1978				3,346	11,931	33,614	17,500	4,850	1,974				73,215
1979				4,157	17,245	18,016	6,107	3,921	1,367				50,813
1980				6,609	20,464	31,460	13,968	2,438	1,904				76,843
1981				3,332	13,244	23,413	6,597	1,299	903				48,788
1982				5,040	13,738	31,161	27,825	7,172	3,965				88,900

Table 30. Average monthly flow (acre-feet) at Gage 09213500. Blank cells indicate that the month is missing more than 10 days of data.

1983	I		8.837	9,491	35.846	19,787	5.238	2.362			81.561
1984			3,655	13,974	23,108	12,149	4,274	4,363			61,523
1985			7,035	19,038	14,188	5,291	2,160	2,534			50,246
1986			6,222	19,036	53,866	15,620	4,797	2,500			102,040
1987			5,344	20,010	15,854	7,621	3,426	2,150			54,403
1988			4,120	12,216	9,027	1,892	644	458			28,357
1989			3,406	9,305	13,184	6,663	2,009	1,539			36,106
1990			4,836	8,101	24,833	9,422	2,596	1,498			51,285
1991			2,739	14,680	35,511	8,210	2,414	2,198			65,751
1992			2,886	9,965	7,323	5,235	1,504	1,291			28,204
1993			2,317	18,500	28,818	15,043	7,476	1,918			74,072
1994			4,447	18,262	12,129	2,753	1,496	1,174			40,261
1995			2,769	10,749	47,554	31,359	6,030	2,489			100,950
1996			3,162	10,854	31,272	10,229	1,960	1,145			58,620
1997			2,991	21,035	38,171	8,440	3,392	1,950			75,978
1998			2,989	12,401	23,316	21,505	5,417	2,267			67,895
1999			4,157	16,725	38,073	14,783	3,564	2,721			80,024
2000			3,860	17,776	15,636	3,483	944	2,025			43,724
2001			2,555	15,091	7,660	2,418	626	674			29,023
2002			3,945	8,033	17,627	3,689	904	1,312			35,511
2003			3,199	12,158	11,124	3,826	818	1,126			32,250
2004			4,370	11,915	17,977	10,352	3,707	3,035			51,355
2005			4,409	18,851	30,280	11,703	2,664	1,175			69,082
2006			3,314	20,337	15,158	3,984	917	1,549			45,260
2007			2,934	13,452	9,889	3,015	2,087	975			32,353
2008			1,854	11,670	22,588	10,635	2,071	1,105			49,923
2009			2,891	14,718	29,554	12,385	2,476	906			62,930
2010			3,816	4,802	21,969	7,981	1,849	1,015			41,432
2011			2,707	7,464	36,461	32,131	4,433	2,477			85,673
2012			6,876	15,844	13,248	3,330	1,580	1,029	557		42,464
2013				12,297	9,153	2,828	608	1,487			26,372
2014		 	3,397	15,668	24,282	8,611	3,366	2,807		 	58,132
2015			4,322	14,559	21,220	5,085	1,911	969	1,248		49,314

Big Sandy Watershed, Level I Study

2016				3,320	14,732	26,057	4,870	1,181	1,300	4,148			55,607
2017													
2018				4,213	16,340	25,448	6,708	1,996					54,705
Min	18	6	184	1,313	4,802	7,323	1,710	608	458	557	546	185	25,708
Max	1,406	1,442	2,870	8,837	26,775	53,866	32,131	7,476	4,844	4,148	2,003	1,335	102,040
Mean	613	630	1,210	3,842	14,195	24,078	10,304	2,794	1,766	1,803	1,111	694	58,729

Year	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1953										974	869	799	
1954	738	889	1,107	2,908	21,023	15,578	9,703	2,354	1,268	1,537	874	430	58,210
1955	185	333	1,353	2,380	14,212	15,733	4,665	2,112	726	1,105	1,075	974	44,541
1956	771	628	990	3,051	19,551	25,278	6,347	2,239	857	924	688	368	62,865
1957	307	389	1,230	2,452	11,175	37,427	22,834	4,864	2,263	2,678	1,813	799	84,920
1958	615	684	1,081	1,339	20,863	14,152	3,199	1,045	635	758	771	706	48,903
1959	676	611	1,071	2,975	6,609	19,075	4,753	1,644	1,007	1,910	1,081	185	40,658
1960	18	6	517	4,011	8,967	9,906	2,815	713	830	1,779	546	490	30,957
1961	81	28	184	2,394	10,039	10,731	1,710	734	1,852	2,303	1,339	456	30,566
1962	922	948	1,031	7,644	18,028	24,359	10,259	2,460	734	1,069	801	498	70,484
1963	246	641	1,254	1,577	12,294	26,775	7,563	1,932	3,691	1,870	1,331	547	58,341
1964	388	349	749	3,481	12,885	20,279	12,419	1,811	650	584	595	880	56,760
1965	1,067	644	1,137	3,697	9,469	41,963	24,234	6,008	3,743	2,654	1,355	1,091	94,021
1966	1,059	787	1,995	3,979	15,083	11,728	3,945	1,746	1,642	1,890	1,245	486	47,064
1967	374	413	2,870	3,124	14,484	39,476	25,571	3,618	2,378	3,959	1,962	1,311	95,929
1968	1,093	976	1,446	3,221	8,575	36,185	9,174	5,834	2,717	2,767	2,003	1,335	76,452
1969	1,406	1,442	1,206	8,672	26,775	23,996	10,832	2,825	1,057	1,547	835	663	84,317
1970	491	603	857	1,428	11,659	21,900	6,938	1,458	1,061	988	823	471	49,440
1971	586	964	1,712	2,664	11,895	33,610	13,254	3,578	1,904	2,414	1,288	787	72,449
1972	742	671	2,111	4,739	18,443	46,755	12,097	3,489	2,834	2,364	2,549	999	96,370
1973	998	1,262	1,162	7,940	17,229	22,106	8,384	2,684	4,844	3,958	1,998	1,140	72,522
1974	1,010	1,198	2,010	3,392	19,518	32,527	8,162	2,866	808	1,873	1,174	500	78,588
1975	291	320	1,089	1,313	9,148	32,244	28,184	3,957	1,069	2,453	1,650	952	81,162

Table 31. Average Monthly Flow (acre-feet) at Gage 09213500 after filling by regression to 09214500. Orange highlight indicates a month filled by regression to 09214500.

1976	840	849	1,145	3,979	18,181	24,877	13,714	4,346	1,525	1,910	1,422	490	74,510
1977	261	250	1,039	3,309	5,681	9,249	3,664	2,283	1,523	2,096	1,527	803	31,080
1978	897	966	1,277	3,346	11,931	33,614	17,500	4,850	1,974	2,009	938	604	80,781
1979	392	397	1,045	4,157	17,245	18,016	6,107	3,921	1,367	1,902	951	756	56,198
1980	721	734	1,119	6,609	20,464	31,460	13,968	2,438	1,904	2,428	1,334	888	83,027
1981	725	774	1,251	3,332	13,244	23,413	6,597	1,299	903				56,188
1982				5,040	13,738	31,161	27,825	7,172	3,965				88,900
1983				8,837	9,491	35,846	19,787	5,238	2,362				81,561
1984				3,655	13,974	23,108	12,149	4,274	4,363				61,523
1985				7,035	19,038	14,188	5,291	2,160	2,534				50,246
1986				6,222	19,036	53,866	15,620	4,797	2,500				102,040
1987				5,344	20,010	15,854	7,621	3,426	2,150				54,403
1988				4,120	12,216	9,027	1,892	644	458				28,357
1989				3,406	9,305	13,184	6,663	2,009	1,539				36,106
1990				4,836	8,101	24,833	9,422	2,596	1,498				51,285
1991				2,739	14,680	35,511	8,210	2,414	2,198				65,751
1992				2,886	9,965	7,323	5,235	1,504	1,291				28,204
1993				2,317	18,500	28,818	15,043	7,476	1,918				74,072
1994				4,447	18,262	12,129	2,753	1,496	1,174				40,261
1995				2,769	10,749	47,554	31,359	6,030	2,489				100,950
1996				3,162	10,854	31,272	10,229	1,960	1,145				58,620
1997				2,991	21,035	38,171	8,440	3,392	1,950				75,978
1998				2,989	12,401	23,316	21,505	5,417	2,267				67,895
1999				4,157	16,725	38,073	14,783	3,564	2,721				80,024
2000				3,860	17,776	15,636	3,483	944	2,025				43,724
2001				2,555	15,091	7,660	2,418	626	674				29,023
2002				3,945	8,033	17,627	3,689	904	1,312				35,511
2003				3,199	12,158	11,124	3,826	818	1,126				32,250
2004				4,370	11,915	17,977	10,352	3,707	3,035				51,355
Mean	639	670	2,070	3 829	14 238	25 265	10 459	2 830	1 777	1 998	1 329	729	61 305
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Max	1 406	1 442	2 870	8 837	26 775	101 223	32 131	7 476	4 844	4 148	3 716	1 335	28 204
Min	18	6	184	1,313	4,802	7,323	1,710	608	458	557	546	185	150,406
2018				4,213	16,340	25,448	6,708	1,996					61,708
2017					17,028	101,223	20,394	5,166	2,447	3,287	3,716		150,406
2016				3,320	14,732	26,057	4,870	1,181	1,300	4,148			52,707
2015				4,322	14,559	21,220	5,085	1,911	969	1,248			48,065
2014				3,397	15,668	24,282	8,611	3,366	2,807				58,132
2013				2,988	12,297	9,153	2,828	608	1,487				29,917
2012				6,876	15,844	13,248	3,330	1,580	1,029	557			41,907
2011				2,707	7,464	36,461	32,131	4,433	2,477				85,673
2010				3,816	4,802	21,969	7,981	1,849	1,015				41,432
2009				2,891	14,718	29,554	12,385	2,476	906				62,930
2008				1,854	11,670	22,588	10,635	2,071	1,105				49,923
2007				2,934	13,452	9,889	3,015	2,087	975				32,353
2006				3,314	20,337	15,158	3,984	917	1,549				45,260
2005				4,409	18,851	30,280	11,703	2,664	1,175				69,082

Year	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1953	NC	NC	NC	NC	NC	NC	NC	NC	NC	974	869	799	NC
1954	738	889	1,107	2,908	21,023	15,578	9,703	2,354	1,268	1,537	874	430	58,409
1955	185	333	1,353	2,380	14,212	15,733	4,665	2,112	726	1,105	1,075	974	44,853
1956	771	628	990	3,051	19,551	25,278	6,347	2,239	857	924	688	368	61,692
1957	307	389	1,230	2,452	11,175	37,427	22,834	4,864	2,263	2,678	1,813	799	88,230
1958	615	684	1,081	1,339	20,863	14,152	3,199	1,045	635	758	771	706	45,848
1959	676	611	1,071	2,975	6,609	19,075	4,753	1,644	1,007	1,910	1,081	185	41,598
1960	18	6	517	4,011	8,967	9,906	2,815	713	830	1,779	546	490	30,596
1961	81	28	184	2,394	10,039	10,731	1,710	734	1,852	2,303	1,339	456	31,850
1962	922	948	1,031	7,644	18,028	24,359	10,259	2,460	734	1,069	801	498	68,754
1963	246	641	1,254	1,577	12,294	26,775	7,563	1,932	3,691	1,870	1,331	547	59,721
1964	388	349	749	3,481	12,885	20,279	12,419	1,811	650	584	595	880	55,071
1965	1,067	644	1,137	3,697	9,469	41,963	24,234	6,008	3,743	2,654	1,355	1,091	97,062
1966	1,059	787	1,995	3,979	15,083	11,728	3,945	1,746	1,642	1,890	1,245	486	45,586
1967	374	413	2,870	3,124	14,484	39,476	25,571	3,618	2,378	3,959	1,962	1,311	99,539
1968	1,093	976	1,446	3,221	8,575	36,185	9,174	5,834	2,717	2,767	2,003	1,335	75,325
1969	1,406	1,442	1,206	8,672	26,775	23,996	10,832	2,825	1,057	1,547	835	663	81,256
1970	491	603	857	1,428	11,659	21,900	6,938	1,458	1,061	988	823	471	48,677
1971	586	964	1,712	2,664	11,895	33,610	13,254	3,578	1,904	2,414	1,288	787	74,656
1972	742	671	2,111	4,739	18,443	46,755	12,097	3,489	2,834	2,364	2,549	999	97,793
1973	998	1,262	1,162	7,940	17,229	22,106	8,384	2,684	4,844	3,958	1,998	1,140	73,706
1974	1,010	1,198	2,010	3,392	19,518	32,527	8,162	2,866	808	1,873	1,174	500	75,038
1975	291	320	1,089	1,313	9,148	32,244	28,184	3,957	1,069	2,453	1,650	952	82,669
1976	840	849	1,145	3,979	18,181	24,877	13,714	4,346	1,525	1,910	1,422	490	73,278
1977	261	250	1,039	3,309	5,681	9,249	3,664	2,283	1,523	2,096	1,527	803	31,684
1978	897	966	1,277	3,346	11,931	33,614	17,500	4,850	1,974	2,009	938	604	79,905
1979	392	397	1,045	4,157	17,245	18,016	6,107	3,921	1,367	1,902	951	756	56,257
1980	721	734	1,119	6,609	20,464	31,460	13,968	2,438	1,904	2,428	1,334	888	84,067

Table 32. Average monthly flow (acre-feet) at Gage 09213500 after filling by regression to 09214500 and 09216050. Orange highlight indicates a month filled by regression to 09214500. Yellow highlight indicates a month filled by regression to 09214500.

1981	725	774	1,251	3,332	13,244	23,413	6,597	1,299	903	2,195	1,509	842	56,084
1982	624	1,691	1,452	5,040	13,738	31,161	27,825	7,172	3,965	2,889	1,811	978	98,345
1983	971	1,003	1,412	8,837	9,491	35,846	19,787	5,238	2,362	3,351	4,513	1,122	93,935
1984	1,225	1,372	1,477	3,655	13,974	23,108	12,149	4,274	4,363	2,506	1,580	919	70,601
1985	980	937	1,244	7,035	19,038	14,188	5,291	2,160	2,534	2,388	1,645	870	58,310
1986	809	898	1,528	6,222	19,036	53,866	15,620	4,797	2,500	2,992	2,387	936	111,590
1987	806	1,041	1,513	5,344	20,010	15,854	7,621	3,426	2,150	2,339	1,590	800	62,492
1988	682	770	1,130	4,120	12,216	9,027	1,892	644	458	1,871	1,181	766	34,757
1989	746	642	1,238	3,406	9,305	13,184	6,663	2,009	1,539	1,673	1,107	659	42,171
1990	521	511	1,139	4,836	8,101	24,833	9,422	2,596	1,498	1,695	1,002	643	56,796
1991	526	727	1,161	2,739	14,680	35,511	8,210	2,414	2,198	2,116	1,711	832	72,824
1992	699	777	1,463	2,886	9,965	7,323	5,235	1,504	1,291	1,883	1,317	682	35,024
1993	560	481	1,185	2,317	18,500	28,818	15,043	7,476	1,918	2,252	1,419	865	80,835
1994	815	630	1,392	4,447	18,262	12,129	2,753	1,496	1,174	2,081	1,310	754	47,242
1995	777	939	2,361	2,769	10,749	47,554	31,359	6,030	2,489	2,298	2,015	1,025	110,365
1996	944	1,016	1,432	3,162	10,854	31,272	10,229	1,960	1,145	2,345	1,760	849	66,966
1997	727	663	3,456	2,991	21,035	38,171	8,440	3,392	1,950	2,307	1,648	753	85,531
1998	739	827	1,324	2,989	12,401	23,316	21,505	5,417	2,267	2,555	1,810	954	76,104
1999	900	835	1,587	4,157	16,725	38,073	14,783	3,564	2,721	2,089	1,502	873	87,811
2000	716	841	1,271	3,860	17,776	15,636	3,483	944	2,025	1,874	1,074	670	50,169
2001	624	664	1,305	2,555	15,091	7,660	2,418	626	674	1,416	864	521	34,416
2002	396	414	1,093	3,945	8,033	17,627	3,689	904	1,312	1,323	786	603	40,124
2003	447	386	1,023	3,199	12,158	11,124	3,826	818	1,126	1,195	518	486	36,305
2004	373	400	1,201	4,370	11,915	17,977	10,352	3,707	3,035	1,497	742	483	56,051
2005	378	391	1,723	4,409	18,851	30,280	11,703	2,664	1,175	1,683	966	648	74,871
2006	583	530	1,161	3,314	20,337	15,158	3,984	917	1,549	1,936	1,350	772	51,591
2007	697	743	1,402	2,934	13,452	9,889	3,015	2,087	975	1,855	1,187	742	38,978
2008	688	756	1,344	1,854	11,670	22,588	10,635	2,071	1,105	2,009	1,435	797	56,952
2009	716	690	1,203	2,891	14,718	29,554	12,385	2,476	906	2,053	1,441	779	69,811
2010	640	640	1,259	3,816	4,802	21,969	7,981	1,849	1,015	1,909	1,368	784	48,032
2011	725	661	1,254	2,707	7,464	36,461	32,131	4,433	2,477	2,169	1,436	712	92,630
2012	655	600	1,309	6,876	15,844	13,248	3,330	1,580	1,029	557	1,232	700	46,959

2013	605	685	1,305	2,988	12,297	9,153	2,828	608	1,487	2,088	1,382	715	36,140
2014	625	723	1,519	3,397	15,668	24,282	8,611	3,366	2,807	2,371	1,505	816	65,690
2015	980	879	1,632	4,322	14,559	21,220	5,085	1,911	969	1,248	1,379	740	54,923
2016	693	775	1,344	3,320	14,732	26,057	4,870	1,181	1,300	4,148	2,122	948	61,490
2017	1,016	1,509	3,692	5,621	17,028	101,223	20,394	5,166	2,447	3,287	3,716	860	165,959
2018	830	796	1,496	4,213	16,340	25,448	6,708	1,996					65,689
Min	18	6	184	1,313	4,802	7,323	1,710	608	458	557	518	185	30,596
Max	1,406	1,691	3,692	8,837	26,775	101,223	32,131	7,476	4,844	4,148	4,513	1,335	165,959
Mean	682	732	1,386	3,856	14,238	25,265	10,459	2,830	1,777	2,048	1,418	759	65,500

Veer	Cumula	ative flow (acre	e-feet)	Wet/Norm	nal/Dry	Fille d 2
Year	Year-Round	Seasonal	Difference	Year-Round	Seasonal	Filled?
1954	58210	52835	5375	Normal	Normal	
1955	44541	39829	4712	Normal	Dry	
1956	62865	57323	5542	Normal	Normal	
1957	84920	81014	3906	Wet	Wet	
1958	48903	41233	7670	Normal	Normal	
1959	40658	36064	4594	Dry	Dry	z
1960	30957	27241	3717	Dry	Dry	0 V
1961	30566	27459	3107	Dry	Dry	lon
1962	70484	63484	7000	Normal	Normal	thly
1963	58341	53832	4509	Normal	Normal	' Da
1964	56760	51525	5235	Normal	Normal	ita I
1965	94021	89115	4907	Wet	Wet	-ille
1966	47064	38123	8942	Dry	Normal	ä
1967	95929	88651	7278	Wet	Wet	
1968	76452	65706	10747	Normal	Normal	
1969	84317	74157	10160	Normal	Wet	
1970	49440	44444	4996	Normal	Normal	
1971	72449	66905	5543	Normal	Normal	
1972	96370	88357	8013	Wet	Wet	
1973	72522	63187	9335	Normal	Normal	Re≷
1974	78588	67273	11314	Normal	Normal	inte
1975	81162	75915	5247	Normal	Normal	er N ssic
1976	74510	66622	7888	Normal	Normal	lont on t
1977	31080	25708	5372	Dry	Dry	ths 0 Og
1978	80781	73215	7566	Normal	Normal	Fille 921
1979	56198	50813	5385	Normal	Normal	ed k 450
1980	83027	76843	6184	Wet	Normal	ŏ×
1981	56188	48788	7400	Normal	Normal	
1982	97213	88900	8313	Wet	Wet	Vir Apr
1983	90626	81561	9064	Wet	Wet	il 20 illec ìter
1984	74582	61523	13060	Normal	Normal	113 : Mo
1985	58412	50246	8166	Normal	Normal	and Reg
1986	110178	102040	8138	Wet	Wet	Ma gres s Fil 092
1987	64078	54403	9675	Normal	Normal	y to sion led 160
1988	35668	28357	7311	Dry	Dry	by F
1989	42550	36106	6444	Dry	Dry	ven 092 Vegr
1990	56895	51285	5610	Normal	Normal	nber 145 .essi
1991	71505	65751	5753	Normal	Normal	00; ion
1992	35801	28204	7598	Dry	Dry	17 to

Table 33. Cumulative streamflow and Wet/Normal/Dry pattern for year-round andseasonal data analysis methodology

1993	80180	74072	6108	Normal	Normal
1994	47634	40261	7373	Normal	Normal
1995	109171	100950	8221	Wet	Wet
1996	67350	58620	8730	Normal	Normal
1997	85778	75978	9800	Wet	Wet
1998	75493	67895	7598	Normal	Normal
1999	88666	80024	8641	Wet	Wet
2000	51015	43724	7291	Normal	Normal
2001	35233	29023	6210	Dry	Dry
2002	40213	35511	4703	Dry	Dry
2003	36818	32250	4567	Dry	Dry
2004	55528	51355	4173	Normal	Normal
2005	74297	69082	5215	Normal	Normal
2006	50829	45260	5570	Normal	Normal
2007	39252	32353	6899	Dry	Dry
2008	56495	49923	6572	Normal	Normal
2009	69779	62930	6849	Normal	Normal
2010	48244	41432	6812	Normal	Normal
2011	92374	85673	6702	Wet	Wet
2012	48788	41907	6881	Normal	Normal
2013	34444	29360	5084	Dry	Dry
2014	65183	58132	7052	Normal	Normal
2015	56247	48065	8182	Normal	Normal
2016	57639	51459	6180	Normal	Normal
2017	165314	151879	13434	Wet	Wet
2018	65689	54705	10985	Normal	Normal

4.2 WET / NORMAL / DRY MONTHLY FLOW AT NATURAL FLOW STREAM GAGES

<u>09212500</u>

At gage 09212500 the observed average annual flow during wet, normal, and dry years, respectively, is 90,000, 62,300, and 38,000 acre-feet. Observed monthly streamflow peaks in June (**Figure 59**), ranging between 40,100 acre-feet in an average wet year and 12,400 acre-feet in an average dry year (**Table 34**). Observed monthly streamflow is lowest in February, ranging between 853 acre-feet in an average normal year and 483 acre-feet in an average dry year.

After regressing gage 09212500 to the fully filled streamflow data at gage 09213500, modeled wet/normal/dry flows are as follows. Average annual flow during wet, normal, and dry years, respectively, is 96,000, 62,400, and 36,200 acre-feet. Modeled monthly streamflow peaks in June (**Figure 60**), ranging between 45,065 acre-feet in an average wet year and 11,400 acre-feet in an average dry year (**Table 35**). Modeled monthly streamflow is lowest in January, ranging between 852 acre-feet in an average wet year and 627 acre-feet in an average dry year.

<u>09213500</u>

At gage 09213500 the observed average annual flow during wet, normal, and dry years, respectively, is 91,600, 62,100, and 37,300 acre-feet. Observed monthly streamflow peaks in June (**Figure 61**), ranging between 39,900 acre-feet in an average wet year and 11,200 acre-feet in an average dry year (**Table 36**). Observed monthly streamflow is lowest in February, ranging between 482 acre-feet in an average wet year and 358 acre-feet in an average dry year. Observed streamflow data indicates that the Big Sandy River flows year-round.

After filling gage 09213500 by regression, modeled wet/normal/dry flows are as follows. Average annual flow during wet, normal, and dry years, respectively, is 99,500, 63,500, and 36,900 acre-feet. Modeled monthly streamflow peaks in June (**Figure 62**), ranging between 39,900 acre-feet in an average wet year and 11,200 acre-feet in an average dry year (**Table 37**). Modeled monthly streamflow is lowest in February, ranging between 267 acre-feet in an average wet year and 196 acre-feet in an average dry year.

<u>09214000</u>

At gage 09214000 the observed average annual flow during wet, normal, and dry years, respectively, is 22,000, 14,900, and 9,600 acre-feet. Observed monthly streamflow peaks in June (**Figure 63**), ranging between 7,700 acre-feet in an average wet year and 3,500 acre-feet in an average dry year (**Table 38**). Observed monthly streamflow is lowest in February, ranging between 853 acre-feet in an average normal year and 483 acre-feet in an average dry year.

After regressing gage 09214000 to the fully filled streamflow data at gage 09213500, modeled wet/normal/dry flows are as follows. Average annual flow during wet, normal, and dry years, respectively, is 23,800, 15,000, and 8,700 acre-feet. Modeled monthly streamflow peaks in June (**Figure 64**), ranging between 9,500 acre-feet in an average wet year and 2,700 acre-feet in an average dry year (**Table 39**). Modeled monthly streamflow is lowest in February, ranging between 308 acre-feet in an average wet year and 193 acre-feet in an average dry year.

<u>09214500</u>

At gage 09214500 the observed average annual flow during wet, normal, and dry years, respectively, is 20,600, 14,100, and 6,200 acre-feet. Observed monthly streamflow peaks in June (**Figure 65**), ranging between 8,100 acre-feet in an average wet year and 1,900 acre-feet in an average dry year (**Table 40**). Observed monthly streamflow is lowest in February, ranging between 126 acre-feet in an average wet year and 116 acre-feet in an average dry year. In extremely dry years, Little Sandy Creek can dry out during August, September, and October.

After regressing gage 09214500 to the fully filled streamflow data at gage 09213500, modeled wet/normal/dry flows are as follows. Average annual flow during wet, normal, and dry years, respectively, is 22,200, 13,700, and 6,600 acre-feet. Modeled monthly streamflow peaks in June (**Figure 66**), ranging between 8,000 acre-feet in an average wet year and 1,900 acre-feet in an average dry year (**Table 41**). Modeled monthly streamflow is lowest in January, ranging between 193 acre-feet in an average dry year.

<u>09215000</u>

At gage 09215000 the observed average annual flow during wet, normal, and dry years, respectively, is 5,500, 3,900, and 2,500 acre-feet. Observed monthly streamflow peaks in March (**Figure 67**), ranging between 3,100 acre-feet and 1,200 acre-feet (**Table 42**). Observed monthly streamflow is lowest in January, ranging between 23 acre-feet and zero acre-feet. Dry Sandy Creek is typically dry from August through February and the creek was dry at least one month during every recorded year.

After regressing gage 09215000 to the fully filled streamflow data at gage 09213500, modeled wet/normal/dry flows are as follows. Average annual flow during wet, normal, and dry years, respectively, is 5,200, 3,800, and 3,000 acre-feet. Modeled monthly streamflow peaks in March (**Figure 68**), ranging between 2,600 acre-feet and 1,600 acre-feet (**Table 43**). Modeled monthly streamflow is lowest in January, ranging between 16 acre-feet and zero acre-feet in an average dry year.

<u>09216050</u>

At gage 09216050 the observed average annual flow during wet, normal, and dry years, respectively, is 83,400, 45,500, and 25,900 acre-feet. Observed monthly streamflow indicates that

flow is greatest in June (**Figure 69**), with flows ranging between 20,700 acre-feet in an average wet year and 2,100 acre-feet in an average dry year (**Table 44**). Observed monthly streamflow is lowest in January, ranging between 2,000 acre-feet and 1,400 acre-feet.

After regressing gage 09216050 to the 09216000 and 09205000, modeled wet/normal/dry flows are as follows. Average annual flow during wet, normal, and dry years, respectively, is 74,800, 43,100, and 26,700 acre-feet. Modeled monthly streamflow peaks in June (**Figure 70**), with flows ranging between 17,100 acre-feet in an average wet year and 2,400 acre-feet in an average dry year (**Table 45**). Modeled monthly streamflow is lowest in January, ranging between 200 acre-feet and 1,400 acre-feet.



Figure 59. Observed flow at 09212500 during Wet/Normal/Dry years

Month	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Number of Observed Monthly Values	N=18	N=18	N=33	N=34	N=34	N=34	N=34	N=34	N=34	N=18	N=17	N=17
Maximum Observed Monthly Flow	1,660	1,408	1,611	7,359	27,295	55,586	28,289	6,204	5,060	3,549	1,944	1,999
Wet Year Average	724	578	996	2,426	14,983	40,077	18,816	4,346	2,587	1,378	851	862
Normal Year Average	875	835	947	2,618	16,708	24,087	9,663	2,870	1,865	1,798	1,165	986
Dry Year Average	606	483	637	2,359	9,678	12,374	3,515	1,537	1,655	1,649	1,145	910
Minimum Observed Streamflow	246	201	342	760	5,683	9,566	2,079	1,103	725	583	630	307

Table 34. Observed Flow at 09212500 during Wet/Normal/Dry Years



Figure 60. Modeled flow at 09212500 during Wet/Normal/Dry years

Month	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Number of Observed Monthly Values	N=65	N=65	N=65	N=65	N=65	N=65	N=65	N=65	N=64	N=64	N=64	N=64
Maximum Observed Monthly Flow	1,660	1,882	2,252	7,359	27,295	102,672	30,442	7,014	5,060	3,782	4,211	1,999
Wet Year Average	852	927	1,212	2,324	15,032	45,065	19,385	4,305	2,523	1,985	1,313	1,030
Normal Year Average	820	807	914	2,415	15,897	23,875	9,000	2,652	1,745	1,946	1,418	994
Dry Year Average	627	576	745	2,077	11,088	11,390	3,507	1,255	1,319	1,570	1,154	875
Minimum Observed Streamflow	246	201	342	760	4,970	7,428	1,793	570	458	508	480	307



Figure 61. Observed flow at 09213500 during Wet/Normal/Dry years

Table 36	. Observed flow	at 09213500 d	during Wet/No	rmal/Dry years
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Month	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Number of Observed Monthly Values	N=18	N=18	N=18	N=63	N=64	N=64	N=64	N=64	N=63	N=21	N=17	N=17
Maximum Observed Monthly Flow	1,406	1,442	2,870	8,837	26,775	53,866	32,131	7,476	4,844	4,148	2,003	1,335
Wet Year Average	583	482	1,745	4,445	14,356	39,851	20,721	4,587	2,632	1,992	843	578
Normal Year Average	676	769	1,162	3,820	15,315	23,515	9,342	2,755	1,683	1,916	1,285	749
Dry Year Average	459	358	942	3,309	10,684	11,206	3,573	1,255	1,209	1,532	938	618
Minimum Observed Streamflow	18	6	184	1,313	4,802	7,323	1,710	608	458	557	546	185



Figure 62. Modeled flow at 09213500 during Wet/Normal/Dry years

Month	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Number of Observed Monthly Values	N=65	N=65	N=65	N=65	N=65	N=65	N=65	N=65	N=64	N=64	N=64	N=64
Maximum Observed Monthly Flow	1,406	1,691	3,692	8,837	26,775	101,223	32,131	7,476	4,844	4,148	4,513	1,335
Wet Year Average	751	850	1,939	4,536	14,561	44,572	20,696	4,631	2,618	2,171	1,392	789
Normal Year Average	707	764	1,284	3,820	15,315	23,515	9,342	2,755	1,683	2,145	1,532	780
Dry Year Average	538	520	1,136	3,285	10,684	11,206	3,573	1,255	1,209	1,726	1,151	663
Minimum Observed Streamflow	18	6	184	1,313	4,802	7,323	1,710	608	458	557	518	185

Table 37. Modeled Flow at 0921350) During Wet/Normal/Dry \	Years
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Figure 63. Observed flow at 09214000 during Wet/Normal/Dry years

Table 38. Observed flow at 09214000 during Wet/Normal/Dry years

Month	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Number of Observed Monthly Values	N=18	N=18	N=18	N=18	N=18	N=18	N=18	N=18	N=18	N=17	N=17	N=17
Maximum Observed Monthly Flow	600	409	523	1,332	4,522	8,206	7,968	2,537	1,008	942	619	457
Wet Year Average	366	267	272	506	2,432	7,656	7,145	1,771	838	251	252	287
Normal Year Average	247	243	264	593	2,962	5,465	2,808	836	416	450	367	294
Dry Year Average	229	196	398	786	1,749	3,545	991	335	285	432	361	285
Minimum Observed Streamflow	108	122	190	314	1,281	3,045	638	169	99	88	144	92



Figure 64. Modeled flow at 09214000 during Wet/Normal/Dry years

Month	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Number of Observed Monthly Values	N=65	N=65	N=65	N=65	N=65	N=65	N=65	N=65	N=64	N=64	N=64	N=64
Maximum Observed Monthly Flow	600	584	673	1,477	4,522	22,026	9,845	2,537	1,314	960	1,361	457
Wet Year Average	315	308	356	759	2,739	9,476	6,278	1,578	729	497	419	315
Normal Year Average	263	246	261	641	2,811	5,220	2,913	916	468	492	456	297
Dry Year Average	219	193	288	619	1,925	2,668	1,088	397	304	403	370	266
Minimum Observed Streamflow	98	81	190	219	882	1,594	580	169	99	88	144	92



Figure 65. Observed flow at 09214500 during Wet/Normal/Dry years

Table 40. Observed flow at 09214500 durin	ng Wet/Normal/Dry years
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Month	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Number of Observed Monthly Values	N=27	N=27	N=27	N=34	N=49	N=63	N=63	N=64	N=63	N=28	N=28	N=27
Maximum Observed Monthly Flow	356	412	2,284	6,066	4,937	20,247	7,949	1,944	1,591	1,117	1,391	580
Wet Year Average	136	126	778	2,335	2,745	8,086	5,112	1,121	582	702	700	357
Normal Year Average	214	220	560	1,539	2,686	4,346	2,060	593	344	306	313	234
Dry Year Average	132	116	513	989	1,175	1,926	361	76	47	226	368	250
Minimum Observed Streamflow	13	42	161	595	538	663	10	0	0	0	108	44



Figure 66. Modeled flow at 09214500 during Wet/Normal/Dry years

Table 41. Modeled flow at 09214500 during Wet/Normal/Dry years

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Number of Observed Monthly Values	N=65	N=65	N=65	N=65	N=65	N=65	N=65	N=65	N=64	N=64	N=64	N=64
Maximum Observed Monthly Flow	356	465	2,284	6,066	4,937	20,247	8,017	1,944	1,591	1,117	1,566	580
Wet Year Average	193	222	953	2,101	2,623	7,978	5,336	1,121	582	430	427	262
Normal Year Average	208	213	604	1,553	2,669	4,305	2,063	590	340	413	470	283
Dry Year Average	161	153	557	1,117	1,390	1,926	361	76	47	268	344	231
Minimum Observed Streamflow	13	42	161	595	538	663	10	0	0	0	103	44



Figure 67. Observed flow at 09215000 during Wet/Normal/Dry years

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Number of Observed Monthly Values	N=21	N=21	N=21	N=22	N=22	N=22	N=21	N=21	N=21	N=21	N=22	N=21
Maximum Observed Monthly Flow	270	509	9,755	7,103	1,719	927	2,148	311	408	137	109	783
Wet Year Average	0	110	3,128	1,332	531	161	64	70	18	37	28	3
Normal Year Average	23	26	1,164	1,511	320	139	197	12	57	16	19	66
Dry Year Average	0	0	1,441	956	50	1	0	14	0	1	6	0
Minimum Observed Streamflow	0	0	0	138	0	0	0	0	0	0	0	0



Figure 68. Modeled flow at 09215000 during Wet/Normal/Dry years

Table 43. Modeled flow at 09215000 during Wet/Normal/Dry years

Month	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Number of Modeled Monthly Values	N=65	N=65	N=65	N=65	N=65	N=65	N=65	N=65	N=64	N=64	N=64	N=64
Maximum Modeled Monthly Flow	270	509	9,755	7,103	1,719	927	2,148	311	408	137	109	783
Wet Year Average	9	62	2,631	1,642	393	143	127	61	54	29	25	33
Normal Year Average	16	26	1,564	1,442	315	99	116	28	53	20	21	54
Dry Year Average	7	14	1,552	1,137	171	25	21	15	24	12	15	29
Minimum Modeled Streamflow	0	0	0	138	0	0	0	0	0	0	0	0



Figure 69. Observed flow at 09216050 during Wet/Normal/Dry years

	U			-								
Month	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Number of Observed Monthly Values	N=34	N=34	N=34	N=34	N=35	N=35	N=35	N=35	N=35	N=34	N=34	N=34
Maximum Observed Monthly Flow	3,412	4,110	24,173	27,470	12,794	37,324	20,882	7,333	5,972	6,264	8,845	3,711
Wet Year Average	1,960	2,265	9,107	10,690	6,890	20,736	11,131	6,086	5,271	3,925	3,069	2,462
Normal Year Average	1,802	1,679	4,271	5,454	4,180	5,204	5,230	4,579	4,139	3,574	3,133	2,211
Dry Year Average	1,417	1,341	3,010	2,769	1,892	2,071	2,295	2,268	2,063	2,770	2,365	1,682
Minimum Observed Streamflow	578	659	1,357	1,482	1,026	1,286	1,343	1,218	1,079	1,057	916	573

Table 44. Observed flow at 09216050 during Wet/Normal/Dry years



Figure 70. Modeled flow at 09216050 during Wet/Normal/Dry years

Month	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Number of Observed Monthly Values	N=64	N=64	N=64	N=64	N=64	N=64	N=63	N=63	N=64	N=64	N=64	N=64
Maximum Observed Monthly Flow	3,412	4,395	24,173	27,470	13,897	37,324	21,811	7,333	5,972	6,264	8,845	3,711
Wet Year Average	1,811	2,077	8,074	8,585	5,745	17,053	12,778	5,475	4,698	3,391	2,922	2,207
Normal Year Average	1,635	1,534	4,136	5,399	4,378	6,019	4,742	3,930	3,617	3,237	2,822	1,964
Dry Year Average	1,307	1,203	3,204	3,400	2,623	2,354	2,279	2,039	2,038	2,505	2,211	1,512
Minimum Observed Streamflow	548	447	1,240	1,482	929	1,286	1,343	784	1,079	1,057	916	6

4.3 WET / NORMAL / DRY MONTHLY FLOW AT HUC10 WATERSHEDS

The Big Sandy River Watershed is composed of six HUC10 watersheds (**Figure 3** and **Table 2**). HUC10 watersheds *Upper Big Sandy* and *Little Sandy Creek* contain high precipitation areas that feed perennial streams while *Pacific Creek* contains moderate precipitation areas that feed intermittent streams (**Figure 71**). HUC10 watersheds *Sublette Flats, Bone Draw,* and *Lower Big Sandy*, produce only ephemeral stream, therefore, wet/normal/dry flow patterns were not developed for these HUC10 watersheds.



Figure 71: Wet/Normal/Dry Streamflow of HUC10 Watersheds

<u>Upper Big Sandy</u>

Gage 09213500 is located near the mouth of the Upper Big Sandy HUC10 watershed. Because of its location, the streamflow measured at 09213500 measures nearly the all surface water produced in the HUC10. Only a few unnamed ephemeral streams confluence with the Big Sandy River between 09213500 and the mount of HUC 10 (FIGURE). Therefore, the wet/normal/dry streamflow values developed for gage 09213500 are representative of the entire HUC10.

From 1954 to 2018, average annual production during wet, normal, and dry years, respectively, is 99,500, 63,500, and 36,900 acre-feet. Monthly streamflow peaks in June (**Figure 62**), ranging between 39,900 acre-feet in an average wet year and 11,200 acre-feet in an average dry year (**Table**

37). Monthly streamflow is lowest in January, ranging between 751 acre-feet in an average wet year and 538 acre-feet in an average dry year. The reported flow data is natural flow developed from observed flow at 09213500 with data gaps filled by regression as described in **Section 4.2**.

Little Sandy Creek

Gage 09214500 is located on Little Sandy Creek upstream of the confluence of Little Sandy Creek and Dry Sandy Creek. Dry Sandy Creek, an intermittent stream, collects surface water from a tributary area of 116.5 square miles. To determine the production of the Little Sandy Creek HUC10 watershed, the production of Dry Sandy Creek must be estimated and combined with Little Sandy Creek.

Dry Sandy Creek originates in the foothills of the Wind River Range and flows southwest to Little Sandy Creek. The Dry Sandy Creek tributary area is similar to the Pacific Creek tributary area in annual precipitation, topography, and elevation. As such, the production of Dry Creek can be estimated by prorating it to the gaged flow at 09215000 using tributary area and annual precipitation data. The Dry Sandy Creek tributary area is 116.5 square miles in area and averages 10.3 inches of precipitation annually. The tributary area of gage 09215000 is 388.5 square miles and averages 10.0 inches of precipitation annually. From this, Dry Sandy Creek is expected to produce approximately one-third as much runoff as Pacific Creek:

 $Dry \, Sandy \, Creek \, Flow = Pacific \, Creek \, Flow \times \frac{116.5 \, square \, miles \times 10.3 \, inches \, precipitation}{388.5 \, square \, miles \times 10.0 \, inches \, precipitation}$

From 1954 to 2018, the average annual production of Little Sandy Creek HUC10 during wet, normal, and dry years, respectively, is 23,800, 14,800, and 7,600 acre-feet. Monthly streamflow peaks in June (**Figure 72**), ranging between 8,000 acre-feet in an average wet year and 1,900 acre-feet in an average dry year (**Table 46**). Monthly streamflow is lowest in January, ranging between 213 acre-feet and 163 acre-feet in an average dry year.

Pacific Creek

Gage 09215000 is located near the mouth of the Pacific Creek HUC10 watershed. Because of its location, the streamflow measured at 09215000 measures nearly all of the surface water produced in the HUC10. Only a few unnamed ephemeral streams confluence with the Pacific Creek between 09213500 and Little Sandy Creek (**Figure 71**). Therefore, the wet/normal/dry streamflow values developed for gage 09215000 are representative of the entire HUC10.

After regressing gage 09215000 to the fully filled streamflow data at gage 09213500, modeled wet/normal/dry flows are as follows. Average annual flow during wet, normal, and dry years, respectively, is 5,200, 3,800, and 3,000 acre-feet. Modeled monthly streamflow peaks in March (**Figure 68**), ranging between 2,600 acre-feet and 1,600 acre-feet (**Table 43**). Modeled monthly streamflow is lowest in January, ranging between 16 acre-feet and zero acre-feet in an average dry year. Dry Sandy Creek is typically dry from August through February and the creek was dry at least

one month during every recorded year. The reported flow data is natural flow developed from observed flow at 09215000 with data gaps filled by regression as described in **Section 4.2**.

Lower Big Sandy

Surface water in the Lower Big Sandy HUC10 watershed is dominated by ephemeral streams, many of which never reach the Big Sandy River (**Figure 71**). Because ephemeral streams are unreliable water sources, average annual and monthly production was not determined for this HUC10 watershed. Average annual and monthly flow of the Big Sandy River in the Lower Big Sandy HUC10 watershed are shown at gaged locations (**Figure 71**) as determined in **Section 4.2**.

Sublette Flats

Surface water in the Sublette Flats HUC10 watershed is dominated by ephemeral streams, many of which never reach the Big Sandy River (**Figure 71**). Because ephemeral streams are unreliable water sources, average annual and monthly production was not determined for this HUC10 watershed.

Bone Draw

Surface water in the Bone Draw HUC10 watershed is dominated by ephemeral streams, many of which never reach the Big Sandy River (**Figure 71**). Because ephemeral streams are unreliable water sources, average annual and monthly production was not determined for this HUC10 watershed.



Figure 72. Modeled flow at Little Sandy Creek HUC10 during Wet/Normal/Dry years

Month	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Number of Observed Modeled Values	N=65	N=65	N=65	N=65	N=65	N=65	N=65	N=65	N=64	N=64	N=64	N=64
Maximum Modeled Monthly Flow	424	483	4,974	6,828	5,068	20,299	8,095	1,970	1,618	1,129	1,587	636
Wet Year Average	195	242	1,765	2,608	2,744	8,023	5,375	1,140	599	439	435	272
Normal Year Average	213	221	1,087	1,998	2,766	4,335	2,099	598	357	419	476	299
Dry Year Average	163	157	1,036	1,468	1,443	1,933	367	81	54	271	348	240
Minimum Modeled Streamflow	14	44	209	693	589	671	16	0	0	0	105	44

5 WATERSHED MANAGEMENT AND REHABILITATION PLAN

This section of the report identifies and evaluates specific rehabilitation, management, and development projects that were individually evaluated. The focus of this task is to bring forward recommendations that will ultimately improve watershed condition and function. The Sublette County and Sweetwater County Conservation Districts (sponsors) emphasized the need to develop this list and associated recommendations. Over the course of this study, 52 projects were identified by interested stakeholders. Input from these constituents was paramount in the process of identifying the listed watershed improvement opportunities. The following section contains detailed information relative to each.

5.1 SMALL WATER PROJECTS

The WWDC Small Water Projects Program (SWPP) can be utilized by landowners to implement improvement projects within the Big Sandy Watershed. This unique funding avenue was developed by the WWDC/WWDO to enable sponsoring agencies to facilitate grant funding for small projects that improve a watershed's condition and overall function. Per SWPP qualification guidelines developed by the WWDC, eligible projects include new construction (Account I) or rehabilitation (Account II) of small reservoirs, wells, pipelines and conveyance facilities, springs, solar platforms, irrigation infrastructure, windmills, wetland developments, environmental projects that improve stream stability or provide erosion protection, projects that provide storage or supply for rural community fire suppression, and recreation based projects. The projects tabulated in the following sub-section will identify all opportunities and whether or not they are SWPP eligible. No large scale projects were identified during the course of this study.

5.1.1 Small Water Projects Program

As stated previously, 52 individual projects were brought forward for consideration during the course of this study. Based on the premise of public benefit, all but one (1) of the projects qualifies under the SWPP. There are 30 projects that fall under Account I (New Development Projects) and the remaining 21 projects fall under Account II (Rehab Projects). It should be noted that some projects may be analyzed as New and Rehab projects based on improvements to existing systems. **Figure 73** depicts the location of each project within the watershed and a supplemental list with associated descriptive information is provided in **Table 47**.

As depicted in **Figure 73**, two (2) projects fall outside of the Big Sandy Watershed boundary. Each project was discussed with the WWDO project manager and because they both concern stock watering facilities that are within the Sublette grazing Allotment, it was agreed that both projects could be further analyzed in this report.



Figure 73. Small Water Project locations within the Big Sandy Watershed

Table 47. Small Water Projects Program (SWPP) – Project Database

	ACCOUNT I - PROJECT PRIORITIES	ACCOUNT II - PROJECT PRIORITIES
1	Source Water Development	Diversion structures and Spring Developments
2	Storage	Storage
3	Pipelines, Conveyance Facilities, Solar Platforms, and Windmills	Pipelines, Conveyance Facilities, Solar Platforms, and Windmills
4	Irrigation	Irrigation other than above
5	Environmental	Environmental
6	Recreational	Recreational

Account I	(NEW DEVELOPMENT)
Account II	(REHABILITATION)

					SWPP	PLSS LOCATION			GEODETIC COOF	RDINATES (NAD83)		
PROJECT ID	PROJECT NAME	APPLICANT	EXISTING PERMIT #	PROJECT TYPE	PROJECT PRIORITY	SECTION ALIQUOT PART TOWNSHIP (N) RANGE (W)		LATITUDE (N) LONGITUDE (W)		OVERALL BENEFIT TO THE WATERSHED		
1	PROSPECT MOUNTAIN #1 WELL	MIDLAND LIVESTOCK COMPANY	P199197.0W	SOURCE WATER DEV.	ACCOUNT I - 1	36	SE/4SW/4	30	105	42°31'20.86"	109°19'04.44"	Air Quality, Wildlife, Range Management & Health
2	PROSPECT MOUNTAIN #2 WELL	MIDLAND LIVESTOCK COMPANY	P199198.0W	SOURCE WATER DEV.	ACCOUNT I - 1	16	SW/4SW/4	28	105	42°23'41.98"	109°21'09.73"	Air Quality, Wildlife, Range Management & Health
3	DAVIS LUMAN ROAD WATER WELL	MIDLAND LIVESTOCK COMPANY	P41168.0W	SOURCE WATER DEV.	ACCOUNT I - 1	21	NW/4SW/4	27	108	42°17'59.42"	109°42'06.90"	Air Quality, Wildlife, Range Management & Health
4	MIDLAND WELL 2011-1	MIDLAND LIVESTOCK COMPANY	P195391.0W	SOURCE WATER DEV.	ACCOUNT I - 1	16	SE/4NE/4	26	107	42°13'51.48"	109°34'14.63"	Air Quality, Wildlife, Range Management & Health
5	MIDLAND WELL 2011-2	MIDLAND LIVESTOCK COMPANY	P195392.0W	SOURCE WATER DEV.	ACCOUNT I - 1	36	SW/4NE/4	27	108	42°16'21.96"	109°38'06.26"	Air Quality, Wildlife, Range Management & Health
6	DAVIS - OLD ROAD UNIT #1 WATER WELL	MIDLAND LIVESTOCK COMPANY	P54621.0W (CANCELLED)	SOURCE WATER DEV.	ACCOUNT I - 1	27	NW/4SE/4	27	108	42°17'06.10"	109°40'24.60"	Air Quality, Wildlife, Range Management & Health
7	HOUSE ON THE FLAT WELL #1	MIDLAND LIVESTOCK COMPANY	NONE	SOURCE WATER DEV.	ACCOUNT I - 1	25	SW/4SW/4	27	107	42°16'41.81"	109°31'28.35"	Air Quality, Wildlife, Range Management & Health
8	MIDLAND ROCK WELL	MIDLAND LIVESTOCK COMPANY	NONE	SOURCE WATER DEV.	ACCOUNT I - 1	10	NE/4SE/4	27	106	42°19'36.21"	109°26'01.57"	Air Quality, Wildlife, Range Management & Health
9	MIDLAND DIESEL WELL	MIDLAND LIVESTOCK COMPANY	NONE	SOURCE WATER DEV.	ACCOUNT I - 1	16	SW/4NE/4	27	109	42°19'04.10"	109°48'36.20"	Air Quality, Wildlife, Range Management & Health
10	MIDLAND PAMONA WELL	MIDLAND LIVESTOCK COMPANY	NONE	SOURCE WATER DEV.	ACCOUNT I - 1	36	NW/4SW/4	27	109	42°16'10.20"	109°45'40.80"	Air Quality, Wildlife, Range Management & Health
11	J&G DITCH / SHEEP CREEK SIPHON	DUNTON SHEEP COMPANY	P2957.0D	PIPELINE	ACCOUNT I - 3	15	NW/4	30	105	42°34'11.04"	109°20'50.58"	Water Conservation, Clean Energy
12	J&G DITCH - PHASE I PIPING	DUNTON SHEEP COMPANY	P2957.0D	PIPELINE	ACCOUNT I - 3	15	SW/4	30	105	42°34'00.20"	109°20'58.93"	Water Conservation, Water Quality Improvement
13	J&G DITCH - PHASE II PIPING	DUNTON SHEEP COMPANY	P2957.0D	PIPELINE	ACCOUNT I - 3	15	W/2SE/4, N/2SW/4	30	105	42°34'34.30"	109°21'19.01"	Water Conservation, Water Quality Improvement
14	SQUARETOP RESERVOIR REHAB	MIDLAND LIVESTOCK COMPANY	P3339.0R	STORAGE	ACCOUNT II - 2	2	N/2SW/4	29	105	42°30'32.11"	109°20'20.54"	Wildlife, Improved Range Management & Health, Water Conservation
15	PROSPECT MTN. ALLOTMENT_BLM FENCE No. 1	MIDLAND LIVESTOCK COMPANY	N/A	ENVIRONMENTAL	ACCOUNT I - 5	4	S/2	29	104	42°30'24.96"	109°15'18.65"	Riparian Area Protection and Improvement
16	PROSPECT MTN. ALLOTMENT- PRIVATE FENCE No. 1	MIDLAND LIVESTOCK COMPANY	N/A	ENVIRONMENTAL	ACCOUNT I - 5	4	SE/4SE/4	29	104	42°30'31.62"	109°14'47.14"	Riparian Area Protection and Improvement
17	PROSPECT MTN. ALLOTMENT- STATE FENCE No. 1	MIDLAND LIVESTOCK COMPANY	N/A	ENVIRONMENTAL	ACCOUNT I - 5	3	S/2SW/4	29	104	42°30'18.40"	109°14'27.55"	Riparian Area Protection and Improvement
18	PROSPECT MTN. ALLOTMENT- PRIVATE FENCE No. 2	MIDLAND LIVESTOCK COMPANY	N/A	ENVIRONMENTAL	ACCOUNT I - 5	3	E/2	29	104	42°30'54.84"	109°13'54.36"	Riparian Area Protection and Improvement

19	PROSPECT MTN. ALLOTMENT-BLM FENCE No. 2	MIDLAND LIVESTOCK COMPANY	N/A	ENVIRONMENTAL	ACCOUNT I - 5	35	SW/4NW/4	30	104	42°31'41.98"	109°13'33.37"	Riparian Area Protection and Improvement
20	PROSPECT MTN. ALLOTMENT- STATE FENCE No. 2	MIDLAND LIVESTOCK COMPANY	N/A	ENVIRONMENTAL	ACCOUNT I - 5	35	N/2	30	104	42°32'04.44"	109°13'08.04"	Riparian Area Protection and Improvement
21	EDEN-FARSON FIRE SUPPRESSION SYSTEM	KIM BROWN	N/A	FIRE SUPPRESSION	ACCOUNT I - 1, 3	27	MULTIPLE	25	106	42°06'31.03"	109°26'56.65"	Fire Protection
22	LITTLE SANDY CREEK CROSSING REHAB	ROBERT CHESNOVAR	NONE	ACCESS	NOT ELIGIBLE	28	SE/4NW/4	26	105	42°12'01.62"	109°20'50.74"	None
23	BIG SANDY DIVERSION STRUCTURE #1	G&E LIVESTOCK, INC.	P6739.0D	DIVERSION STRUCTURE	ACCOUNT I - 1	4	LOT 3	28	106	42°25'45.82"	109°27'42.75"	Water Conservation
24	BIG SANDY DIVERSION STRUCTURE #2	G&E LIVESTOCK, INC.	P6739.0D	DIVERSION STRUCTURE	ACCOUNT I - 1	4	LOT 4	28	106	42°25'50.71"	109°28'10.61"	Water Conservation
25	ERRAMOUSPE SPRING DEVELOPMENT #1	G&E LIVESTOCK, INC.	NONE	SPRING DEVELOPMENT	ACCOUNT I - 1	20	SW/4NW/4	29	106	42°28'10.29"	109°31'04.16"	Water Conservation, Water Quality Improvement, Improved Range Management & Health
26	ERRAMOUSPE SPRING DEVELOPMENT #2	G&E LIVESTOCK, INC.	NONE	SPRING DEVELOPMENT	ACCOUNT I - 1	25	SW/4SE/4	29	106	42°26'46.06"	109°25'48.08"	Water Conservation, Water Quality Improvement, Improved Range Management & Health
27	BOUNDARY #4645 WELL STOCK WATER TROUGH REHAB	G&E LIVESTOCK, INC.	P51229.0W	STORAGE	ACCOUNT II - 2	25	NE/4NW/4	28	108	42°22'45.07"	109°38'30.13"	Water Conservation, Water Quality Improvement, Improved Range Management & Health
28	MCMURRY DITCH REHAB	MCMURRY RANCH, LLC	P24983.0D	PIPELINE	ACCOUNT II - 3	9	E/2SW/4	24	106	42°04'08.39"	109°25'59.75"	Water Conservation, Water Quality Improvement
29	FRANCIS DITCH CHECK STRUCTURE REHAB	X BAR T RANCH, LLC	T4314	DIVERSION STRUCTURE	ACCOUNT II - 1	3	LOT 1	25	106	42°10'29.74"	109°25'57.00"	Fish Passage, Wildlife Habitat
30	FRANCIS DITCH DIVERSION REHAB	X BAR T RANCH, LLC	T4314	DIVERSION STRUCTURE	ACCOUNT II - 1	3	LOT 1	25	106	42°10'29.41"	109°25'57.22"	Water Conservation
31	DEAD COW FIELD DIVERSION REHAB	X BAR T RANCH, LLC	P3105.0E	DIVERSION STRUCTURE	ACCOUNT II - 1	3	SE/4NE/4	25	106	42°10'17.28"	109°25'58.11"	Water Conservation
32	EAST BIG SANDY SPREADER DIKE DEVELOPMENT	X BAR T RANCH, LLC	P3105.0E	CONVEYANCE FACILITY	ACCOUNT I - 4	10	NE/4	25	106	42°09'34.13"	109°26'11.88"	Wildlife Habitat and Water Conservation
33	FRANCIS DITCH TURNOUT #1	X BAR T RANCH, LLC	P3105.0E	DIVERSION STRUCTURE	ACCOUNT II - 1	10	NE/4SW/4	25	106	42°09'08.96"	109°26'39.43"	Water Conservation
34	FRANCIS DITCH TURNOUT #2	X BAR T RANCH, LLC	P3105.0E	DIVERSION STRUCTURE	ACCOUNT II - 1	10	NW/4NE/4	25	106	42°09'35.81"	109°26'29.50"	Water Conservation
35	FRANCIS DITCH TURNOUT #3	X BAR T RANCH, LLC	P3105.0E	DIVERSION STRUCTURE	ACCOUNT II - 1	10	NW/4NE/4	25	106	42°09'39.07"	109°26'29.71"	Water Conservation
36	FRANCIS DITCH TURNOUT #4	X BAR T RANCH, LLC	P3105.0E	DIVERSION STRUCTURE	ACCOUNT II - 1	3	SW/4SE/4	25	106	42°09'43.65"	109°26'25.80"	Water Conservation
37	FRANCIS DITCH TURNOUT #5	X BAR T RANCH, LLC	P3105.0E	DIVERSION STRUCTURE	ACCOUNT II - 1	3	SW/4SE/4	25	106	42°09'54.45"	109°26'22.70"	Water Conservation
38	FRANCIS DITCH DROP STRUCTURE REHAB	X BAR T RANCH, LLC	P3105.0E	CONVEYANCE FACILITY	ACCOUNT II - 3	10	NE/4SW/4	25	106	42°09'04.81"	109°26'33.32"	Water Conservation
39	FRANCIS DITCH DIVERSION #1	X BAR T RANCH, LLC	P3105.0E	DIVERSION STRUCTURE	ACCOUNT II - 1	10	NE/4SW/4	25	106	42°09'04.35"	109°26'31.95"	Water Conservation
40	FRANCIS DITCH DIVERSION #2	X BAR T RANCH, LLC	P3105.0E	DIVERSION STRUCTURE	ACCOUNT II - 1	10	NE/4SW/4	25	106	42°09'04.45"	109°26'31.81"	Water Conservation
41	LOWER RANCH SPRING DEVELOPMENT	X BAR T RANCH, LLC	NONE	SPRING DEVELOPMENT	ACCOUNT I - 1	15	NE/4NW/4	25	106	42°08'49.35"	109°26'34.24"	Water Conservation and Water Quality Improvement
42	CHAMBERS DITCH CHECK STRUCTURE REHAB	LITTLE SANDY GRAZING ASSOCIATION	P10970.0D	DIVERSION STRUCTURE	ACCOUNT II - 1	2	LOT 2	26	105	42°15'42.16"	109°18'06.94"	Fish Passage, Wildlife Habitat
43	SCHIESTLER-BRADY CHECK STRUCTURE REHAB	LITTLE SANDY GRAZING ASSOCIATION	P9318.0D	DIVERSION STRUCTURE	ACCOUNT II - 1	5	SE/4SW/4	27	104	42°20'09.97"	109°15'04.69"	Fish Passage, Wildlife Habitat
44	LITTLE SANDY WELL #1 REHAB	LITTLE SANDY GRAZING ASSOCIATION	NONE	SOURCE WATER DEV.	ACCOUNT II - 3	25	SW/4NE/4	28	105	42°22'19.69"	109°17'41.68"	Air Quality, Wildlife, Range Management & Health
45	COWAN STOCK RESERVOIR	CLAYTON COWAN	NONE	STORAGE	ACCOUNT I - 2	12	NE/4SE/4	25	106	42°09'06.15"	109°23'47.15"	Wildlife Habitat and Water Conservation
46	JONAH STOCK WATER WELL SOLAR CONVERSION	G&E LIVESTOCK, INC.	NONE	SOURCE WATER DEV.	ACCOUNT I - 1	14	SW/4SW/4	28	108	42°23'56.72"	109°39'46.15"	Air Quality, Wildlife, Range Management & Health

47	BURRIS STOCK WATER WELL No. 2	TOM BURRIS	NONE	SOURCE WATER DEV.	ACCOUNT I - 1	21	SE/4SE/4	24	106	42°02'12.90"	109°25'13.02"
48	BURRIS STOCK WATER WELL No. 3	TOM BURRIS	NONE	SOURCE WATER DEV.	ACCOUNT I - 1	21	NE/4SE/4	24	106	42°02'33.70"	109°25'08.68"
49	MINES STOCK WATER WELL No. 6	JIM MINES	NONE	SOURCE WATER DEV.	ACCOUNT I - 1	23	SW/4SW/4	26	106	42°12'20.48"	109°25'41.13"
50	MINES SPRINKLER SYSTEM DIVERSION REHAB	JIM MINES	P26141.0D	DIVERSION STRUCTURE	ACCOUNT II - 1	35	SW/4NW/4	26	106	42°11'10.11"	109°25'39.06"
51	GURR STOCK WATER WELL DEVELOPMENT	GURR FAMILY RANCH	P20212.0W	SOURCE WATER DEV.	ACCOUNT I - 1	31	NE/4SE/4	25	105	42°05'43.78"	109°22'28.10"
52	PROSPECT MTN. ALLOTMENT- STATE FENCE No. 3	MIDLAND LIVESTOCK COMPANY	N/A	ENVIRONMENTAL	ACCOUNT I - 5	35	NW/4	30	104	42°31'43.99"	109°13'20.55"

Air Quality, Wildlife, Range Management & Health

Air Quality, Wildlife, Range Management & Health

Air Quality, Wildlife, Range Management & Health

Improved Riparian Condition, Water Conservation

Air Quality, Wildlife, Range Management & Health

Riparian Area Protection and Improvement

As part of the management and rehabilitation plan, conceptual-level designs were prepared. These designs were primarily utilized to gain an understanding of individual project scope, project cost, associated permitting requirements, and to assist in identifying any fatal flaws. The full set of designs can be found in **Appendix E**. Each project was assigned an individual identification number and is similarly referenced under the associated project cost estimates and permitting requirements under Section 6 and Section 8, respectively. Out of the total project list (52), there were three (3) projects that conceptual-level designs were not completed. An explanation and description of those projects is attached under **Appendix E**, in place of the project cost estimate. It should be noted that said Appendix includes project designs, project cost estimates, and project permitting requirements. This combined format will allow the sponsor(s) or interested stakeholders to research each project in a more streamlined and efficient manner.

All projects identified here were physically inspected and when found necessary to improve design concepts, field surveys were conducted. Meetings with each respective land owner were scheduled in order to gain knowledge of the current problems or deficiencies, the desired product or corrective measures being sought, and what geographic or other physical related issues would need to be addressed.

5.1.1.1 Source Water Development Projects (Account I)

There were 16 projects that involved developing or further developing groundwater wells for stock water use. These projects vary in scope and magnitude based on existing condition of the wells,

water troughs, storage tanks, conveyance facilities, and current power supply. For most of the systems identified, solar power (conversions and new developments) is a primary objective of the project. Due to the extremely rural locations of many of these watering facilities, generator operation, maintenance, and fueling is an ongoing hardship for livestock producers. Many of the systems also require



Figure 74. House on the Flat Well (Project ID: 7)

stock tank and/or storage tank rehabilitation (**Figure 74**). After researching the SEO e-Permit database, it was found that approximately half of the wells identified are not currently permitted or the permit has been cancelled. In addition to operator testimony, it is apparent that all of these unpermitted wells have been historically used for many decades.

Due to the solar power applications preferred by constituents, water storage tanks are used as a means to meet peak livestock demands. As a result of this additional storage, the required solar power and pumping capacities can be effectively downsized, which ultimately reduces overall project development costs. The integrated trough systems include dual species (cattle and sheep)

or single species. Regarding cattle, heavy equipment tire troughs were predominantly preferred due to their capacity, robustness, and overall durability.

5.1.1.2 Diversion Structure Projects (Account I and II)

There were 15 Diversion Structure Projects identified during this study. Associated projects include check structures, head gates, turnouts, and pumping point diversions. The majority of the diversion projects included turnouts and head gates. Except for two (2) of these head gate/turnout projects, the remaining were focused on the rehabilitation of existing structures. Regarding head gates, sediment loading is also an apparent issue that land owners face throughout the watershed. The high sand conveyance properties of the main diversion streams during high flow events cause issues with head gate operation and require excessive maintenance. The associated concept designs developed for these particular projects include sand sluice gates and auxiliary pipes that can be operated to mitigate these loading effects.

In addition, three (3) existing check structures were analyzed. These structures have outlived their respective service lives. In their dilapidated state, these diversion features also create unilateral fish barriers. Concept designs associated with these check structures were developed to not only regulate water elevations for successful diversion, but also to mitigate for successful fish passage.



Figure 75. Francis Ditch check structure (Project ID: 29)

5.1.1.3 Environmental Projects (Account I)

There were seven (7) identified Environmental Projects, all of which regard riparian area fencing along Little Sandy Creek. These fencing projects, once constructed, will effectively create a riparian area buffer between Little Sandy Creek and the Little Sandy Allotment (BLM #13003). The proposed fence will also delineate the common boundary line between said Little Sandy Allotment and the Prospect Mountain Allotment (BLM #13004). There are four separate land jurisdictions involved in the overall project; federal (BLM), state, and two (2) private entities. Each associated fencing project was compiled based on geographic location and ownership. Permitting regulations differ from one parcel to the next and as such, construction timelines and actual construction standards may vary significantly. State Fence No. 3 (Project ID: 52) is an alternative alignment proposal to BLM Fence No. 2 (Project ID: 19) and was introduced at a later time during the project scoping



Figure 76. Prospect Mtn. Allotment fencing project(s) overview

phase of this study. This alternative was developed due to permitting concerns generated from an onsite project meeting held with the BLM Rock Springs Field Office Range Specialist.

5.1.1.4 Pipeline Projects (Account I and II)

There were four (4) Pipeline Projects brought forward by constituents during the course of this study. Three (3) of these involve the conversion of existing open channel ditches to pipe conveyance systems. These projects were born from the large amount of seepage losses that occur along each respective ditch section, as presently constructed. The J&G (Johnson & Gasswint) Ditch and McMurry Ditch are located on an existing cross-cut side hill and manmade embankment, respectively. The installation of pipe will also mitigate potential blowout locations along each respective alignment.

The fourth project (Project ID: 11) involves a large scale project that diverts water from the J&G Ditch to Sheep Creek. According to the land owner, this large siphon project has been fully designed. The objective of this project is to by-pass miles of shallow gradient lowlands, primarily composed of sand. Additionally, the hydraulic energy would be harnessed in the form of hydropower to self-sustain pivot operations. RVE was unsuccessful in their efforts to obtain the plan set for inclusion herein. A full explanation of this project can be found under **Appendix E**.

5.1.1.5 Storage Projects (Account I and II)

There were three (3) Storage Projects identified during this study. One project involves the rehabilitation of a permitted reservoir (Squaretop Reservoir, Project ID: 14) and the second project involves the development of a new reservoir for stock watering and wildlife propagation purposes (Cowan Stock Reservoir, Project ID: 45). The Squaretop Reservoir is an on-channel earthen dam and is currently permitted. The Cowan Stock Reservoir is a proposed pit-type constructed reservoir.

The third project involves stock tank rehabilitation (Boundary #4645 Well Stock water Trough Rehab, Project ID: 27). This recently installed system is located on BLM lands and is supplied by an artesian well. Because the water source is intact and functioning as designed, this rehabilitation concept was defined as a storage project.



Figure 77. Existing condition of the Boundary #4645 Well stock watering system

5.1.1.6 Spring Development Projects (Account I)

There were three (3) Spring Development Projects brought forward by constituents during the course of this study. Two (2) of the projects are new developments and the third involves modification and re-development of an existing spring capture system. Both new developments include the installation of side hill spring collection systems, conveyance pipelines, and cattle troughs.

The third project involves redeveloping the Lower Ranch Spring (Project ID: 41). This system is currently unregulated and includes a tank that encapsulates a spring source. The rehabilitation plan for this system includes construction of a new upland stock tank, conveyance system, and



pumping equipment. Due to concerns of altering the existing spring outlet during a successive development, the existing stock tank will be utilized as a storage tank for pumping operations.

Figure 78. Existing spring and trough (Project ID: 41)

5.1.1.7 Conveyance Facility Projects (Account I and II)

There were two (2) Conveyance Facility Projects identified during the rehabilitation and



management phase of this study. These projects involve a drop structure rehabilitation on the Francis Ditch (Project ID: 38) and the installation of spreader dikes and conveyance ditches along the east side of the Big Sandy River (Project ID: 32) on lands owned by X Bar T Ranch, LLC. Conceptual-level designs were completed for each project.

Figure 79. Existing Francis Ditch drop structure (Project ID: 38)

It should be noted that the spreader dike project will require substantial topographic surveying before final designs can be developed. Due to budget restrictions, this survey could not be completed as part of this Level I Study. Instead, RVE used aerial photography and on-site evaluations of the area to develop the conceptual-level design. Actual project scope and construction costs may vary significantly. For this reason, RVE recommends that the land owner complete a shovel-ready design before applying for SWPP funding.

5.1.1.8 Fire Suppression Projects (Account I)

There was one (1) Fire Suppression Project identified by a resident in the Eden-Farson area. The constituent is concerned about fire suppression availability within the Eden-Farson area due to current development standards regulated by Sweetwater County. Currently, there are no centralized potable or fire suppression systems in place.

Two (2) recently funded WWDC studies were conducted to analyze distribution systems in the Eden-Farson area. These studies are more particularly discussed under **Section 3.3.2.1** Potable Water Systems within this report. Due to this previous analytical work and no specific recommendations for project implementation, RVE did not develop a conceptual-level design for this project. A more developed explanation of this project can also be found under **Appendix E**.

5.1.1.9 Non-eligible Projects

There was one (1) project that was found to be ineligible under the Small Water Projects Program guidelines. This lone project was analyzed as a private lands access issue. During the exceptionally high snowmelt runoff event in May-June of 2017, an existing access road crossing Little Sandy Creek was washed out. This route served as the sole means to access private lands that are separated from the main ranch body by Little Sandy Creek.

Due to the inability to prove a public benefit exists in repairing this crossing, the project was found to be ineligible for SWPP funding. A conceptual-level design was prepared for the project and involves the installation of concrete mats to allow the creek to be forded during the majority of the

year. Alternative designs may be developed for bridging or piping the creek but due to interest in cost, the fording option was chosen by RVE.



Figure 80. Current conditions at the Little Sandy Creek Crossing (Project ID: 22)

5.1.2 Small Water Projects Program - Process Description

This sub-section has been developed for informational purposes regarding the SWPP application process and the necessary steps to bring a conceptual-design phase project to completion. A detailed description of this process is well documented on the Wyoming Water Development Office website at the following link under the Small Water Project Program 101 Slideshow:

http://wwdc.state.wy.us/small_water_projects/small_water_project.html

The full document and relative descriptions can also be found under Appendix F.


6 COST ESTIMATES

This section of the report specifically identifies cost estimates for each project analyzed under the previous section. The costs in Table 48 reflect estimated Total Project Costs associated with the conceptual-level designs completed. These total estimated costs were developed using a WWDC approved format and are itemized by unit cost within Appendix E of this report. As stated in Section 5, each project cost estimate is identified by a unique project ID number and combined with the respective conceptual-level design and permitting requirements.

The total project costs listed below include material and labor, preparation of final designs and specifications, permitting and mitigation, legal fees, acquisition of rights-of-way, construction engineering, and a contingency.

PROJECT ID	PROJECT NAME	APPLICANT	COST ESTIMATE
1	PROSPECT MOUNTAIN #1 WELL	MIDLAND LIVESTOCK COMPANY	\$ 30,275.02
2	PROSPECT MOUNTAIN #2 WELL	MIDLAND LIVESTOCK COMPANY	\$ 40,571.80
3	DAVIS LUMAN ROAD WATER WELL	MIDLAND LIVESTOCK COMPANY	\$ 17,403.50
4	MIDLAND WELL 2011-1	MIDLAND LIVESTOCK COMPANY	\$ 20,932.25
5	MIDLAND WELL 2011-2	MIDLAND LIVESTOCK COMPANY	\$ 20,113.00
6	DAVIS - OLD ROAD UNIT #1 WATER WELL	MIDLAND LIVESTOCK COMPANY	\$ 16,337.51
7	HOUSE ON THE FLAT WELL #1	MIDLAND LIVESTOCK COMPANY	\$ 44,649.63
8	MIDLAND ROCK WELL	MIDLAND LIVESTOCK COMPANY	\$ 30,262.00
9	MIDLAND DIESEL WELL	MIDLAND LIVESTOCK COMPANY	\$ 37,045.31
10	MIDLAND PAMONA WELL	MIDLAND LIVESTOCK COMPANY	\$ 44,292.56
11	J&G DITCH / SHEEP CREEK SIPHON	DUNTON SHEEP COMPANY	\$-
12	J&G DITCH - PHASE I PIPING	DUNTON SHEEP COMPANY	\$ 205,864.55
13	J&G DITCH - PHASE II PIPING	DUNTON SHEEP COMPANY	\$ 199,738.95
14	SQUARETOP RESERVOIR REHAB	MIDLAND LIVESTOCK COMPANY	\$ 128,990.13
15	PROSPECT MTN. ALLOTMENT_BLM FENCE No. 1	MIDLAND LIVESTOCK COMPANY	\$ 33,742.04
16	PROSPECT MTN. ALLOTMENT-PRIVATE FENCE No. 1	MIDLAND LIVESTOCK COMPANY	\$ 37,191.51
17	PROSPECT MTN. ALLOTMENT-STATE FENCE No. 1	MIDLAND LIVESTOCK COMPANY	\$ 38,510.15
18	PROSPECT MTN. ALLOTMENT-PRIVATE FENCE No. 2	MIDLAND LIVESTOCK COMPANY	\$ 105,110.88
19	PROSPECT MTN. ALLOTMENT-BLM FENCE No. 2	MIDLAND LIVESTOCK COMPANY	\$ 30,377.78
20	PROSPECT MTN. ALLOTMENT-STATE FENCE No. 2	MIDLAND LIVESTOCK COMPANY	\$ 65,724.35
21	EDEN-FARSON FIRE SUPPRESSION SYSTEM	KIM BROWN	\$-
22	LITTLE SANDY CREEK CROSSING REHAB	ROBERT CHESNOVAR	\$ 27,242.58
23	BIG SANDY DIVERSION STRUCTURE #1	G&E LIVESTOCK, INC.	\$ 39,753.85
24	BIG SANDY DIVERSION STRUCTURE #2	G&E LIVESTOCK, INC.	\$ 42,985.92
25	ERRAMOUSPE SPRING DEVELOPMENT #1	G&E LIVESTOCK, INC.	\$ 31,835.76
26	ERRAMOUSPE SPRING DEVELOPMENT #2	G&E LIVESTOCK, INC.	\$ 30,237.01
27	BOUNDARY #4645 WELL STOCK WATER TROUGH REHAB	G&E LIVESTOCK, INC.	\$ 49,935.10
28	MCMURRY DITCH REHAB	MCMURRY RANCH, LLC	\$ 36,134.50
29	FRANCIS DITCH CHECK STRUCTURE REHAB	X BAR T RANCH, LLC	\$ 83,420.35

Table 48. Tabulation of individual SWPP project cost estimates (total)

30	FRANCIS DITCH DIVERSION REHAB	X BAR T RANCH, LLC	\$ 28,995.15
31	DEAD COW FIELD DIVERSION REHAB	X BAR T RANCH, LLC	\$ 41,017.45
32	EAST BIG SANDY SPREADER DIKE DEVELOPMENT	X BAR T RANCH, LLC	\$ 64,452.75
33	FRANCIS DITCH TURNOUT #1	X BAR T RANCH, LLC	\$ 8,353.34
34	FRANCIS DITCH TURNOUT #2	X BAR T RANCH, LLC	\$ 8,353.34
35	FRANCIS DITCH TURNOUT #3	X BAR T RANCH, LLC	\$ 8,353.34
36	FRANCIS DITCH TURNOUT #4	X BAR T RANCH, LLC	\$ 8,353.34
37	FRANCIS DITCH TURNOUT #5	X BAR T RANCH, LLC	\$ 8,353.34
38	FRANCIS DITCH DROP STRUCTURE REHAB	X BAR T RANCH, LLC	\$ 11,218.25
39	FRANCIS DITCH DIVERSION #1	X BAR T RANCH, LLC	\$ 4,842.00
40	FRANCIS DITCH DIVERSION #2	X BAR T RANCH, LLC	\$ 5,498.00
41	LOWER RANCH SPRING DEVELOPMENT	X BAR T RANCH, LLC	\$ 41,572.30
42	CHAMBERS DITCH CHECK STRUCTURE REHAB	LITTLE SANDY GRAZING ASSOCIATION	\$ 34,139.50
43	SCHIESTLER-BRADY CHECK STRUCTURE REHAB	LITTLE SANDY GRAZING ASSOCIATION	\$ 48,544.98
44	LITTLE SANDY WELL #1 REHAB	LITTLE SANDY GRAZING ASSOCIATION	\$ -
45	COWAN STOCK RESERVOIR	CLAYTON COWAN	\$ 136,840.00
46	JONAH STOCK WATER WELL SOLAR CONVERSION	G&E LIVESTOCK, INC.	\$ 48,164.10
47	BURRIS STOCK WATER WELL No. 2	TOM BURRIS	\$ 57,721.34
48	BURRIS STOCK WATER WELL No. 3	TOM BURRIS	\$ 56,016.75
49	MINES STOCK WATER WELL No. 6	JIM MINES	\$ 63,840.83
50	MINES SPRINKLER SYSTEM DIVERSION REHAB	JIM MINES	\$ 23,503.04
51	GURR STOCK WATER WELL DEVELOPMENT	GURR FAMILY RANCH	\$ 50,635.38
52	PROSPECT MTN. ALLOTMENT-STATE FENCE No. 3	MIDLAND LIVESTOCK COMPANY	\$ 41,884.47

AVERAGE PROJECT COST: \$ 44,025.60



small water project design experience, associated bid results, and current knowledge of material and labor rates in the area. Each project estimate also includes a mobilization cost, which generally equates to 10% of the total material and labor cost of the project. The geographic location, method of access, and land ownership of each project are all factors that were taken into account when developing the individual cost estimates. Due to the rural location and difficult access to some of the projects analyzed, alternative material sources and products were also contemplated.

RVE generated the applicable cost estimates based on past

Figure 81. Itemized cost estimate example (Project ID: 46)

In reference to the unit description acronyms that are identified in **Appendix E**, the following definitions apply:

LS = Lump Sum LF = Lineal Foot EA = Each SF = Square Foot SY = Square Yard CF = Cubic Foot CY = Cubic Yard

No large scale projects were identified during the course of this study. Accordingly, specific costs related to operation and maintenance, administration, and debt retirement were not made a part of the compiled estimates.

7 ECONOMIC ANALYSIS

This section of the report will describe alternative funding opportunities that may be utilized by constituents for management and rehabilitation purposes within the Big Sandy Watershed. **Section 5** of this report detailed the SWPP process, eligibility, and funding process. The following information should be considered by those prospective applicants who wish to seek alternative or additional funding avenues outside of the SWPP program.

The subject of funding and economics is a vital aspect of any project. The projects in this study were brought forward by individuals or family ranches and financing these projects is one of the primary challenges for each. The SWPP program is an excellent funding opportunity but for some constituents, this program alone is not enough to make the desired project development feasible. The following information (**Table 49, Table 50, Table 51, Table 52, Table 53,** and **Table 54**) summarize federal, state, and local funding opportunities that may be applicable to the projects listed in this report. These opportunities may include 1.) construction or improvement of water management or irrigation structures, 2.) improvement of resource conditions such as soil quality, water quality, air quality, habitat quality, and energy, or 3.) implementation of conservation practices or activities.

No large scale projects were brought forward during the course of this study. Accordingly, preparation of financing plans, annual operation cost estimates, identification of sinking fund requirements, and other more detailed economic analysis was not prepared for this report.

FUNDING AGENCY	PROGRAM NAME	FUNDING CRITERIA	ELIGIBILITY/APPLICATION REQUIREMENTS		
FEDERAL AGENCIES					
		Through EQIP, NRCS provides agricultural producers with financial resources and one-on- one help to plan and implement improvements, or what NRCS calls conservation practices. Using these practices can lead to cleaner water and air, healthier soil and better wildlife	 Applications will be accepted for all eligible lands including: Cropland and Hayland, Rangeland, Pastureland, Non-industrial private forestland, Other fam or ranch lands, and Environmentally sensitive areas. 		
	EQIP - Environmental Quality Incentives		2.) Applications will be accepted for all eligible person(s) including: Agricultural producers, Owners of non-industrial private forestland, Indian tribes, Those with interest in the agricultural or forestry operations.		
ervice	Program	habitat, all while improving agricultural operations. Through EQIP, you can voluntarily implement conservation practices, and NRCS co-invests in these practices with you.	3.) Farm records must be established or updated with the Farm Service Agency for both the person(s) and the land for your application to be eligible and evaluated. Farm records for the person must indicate the applicant a.) Controls or owns eligible land, b.) Meets adjusted gross income (AGI) and payment limitation provisions, and c.) Is in compliance with highly erodible land and wetland conservation requirements.		
۱ Se					
ation	CSP - Conservation Stewardship Program	I hrough CSP, NRCS will provide financial and technical assistance to eligible producers to conserve and enhance soil, water, air, and related natural resources on their land. CSP encourages land stewards to improve their conservation performance by installing and adopting additional activities, and improving, maintaining, and managing existing activities on agricultural land and nonindustrial private forest land.	1.) Must be an operator of record in farm service agency record system.		
erva			2.) Will control the land for the term of the contract (5years).		
suc			3.) In compliance with highly erodible land and wetland conservation program.		
es Ci			4.) In compliance with average adjusted gross income (AGI) provisions. If the AGI is greater than \$900,000, the person or legal entity is not eligible.		
ourc			5.) Land must be agricultural land or nonindustrial private forest land.		
atural Reso			6.) Must include all land in the applicants operation that will be controlled for the term of the contract (5 years).		
-					
SOS		The Agricultural Management	 AMA provides financial assistance up to 75 percent of the cost of installing conservation practices. 		
Ï		Assistance (AMA) helps agricultural producers manage	2.) Total AMA payments shall not exceed \$50,000 per participant for any fiscal year.		
		financial risk through diversification, marketing or	3.) Participants are not subject to Highly Erodible Land and Wetland Conservation provisions of the Food Security Act of 1985.		
	AMA -	natural resource conservation practices. Producers may	4.) Participants are subject to Adjusted Gross Income provisions of the Food Security Act of 1985.		
	Agricultural Management	construct or improve water	AMA offers an additional higher cost-share for historically underserved producers.		
	Assistance	irrigation structures; plant trees for windbreaks or to improve water quality; and mitigate risk through production diversification or resource conservation practices.	6.) Applications will be accepted for all eligible producers including: Livestock or agricultural producers, have an interest in the farming operation associated with the land being offered for AMA enrollment, have control of the land for the term of the proposed contract (5 years), be in compliance with the provisions for protecting the interests of tenants and sharecroppers, and be within appropriate payment limitation requirements.		

Table 49. Natural Resources Conservation Service funding opportunities

FUNDING AGENCY	PROGRAM NAME	FUNDING CRITERIA	ELIGIBILITY/APPLICATION REQUIREMENTS			
	FEDERAL AGENCIES					
		Projects are primarily conducted on lands administered by the	 2 CFR 200, Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards applies to this program. 			
BLM - Bureau of Land Management	CFDA 15.244 - Fisheries and Aquatic Resource Management	BLM but may also be conducted on other public or private lands. Most of these lands are located in the Western United States and Alaska. Assistance can be used to help protect, restore, and enhance aquatic habitats and aquatic ecosystem resources and to provide related public contact/education opportunities. Funding is highly variable each fiscal year.	2.) 2 CFR, Part 200, Subpart C—Pre-Federal Award Requirements and Contents of Federal Awards. A Standard Form 424, Application for Federal Assistance, Standard Form 424A, Budget Information for Non-Construction Programs, Standard Form 424B, Assurances for Non-Construction Programs, and a written proposal, budget spreadsheet, a budget narrative/breakdown, and any other requirements specified in the Notice of Funding Opportunity Notice and must be submitted through www.grants.gov. State plan is not required for this application.			
		To provide financial assistance, through grants or cooperative agreements to manage, develop and protect public lands and enhance the understanding of rangeland and watershed	 2 CFR 200, Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards applies to this program. 			
	CFDA 15.237 - Rangeland Resource Management	resources, their ecological processes, and capabilities in order to meet rangeland and water quality standards for the improvement of rangelands on public lands. Projects and livestock administration for the management of rangeland ecosystems are conducted in a coordinated manner and consider the interrelationships of living organisms of plants and animals, the physical environment of soil, water, air, and landscape characteristics when developing and implementing resource objectives and management actions.	2.) A Standard Form 424, Application for Federal Assistance, Standard Form 424A, Budget Information for Non-Construction Programs, Standard Form 424B, Assurances for Non-Construction Programs, and a written proposal should be submitted through Grants.gov or via a hardcopy to the project office and include: a title, objectives, timeframe, and a budget breakdown as specified in the funding opportunity announcement.			

Table 50. Bureau of Land Management funding opportunities

Table 51. U.S. Bureau of Reclamation funding opportunities
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FUNDING AGENCY	PROGRAM NAME	FUNDING CRITERIA	ELIGIBILITY/APPLICATION REQUIREMENTS	
FEDERAL AGENCIES				
			1.) Up to \$75,000 in federal funds; maximum total construction costs of \$200,000 per project	
	WaterSMART	To provide financial assistance, through a streamlined	2.) Criteria A - Project benefits	
	Grants - Small Scale Water	application process, for small-scale on-the-ground projects including canal lining/piping, municipal metering, irrigation flow measurement, SCADA and automation,	 Criteria B - Planning efforts supporting the project 	
_	Efficiency		4.) Criteria C - Project implementation	
ation	Projects	irrigation measures, and other similar projects.	5.) Criteria D - Nexus to reclamation	
clama			6.) Criteria E - Department of the Interior priorities	
eau of Re	Basinwide & Basin States Salinity Control Program - Funding Opportunity Announcement BOR-UC-20-F001	To provide financial assistance to improve water quality in the Colorado River and to minimize salt loading. Projects have typically involved converting unlined canals and ditches to pipelines located in the Upper Basin States of Utah, Colorado, New Mexico, and Wyoming to reduce seepage that picks up salt and carries it into the Colorado River system. Reclamation also utilizes the services of state agencies in the states of Colorado, Utah, and Wyoming, to assist in funding cost-effective activities to reduce salinity in the Colorado	 Be a legal entity or individual that is the owner or operator of the features to be replaced and/or to be constructed and capable of contracting with the state of Wyoming. 	
S. Bur			2.) The project being proposed is located in the Colorado River Basin above Hoover Dam.	
BR - U.			 Assurances: SF 424 Forms, Registered in the Systems for Award Management (SAM), and Registered in Grants.gov 	
n			4.) Completed project application (Project summary, Project costs and funding plan, Project maps, and salt load reduction estimate)	
			5.) Signature and Review Letters	
			6.) Recommended State Representative Signature Letter and Basin Sates Salinity Coordinator Concurrence Letter.	

FUNDING AGENCY	PROGRAM NAME	FUNDING CRITERIA	ELIGIBILITY/APPLICATION REQUIREMENTS
		STATE A	GENCIES
SLIB - Wyoming Office of State Lands and Investments	Farm Loans	The Farm Loan program awards loans to 1.) purchase lands used principally for raising agricultural products, livestock, or dairying, 2.) purchase livestock, fertilizers, and equipment calculated to maintain or increase the earning capacity of the borrower's agricultural operation, 3.) purchase, construct, or install improvements calculated to maintain or increase the earning capacity of the borrower's agricultural operation, or install improvements calculated to maintain or increase the earning capacity of the borrower's agricultural operation, or 4.) liquidate debts of the borrower incurred in the furtherance of the borrower's agricultural operation.	 Individuals, to be an eligible applicant, must be able to demonstrate that they are qualified Wyoming Electors as determined by Election Code Statutes of Title 22. Legal entities, to be an eligible applicant, must be able to demonstrate that a majority of the ownership is by individuals who meet the qualifications listed in subsection (a) of this section. Farm loan applications may be considered at any regularly scheduled SLIB meeting. The interest rate for loans under this chapter shall be pursuant to Chapter 14 of the rules as established by the Board in accordance with current interest rates. The application fee is \$100. Additionally, 1% origination fee is charged and shall be paid by the borrower at closing. The term of each loan shall be set by the Board with due regard given to repayment ability and the security offered, but in no event shall the term exceed thirty (30) years. Loans shall be payable in equal, annual installments. (Lead Time to Qualify): Loan applications must be received by the Office of State Lands and Investments at least eight (80) days prior to any regularly scheduled SLIB meeting. Applicants must cure any defects in their applications no later than forty-five (45) calendar days before any regularly scheduled SLIB meeting. Each prospective borrower shall submit a written loan application, on the form furnished by the Office.

Table 52. Wyoming Office of State Lands and Investments funding opportunities

FUNDING AGENCY	PROGRAM NAME	FUNDING CRITERIA	ELIGIBILITY/APPLICATION REQUIREMENTS
		STATE AGENCIES	
WWDC - Wyoming Water Development Commission	Level I and Level II Project Feasibility Studies - Agricultural Water Projects Level III Construction Projects - Construction Funding for Agricultural Projects Groundwate r Exploration Grant Program Small Water Project	Funding for projects is based on WWDC recommendations and is appropriated by the legislature from the Water Development Accounts. Legislative authorization is required before the WWDC can begin project work. Applications for projects to the Water Development Program must be submitted no later than March 1. Applicants seeking Level I reconnaissance studies or Level II feasibility studies for dams and reservoirs need not be an entity of local government. However, applicants for all other Level II feasibility studies and any Level III construction funding must be an entity of local government with taxing and/or assessment authority. Private corporations and individuals are not eligible for assistance. If the applicant is not such a public entity, indicate what steps have been taken to form such an entity in a cover letter to this application.	 The person signing the application must have authority to commit the entity to a binding contract. A notarized copy of a resolution supporting this application passed by the board or other governing body of the entity must be provided. A check for the \$1,000.00 filing fee must accompany the application. If the application is denied, 75% of the application fee will be refunded to the applicant. A project area map (8.5" x 11" preferred) showing corporate boundaries, project location and features should be provided. Include any reports or other supporting information available. Before applying for project funding, the Wyoming Water Development Commission strongly recommends to complete a Public Water System Survey or Irrigation Systems Survey.
	Project Program (SWPP)	information related to the SWPP funding criteria and application requirements.	

Table 53. Wyoming Water Development Commission funding opportunities

Table 54. Sublette and Sweetwater County Conservation District funding opportunities

FUNDING PROGRAM FUNDING CRITERIA		ELIGIBILITY/APPLICATION REQUIREMENTS	
		LOCAL AGENCIES	
SCCD & SWCCD - Sublette and Sweetwater County Conservation Districts	Technical Assistance, State & Federal Grant Partnering, & Grant Applications	These respective Districts have valuable knowledge and expertise regarding range land improvements, water quality, wildlife and habitat, and project implementation. The District's may also be utilized for sponsorship of grant applications.	None

8 PERMITS

Permit acquisition is an ever-growing and constantly evolving process that should be taken into consideration during project planning, prior to implementation. Each project identified during the management and rehabilitation phase of this study was analyzed to determine what permit(s) are necessary, both prior to commencement of construction and in some cases, post construction.

As stated in the previous sections, an individual permit requirement was completed for each conceptual-level design, provided in **Appendix E**. Due to the vast sage grouse core area located in the Big Sandy Watershed, a Density and Disturbance Calculation Tool (DDCT) will need to be used on a case-by-case basis to determine if any treatment or mitigation measures are required. The tool is utilized to determine project proximity to known leks and for overall disturbance calculations. Many of the projects are considered to be "*de minimus*" or exempt based on definition however, the DDCT should be utilized to meet application requirements of the WWDC.

Other permits that were evaluated are under jurisdiction of agencies such as the U.S. Army Corps of Engineers, Wyoming Department of Environmental Quality, Bureau of Land Management, Wyoming State Engineer's Office, Wyoming Office of State Lands and Investments, Wyoming Game and Fish Department, Environmental Protection Agency, and U.S. Fish and Wildlife Service.

It should be noted that some permitting requirements will be more particularly defined once an onsite meeting is conducted with the appropriate administrative agency, prior to final design.

9 CONCLUSIONS AND RECOMMENDATIONS

This study was completed in order to evaluate the current state of the Big Sandy Watershed and to plan for implementation of projects and/or management practices that can improve the overall health of the watershed. The information contained in this report will enable the Wyoming Water Development Commission and the Sublette/Sweetwater County Conservation Districts to more effectively delineate prospective projects that will aid in the conservation and efficient use of the water resources available in this watershed. The following list itemizes key outcomes and recommendations that are supported by the contents of this study:

- Groundwater is a vital resource that largely impacts the health and function of rangeland, wildlife, livestock, and anthropogenic systems throughout the watershed. Specifically, groundwater is essential for domestic use and will ultimately impact the future population and economic growth within the watershed for years to come.
- Surface water is largely influenced by winter precipitation that falls within the Wind River Mountains and as such, the productivity of irrigated lands is highly dependent upon the storage and management of this resource.
- The Big Sandy Watershed contains vast areas that are dry throughout much of the year. Stock water development projects are an essential component within these areas and provide a means to effectively manage not only livestock movement and grazing patterns, but also manage rangeland and riparian corridor health.
- Water rights research and documentation provided in this report will allow constituents to effectively plan for future water resource projects, identify shortages, and to plan for conservation measures that will benefit their respective operations and watershed as a whole.
- The Big Sandy Watershed provides for essential Sage Grouse habitat and due to governing laws, future project implementation will be largely dictated based on the proximity of these potential sites to known leks. Additionally, the present mule deer migration corridor will also impact project planning and development.
- The rehabilitation and management plan contained in this report identifies opportunities to improve watershed function. This is not an exhaustive list however, this report may also be utilized to plan for future/alternative projects and to streamline the planning process. The funding opportunities listed herein can also be used as a general guideline for land owners considering future project implementation. The individual project information contained within Appendix E will allow the sponsors to efficiently conduct the necessary research to complete applications on behalf of the varying constituents who expressed interest during the course of this study.

10 REFERENCES

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Big Sandy Watershed, Level I Study

APPENDIX A

Big Sandy Watershed Public Meeting Transcripts

BIG SANDY WATERSHED STUDY



BRING US YOUR WATER PROJECT IDEAS! Project Scoping Meeting in Farson July 20, 2018 - 7:30 a.m. - Farson Community Center



The Sublette and Sweetwater County Conservation Districts and Wyoming Water Development Office are holding a project scoping meeting for the Big Sandy Watershed Level I Study at 7:30 a.m. on July 20, 2018. The meeting will be held in the "Boars Tusk Room" in the Eden Valley Community Center located at 4039 U.S. Highway 191, Farson, WY.

This meeting is being conducted in order to brief interested parties and stakeholders on the watershed study objectives and will also provide a great opportunity for local stakeholders and users to bring water related projects forward for conceptual development. Funding opportunities, as they relate to water development and rehabilitation, will also be discussed. If you have project plans in the works, bring whatever information you have to the meeting for discussion following a formal presentation.

Find out more at https://www.facebook.com/SubletteCD/

For questions please contact:

Mike Jackson, Rio Verde Engineering Mike Henn, SCCD Julie Gondzar, WWDO (307) 367-2826 (307) 367-2257 (307) 777-7626

Big Sandy Watershed Study Scoping Meeting - Attendance Sheet

20-Jul-18

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Eden Valley Community Center

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Michael Henn	Sublette County Conservation District	(307) 367-2257	mhenn@sublettecd.com
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2 MARK KOT	Sweetungton Co	307-872-391	> KOTH @ Sweeting 45
13ob Chesnevar		307-350-2114	Chesnevare smith poir co
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Mailton Cowar		307 220 34441	Claudos76 & Smail Con
KATE OLSEN	US FURIEST SERVICE	307-367-5751	Knolsen CFS Fed. 4
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Kim BROWN	Land mei	307-350-0750	Kim Epremiekpowekplants Kom
John P'Errancusse	GAE Livestock Inc	307-354-836	gelinstockermailsion
Garn ZAKetnik	1 (32 Livistuck	367-273.948	
Ster Mines		307 3502828	Sminese W/smines com
Ley Acambel	Dunton Skeep Company	301-5546510	midland ranger & homail com
Pite trankel	Midland Wiresteck	307 354 8241	< f
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Memo July 20, 2018 Re: Scoping Meeting – Big Sandy Watershed, Level I Study

A Scoping Meeting for the Big Sandy Watershed, Level I Study was held on July 20, 2018 at 7:30 am in the Eden Valley Community Center "Boar's Tusk Room". Handouts were available for attendees consisting of an agenda and information on the Wyoming Water Development Commissioner's (WWDC) Small Water Projects Program. An agenda and attendance list are attached to this Memo.

After introductions, Julie Gondzar, WWDC, discussed WWDC's role in the Study and Mike Henn, Sublette County Conservation District (SCCD), discussed how SCCD became the sponsor in Sweetwater County. Mike also discussed the benefits of the GIS portion of the project.

As listed on the agenda, the objectives were discussed prior to covering the balance of the agenda with a presentation and corresponding power point slide show. Members of the team presented their respective parts of the slide show specifically – Skylor Wade, Wenck, on physical systems and Luke Martinson, WEST, on biological and environmental systems.

Several public comments were made throughout the presentation and during the open discussion concerning the problems and discrepancy between sprinkler system and ditch irrigation locations and use versus right.

Mike Henn discussed individual projects in relationship to the WWDC's Small Water Project Program (SWPP) and to the overall health of the watershed. Kim Brown wanted to know if a public water system and fire suppression fit in the SWPP. Julie Gondzar and Mike Henn discussed timing of the funding once a project has been approved being 2-3 years.

Discussion on how the various agencies with jurisdiction might work together on projects – BOR, WWDC, Sweetwater County, Recreation. The last topic of discussion was the enlargement of the Big Sandy Reservoir and how that would open up projects and opportunities. Mike Henn talked about looking at the future needs of the area and timing indicating that projects could be in the hopper in anticipation of the completion of the enlargement. Although the permitting is different, projects could be on public or State lands.

At this point the meeting adjourned and discussions continued.

BIG SANDY WATERSHED STUDY



BRING US YOUR WATER PROJECT IDEAS! Public Meeting in Farson April 17 – 1:00 p.m. - Farson Community Center



The Sublette and Sweetwater County Conservation Districts and Wyoming Water Development Office are holding a project update meeting for the Big Sandy Watershed Level I Study at 1:00 p.m. on April 17, 2019. The meeting will be held in the "Boars Tusk Room" in the Eden Valley Community Center located at 4039 U.S. Highway 191, Farson, WY.

This meeting is being conducted in order to update interested parties and stakeholders on the watershed study progress and will also provide a final opportunity for local stakeholders and users to bring water related projects forward for conceptual development. If you have project plans in the works, bring whatever information you have to the meeting for discussion following a formal presentation. THE DEADLINE FOR PROJECT SUBMITTAL IS MAY 1, 2019!

Find out more at https://www.facebook.com/SubletteCD/

For questions please contact:

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Big Sandy Watershed Study Public Meeting - Attendance Sheet

17-Apr-19

Eden Valley Community Center

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Sharon Smith	X-T Ranch	307-350-5128	higSandy 1910 @ outlook. CUM	
Gary PAKotnik	GZLVestack Co	307-273-948	gnizztotnik @ 1 mail	Comm
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BIG SANDY WATERSHED STUDY



Results Meeting in Farson September 13 – 9:00 a.m. - Farson Community Center



The Sublette and Sweetwater County Conservation Districts and Wyoming Water Development Office are holding a public results meeting for the Big Sandy Watershed Level I Study at 9:00 a.m. on September 13, 2019. The meeting will be held in the "Boars Tusk Room" in the Eden Valley Community Center located at 4039 U.S. Highway 191, Farson, WY.

This meeting is being conducted in order to update interested parties and stakeholders on the watershed study findings and will also provide said stakeholders an opportunity to discuss rehabilitation projects brought forward during the course of this study.

Find out more at https://www.facebook.com/SubletteCD/

For questions please contact:

Mike Jackson, Rio Verde Engineering (307) 367-2826

Mike Henn, SCCD

(307) 367-2257

Julie Gondzar, WWDO (307) 777-7626

PUBLIC NOTICE

BIG SANDY WATERSHED STUDY Report Presentation Meeting in Farson, WY September 13, 2019 9:00 a.m.

The Sublette County Conservation District (SCCD), Sweetwater County Conservation District (SWCCD), and Wyoming Water Development Office (WWDO) are holding a report presentation meeting for the Big Sandy Watershed Level I Study at 9:00 a.m. on September 13, 2019. The meeting will be held in the "Boars Tusk Room" in the Eden Valley Community Center located at 4039 U.S. Highway 191, Farson, Wyoming.

The Level I Study has been ongoing since July of 2018 and this meeting is being held to present the findings of said study. General topics covered will include water rights, water quality, rehabilitation project inventory, surface water hydrography/hydrology, blology, GIS database, and other pertinent information related to the function of said watershed. Following a presentation outlining the results of this watershed study, we will be available to discuss funding resources, Small Water Project Program application process, and any other specific questions you may have regarding the watershed study findings.

For questions or more information, please contact:

Mike Jackson, Rio Verde Engineering: (307) 367-2826

Mike Henn, SCCD (307) 367-2257 Julie Gondzar, WWDQ:

(307) 777-7626

Find more information on Facebook at http://www.facebook.com/SubletteCD/ Public Notice #7986 published in the Pinedale

Roundup on August 30, Sept. 6, 2019

PROOF OF PUBLICATION

STATE OF WYOMING

ss.

COUNTY OF SUBLETTE

Subscribed and sworn to (or affirmed) before

me by Holly Dabb this day of 2019.

Notary Public

My Commission expires STARR AVERY KUHN - NOTARY PUBLIC STATE OF COUNTY OF SUBLETTE WYOMING 5 .29 -22 Commission Expires

Legal advertising deadline is Monday at noon.

Big Sandy Watershed Study Results Presentation Meeting - Attendance Sheet

13-Sep-19

Eden Valley Community Center

Name	Company / Agency / Ranch	Phone #	e-mail
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Tom Buyrts	SWEED	300 389 354	
Kyle Smith	Farson	307-922-1923	
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Memo September 13, 2019 Re: Results Presentation Meeting – Big Sandy Watershed, Level I Study

A Results Presentation Meeting for the Big Sandy Watershed, Level I Study was held on September 13, 2019 at 9:00 am in the Eden Valley Community Center "Boar's Tusk Room". Handouts were available for attendees consisting information on the Wyoming Water Development Commissioner's (WWDC) Small Water Projects Program. The attendance list is attached to this Memo.

Julie Gondzar opened the meeting with introductions, which included the following: Julie Gondzar (WWDO, Project Manager), Michael Henn (SCCD), Mike Jackson (RVE), Drew McGuire (RVE), Skylor Wade (Wenck), Adam Marsh (Wenck).

After introductions, Mike Jackson began the presentation by asking attendees what media source was used to learn about this meeting. The general consensus was posted media flyers at the local post office(s). Mike then went on to describe the nature and location of past project conducted within the Big Sandy Watershed.

Adam Marsh followed by discussing results relative to topography and geology, which included Peak Ground Acceleration information as well as known fault locations within the watershed. Adam went on to discuss average annual precipitation and temperature, as obtained from weather stations in the upper reach of the watershed near the Big Sandy Opening and the lower reach near Farson, Wyoming. Following this explanation of climate data, Adam discussed results associated with hydrology work that Wenck performed. Information and slides on stream classification, streamgage location (and period of record), wet-normal-dry hydrologic years/flows, wetlands, water quality, and salinity control, were presented.

Mike Jackson followed Adam by presenting results of the Biological Systems aspect of the study. Slides used to present included fisheries, big game, sensitive species, and environmental highlights. These highlights included information that could potentially impact construction permitting and timing relative to future projects within the watershed. These items included Sage Grouse Core area implications, Upper Colorado River Endangered Fish Recovery Program, and Big Game crucial ranges and migration corridors.

Mike Jackson then continued with results of the Anthropogenic Systems within the Big Sandy Watershed which included specific information about permitted tributaries (62), trans-basin diversions (7), adjudicated surface water (Original: 557.51 cfs, Supplemental: 1,870.9 Ac.,

Secondary: 33,784.6 Ac., Reservoir Storage: 63,700 Ac-Ft). Information on groundwater sources was also discussed, including 249 permitted wells for domestic use, 24 for miscellaneous use, 3 for industrial use, and 0 for municipal use. Land use and ownership diagrams were presented following the water specific section.

Mike then started the Watershed Management and Rehabilitation Plan presentation by stating the landowners themselves were his greatest resource for determining watershed improvement projects within the watershed. 52 projects were identified during the course of this study with 16 being source water development projects, 15 being for diversion structures, 7 for environmental projects, 4 for pipeline projects, 3 for spring developments, 2 for conveyance facilities, and 1 fire suppression projects. Mike followed with slides of project examples and location within the watershed.

Mike then discussed cost estimates and structure as well as funding sources available to constituents including NRCS programs, BLM programs, USBOR programs, WYSLIB programs, and WWDC programs.

Mike finished the results presentation by explaining what information was compiled in a GIS deliverable format for this watershed study and how that information could be useful to landowners. The attendees were then informed of a post-meeting GIS demonstration that would be offered.

After discussing the overall results of the watershed, Mike opened up the meeting for questions from the public attendees.

Question 1: Will the GIS information be available online for use?

Answer 1: Mike Henn – We are working on the process and logistics of getting this information on the existing mapserver platforms. Until that goal is reached, any constituent can come into his office and he could help them find information they need using his ArcGIS program. Mr. Henn then went on stating that the current e-permit system is difficult for the average user to navigate and that a public server with the water rights database developed during this project (and others) would be a huge step in the right direction.

Mary Thoman opened a discussion about the recent drought mitigation meetings and how users need to utilize their permitted water in order to protect their rights. These public meetings will be on-going over the course of the next 16 months. She also briefly discussed the new idea of voluntary stopping irrigation or leasing water to downstream users.

After discussion, Julie Gondzar stated that the Big Sandy Watershed, Level I Study Final Report would be available online (WWDO and SCCD) by late fall of 2019. The meeting then adjourned and a GIS demonstration followed.

BIG SANDY WATERSHED, LEVEL I STUDY RESULTS MEETING – SEPTEMBER 13, 2019





RIO VERDE ENGINEERING

CONSULTING ENGINEERS AND LAND SURVEYOR: PINEDALE, WYOMING 82941



PROJECT TASKS

- <u>TASK 1</u>: PROJECT MEETINGS AND PUBLIC PARTICIPATION
- <u>TASK 2</u>: REVIEW OF BACKGROUND INFORMATION
- <u>TASK 3</u>: WATERSHED INVENTORY AND DESCRIPTIONS
- <u>TASK 4</u>: STREAMFLOW HYDROLOGY
- <u>TASK 5</u>: WATERSHED MANAGEMENT AND REHABILITATION PLAN
- TASK 6: COST ESTIMATES
- TASK 7: ECONOMIC ANALYSIS
- TASK 8: PERMITS
- <u>TASK 9</u>: GEOGARPHIC INFORMATION SYSTEM DELIVERABLES

Big Sandy Watershed – Review of Background Information

INVENTORY OF PAST WWDC STUDIES



Source: Rio Verde Engineering shapefile. Developed July 2019

10

20 Miles

Big Sandy Watershed – Watershed Inventory & Descriptions

A. PHYSICAL SYSTEMS

- Surface water
- Geology
- Climate
- **B. BIOLOGICAL SYSTEMS**
 - Fish and Wildlife
 - Land Cover
- C. ANTHROPOGENIC SYSTEMS
 - Agricultural Water Use
 - Domestic, Municipal, and Industrial Water Use
 - Water Storage
 - Land



BIG SANDY WATERSHED

TOPOGRAPHY AND GEOLOGY

BIG SANDY WATERSHED – TOPOGRAPHY AND GEOLOGY



Several faults are present in the Big Sandy Watershed, generally following a northwest to southeast alignment between the Wind River Range and the Green River Basin.

While most faults are dormant, several faults show evidence of activity



BIG SANDY WATERSHED – TOPOGRAPHY AND GEOLOGY





BIG SANDY WATERSHED

CLIMATE

BIG SANDY WATERSHED – CLIMATE STATIONS





Station		Period of Record			Daily Data Types Recorded			
Name	ID	Beginning	Ending	Coverage	Precipitation	Air Temperature	Snow Depth	Evaporation
Farson 2 NNE	USC00483170	1/1/1915	Present	82%	Х	Х	Х	Х
Superior 38.0	US1WYSW0007	1/17/2006	5/18/2018	5%	Х			
Big Sandy Opening	USS0009G09S	9/30/1978	Present	98%	Х	Х	Х	
Dutch Joe	USC00482780	1/12/1915	10/28/1926	50%	Х	Х		
BIG SANDY WATERSHED – AVERAGE ANNUAL PRECIPITATION





BIG SANDY WATERSHED – AVERAGE MONTHLY PRECIPITATION AND TEMPERATURE





HYDROLOGY

BIG SANDY WATERSHED -STREAM CLASSIFICATION



Ephemeral Streams flow only briefly during or after a storm event

Intermittent Streams flow seasonally but are dry-out during part of the year

Perennial Streams flow year-round



BIG SANDY WATERSHED – STREAMGAGE LOCATIONS AND PERIOD OF RECORD





BIG SANDY WATERSHED – WET-NORMAL-DRY HYDROLOGIC YEARS





Year	Cumulative flow (acre-feet)	Wet/Normal/Dry	Year	Cumulative flow (acre-feet)	Wet/Normal/Dry	Year	Cumulative flow (acre-feet)	Wet/Normal/Dr		
1951	-	-	1976	74510	Normal	2001	35233	Dry		
1952	-	-	1977	31080	Dry	2002	40213	Dry		
1953	-	-	1978	80781	Normal	2003	36818	Dry		
1954	58210	Normal	1979	56198	Normal	2004	55528	Normal		
1955	44541	Normal	1980	83027	Wet	2005	74297	Normal		
1956	62865	Normal	1981	56188	Normal	2006	50829	Normal		
1957	84920	Wet	1982	97213	Wet	2007	39252	Dry		
1958	48903	Normal	1983	90626	Wet	2008	56495	Normal		
1959	40658	Dry	1984	74582	Normal	2009	69779	Normal		
1960	30957	Dry	1985	58412	Normal	2010	48244	Normal		
1961	30566	Dry	1986	110178	Wet	2011	92374	Wet		
1962	70484	Normal	1987	64078	Normal	2012	48788	Normal		
1963	58341	Normal	1988	35668	Dry	2013	34444	Dry		
1964	56760	Normal	1989	42550	Dry	2014	65183	Normal		
1965	94021	Wet	1990	56895	Normal	2015	56247	Normal		
1966	47064	Dry	1991	71505	Normal	2016	57639	Normal		
1967	95929	Wet	1992	35801	Dry	2017	165314	Wet		
1968	76452	Normal	1993	80180	Normal	2018	65689	Normal		
1969	84317	Normal	1994	47634	Normal	The 20% of years with the greatest cumulative streamflow are considered " Wet "				
1970	49440	Normal	1995	109171	Wet					
1971	72449	Normal	1996	67350	Normal					
1972	96370	Wet	1997	85778	Wet					
1973	72522	Normal	1998	75493	Normal					
1974	78588	Normal	1999	88666	Wet	The 20% of years with the lowest				
1975	81162	Normal	2000	51015	Normal					

Note: At 09213500 streamflow data collected seasonally (April to September) after 1970 and no streamflow data is available for 2017. Missing data filled by regression to 09214500 (Little Sandy Creek).

The 20% of years with the lowest cumulative streamflow are considered "Dry"

The remaining years are considered "Normal"

BIG SANDY WATERSHED – WET-NORMAL-DRY FLOWS





09213500 – Big Sandy River near Farson, WY

25,000 Cumulative Flow (Acre-feet) 12,000 12,000 10,000 2,000 0 Feb Mar May Jul Oct Jan Apr Jun Aug Sec Nov Dec Minimum Observed Monthly Streamflow Dry Year Average Maximum Observed Monthly Streamflow Vet Year Average Normal Year Average

09214500 - Little Sandy Creek above Eden, WY

09215000 - Pacific Creek near Farson, WY



BIG SANDY WATERSHED – WETLANDS





BIG SANDY WATERSHED - WATER QUALITY

Figure 8.5.3. Map of the Big Sandy Sub-basin showing the location of assessed waters.





Water quality is generally good in the Big Sandy Watershed

Two segments evaluated under section Clean Water Act section 303d

- Big Sandy River No impairments
- Little Sandy Creek 17.7 miles impaired by sediment/siltation

BIG SANDY WATERSHED – water quality

Salinity Control

- Colorado River Basin Salinity Control Act 1974 (1984, 1995)
- Big Sandy River Salinity
 - 164,000 tons of salt annually
 - 1.8% of total load in Colorado River
- Control Measures
 - 13,500 acres treated
 - 58,000 ton reduction (70% of goal)
 - Total cost of \$13,840,000
 - \$239/ton (among the most cost effective in the Colorado Rive Basin)





BIOLOGICAL SYSTEMS

Big Sandy Watershed - Fisheries

- No blue or red ribbon fisheries
- No instream flow water rights



Flannelmouth Sucker (Catostomus ... fs.usda.gov



Bluehead Sucker (Catostomus discobolus fs.usda.gov

- Bluehead and flannelmouth suckers are imperiled and occur in the Big Sandy River and Little Sandy Creek
- Fish barriers in watershed constructed along Big Sandy River, Long Draw, and Sculpin Creek
- Five fish species listed as WGFD Species of Greatest Conservation Need; 4 species listed as USFS and BLM sensitive species
- Humpback Chub, Bonytail Chub, Colorado Pikeminnow, and Razorback Sucker are USFWS endangered; no known populations in the watershed; downstream impacts need to be considered for water projects



Big Sandy Watershed – Big Game

<u>Pronghorn</u>

- Designated crucial range across the majority of the watershed
- Multiple migration routes and barriers

<u>Moose</u>

 Limited ranges and migration routes designated across watershed, most near Wind River Range foothills or along large river corridors





Vearlong

Migration Route Migration Barrier

Southern end of major migratory routes near Wind River Range foothills Elk

Mule Deer

in watershed

- Limited crucial range designated in southeast and northeast watershed
- Parturition areas designated near crucial range



Range coincides with river corridors and agriculture

Crucial range and severe winter relief areas designated

Pronghorn Range Crucial Winter/Yearlong Winter/Yearlong Yearlong Parturition Area Migration Route Migration Barrier

Big Sandy Watershed – Sensitive Species

USFWS: 4 threatened species, 1 candidate, no critical habitat

- Grizzly bear, Canada lynx, Whitebark pine found on USFS land
- Yellow-billed cuckoo found along major river/riparian corridors
- Ute's ladies-tresses found along waterways

WGFD Species of Greatest Conservation Need: 51 birds, 23 mammal, 3 amphibian, 3 reptile, 5 fish, and 23 mollusks

BLM Sensitive Species: 27 wildlife species and 2 plant species

<u>USFS Sensitive Species (wildlife)</u>: 31 wildlife species and 3 plant species

Wyoming Natural Diversity Database (WYNDD): 40 plant species designated as sensitive

Greater sage-grouse: The majority of the watershed is identified as Core Area (by executive order); 116 leks identified based on 2018 data (66 occupied)



Unoccupied

Big Sandy Watershed – Environmental Highlights

CORE grouse habitat restrictions

- Surface disturbance limits (5%) and restrictions (based on distance from leks)
- Seasonal restrictions (March 14 July 1)
- See EO 2015-4 (or report) for full details

Upper Colorado River Endangered Fish Recovery Program

- Downstream affects to 4 listed fish species
- Activities with < 0.1 ac-ft/yr depletion may be exempt
- New or increased reservoir yield is assessed
- One-time fee for 2019 \$21.61 per ac-ft

<u>Big Game</u>

- A variety of crucial ranges and migratory routes identified (specifically pronghorn and mule deer)
- May require coordination with the WGFD on project-specific basis

Sensitive Species

- Primary triggers/concerns for projects will likely be federal lands and aquatic habitats
 - USFS and BLM
 - Many sensitive species are associated with wetland/waters
 - Ute's ladies-tress, Yellow-billed cuckoo, various fish species, among others

ANTHROPOGENIC SYSTEMS

Big Sandy Watershed – Irrigated Lands

SURFACE WATER RESULTS

- 1. 62 tributaries with adjudicated water rights (original, secondary, and supplemental supply) includes ditches, reservoirs, springs
- 2. 7 trans-basin diversions (1 inflow & 6 outflow)
 - Supplemental inflow from Sweetwater River 320.0 ac
 - Original supply to lands outside of watershed 22.33 cfs

BIG SANDY WATERSHED TOTALS (Adjudicated Surface Water)

- 1. Original supply 25,550 acres (557.51 cfs)
- 2. Supplemental supply 1,870.9 ac
- 3. Secondary supply 33,784.6 ac
- 4. Reservoir storage 63,700 ac-ft
 - Stock reservoir storage 77.95 ac-ft
 - Other reservoir storage 63,636.31 ac-ft





Big Sandy Watershed – Domestic, Municipal, and Industrial (DMI) Use

DOMESTIC USE

- 249 PERMITTED WELLS
- **MISCELLANEOUS USE**
 - 24 COMPLETED/ADJUDICATED WELLS
- **MISCELLANEOUS USE**
 - 3 PERMITTED WELLS

MUNICIPAL USE

• 0 PERMITTED WELLS



Big Sandy Watershed – Water Storage

PERMITTED STOCK RESERVOIRS

- 1. Stock Reservoirs (18)
 - 116.6 ac-ft of combined storage

OTHER RESERVOIRS

- 1. Big Sandy Reservoir
 - 39,700 ac-ft
 - Proposed enlargement 12,944 ac-ft
- 2. Eden No. 1 Reservoir
 - 18,489.93 ac-ft
- 3. All other permitted reservoirs (26)
 - 5,446.38 ac-ft



Big Sandy Watershed – Land





LAND OWNERSHIP DISTRIBUTION

ZONING DISTRICT BOUNDARIES

WATERSHED MANAGEMENT AND REHABILITATION PLAN

SWPP PROJECTS

- 1. 52 projects were brought forward by stakeholders
 - Account I New Development: 30 Projects
 - Account II Rehabilitation Projects: 21 Projects
 - Non-qualifying 1 Project

PROJECT TYPES

- **1.** Source Water Developments 16 projects
- 2. Diversion Structures 15 projects
- 3. Environmental 7 projects
- 4. Pipelines 4 projects
- 5. Spring Developments 3 projects
- 6. Conveyance Facilities 2 projects
- 7. Fire Suppression 1 project









PROJECT DISTRIBUTION





WELL REHAB / SOLAR CONVERSION

RESERVOIR REHAB





CHECK STRUCTURE REHAB

DITCH PIPING PROJECT

COST ESTIMATES AND ECONOMIC ANALYSIS

AVERAGE SWPP PROJECT COST: \$44,025.60

BASED ON CONCEPT LEVEL DESIGNS

- WWDC & SWPP ELIGIBLE COMPONENTS
- DELIVERED IN APPROPRIATE WWDC FORMAT
- MATERIAL SCHEDULE
- **PERMITTING**
- LEGAL FEES
- RIGHT-OF-WAY ACQUISITION

NEW FORK RIVER WATERSHED STUDY LEVEL I

Owner/Operator: Murdock Ranch Project Type: Irrigation Project ID: 59 Project Name: Island Ditch Waste Way Structure Location (IRVLong): 42.92511*, 109.92212*

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST		TOTAL COS	
1	Mobilization	1	LS	\$	1,200.00	\$	1,200.
2	Bonds	1	LS	\$	300.00	\$	300
3	Misc. Excavation & Placement	20	CY	\$	22.00	\$	440
4	Headgate (Concrete)	1	LS	\$	6,500.00	\$	6,500
5	Steel Grate Walk Way (3'x6.5')	1	EA	\$	350.00	\$	350
6	60"x36" Steel Screw Gate	1	EA	\$	4,800.00	Ş	4,800
7	24" Slide Gate (Galvanized)	1	EA	\$	850.00	Ş	850
8	24" ADS N-12 Pipe	15	LF	\$	52.00	\$	780
9	Rip-Rap	10	CY	\$	42.00	\$	420
			IENT COS		BTOTAL #21-	¢	15 640





FUNDING SOURCES

NATURAL RESOURCES CONSERVATION SERVICE (NRCS)

- Environmental Quality Incentives Program
- Conservation Stewardship Program
- Agricultural Management Assistance

BUREAU OF LAND MANAGEMENT (BLM)

- Fisheries and Aquatic Resource Management
- Rangeland Resource Management

U.S. BUREAU OF RECLAMATION (USBR)

- WaterSMART Program
- Basinwide and Basin States Salinity Control Program

WYOMING STATE LANDS & INVESTMENTS BOARD (SLIB)

Farm Loans

WYOMING WATER DEVELOPMENT COMMISSION (WWDC)

- Level I and Level II Feasibility Studies
- Level III Construction Projects
- Groundwater Exploration Grant Program



PERMITS

PERMITS

SHPO

JURISDICTIONAL AGENCIES USACE USFWS WDEQ SLIB WYGFD WSEO



PROJECT SPECIFIC PERMITTING REQUIREMENTS USED TO:

1.) ASSESS PROJECT FEASIBILITY

2.) DETERMINE RELATED COST

3.) ASSESS PROJECTED PROJECT TIMELINE REQUIREMENTS

GEOGRAPHIC INFORMATION SYSTEM (GIS)

INCLUDES COMPILED DATA FROM ALL PREVIOUS TASKS

FOCUSED ON IMPROVING AND ADDING INFORMATION TO EXISTING PLATFORMS

DATA ACQUISITION

- WWDC GIS COMMON BASE DATA SETS
- SUITEWATER
- LANDFIRE
- WYGISC
- SUBLETTE COUNTY GIS (GREENWOOD MAPPING)
- SWEETWATER COUNTY GIS (GREENWOOD MAPPING)

GIS DATABASE UPDATE:

- WATER RIGHTS RESEARCH TOOL: POD, POU, AND MOC
- REHABILITATION PROJECTS
- LAND USE, OWNERSHIP, TOPOGRAPHY
- PHYSICAL SYSTEMS: SURFACE WATER, GEOLOGY, CLIMATE
- BIOLOGICAL SYSTEMS: FISH & WILDLIFE, LAND COVER
- STREAMFLOW HYDROLOGY

GIS DEMONSTRATION TO FOLLOW THIS PRESENTATION!!!!!





Big Sandy Watershed, Level I Study

APPENDIX B

Tabulation of Adjudicated Water Rights of the State of Wyoming – Water Division Number IV

Permit No.	Facility Name	Appropriator	Priority	Use	C.F.S/AF	Acres	HG LOC	Proof No.	CR No.	
	UD 23 DRAW, TRIBUTARIES OF PIPE	DRAW, LITTLE DRY CREEK, DRY CH	REEK, GREEN	RIVER						
P7472.0S	UD 72-23 STOCK RESERVOIR	UINTA DEVELOPMENT COMPANY;	02/26/1973	STO	0.720AF	C	021N-112W-01-NENE	31350	CR CR07/457	
	BIG SANDY RIVER, TRIBUTARIES OF	F GREEN RIVER								
T4313.0-	FRANCIS DITCH	THOMAS FRANCIS;	12/31/1886	IRR_SW	0.840	58.9	025N-106W-03-NENE	4313	CR CC36/829	
T4314.0-	PIPER FRANCIS DITCH ACT FRANCIS DITCH	SOPHIA A COX;	12/31/1886	IRR_SW	0.860	60	025N-106W-03-NENE	4314	CR CC36/830	
T4315.0-	FRANCIS NO 2 DITCH ACT FRANCIS	THOMAS FRANCIS;	12/31/1887	IRR_SW	1.990	139.3	025N-106W-03-NENE	4315	CR CC36/831	
P2957.0D	JOHNSON AND GASSWINT (BIG SANDY)	DUNTON SHEEP COMPANY;	12/12/1900				030N-105W-14-NESW		CR CC68/099	
P2957.0D	JOHNSON AND GASSWINT (BIG SANDY) DITCH	ROSS REED;	12/12/1900	IRR_SW	0.470	33	030N-105W-14-NESW	24655	CR CC62/182	
P3566.0D	TUNNEL DITCH	SWAN JOHNSON;	11/25/1901				030N-105W-14-SESW	8996	CR CC27/409	
P3566.0D	TUNNEL DITCH ACT BIG SANDY DITCH	DUNTON SHEEP COMPANY;	11/25/1901	IRR_SW, S&D	5.000	350	030N-105W-14-NESW		CR CC66/333	
P5718.0D	EDEN CANAL NO. 1	EDEN VALLEY IRRIGATION DISTRICT;	11/24/1903	IRR_SW	113.010 0	R 1 912.14	027N-106W-17-SENW	32888	CR CC74/203	
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	BUREAU OF RECLAMATION; KIM R. BROWN LIVING TRUST; CHRISTOPHER A. AND SHELLEY	11/24/1903	DOM_SW, IRR_SV	SUP 0.990	55.2 69.8	026N-106W-11-NWNW	18934	CR CC90/191	
		HARPER;								
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	RADOSEVICH LIVESTOCK, L.L.C.;	11/24/1903	DOM_SW, IRR_SW	N 1.060	74	026N-106W-11-NWNW	22876	CR CC90/193	
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	RADOSEVICH LIVESTOCK, L.L.C.;	11/24/1903	IRR_SW	2.120	148.8	026N-106W-11-NWNW	18939	CR CC91/037	
P5718.0D	EDEN NO. I CANAL ACT MEANS CANAL	DERYL SWEAT;	11/24/1903	DSP, IRR_SW	1.138	1/9.7	026N-106W-11-NWNW	22634	CR CC92/195	
P5/10.0D	EDEN NO. I CANAL ACI MEANS CANAL	X BAR T RANCH;	11/24/1903	DOM_SW, IRR_SI	N 2.080	145.0	020N-100W-11-NWNW	10940	CR CC92/238	
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	SOFIJA BOSERICH;	11/24/1903	IRR_SW	0.500	35.1	026N-106W-11-NWNW	23109	CR CC58/330	
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	O. FINLEY;	11/24/1903	IRR_SW	0.470	32.6	026N-106W-11-NWNW	23110	CR CC58/331	
P5/18.0D	EDEN NO. I CANAL ACT MEANS CANAL	COMMISSIONERS; AUGUST HENNECKE;	11/24/1903	IRR_SW	2.480	1/3.8	026N-106W-11-NWNW	23111	CR CC58/332	
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	LUTHER MCNALLEY;	11/24/1903	IRR_SW	1.130	79.1	026N-106W-11-NWNW	23112	CR CC58/333	
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	JOHN COPPES;	11/24/1903	IRR_SW	0.180	12.3	026N-106W-11-NWNW	22740	CR CC58/018	
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	JOHN FRULLO; PETE FRULLO; MIKE FRULLO;	11/24/1903	IRR_SW	0.950	66.3	026N-106W-11-NWNW	22741	CR CC58/019	
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	CLARENCE JENSEN;	11/24/1903	DOM_SW, IRR_SW	0.550	38.4	026N-106W-11-NWNW	22742	CR CC58/020	
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	ALEXANDER LISZEWSKI;	11/24/1903	IRR_SW	0.570	40	026N-106W-11-NWNW	22743	CR CC58/021	
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	LEO SKORCZ;	11/24/1903	IRR_SW	0.550	38.7	026N-106W-11-NWNW	22745	CR CC58/023	
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	Mrs MINNIE SITZMAN;	11/24/1903	IRR_SW	0.260	18.32	026N-106W-11-NWNW	22746	CR CC58/024	
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	JACK TOMICICH;	11/24/1903	IRR_SW	1.070	75.1	026N-106W-11-NWNW	22747	CR CC58/025	
P5718.0D	EDEN NO. I CANAL ACT MEANS CANAL	BIG SANDY LIVESTOCK COMPANY;	11/24/1903	IRR_SW	0.490	34.5	026N-106W-11-NWNW	228/3	CR CC58/131	
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	JOSEDH HUDAK:	11/24/1903	IRR_SW	1.090	34 9	026N-106W-11-NWNW	22074	CR CC58/132	
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	FRED NELSON;	11/24/1903	IRR_SW	1 092	76 5	026N-106W-11-NWNW	22873	CR CC58/135	
P5718.0D	EDEN NO. 1 CANAL	EARL PULLEY;	11/24/1903	1101_011	1.052	,	027N-106W-17-SENW	22878	CR CC58/136	
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	ESTATE OF BERTHA E. SAVAGE;	11/24/1903	IRR SW	1.070	75	026N-106W-11-NWNW	22879	CR CC58/137	
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	ABEL VIGIL;	11/24/1903	IRR_SW	1.100	77	026N-106W-11-NWNW	22880	CR CC58/138	
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	ANDREW ARNOTT;	11/24/1903	IRR_SW	0.530	36.7	026N-106W-11-NWNW	21763	CR CC52/509	
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	BLAIR HAY LAND AND LIVESTOCK COMPANY;	11/24/1903	DOM_SW, IRR_SV	₩ 1.260	88.3	026N-106W-11-NWNW	22616	CR CC57/376	
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	BLAIR HAY LAND AND LIVESTOCK COMPANY;	11/24/1903	DOM_SW, IRR_SW	N 1.910	134.1	026N-106W-11-NWNW	22617	CR CC57/377	
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	R. BONNETT;	11/24/1903	IRR_SW	1.630	114.29	026N-106W-11-NWNW	22618	CR CC57/378	
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	CHARLES BROWN;	11/24/1903	IRR_SW	1.030	72.2	026N-106W-11-NWNW	22619	CR CC57/379	
P5718.0D	EDEN NO. 1 CANAL	ANN DEWEY;	11/24/1903	IRR_SW	0.570	40	027N-106W-17-SENW	22620	CR CC57/380	
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	CLARA FISCUS;	11/24/1903	IRR_SW	0.980	68.8	026N-106W-11-NWNW	22621	CR CC57/381	
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	WILSON FISCUS;	11/24/1903	IRR_SW	0.800	55.8	026N-106W-11-NWNW	22622	CR CC57/382	
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	JESSE ENGLE;	11/24/1903	IRR_SW	0.340	24.1	026N-106W-11-NWNW	22623	CR CC57/383	
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	LYNN GRANDY;	11/24/1903	IRR_SW	0.520	36.6	026N-106W-11-NWNW	22624	CR CC57/384	
52/18.0D	EDEN NO. I CANAL ACT MEANS CANAL	KUBERT GREIG;	11/24/1903	IRR_SW	3.200	224.3	o oz¢m-to¢m-tt-NMNM	22025	CR CC57/385	
Permit No.	Facility Name	Appropriator	Priority	Use		C.F.S/AF	Acres	HG LOC	Proof No.	CR No.
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P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	A. M. HAFEY;	11/24/1903	DOM_SW,	IRR_SW	3.780	264.6	026N-106W-11-NWNW	22626	CR CC57/386
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	JAMES HODSON;	11/24/1903	IRR_SW		0.570	40	026N-106W-11-NWNW	22627	CR CC57/387
P5718.0D	EDEN NO. 1 CANAL	ELLIS HUDMAN;	11/24/1903					027N-106W-17-SENW	22628	CR CC57/388
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	D. JOSLIN;	11/24/1903	IRR_SW		0.560	39.6	026N-106W-11-NWNW	22629	CR CC57/389
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	LLOYD LAUGHLIN;	11/24/1903	IRR_SW		1.060	73.9	026N-106W-11-NWNW	22630	CR CC57/390
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	MARGARET MCCOMAS;	11/24/1903	IRR_SW		1.110	78	026N-106W-11-NWNW	22631	CR CC57/391
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	ELLA MCMURRY;	11/24/1903	IRR_SW		1.020	71.4	026N-106W-11-NWNW	22632	CR CC57/392
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	VERN MCMURRY;	11/24/1903	IRR_SW		1.060	74.7	026N-106W-11-NWNW	22633	CR CC57/393
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	GUSTAVE NELSON;	11/24/1903	IRR_SW		2.150	150.69	026N-106W-11-NWNW	22635	CR CC57/395
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	NELS NELSON;	11/24/1903	IRR_SW		1.130	79.4	026N-106W-11-NWNW	22636	CR CC57/396
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	ROWE PENNOCK;	11/24/1903	IRR_SW		1.100	76.9	026N-106W-11-NWNW	22637	CR CC57/397
P5718.0D	EDEN NO. I CANAL ACT MEANS CANAL	OF ABBIE E. PETERSON; ESTATE	11/24/1903	IRR_SW		1.140	80	026N-106W-11-NWNW	22638	CR CC57/398
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	A. PIERCE;	11/24/1903	IRR_SW		0.550	38.7	026N-106W-11-NWNW	22639	CR CC57/399
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	ED. SASS;	11/24/1903	IRR_SW		0.640	45	026N-106W-11-NWNW	22640	CR CC57/400
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	JOHN SKORCZ; LEO SKORCZ;	11/24/1903	IRR_SW		1.070	75	026N-106W-11-NWNW	22641	CR CC57/401
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	SUPERIOR LUMBER COMPANY;	11/24/1903	IRR_SW		0.980	69.2	026N-106W-11-NWNW	22642	CR CC57/402
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	FRED TAUCHER;	11/24/1903	IRR_SW		1.060	74.1	026N-106W-11-NWNW	22643	CR CC57/403
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	JOSEPH TOMICICH;	11/24/1903	IRR_SW		0.540	37.6	026N-106W-11-NWNW	22644	CR CC57/404
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	L. TROVATTEN;	11/24/1903	IRR_SW		6.540	458.2	026N-106W-11-NWNW	22645	CR CC57/405
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	W. WRIGHT;	11/24/1903	IRR_SW		2.140	150.1	026N-106W-11-NWNW	22646	CR CC57/406
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	UNIVERSITY OF WYOMING;	11/24/1903	IRR_SW		2.100	147.3	026N-106W-11-NWNW	23489	CR CC59/368
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	PAUL JUEL;	11/24/1903	IRR_SW		2.080	145.9	026N-106W-11-NWNW	23423	CR CC59/285
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	D. JOSLIN;	11/24/1903	IRR_SW		1.060	74.3	026N-106W-11-NWNW	20115	CR CC47/041
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	A. MERSHON;	11/24/1903	IRR_SW		2.140	149.6	026N-106W-11-NWNW	20309	CR CC47/242
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	LYNN GRANDY;	11/24/1903	IRR_SW		0.510	35.6	026N-106W-11-NWNW	20310	CR CC47/243
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	LYNN GRANDY;	11/24/1903	IRR_SW		2.180	152.4	026N-106W-11-NWNW	20402	CR CC47/349
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	WILLIAM WRIGHT;	11/24/1903	IRR_SW		3.940	275.9	026N-106W-11-NWNW	19984	CR CC46/448
P5718.0D	EDEN NO. I CANAL ACT MEANS CANAL	FRANK STIMSON;	11/24/1903	IRR_SW		0.990	69.1 70.2	026N-106W-11-NWNW	19732	CR CC46/165
P5/18.0D	EDEN NO. I CANAL ACT MEANS CANAL	FRED MEYER;	11/24/1903	IRR_SW		1.130	/9.3	026N-106W-11-NWNW	21019	CR CC49/309
P5718.0D	EDEN NO. 1 DITCH ACT MEANS CANAL	LYNN GRANDY;	11/24/1903	IRR_SW		0.550	38.7	026N-106W-11-NWNW	21535	CR CC52/261
P5/18.0D	EDEN NO. I CANAL ACT MEANS CANAL	ANDREW ARNOTT;	11/24/1903	TDD OW		1 0 2 0	70 4	026N-106W-11-NWNW	21536	CR CC52/262
P5/18.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	J. SILWARD,	11/24/1903	IRR_SW		1.030	105 2	026N-106W-11-NWNW	19574	CR CC45/623
P5/18.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	NORTH SIDE STATE BANK,	11/24/1903	IRR_SW		1.790	125.3	026N 106W 11 NUNW	10925	CR CC44/720
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	DANKS DRADY.	11/24/1903	IRR_SW		1.010	70.90	026N-106W-11-NWNW	19920	CR CC44/721
P5718 0D	EDEN NO. 1 CANAL ACT MEANS CANAL	JOHN CARLSON:	11/24/1903	TPP SW		2 620	183 7	026N-106W-11-NWNW	18928	CR CC44/722
P5718 0D	EDEN NO. 1 CANAL ACT MEANS CANAL	T HENDRICKS:	11/24/1903	TRR_SW		0 980	68 3	026N-106W-11-NWNW	18920	CR CC44/724
P5718 0D	EDEN NO. 1 CANAL ACT MEANS CANAL	Mrs J ADCOCK;	11/24/1903	TRR SW		1 110	78	026N-106W-11-NWNW	18930	CR CC44/725
P5718 0D	EDEN NO. 1 CANAL ACT MEANS CANAL	C ANDERSON;	11/24/1903	TRR SW		1 090	76 5	026N-106W-11-NWNW	18931	CR CC44/726
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	A. WILLIAMS;	11/24/1903	TRR SW		1.110	77.7	026N-106W-11-NWNW	18932	CR CC44/727
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	JAMES HODSON;	11/24/1903	IRR SW		0.570	40	026N-106W-11-NWNW	18933	CR CC44/728
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	NATHAN HODSON;	11/24/1903	IRR SW		1.140	80	026N-106W-11-NWNW	18935	CR CC44/730
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	HARRISON OLIVER;	11/24/1903	IRR SW		2.180	152.4	026N-106W-11-NWNW	18936	CR CC44/731
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	H. BRANSON;	11/24/1903	IRR SW		0.540	38.1	026N-106W-11-NWNW	18937	CR CC44/732
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	WILSON FISCUS;	11/24/1903	IRR SW		1.080	75.6	026N-106W-11-NWNW	18938	CR CC44/733
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	LUCY TALIAFERRO;	11/24/1903	IRR_SW		0.210	15	026N-106W-11-NWNW	18940	CR CC44/735
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	T. TALIAFERRO T;	11/24/1903	IRR_SW		1.040	73	026N-106W-11-NWNW	18941	CR CC44/736
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	T. TALIAFERRO J;	11/24/1903	IRR_SW		6.960	486.9	026N-106W-11-NWNW	18942	CR CC44/737
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	C. TUFFIELD;	11/24/1903	IRR_SW		0.480	33.8	026N-106W-11-NWNW	18943	CR CC44/738
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	EDWARD KRAUTLAGER;	11/24/1903	IRR_SW		0.568	39.8	026N-106W-11-NWNW	18944	CR CC44/739
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	C. JUEL;	11/24/1903	IRR_SW		4.370	305.9	026N-106W-11-NWNW	18945	CR CC44/740
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	JESSE ENGLE;	11/24/1903	IRR_SW		1.080	75.8	026N-106W-11-NWNW	18947	CR CC44/742
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	G. HENDERSON;	11/24/1903	IRR_SW		1.790	125.4	026N-106W-11-NWNW	18948	CR CC44/743
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	GILBERT KEELER;	11/24/1903	IRR_SW		3.190	223.6	026N-106W-11-NWNW	18949	CR CC44/744
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	H. ENGLE;	11/24/1903	IRR_SW		1.050	73.9	026N-106W-11-NWNW	18950	CR CC44/745
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	ARTHUR SAVAGE;	11/24/1903	IRR_SW		2.160	151.2	026N-106W-11-NWNW	18951	CR CC44/746
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	EDWARD SASS;	11/24/1903	IRR_SW		3.020	211.9	026N-106W-11-NWNW	18952	CR CC44/747
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	JOSEPHINE DEARTH;	11/24/1903	IRR_SW		2.210	154.8	026N-106W-11-NWNW	18953	CR CC44/748
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	FLOYD ANDERSON;	11/24/1903	IRR_SW		0.550	38.3	026N-106W-11-NWNW	18954	CR CC44/749
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	I. DEARTH;	11/24/1903	IRR_SW		3.400	238.3	026N-106W-11-NWNW	18955	CR CC44/750
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	HARRY GRANDY;	11/24/1903	IRR_SW		1.140	40	026N-106W-11-NWNW	18956	CR CC44/751
P6298.0D	JOSEPH THOMPSON DITCH	T TALIAFERRO J;	09/09/1904						10845	CR CC31/499

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Permit No.	Facility Name	Appropriator	Priority	Use	C.F.S/AF	Acres	HG LOC	Proof No.	CR No.
P6298.0D P6737.0D	JOSEPH THOMPSON DITCH LOUGHMAN DITCH ACT G. AND E.	WALTER DUNTON; G AND E LIVESTOCK, INC.;	09/09/1904 06/10/1905	IRR_SW	0.810	57	030N-105W-31-SENE 029N-105W-25-NWSW	10846	CR CC31/500 CR CC69/014
P6738.0D	LON POSTON DITCH ACT G. AND E.	G AND E LIVESTOCK, INC.;	06/10/1905	IRR_SW, STKND	MS 2.310	162	028N-106W-05-SESE		CR CC69/015
₽6738.0D	LON POSTON DITCH ACT G. AND E.	G AND E LIVESTOCK, INC.;	06/10/1905	IRR_SW, STO	0.660	46	028N-106W-05-SESE		CR CC69/016
P6739.0D	POSTON-LOUGHMAN DITCH ACT G. AND E. SPRINKLER	G AND E LIVESTOCK, INC.;	06/10/1905	IRR_SW	1.870	130.7	029N-106W-35-SENW		CR CC69/017
P1427.0E	ENLARGED JOHNSON AND GASSWINT DITCH (BIG SANDY DITCH)	DUNTON SHEEP COMPANY;	09/04/1905	IRR_SW, S&D	2.000	140	030N-105W-14-NESW		CR CC68/100
P1427.0E	ENLARGED JOHNSON AND GASSWINT DITCH (BIG SANDY DITCH)	W M EDWARDS;	09/04/1905	IRR_SW	2.000	140	030N-105W-14-NESW		CR CC70/081
P1427.0E	ENLARGED JOHNSON AND GASSWINT DITCH (BIG SANDY DITCH)	E MACK;	09/04/1905	IRR_SW	2.220	156	030N-105W-14-NESW	19198	CR CC45/205
P1427.0E	ENLARGED JOHNSON AND GASSWINT DITCH (BIG SANDY DITCH)	C PARKINSON;	09/04/1905	IRR_SW	1.140	80	030N-105W-14-NESW	24336	CR CC61/388
P818.0R	EDEN IRRIGATION AND LAND CO NO 1 RESERVOIR	EDEN IRRIGATION AND LAND CO;	12/30/1905	DOM_SW, IRR_S	W 18489.930	AF O	026N-105W-20-SWNW	18957	CR CR44/752
₽947.OR	EDEN NO. 2 RESERVOIR ACT BIG SANDY RESERVOIR	BUREAU OF RECLAMATION; EDEN VALLEY IRRIGATION DISTRICT;	11/09/1906	IRR_SW	39700.000	AF O	026N-106W-11-NWNW	32895	CR CR09/072
P1772.0E P1772.0E P1775.0E	ENLARGED THOMPSON DITCH ENLARGED THOMPSON DITCH ENLARGED POSTON DITCH ACT G AND E SPRINKLER SYSTEM ACIPT MEANS	WALTER DUNTON; T TALIAFERRO J; G AND E LIVESTOCK, INC.;	09/04/1907 09/04/1907 09/09/1907	IRR_SW	1.190	83.2	030N-105W-31-SENE 030N-105W-31-SENE 028N-106W-05-SESE	10848 10849	CR CC32/002 CR CC32/003 CR CC92/164
P1831.0E	CANAL ENLARGED LON POSTON DITCH ACIPT	G AND E LIVESTOCK, INC.;	02/24/1908	IRR_SW, STO	0.140	10	028N-106W-05-SESE		CR CC69/019
P2466.0E	G AND E SPRINCHER SISTEM ENLARGED LON POSTON DITCH ACIPT C AND E SDRINKLED SYSTEM	G AND E LIVESTOCK, INC.;	06/07/1911	IRR_SW	0.100	6.9	028N-106W-05-SESE		CR CC69/020
P3100.0E	ENLARGED JOHNSON AND GASSWINT DITCH (BIG SANDY DITCH)	DUNTON SHEEP COMPANY;	01/06/1915	IRR_SW	0.290	20	030N-105W-14-NESW	15417	CR CC68/101
P12973.0D	HOWELL DITCH	D. DEWEY;	01/19/1915	IRR_SW	1.720	120.5	026N-106W-13-SWSW	19733	CR CC46/166
P3105.0E	ENLARGED FRANCIS DITCH	CHARLES HOWELL;	01/22/1915	IRR_SW	1.390	97.4	025N-106W-03-NENE	17694	CR CC43/143
P15588.0D	HOLMES DITCH	MINNIE HOLMES;	08/15/1919	IRR_SW	1.110	78	027N-106W-17-SWSE	19477	CR CC45/523
P15758.0D	CONKLIN DITCH	ALFRED HOLMES;	04/23/1920	IRR_SW	1.480	104	026N-106W-02-SWSW	18443	CR CC44/187
P26141.0D	MINE'S SPRINKLER SYSTEM	RODNEY J. AND JANICE MINES;	06/10/1977	IRR_SW	2.000	140	026N-106W-35-SWNW	33565	CR CC88/169
P32209.0D	D. M. NO. 2 PIPELINE	DONALD S. AND VICKI MILLER;	01/15/1999	IRR_SW	0.150 ORI SUP	10.6 59.8	025N-106W-22-SENW	38670	CR CC83/218
P32122.0D P13818.0R	EDEN VALLEY CEMETERY PIPELINE JACK'S RESERVOIR	EDEN VALLEY CEMETERY DISTRICT; JACK V MCMURRY REVOCABLE TRUST; MERIAM M MCMURRY REVOCABLE TRUST;	03/15/1999 09/28/2010	IRR_SW FIS, WET, WL	0.090 1.200AF	6.2 0	025N-106W-33-NENE 025N-106W-22-NWSW	38671 42400	CR CC83/219 CR CR23/349
	WATER STORED IN BIG SANDY RES	ERVOIR PERMIT NO. 947, TRIBUTARI	ES OF BIG SA	NDY RIVER, GF	REEN RIVER	ł			
P21403.0D	MEANS CANAL	EDEN VALLEY IRRIGATION DISTRICT;	04/24/1952	IRR_SW	0.000	16849.1	026N-106W-11-NWNW	32890	CR CC74/205
P7751.0E	ENLARGED MEANS CANAL	USDI BUREAU OF LAND MANAGEMENT; MORGAN MURDOCK; USDI BUREAU OF	01/15/2010	IRR_SW	0.180	12.6	026N-106W-11-NWNW	41893	CR CC94/308
P7651.0E	ENL. MEANS CANAL	RECLAMATION; G AND E LIVESTOCK INC; EDEN	05/13/2010	IRR_SW	0.000	23.9	026N-106W-11-NWNW	40907	CR CC92/152
		VALLEY IRRIGATION AND DRAINAGE DISTRICT; USDI BUREAU OF RECLAMATION;							
	WATER STORED IN EDEN IRRIGATI	ON PERMIT NO 818, TRIBUTARIES OI	F BIG SANDY I	RIVER, GREEN	RIVER				
P16814.0D	EDEN NO. 1 CANAL	DERYL SWEAT; USDI BUREAU OF	12/30/1905	IRR_SW, S&D		79.7	026N-105W-20-SWNW	22664	CR CC92/196
P16814.0D P16814.0D	EDEN NO. 1 CANAL EDEN NO. 1 CANAL	RADOSEVICH LIVESTOCK, L.L.C.; X BAR T RANCH; SHARON K AND	12/30/1905 12/30/1905	IRR_SW IRR_SW, S&D		148.8 145.8	026N-105W-20-SWNW 026N-105W-20-SWNW	18972 18979	CR CC91/038 CR CC92/239

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Permit No.	Facility Name	Appropriator	Priority	Use	C.F.S/AF Acre	es	HG LOC	Proof No.	CR No.
		WILLIAM J SMITH II;				_			
P16814.0D	EDEN NO. 1 CANAL	RADOSEVICH LIVESTOCK, L.L.C.;	12/30/1905	IRR_SW		74	026N-105W-20-SWNW	22884	CR CC90/194
P16814.0D	EDEN NO. I CANAL	KIM R. BROWN LIVING TRUST;	12/30/1905	IRR_SW		69.8	026N-105W-20-SWNW	18967	CR CC90/192
		CHRISTOPHER A. AND SHELLEY L.							
D16014 0D	EDEN NO 1 CANAL	HARPER,	12/20/1005	TDD CW	700	7 24	ODEN 10EN DO CHINH	22000	CD CC74/204
P10014.0D	EDEN NO. I CANAL	EDEN VALLEI IRRIGATION DISTRICI,	12/30/1905	IKK_SW	780	1.54	0201-105W-20-5WNW	32009	CR CC/4/204
D16914 0D	EDEN NO 1 CANAL	NORTH SIDE STATE DANK	12/20/1005	TED CW CCD	1	25.2	026N-105W-20-SWNW	19959	CP CC44/752
P16814.0D	EDEN NO. 1 CANAL	T C ANDERSON:	12/30/1905	TRR_SW, S&D		0 96	026N-105W-20-SWNW	18959	CR CC44/753
P16814 0D	EDEN NO. 1 CANAL	BANKS BRADY:	12/30/1905	IRR SW S&D	· · ·	73 1	026N-105W-20-SWNW	18960	CR CC44/755
P16814 0D	EDEN NO. 1 CANAL	JOHN CARLSON;	12/30/1905	IRR SW. S&D	1	83 7	026N-105W-20-SWNW	18961	CR CC44/756
P16814.0D	EDEN NO. 1 CANAL	J G HENDRICKS;	12/30/1905	IRR SW, S&D		68.3	026N-105W-20-SWNW	18962	CR CC44/757
P16814.0D	EDEN NO. 1 CANAL	Mrs J A ADCOCK;	12/30/1905	IRR SW, S&D		78	026N-105W-20-SWNW	18963	CR CC44/758
P16814.0D	EDEN NO. 1 CANAL	C L ANDERSON;	12/30/1905	IRR SW, S&D		76.5	026N-105W-20-SWNW	18964	CR CC44/759
P16814.0D	EDEN NO. 1 CANAL	A L WILLIAMS;	12/30/1905	IRR_SW, S&D		77.7	026N-105W-20-SWNW	18965	CR CC44/760
P16814.0D	EDEN NO. 1 CANAL	JAMES HODSON;	12/30/1905	IRR_SW, S&D		40	026N-105W-20-SWNW	18966	CR CC44/761
P16814.0D	EDEN NO. 1 CANAL	NATHAN HODSON;	12/30/1905	IRR_SW, S&D		80	026N-105W-20-SWNW	18968	CR CC44/763
P16814.0D	EDEN NO. 1 CANAL	HARRISON OLIVER;	12/30/1905	IRR_SW, S&D	1	52.4	026N-105W-20-SWNW	18969	CR CC44/764
P16814.0D	EDEN NO. 1 CANAL	H R BRANSON;	12/30/1905	IRR_SW, S&D		38.1	026N-105W-20-SWNW	18970	CR CC44/765
P16814.0D	EDEN NO. 1 CANAL	WILSON FISCUS;	12/30/1905	IRR_SW, S&D		75.6	026N-105W-20-SWNW	18971	CR CC44/766
P16814.0D	EDEN NO. 1 CANAL	LUCY TALIAFERRO;	12/30/1905	IRR_SW, S&D		15	026N-105W-20-SWNW	18973	CR CC44/768
P16814.0D	EDEN NO. 1 CANAL	T S TALIAFERRO T;	12/30/1905	IRR_SW, S&D		73	026N-105W-20-SWNW	18974	CR CC44/769
P16814.0D	EDEN NO. 1 CANAL	T S TALIAFERRO J;	12/30/1905	IRR_SW, S&D	4	86.9	026N-105W-20-SWNW	18975	CR CC44/770
P16814.0D	EDEN NO. 1 CANAL	C J TUFFIELD;	12/30/1905	IRR_SW, S&D		33.8	026N-105W-20-SWNW	18976	CR CC44/771
P16814.0D	EDEN NO. 1 CANAL	EDWARD KRAUTLAGER;	12/30/1905	IRR_SW, S&D	0.000	39.8	026N-105W-20-SWNW	18977	CR CC44/772
P16814.0D	EDEN NO. 1 CANAL	C. JUEL;	12/30/1905	IRR_SW, S&D	3	05.9	026N-105W-20-SWNW	18978	CR CC44/773
P16814.0D	EDEN NO. 1 CANAL	JESSE ENGLE;	12/30/1905	IRR_SW, S&D		75.8	026N-105W-20-SWNW	18980	CR CC44/775
P16814.0D	EDEN NO. 1 CANAL	G W HENDERSON;	12/30/1905	IRR_SW, S&D	1	25.4	026N-105W-20-SWNW	18981	CR CC44/776
P16814.0D	EDEN NO. 1 CANAL	GILBERT KEELER;	12/30/1905	IRR_SW	2	23.6	026N-105W-20-SWNW	18982	CR CC44/777
P16814.0D	EDEN NO. 1 CANAL	H. ENGLE;	12/30/1905	IRR_SW		73.9	026N-105W-20-SWNW	18983	CR CC44/778
P16814.0D	EDEN NO. 1 CANAL	ARTHUR SAVAGE;	12/30/1905	IRR_SW	1	51.2	026N-105W-20-SWNW	18984	CR CC44/779
P16814.0D	EDEN NO. 1 CANAL	EDWARD SASS;	12/30/1905	IRR_SW	2	11.9	026N-105W-20-SWNW	18985	CR CC44/780
P16814.0D	EDEN NO. I CANAL	JOSEPHINE DEARTH;	12/30/1905	IRR_SW	1	54.8	026N-105W-20-SWNW	18986	CR CC44/781
P16814.0D	EDEN NO. I CANAL	FLOYD ANDERSON;	12/30/1905	IRR_SW	0	38.3	026N-105W-20-SWNW	18987	CR CC44/782
P16814.0D	EDEN NO. I CANAL	I. DEARTH;	12/30/1905	IRR_SW	2	38.3	026N-105W-20-SWNW	18988	CR CC44/783
P16014.0D	EDEN NO. 1 CANAL	TARKI GRANDI,	12/30/1905	IRR_SW		72 4	026N 105W 20 SWNW	10575	CR CC44/784
P16814.0D	EDEN NO. 1 CANAL	U. SIEWARD, EDANK CTIMCON.	12/30/1905	IRR_SW		60 1	026N-105W-20-SWNW	19774	CR CC45/024
P16814.0D	EDEN NO. 1 CANAL	A MERCHON:	12/30/1905	TRR_SW	1	49 6	026N-105W-20-SWNW	20311	CR CC47/244
P16814 0D	EDEN NO. 1 CANAL	D JOSLIN:	12/30/1905	TRR_SW	-	74 3	026N-105W-20-SWNW	20116	CR CC47/042
P16814 0D	EDEN NO. 1 CANAL	WILLIAM WRIGHT:	12/30/1905	IRR_SW	2	75 9	026N-105W-20-SWNW	20110	CR CC47/042
P16814 0D	EDEN NO. 1 CANAL	PAUL, JUEL;	12/30/1905	IRR SW	1	45 9	026N-105W-20-SWNW	23424	CR CC59/286
P16814 0D	EDEN NO 1 CANAL	UNIVERSITY OF WYOMING;	12/30/1905	TRR SW	1	47 3	026N-105W-20-SWNW	23490	CR CC59/369
P16814.0D	EDEN NO. 1 CANAL	ANDREW ARNOTT;	12/30/1905	IRR SW	-	36.7	026N-105W-20-SWNW	22647	CR CC57/407
P16814.0D	EDEN NO. 1 CANAL	BLAIR AND HAY LAND AND LIVESTOCK	12/30/1905	IRR SW		88.3	026N-105W-20-SWNW	22648	CR CC57/408
		COMPANY;	, , , , , ,						
P16814.0D	EDEN NO. 1 CANAL	BLAIR AND HAY LAND AND LIVESTOCK COMPANY;	12/30/1905	IRR_SW	1	34.1	026N-105W-20-SWNW	22649	CR CC57/409
P16814.0D	EDEN NO. 1 CANAL	R. BONNETT;	12/30/1905	IRR_SW	11	4.29	026N-105W-20-SWNW	22650	CR CC57/410
P16814.0D	EDEN NO. 1 CANAL	CHARLES BROWN;	12/30/1905	IRR_SW		72.2	026N-105W-20-SWNW	22651	CR CC57/411
P16814.0D	EDEN NO. 1 CANAL	JESSE ENGLE;	12/30/1905	IRR_SW		24.1	026N-105W-20-SWNW	22652	CR CC57/412
P16814.0D	EDEN NO. 1 CANAL	CLARA FISCUS;	12/30/1905	IRR_SW		68.8	026N-105W-20-SWNW	22653	CR CC57/413
P16814.0D	EDEN NO. 1 CANAL	WILSON FISCUS;	12/30/1905	IRR_SW		55.8	026N-105W-20-SWNW	22654	CR CC57/414
P16814.0D	EDEN NO. 1 CANAL	LYNN GRANDY;	12/30/1905	DOM_SW, IRR_SW	, 2	63.3	026N-105W-20-SWNW	22655	CR CC57/415
				STO					
P16814.0D	EDEN NO. 1 CANAL	ROBERT GREIG;	12/30/1905	IRR_SW	2	24.3	026N-105W-20-SWNW	22656	CR CC57/416
P16814.0D	EDEN NO. 1 CANAL	A. M. HAFEY;	12/30/1905	IRR_SW, STKNDM	S 0.000 2	64.6	026N-105W-20-SWNW	22657	CR CC57/417
P16814.0D	EDEN NO. 1 CANAL	JAMES HODSON;	12/30/1905	IRR_SW		40	026N-105W-20-SWNW	22658	CR CC57/418
P16814.0D	EDEN NO. 1 CANAL	D. JOSLIN;	12/30/1905	IRR_SW		39.6	026N-105W-20-SWNW	22659	CR CC57/419
P16814.0D	EDEN NO. 1 CANAL	LLOYD LAUGHLIN;	12/30/1905	IRR_SW		73.9	026N-105W-20-SWNW	22660	CR CC57/420
P16814.0D	EDEN NO. 1 CANAL	MARGARET MCCOMAS;	12/30/1905	IRR_SW		78	026N-105W-20-SWNW	22661	CR CC57/421
P16814.0D	EDEN NO. 1 CANAL	ELLA MCMURRY;	12/30/1905	IRR_SW		71.4	026N-105W-20-SWNW	22662	CR CC57/422
P16814.0D	EDEN NO. 1 CANAL	VERN MCMURRY;	12/30/1905	IRR_SW		74.7	026N-105W-20-SWNW	22663	CR CC57/423

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P16814.0D	EDEN NO. 1 CANAL	FRED MEYER;	12/30/1905	IRR_SW		79.3	026N-105W-20-SWNW	22665	CR CC57/425
P16814.0D	EDEN NO. 1 CANAL	GUSTAVE NELSON;	12/30/1905	IRR_SW		150.69	026N-105W-20-SWNW	22666	CR CC57/426
P16814.0D	EDEN NO. 1 CANAL	NELS NELSON;	12/30/1905	IRR_SW		79.4	026N-105W-20-SWNW	22667	CR CC57/427
P16814.0D	EDEN NO. 1 CANAL	ROWE PENNOCK;	12/30/1905	IRR_SW		76.9	026N-105W-20-SWNW	22668	CR CC57/428
P16814.0D	EDEN NO. I CANAL	OF ABBLE E DETERSON; ESTATE	12/30/1905	IRR_SW		80	026N-105W-20-SWNW	22669	CR CC57/429
P16814.0D	EDEN NO. 1 CANAL	A. PIERCE;	12/30/1905	IRR SW		38.7	026N-105W-20-SWNW	22670	CR CC57/430
P16814.0D	EDEN NO. 1 CANAL	ED SASS;	12/30/1905	IRR_SW		45	026N-105W-20-SWNW	22671	CR CC57/431
P16814.0D	EDEN NO. 1 CANAL	JOHN SKORCZ; LEO SKORCZ;	12/30/1905	IRR_SW		75	026N-105W-20-SWNW	22672	CR CC57/432
P16814.0D	EDEN NO. 1 CANAL	SUPERIOR LUMBER COMPANY;	12/30/1905	IRR_SW		69.2	026N-105W-20-SWNW	22673	CR CC57/433
P16814.0D	EDEN NO. 1 CANAL	FRED TAUCHER;	12/30/1905	IRR_SW		74.1	026N-105W-20-SWNW	22674	CR CC57/434
P16814.0D	EDEN NO. 1 CANAL	JOSEPH TOMICICH;	12/30/1905	IRR_SW		37.6	026N-105W-20-SWNW	22675	CR CC57/435
P16814.0D	EDEN NO. 1 CANAL	L. TROVATTEN;	12/30/1905	IRR_SW		458.2	026N-105W-20-SWNW	22676	CR CC57/436
P16814.0D	EDEN NO. 1 CANAL	W. WRIGHT;	12/30/1905	IRR_SW		150.1	026N-105W-20-SWNW	22677	CR CC57/437
P16814.0D	EDEN NO. 1 CANAL	BIG SANDY LIVESTOCK COMPANY;	12/30/1905	IRR_SW		34.5	026N-105W-20-SWNW	22881	CR CC58/139
P16814.0D	EDEN NO. 1 CANAL	JOHN CARLSON;	12/30/1905	IRR_SW		/5.90	026N-105W-20-SWNW	22882	CR CC58/140
P16814 0D	EDEN NO. 1 CANAL	FRED NELSON:	12/30/1905	IRR SW		76 5	026N-105W-20-SWNW	22885	CR CC58/143
P16814 0D	EDEN NO. 1 CANAL	ESTATE OF BERTHA E SAVAGE;	12/30/1905	TRR SW		75	026N-105W-20-SWNW	22886	CR CC58/144
P16814.0D	EDEN NO. 1 CANAL	ABEL VIGIL;	12/30/1905	IRR SW		77	026N-105W-20-SWNW	22887	CR CC58/145
P16814.0D	EDEN NO. 1 CANAL	JOHN COPPES;	12/30/1905	IRR SW		12.3	026N-105W-20-SWNW	22748	CR CC58/026
P16814.0D	EDEN NO. 1 CANAL	JOHN FRULLO; PETE FRULLO; MIKE	12/30/1905	IRR_SW		66.3	026N-105W-20-SWNW	22749	CR CC58/027
D16014 0D	EDEN NO. 1 CANAL	FRULLO;	10/20/1005			20.4	00 CN 10 EN 00 CUNH	00750	
P16814.0D	EDEN NO. 1 CANAL	CLARENCE JENSEN;	12/30/1905	IRR_SW, S&D		38.4	026N-105W-20-SWNW	22750	CR CC58/028
P16814.0D	EDEN NO. 1 CANAL	ALEXANDER LISZEWSKI,	12/30/1905	IRR_SW		20 7	026N-105W-20-SWNW	22/51	CR CC58/029
P16814 0D	EDEN NO. 1 CANAL	Mrs MINNIE SITZMAN:	12/30/1905	IRR SW		18 32	026N-105W-20-SWNW	22753	CR CC58/030
P16814 0D	EDEN NO. 1 CANAL	JACK TOMICICH:	12/30/1905	TRR SW		75 1	026N-105W-20-SWNW	22754	CR CC58/032
P16814.0D	EDEN NO. 1 CANAL	SOFIJA BOSERICH;	12/30/1905	IRR SW		35.1	026N-105W-20-SWNW	23113	CR CC58/334
P16814.0D	EDEN NO. 1 CANAL	O. FINLEY;	12/30/1905	IRR SW		32.6	026N-105W-20-SWNW	23114	CR CC58/335
P16814.0D	EDEN NO. 1 CANAL	WYOMING STATE BOARD OF LAND	12/30/1905	IRR_SW		173.8	026N-105W-20-SWNW	23115	CR CC58/336
		COMMISSIONERS; AUGUST HENNECKE;							
P16814.0D	EDEN NO. 1 CANAL	LUTHER MCNALLEY;	12/30/1905	IRR_SW		79.1	026N-105W-20-SWNW	23116	CR CC58/337
P7752.0E	ENLARGED EDEN CANAL NO. 1	MORGAN MURDOCK; USDI BUREAU OF RECLAMATION;	01/15/2010	IRR_SW	0.000	12.6	026N-105W-20-SWNW	41894	CR CC94/309
P7650.0E	ENL. EDEN CANAL NO. 1	G AND E LIVESTOCK, INC; EDEN	05/13/2010	IRR_SW	0.000	23.9	026N-105W-20-SWNW	40908	CR CC92/153
		VALLEY IRRIGATION AND DRAINAGE							
		DISTRICT; USDI BUREAU OF							
		RECLAMATION;							
	DDV CREEK TRIDUTARIES OF DIC 6	ANDV DIVED CDEEN DIVED							
	DRI CREEK, IKIBUIARIES OF DIG S	SANDI RIVER, GREEN RIVER							
D2862 0D	DEV CREEK RECEDUCIE	JOHN HAY:	11/29/1011	STO.	4 00035		023N-106W-20-9WOW	16505	CP CP/1/202
F2005.0K	DRI CREEK RESERVOIR	JOHN HAT	11/20/1911	510	4.000Ar	0	02311-1000-30-3030	10202	CK CK41/393
	SANDY DRAW, TRIBUTARIES OF BIO	SANDY RIVER. GREEN RIVER							
P13490 05	JACK AND MERIAM MCMURRY STOCK	TACK V AND MERIAM M MCMURRY:	06/01/1999	STO	5 63045	0	025N-106W-22-NWSW	38255	CR CR15/385
115150.00	RESERVOIR	oner v mud minimi m memorici ,	00/01/1999	510	5.05011	0	02511 10011 22 111051	50255	cit citis, sos
	WASHINGTON DRAW, TRIBUTARIES	S OF BIG SANDY RIVER, GREEN RIVE	R						
D4464 0D	DOMENT DECEDUATE		07/17/1021	DOM ON THE OW	20 00035		004NT 107W 06 0F0F	22682	CD CD01/170
P4404.UR	DOMEN KEPEKAOIK	KALFH BUWEN,	01/1//1931	DOM_SW, IRR_SW STO	, 30.000AF	0	024N-10/W-26-SESE	22083	CK CRUI/1/8
P17974.0D	BOWEN DITCH	RALPH BOWEN;	07/17/1931	IRR_SW	0.280	20	024N-107W-26-SESE	22678	CR CC57/438
P17975.0D	BOWEN DITCH	RALPH BOWEN;	02/13/1932	IRR_SW	0.000	20	024N-107W-26-SESE	22679	CR CC57/439

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	LUMAN CREEK, TRIBUTARIES OF SI	XMILE DRAW, WASHINGTON DRAW	, BIG SANDY	RIVER, GREEN	RIVER				
P8684.0D P8685.0D	LUMAN NO. 1 DITCH LUMAN NO. 2 DITCH	ESTATE CHARLES WASHINGTON; ESTATE CHARLES WASHINGTON;	09/11/1908 09/11/1908	IRR_SW IRR_SW	0.400 0.340	27.8 23.8	024n-106w-25-nene 024n-106w-25-nene	10132 10133	CR CC30/287 CR CC30/288
	TOMICH DRAW, TRIBUTARIES OF W	ASHINGTON DRAW, BIG SANDY RIV	'ER, GREEN R	IVER					
₽3276.0S	ED TOMICH STOCK RESERVOIR	STEVEN E AND DEBRA TOMICH;	05/18/1960	STO	3.200AF	C	024N-106W-29-NWSE	42091	CR CR21/321
	DELAMBERT DRAIN DRAW, TRIBUT	ARIES OF WASHINGTON DRAW, BIG	SANDY RIVE	R, GREEN RIVE	R				
P24388.0D	DELAMBERT NO. 1 DITCH	BURTON DELAMBERT; CHRISTINE	03/21/1974	IRR_SW, STO	0.056 ORI	0	024N-106W-28-NENE	36031	CR CC79/045
P24389.0D	DELAMBERT NO. 2 DITCH	BURTON DELAMBERT; CHRISTINE DELAMBERT;	03/21/1974	IRR_SW, STO	0.056 ORI SUP	0	024N-106W-28-NENE	36032	CR CC79/046
	OX YOKE SPRINGS, TRIBUTARIES O	F OX YOKE DRAW, WASHINGTON DI	RAW, BIG SAN	DY RIVER, GR	EEN RIVER				
P8910.0D P11727.0D	FELIX SCHIESTLER DITCH FELIX SCHIESTLER DITCH	FELIX SCHIESTLER; FELIX SCHIESTLER;	12/14/1908 03/03/1913	IRR_SW, STO IRR_SW	0.210 0.210	15	 025N-104W-33-SESW	11231 14585	CR CC32/399 CR CC38/203
	UNNAMED LAKE, TRIBUTARIES OF	WALTERS DRAW, WASHINGTON DR	AW, BIG SANI	Y RIVER, GRE	EN RIVER				
P12069.0D	WALTERS DITCH	JOHN HAY;	10/11/1913	IRR_SW	1.270	89	024N-104W-08-NENW	17437	CR CC42/608
	DEER SPRING, TRIBUTARIES OF WA	SHINGTON DRAW, BIG SANDY RIVE	R, GREEN RIV	TER					
P3467.0R P15018.0D	DEER SPRING RESERVOIR DEER SPRING DITCH	WILLIAM LEWIS; WILLIAM LEWIS;	03/16/1918 03/16/1918	IRR_SW IRR_SW, STO	4.200AF 0.140	0 10	024N-104W-14-SWSW 024N-104W-14-SWSW	17263 17264	CR CR42/435 CR CC42/436
	CHANNEL OF CARLSON DRAW, TRU	BUTARIES OF CARLSON DRAW, BIG	SANDY RIVER	, GREEN RIVEI	ĸ				
P10591.0R	GERKEN RESERVOIR	STEWART GERKEN;	08/15/1997	FIS, WL	8.640AF	C	024N-106W-09-NWNW	38254	CR CR15/384
	EDEN PROJECT DRAIN NO. 1, TRIBU	TARIES OF CARLSON DRAW, BIG SA	NDY RIVER, G	REEN RIVER					
P24983.0D	MCMURRY SPRINKLER IRRIGATION	ROBERT MCMURRY; ANGELA MCMURRY;	04/08/1974	IRR_SW	2.620	183.3	024N-106W-09-SWNE	32488	CR CC73/238
P10945.0R P32737.0D P32738.0D	SISIEM S. MINES WILDLIFE RESERVOIR COY IRRIGATION SYSTEM (NORTH) COY IRRIGATION SYSTEM NO. 2	STEVEN MINES; GARY D COY; GARY D COY;	11/22/1999 05/23/2001 05/23/2001	WL IRR_SW IRR_SW	3.580AF 0.360 0.100	0 25 7	025N-106W-36-SWSW 024N-106W-09-SENW 024N-106W-09-SENW	38685 42356 42357	CR CR16/224 CR CC95/124 CR CC95/125
	EDEN PROJECT DRAIN NO. 2, TRIBU	TARIES OF CARLSON DRAW, BIG SA	NDY RIVER, G	REEN RIVER					
P24984.0D	MCMURRY DITCH	ROBERT L AND ANGELA MCMURRY;	04/08/1974	IRR_SW	0.000	183.3	024N-106W-09-SWSE	32489	CR CC73/239
	LITTLE SANDY CREEK, TRIBUTARI	ES OF BIG SANDY RIVER, GREEN RIV	'ER						
T4316.0- P3918.0D	GILLETTE AND LUMAN DITCH CONTINENTAL DIVIDE DITCH	Mrs CATHERINE FORSHAW; LITLE SANDY GRAZING	12/31/1887 05/19/1902	IRR_SW IRR_SW	6.600	455	 030N-104W-25-NWNE	4316	CR CC45/348 CR CC69/435
P3917.0D	FRANCIS DITCH	ASSOCIATION; ARTHUR FRANCIS;	05/19/1902	IRR SW	1.910	134	030N-104W-24-SESE	6595	CR CC19/039

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P3917.0D	FRANCIS DITCH	JOSEPH THOMPSON S; THOMAS THOMPSON;	05/19/1902	IRR_SW	1.970	138	030N-104W-24-SESE	6596	CR CC19/040
P6297.0D	JOHN NELSON DITCH	MIDLAND LIVE STOCK CO.;	09/09/1904	IRR SW	1.570	110	030N-104W-24-NESE	12670	CR CC35/394
P1407.0E	ENLARGED JOHN NELSON DITCH	MIDLAND LIVE STOCK COMPANY;	07/19/1905	IRR SW	3.700	259	030N-104W-24-NESE		CR CC68/097
P1422.0E	ENLARGED CONTINENTAL DIVIDE	HELEN JUEL;	09/07/1905	IRR_SW, STO	0.900	63	030N-104W-25-NWNE	9343	CR CC69/024
P1422.0E	ENLARGED CONTINENTAL DIVIDE	MAGAGNA BROS., INC.;	09/07/1905	IRR_SW, STO	2.930	205	030N-104W-25-NWNE	9343	CR CC69/026
P6933.0D	JOSEPH THOMPSON AND SONS DITCH	LITTLE SANDY GRAZING	09/29/1905	IRR_SW	0.880	61.6	029N-104W-09-NENW		CR CC69/436
P6977 0D	ZEMBA DITCH	MIDLAND LIVE STOCK COMPANY;	11/06/1905	TRR SW	6 300	441	029N-104W-09-NENW		CR CC68/098
P7085.0D	JOSEPH THOMPSON AND SONS DITCH	LITTLE SANDY GRAZING	01/02/1906	IRR_SW	4.520	317	029N-104W-09-NENW		CR CC69/437
P1746.0E	ENLARGED ZEMBA DITCH ACT LITTLE	JOSEPH THOMPSON S;	06/14/1906	IRR_SW	2.740	192	029N-104W-09-NENW	9344	CR CC29/006
P1746.0E	ENLARGED ZEMBA DITCH ACT LITTLE SANDY DITCH	THOMAS THOMPSON;	06/14/1906	IRR_SW	1.920	135	029N-104W-09-NENW	9345	CR CC29/007
P7704.0D	ELKHORN DITCH	BLAIR HAY LAND AND LIVESTOCK	07/23/1906	IRR_SW	4.000	280	029N-104W-16-SWSW		CR CC69/105
P1025.0R	ELKHORN RESERVOIR	JOE THOMPSON JR. LIVESTOCK CO ;	07/23/1906	TRR SW. STO	1450.0004	F O	031N-103W-34-NENW	24066	CR CR01/342
P7802 0D	JOSEPH THOMPSON DITCH	JOSEPH THOMPSON;	05/18/1907	IRR SW	0 800		028N-104W-28-SWSW	14643	CR CC38/289
P9318 0D	SCHIESTLER-BRADY DITCH	FELIX SCHIESTLER:	09/12/1908	IRR SW	1 780	125	027N-104W-05-SWSW	10852	CR CC32/006
P9318.0D	SCHIESTLER-BRADY DITCH	LITTLE SANDY GRAZING ASSOCIATION;	09/12/1908	IRR_SW, STKND	us 0.810	57	027N-104W-05-SWSW	10052	CR CC69/432
P2135.0E	ENLARGED LITTLE SANDY DITCH	LITTLE SANDY GRAZING	09/25/1909	IRR_SW	3.100	217	029N-104W-09-NENW		CR CC69/438
P2140.0E	ENLARGED CONTINENTAL DIVIDE	MAGAGNA BROS., INC.;	12/17/1909	IRR_SW, STO	1.320	92.5	030N-104W-25-NWNE	14074	CR CC69/027
P2140.0E	ENLARGED CONTINENTAL DIVIDE DITCH	HELEN MARIE JUEL; MARGARET JUEL RAY; DORIS JUEL; ALICE JUEL;	12/17/1909	IRR_SW, STO	1.600	112	030N-104W-25-NWNE		CR CC69/025
P1675.0R	PROSPECT NO. 1 RESERVOIR	CHRIS JUEL; ROSE JUEL;	12/17/1909	IRR_SW, STO	187.000AF	0	028N-104W-10-NENW	14073	CR CR44/213
P2450.0E	ENLARGED ZEMBA DITCH	MIDLAND LIVESTOCK COMPANY;	05/16/1911	IRR SW, S&D	1.540	108	029N-104W-09-NENW	14071	CR CC37/458
P10970.0D	CHAMBERS DITCH	LITTLE SANDY GRAZING ASSOCIATION;	02/05/1912	IRR_SW	1.090	76.8	026N-105W-02-NWNE		CR CC69/433
P2623.0E	ENLARGED SCHIESTLER-BRADY DITCH	LITTLE SANDY GRAZING ASSOCIATION;	07/15/1912	IRR_SW	0.600	42	027N-104W-05-SWSW		CR CC69/434
P3021.0E	ENLARGED ZEMBA DITCH	ADA DUNTON;	06/23/1914	IRR SW, STO	3,960	277.5	029N-104W-09-NENW	14072	CR CC37/459
P13079.0D	MEYERS NO. 1 ACT LITTLE SANDY INTAKE CANAL	RUDOLPH CHESNOVAR;	03/06/1915	IRR_SW	1.240	86.8	026N-105W-15-NWSE		CR CC69/022
P13080.0D	MEYERS NO. 2 DITCH ACT LITTLE SANDY INTAKE CANAL	RUDOLPH CHESNOVAR;	04/26/1915	IRR_SW, S&D	0.910	63.5	026N-105W-15-NWSE		CR CC69/023
P4048.0E	ENLARGED MEYERS NO. 1 DITCH ACT	RUDOLPH CHESNOVAR;	11/12/1919	IRR_SW, STO	1.150	80.7	026N-105W-15-NWSE	28812	CR CC69/102
P4049.0E	ENLARGED MEYERS NO. 2 DITCH ACT LITTLE SANDY INTAKE CANAL	RUDOLPH CHESNOVAR;	11/12/1919	IRR_SW, STO	0.200	14	026N-105W-15-NWSE		CR CC69/103
P4368.0E	ENLARGED CHAMBERS DITCH	RUTH SPICER;	07/02/1923		0.930		026N-105W-02-NWNE	21109	CR CC49/414
P4368.0E	ENLARGED CHAMBERS DITCH	ERNEST SPICER;	07/02/1923					21110	CR CC49/415
P4503.0E	ENLARGED GILLETTE AND LUMAN DITCH	PARFITT AND MORGAN;	09/29/1923				026N-105W-32-NENE	20118	CR CC47/044
P4503.0E	ENLARGED GILLETTE AND LUMAN DITCH	PARFITT AND MORGAN;	09/29/1923					19735	CR CC46/168
P4600.0E P18979.0D	ENLARGED CHAMBERS DITCH LITTLE SANDY INTAKE CANAL	MR AND MRS WILLIAM A MEYER; UNITED STATES BUREAU OF	07/25/1928 11/08/1937	IRR_SW, S&D RES	3.700 0.000	259 0	026N-105W-02-NWNE 026N-105W-15-NWSE	21410	CR CC52/133 CR CC66/065
P32187.0D	ANDERSON PUMP NO. 1	PHILIP ANDERSON; HAZEL ANDERSON; KIM ANDERSON; JAQULINE ANDERSON;	10/09/1998	DSP	0.220	0	025N-106W-24-NENE	38672	CR CC83/220
	PACIFIC CREEK, TRIBUTARIES OF I	ITTLE SANDY CREEK. BIG SANDY R	IVER, GREEN	RIVER					
			,						
D0001 0D			10/14/1005		4 550	200	0.000 1.000 1.0 0000	11000	an aann (nn 1

28091.0D	ARCHIBALD BLAIR DITCH	ARCHIBALD BLAIR;	12/14/1907	IRR_SW	4.570	320 026N-103W-16-SWNW	11226	CR CC32/394
910817.0D	PACIFIC CREEK DITCH	JOHN HAY;	06/03/1911	IRR_SW	1.140	80 026N-104W-27-SWSW	14569	CR CC38/187
217139.0D	PACIFIC MEADOW DITCH	BLAIR HAY LAND AND LIVESTOCK	08/14/1926	IRR SW, STO	1.050	73.6 027N-102W-21-NWSE	26132	CR CC65/077

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	Facility Name	Appropriator	Priority	Use	C.F.S/AF	Acres	HG LOC	Proof No.	CR No.	
P17140.0D	ENLARGED MCDOWELL DITCH	COMPANY; BLAIR HAY LAND AND LIVESTOCK COMPANY;	09/10/1926	RES	0.000	(027N-102W-22-NWNE		CR CC65/078	
	MANGANESE SPRING, TRIBUTAI	RIES OF JACK MORROW CREEK, PACI	FIC CREEK, LIT	TLE SANDY (CREEK, BIG S	ANDY R	IVER, GREEN RIVER			
P8107.0D	MANGANESE SPRING DITCH	JOHN HAY;	12/04/1907	IRR_SW	0.140	10	0 025N-103W-18-SWNE	9366	CR CC29/032	
	FIFTEEN HUNDRED DOLLAR SPI	RING, TRIBUTARIES OF JACK MORROV	V CREEK, PAC	FIC CREEK, I	LITTLE SAND	Y CREE	K, BIG SANDY RIVER	, GREEN F	RIVER	
P8106.0D	\$1,500.00 SPRING DITCH	JOHN HAY;	12/04/1907	IRR_SW	0.070	Ę	5 025N-102W-28-SWSW	9367	CR CC29/033	
	HILLSIDE NO. 1 SPRING, TRIBUT	CARIES OF BOX DRAW, BOX CANYON C	REEK, JACK M	ORROW CRE	EK, PACIFIC	CREEK,	LITTLE SANDY CRE	EK, BIG SA	ANDY	
	RIVER, GREEN RIVER									
P8108.0D	HILLSIDE NO. 1 DITCH	JOHN HAY;	12/04/1907	IRR_SW	0.050	4	4 024N-103W-13-NENE	9365	CR CC29/031	
	HILLSIDE NO. 2 SPRING, TRIBUT	ARIES OF BOX DRAW, BOX CANYON C	REEK, JACK M	ORROW CRE	EK, PACIFIC	CREEK,	LITTLE SANDY CRE	EK, BIG S∤	ANDY	
	RIVER, GREEN RIVER									
P8109.0D	HILLSIDE NO. 2 DITCH	JOHN HAY;	12/04/1907	IRR_SW	0.040	3	3 024N-103W-13-SWNE	9364	CR CC29/030	
	HILLSIDE NO. 2 SPRING, TRIBUT	ARIES OF BOX DRAW, BOX CANYON C	REEK, JACK M	ORROW CRE	EK, PACIFIC	CREEK,	LITTLE SANDY CRE	EK, BIG SA	ANDY	
	RIVER, GREEN RIVER									
P8109.0D	HILLSIDE NO. 2 DITCH	JOHN HAY;	12/04/1907	IRR_SW	0.130	9	9 024N-103W-13-SWNE	16506	CR CC41/394	
	HAY NO. 2 SPRING, TRIBUTARIE	S OF MOWING MACHINE DRAW, ROCH	K CABIN CREEI	K, JACK MORI	ROW CREEK,	PACIFI	C CREEK, LITTLE SA	NDY CREI	EK, BIG	
	SANDY RIVER, GREEN RIVER									
P8100.0D	HAY NO. 2 DITCH	JOHN HAY;	12/04/1907	IRR_SW	0.100	7	7 025N-101W-17-SWNW	12192	CR CC34/383	
	HAY NO. 1 SPRING, TRIBUTARIE	S OF JOE HAY DRAW, ROCK CABIN CR	EEK, JACK MO	RROW CREE	K, PACIFIC C	REEK, L	ITTLE SANDY CREE	K, BIG SAN	NDY	
	RIVER, GREEN RIVER									
P8099.0D	HAY NO. 1 DITCH	JANE BLAIR;	12/04/1907	IRR_SW, STO	0.270	19	9 025N-101W-05-NWNW	9370	CR CC29/036	
	OREGON BUTTE SPRING NO. 1, 7	TRIBUTARIES OF ROCK CABIN CREEK,	JACK MORRO	W CREEK, PA	CIFIC CREEK	K, LITTL	E SANDY CREEK, BIO	G SANDY I	RIVER,	
	GREEN RIVER									
P13768.0D	OREGON BUTTE SPRING NO. 1	AUGUST FAURE;	12/22/1915	STO	0.200	(026N-101W-28-SWSE	16377	CR CC41/080	
	CHILTON'S STEAMBOAT MOUN	TAIN SPRINGS, TRIBUTARIES OF SOUT	H FORK JACK	MORROW CR	EEK, JACK M	IORROW	V CREEK, PACIFIC CI	REEK, LIT	TLE SANDY	
	CREEK, BIG SANDY RIVER, GRE	EN RIVER								
P8278.0D	GEO. CHILTON DITCH	GEORGE CHILTON;	03/12/1908	IRR_SW	0.370	26	5 023N-102W-05-SWSW	16294	CR CC40/691	

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Permit No.	Facility Name	Appropriator	Priority	Use	C.F.S/AF	Acres	HG LOC	Proof No.	CR No.
	HAY NO. 4 SPRING, TRIBUTARIES GREEN RIVER	OF SAW DRAW, PARNELL CREEK, JAC	K MORROW	CREEK, PACIFIC	C CREEK, L	ITTLE S	ANDY CREEK, BIG S	ANDY RIV	ER,
P8102.0D	HAY NO. 4 DITCH	JOHN HAY;	12/04/1907	IRR_SW, STO	0.110	٤	8 025N-101W-27-SESW	12190	CR CC34/38
	HAY NO. 3 SPRING, TRIBUTARIES SANDY RIVER, GREEN RIVER	OF WAY DRAW, SAW DRAW, PARNELI	L CREEK, JAC	K MORROW CR	ЕЕК, РАСП	FIC CRE	EK, LITTLE SANDY (CREEK, BI	G
P8101.0D	HAY NO. 3 DITCH	JOHN HAY;	12/04/1907	IRR_SW, STO	0.430	30	025N-101W-27-NESW	12191	CR CC34/382
	RESERVOIR SPRING, TRIBUTARIE	S OF RESERVOIR DRAW, SOUTH FORI	K JACK MORF	OW CREEK, JA	CK MORRO	OW CRE	EK, PACIFIC CREEK,	LITTLE S	ANDY
	CREEK, BIG SANDY RIVER, GREEN	RIVER							
P8110.0D	RESERVOIR SPRING DITCH	JOHN HAY;	12/04/1907	IRR_SW	0.070	Ę	024N-102W-30-SWNW	9363	CR CC29/029
	SPRING, TRIBUTARIES OF DRY FO	RK MCCRADY CREEK, JACK MORRO	W CREEK, PAO	CIFIC CREEK, LI	TTLE SAN	DY CRE	EK, BIG SANDY RIVE	R, GREEN	RIVER
P6448.0D	NO NAME PROVIDED	GEORGE CHILTON;	12/30/1904	STO	0.200	(023N-102W-09-NENW	16292	CR CC40/68
	WHITE HORSE DRAW, TRIBUTARI	ES OF ALKALI CREEK, PACIFIC CREE	K, LITTLE SA	NDY CREEK, BIO	G SANDY R	IVER, G	REEN RIVER		
P17138.0D	WHITE HORSE DITCH	BLAIR AND HAY LAND AND LIVESTOCK COMPANY;	08/14/1926	IRR_SW, RES	0.000	320	026N-102W-08-SWNE	26134	CR CC65/079
	WEST PACIFIC CREEK, TRIBUTAR	IES OF PACIFIC CREEK, LITTLE SAND	Y CREEK, BIO	G SANDY RIVER,	GREEN RI	VER			
P9362.0S	SHEEP CAMP NO. 1 STOCK RESERVOIR	USDI, BUREAU OF LAND MANAGEMENT;	04/03/1984	STO	0.700AF	(028N-102W-23-NWSW	33878	CR CR10/313
	KERRI DRAW, TRIBUTARIES OF D	RY SANDY CREEK, LITTLE SANDY CR	EEK, BIG SAN	DY RIVER, GREI	EN RIVER				
P9363.0S	LOST MOUNTAIN STOCK RESERVOIR	USDI, BUREAU OF LAND MANAGEMENT;	04/03/1984	STO	14.000AF	(028N-103W-19-SESE	33877	CR CR10/312
	EMIGRANT SPRINGS, TRIBUTARIE	S OF DRY SANDY CREEK, LITTLE SAN	DY CREEK, B	IG SANDY RIVE	R, GREEN I	RIVER			
P6986.0D	EMIGRANT SPRINGS	M. LARSEN;	11/07/1905	STO	0.200	(027N-103W-21-SWSW	16295	CR CC40/692
	HALL'S MEADOW SPRING, TRIBUT	CARIES OF HAY CREEK, DRY SANDY C	REEK, LITTLI	E SANDY CREEK	, BIG SANI	OY RIVE	R, GREEN RIVER		
P6988.0D	HALLS MEADOW SPRING	M. LARSEN;	11/07/1905	STO	0.200	(028N-102W-20-NWNE	16296	CR CC40/693
	JUMBO SPRING, TRIBUTARIES OF	MONUMENT DRAW, HAY CREEK, DRY	SANDY CREI	EK, LITTLE SAN	DY CREEK	, BIG SA	NDY RIVER, GREEN	RIVER	
P6989.0D	JUMBO SPRING	M. LARSEN;	11/07/1905	STO	0.200	(028N-102W-28-NENE	16297	CR CC40/694
	LONG DRAW, TRIBUTARIES OF LI	ITLE SANDY CREEK, BIG SANDY RIVE	CR, GREEN RIV	VER					
P1216.0R	ZEMBA RESERVOIR	MIDLAND LIVESTOCK COMPANY;	01/24/1908	IRR_SW, STO	87.000AF	(030N-104W-30-SWSE	16253	CR CR40/650

Permit No.	Facility Name	Appropriator	Priority	Use	C.F.S/AF	Acres	HG LOC	Proof No.	CR No.
	SNOW GULCH, TRIBUTARIES OF LO	NG DRAW, LITTLE SANDY CREEK, B	IG SANDY RIV	VER, GREEN RIV	ER				
P8250.0D	SNOW GULCH DITCH	MIDLAND LIVE STOCK CO.;	02/13/1908	RES	0.000	٥	030N-104W-32-SENE		CR CC32/009
	PROSPECT MOUNTAIN SPRINGS, TR	IBUTARIES OF LONG DRAW, LITTLE	SANDY CREI	EK, BIG SANDY R	RIVER, GRI	EEN RIV	ER		
P10265.0D P2010.0R	DUTTON DITCH DUNTON NO. 1 RESERVOIR	T. TALIAFERRO; T. TALIAFERRO;	10/09/1907 10/09/1907	IRR_SW DOM_SW, IRR_SW	0.110 , 0.500AF	8 0	030N-104W-20-SESW 030N-104W-20-SESW	14669 14670	CR CC38/315 CR CR38/316
P2011.0R	DUNTON NO. 2 RESERVOIR	T. TALIAFERRO J;	02/04/1909	DOM_SW, IRR_SW	, 0.500AF	C	030N-104W-20-SESW	14671	CR CR38/317
P2012.0R	DUNTON NO. 3 RESERVOIR	T. TALIAFERRO J;	02/04/1909	DOM_SW, IRR_SW	, 0.500AF	C	030N-104W-20-NWSW	14672	CR CR38/318
	SPRINGS, TRIBUTARIES OF LITTLE	SANDY CREEK, BIG SANDY RIVER, G	REEN RIVER						
P7244.0D	JOSEPH THOMPSON AND SONS NO. 3 DITCH	JOSEPH THOMPSON AND SONS;	06/14/1906	IRR_SW	2.140	150	030N-104W-24-SWNE	10099	CR CC30/257
	U.S. DRAIN F3, TRIBUTARIES OF BIG	SANDY RIVER, GREEN RIVER							
P32208.0D	D.M. NO. 1 DITCH	DONALD S. AND VICKI MILLER;	01/15/1999	IRR_SW	0.180	12.6	025N-106W-22-NENW	38669	CR CC83/217
	BORROW DRAW, TRIBUTARIES OF F	BIG SANDY RIVER, GREEN RIVER							
P10833.0S	ROD MINES STOCK RESERVOIR	ROD MINES AND JAMES MINES AND SONS, INC.;	01/02/1990	STO	19.000AF	C	026N-106W-35-NWNW	35941	CR CR13/139
	MINES DRAIN, TRIBUTARIES OF BOI	RROW DRAW, BIG SANDY RIVER, GR	EEN RIVER						
P33540.0D	MINES DITCH	RODNEY J MINES LIVING TRUST;	03/31/2003	IRR_SW, RES		140	026N-106W-34-SENW	42358	CR CC95/126
P12581.0R P7535.0E	MINES IRRIGATION RESERVOIR ENL. MINES DITCH	RODNEY J MINES LIVING TRUST; RODNEY J MINES LIVING TRUST;	03/31/2003 01/22/2007	IRR_SW IRR_SW	3.760AF	0 54.6	026N-106W-34-SENW 026N-106W-34-SENW	42401 42359	CR CR23/350 CR CC95/127
	JONAH GULCH, TRIBUTARIES OF BI	G SANDY RIVER, GREEN RIVER							
P3328.0R P7894.0S	JONAH STOCK WATER RESERVOIR SAGEBRUSH NO. 260 STOCK	ALONZO POSTON; USDI, BUREAU OF LAND MANAGEMENT;	06/19/1916 09/03/1974	STO STO	22.680AF 2.500AF	0	028N-108W-14-SWSW 028N-108W-17-SESE	16255 31630	CR CR40/652 CR CR08/082
P12537.0R	JOHN ARAMBEL RESERVOIR	OFFICE OF STATE LANDS & INVESTMENTS;	11/07/2005	CMU, STO, WL	343.600AF	C	027N-107W-22-NWSE	42627	CR CR24/080
	JUEL SPRING, TRIBUTARIES OF JON	AH GULCH, BIG SANDY RIVER, GRE	EN RIVER						
P20004.0D	JUEL SPRING PIPE LINE	PAUL JUEL;	11/14/1945	STO	0.010	C	027N-107W-14-NWNW	24268	CR CC61/331
	NORTH SUBLET MEADOW SPRING, T	TRIBUTARIES OF JONAH GULCH, BIO	G SANDY RIVI	ER, GREEN RIVE	R				
P7690.0D	ROSE JUEL DITCH	ROSE JUEL;	03/18/1907	STO	0.000	C	027N-107W-08-SENW	9001	CR CC27/301

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Permit No.	Facility Name	Appropriator	Priority	Use	C.F.S/AF	Acres	HG LOC	Proof No.	CR No.
	NORTH SEEPAGE DRAW, TRIBUTA	RIES OF BIG SANDY RIVER, GREEN RI	VER						
P12115.0D	DEWEY DITCH	D. DEWEY;	11/06/1913	IRR_SW	1.500	105.4	027N-106W-35-SWSW	17262	CR CC42/434
	WATER HOLE DRAW, TRIBUTARIE	S OF BIG SANDY RIVER, GREEN RIVE	R						
P153.0S	ERRAMOUSPE NO. 2 STOCK RESERVOIR	STATE BOARD OF LAND COMMISSIONERS; G AND E LIVESTOCK, INC.;	01/14/1949	STO	10.200AF	0	028N-107W-16-SESW	32241	CR CR08/484
	ELK WASH, TRIBUTARIES OF BIG S	ANDY RIVER, GREEN RIVER							
P6320.0R	ERRAMOUSPE STOCK RESERVOIR	G AND E LIVESTOCK, INC.;	12/22/1955	STO	346.300AF	0	028N-106W-23-SWSW	32242	CR CR08/485
	SPRINGS, TRIBUTARIES OF ELK WA	ASH, BIG SANDY RIVER, GREEN RIVEI	R						
P2015.0R	TALIAFERRO NO. 3 RESERVOIR	WALTER DUNTON;	02/04/1909	STO	0.500AF	0	028N-105W-09-SENW	12193	CR CR34/384
	POSTON DRAW, TRIBUTARIES OF E	BIG SANDY RIVER, GREEN RIVER							
P152.0S	ERRAMOUSPE NO. 1 STOCK RESERVOIR	STATE BOARD OF LAND COMMISSIONERS; G AND E LIVESTOCK, INC.;	01/14/1949	STO	18.840AF	0	029N-107W-36-SESW	32240	CR CR08/483
	SEC. 19 DRAW, TRIBUTARIES OF PO	OSTON DRAW, BIG SANDY RIVER, GRE	EEN RIVER						
P8301.0S	SQUARETOP PIT NO. 10-1862 STOCK RESERVOIR	USDI, BUREAU OF LAND MANAGEMENT;	04/11/1977	STO	1.860AF	0	029N-107W-20-NESW	32393	CR CR08/590
	A WASH (19-29-105), TRIBUTARIES C	DF BIG SANDY RIVER, GREEN RIVER							
P12623.0D	ENLARGED ZEMBA DITCH	ADA DUNTON;	08/22/1914	IRR_SW	0.000	277.5	029N-105W-23-SWNE	14077	CR CC37/464
	WASH, TRIBUTARIES OF A WASH (1	19-29-105), BIG SANDY RIVER, GREEN H	RIVER						
P12624.0D	ENLARGED ZEMBA DITCH	ADA DUNTON;	08/22/1914	IRR_SW	0.000	277.5	029N-105W-22-SESE	14076	CR CC37/463
	SQUARETOP WASH, TRIBUTARIES	OF WASH (19-29-105), BIG SANDY RIVE	R, GREEN RI	VER					
P3339.0R	SQUARETOP RESERVOIR	MIDLAND LIVE STOCK CO.;	06/19/1916	DOM_SW, STO	16.000AF	0	029N-105W-02-NESW	16254	CR CR40/651
	JIMMY CREEK, TRIBUTARIES OF B	IG SANDY RIVER, GREEN RIVER							
P17698.0D P10077.0R P10078.0R P10079.0R P31304.0D	PARKINSON DITCH CHUCK WAGON RESERVOIR CONESTOGA RESERVOIR BUCKBOARD RESERVOIR CHUCK WAGON DITCH	C. PARKINSON; RICHARD SMITH; RICHARD SMITH; RICHARD SMITH; RICHARD SMITH;	01/22/1930 06/23/1993 06/23/1993 06/23/1993 06/23/1993	IRR_SW FIS, WL FIS, WL FIS, WL RES	1.030 3.000AF 4.140AF 3.050AF 0.000	72 0 0 0 0	030N-105W-21-SWNW 030N-105W-21-NWSW 030N-105W-21-NWSW 030N-105W-20-NESE 030N-105W-21-NWSW	24337 37310 37311 37312 37302	CR CC61/389 CR CR14/428 CR CR14/429 CR CR14/430 CR CC81/173

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Permit No.	Facility Name	Appropriator	Priority	Use	C.F.S/AF	Acres	HG LOC	Proof No.	CR No.
	EAST JIMMY CREEK, TRIBUTARIES	S OF JIMMY CREEK, BIG SANDY RIVE	R, GREEN RIV	ÆR					
P10455.0R	JIMMY CREEK RESERVOIR	RICHARD SMITH;	11/01/1996	FIS, WL	4.710AF	0	030N-105W-21-SWNW	37841	CR CR15/204
	LONG DRAW, SHEEP AND JOHNS D	RAW, TRIBUTARIES OF BIG SANDY RI	IVER, GREEN	RIVER					
P9230.0D	ROSCOE D MACK DITCH	ROSCOE MACK;	07/17/1909	IRR_SW	2.280	160	030N-105W-02-NESE	15284	CR CC39/324
	GRANITE GULCH, TRIBUTARIES OI	F BIG SANDY RIVER, GREEN RIVER							
P8251.0D	GRANITE GULCH DITCH	MIDLAND LIVE STOCK CO.;	02/13/1908	RES, STO	0.000	0	030N-104W-19-NWSW		CR CC32/010
	FLANIGAN DRAW, TRIBUTARIES O	F BIG SANDY RIVER, GREEN RIVER							
P11378.0S	BIG SANDY STOCK RESERVOIR	PETER FLANIGAN;	05/13/1991	STO	1.760AF	C	030N-104W-17-NENW	36201	CR CR13/238
	DUTCH JOE CREEK, TRIBUTARIES	OF SQUAW CREEK, BIG SANDY RIVEI	R, GREEN RIV	ER					
T4367.0- P709.0E P18958.0D	LECKIE DITCH ENLARGED DUTCH JOE DITCH DUTCH JOE DITCH	SAMUEL LECKIE; MARY LECKIE; UNITED STATES OF AMERICA, FOREST SERVICE;	06/10/1890 10/10/1901 03/08/1937	IRR_SW IRR_SW IRR_SW	2.110 2.660 1.180	148 186 82.44	8 030N-104W-08-NESE 5 030N-104W-08-NESE 6 031N-104W-33-NWNE	4367 14645 23117	CR CA03/155 CR CC38/291 CR CC58/338
	UNNAMED SPRING, TRIBUTARIES (OF DUTCH JOE CREEK, SQUAW CREE	K, BIG SANDY	RIVER, GREEN	RIVER				
P19399.0D	DUTCH JOE RANGER STATION WATER SUPPLY SYSTEM PIPELINE	UNITED STATES OF AMERICA, FOREST SERVICE;	07/01/1940	DOM_SW	0.013	۵	031N-104W-34-NWSW	23118	CR CC58/339
	GRASS CREEK, TRIBUTARIES OF SO	QUAW CREEK, BIG SANDY RIVER, GR	EEN RIVER						
P5557.0D	GRASS CREEK DITCH	THOMAS BOYER;	07/06/1903	IRR_SW	0.840	59	030N-104W-23-NENE	9000	CR CC27/300
	CLEAR CREEK, TRIBUTARIES OF B	IG SANDY RIVER, GREEN RIVER							
P5398.0R	CLEAR LAKE RESERVOIR	UNITED STATES OF AMERICA;	03/21/1935	IRR_SW	318.600AF	0	032N-104W-24-	23772	CR CR01/317
	BLACK JOE CREEK, TRIBUTARIES	OF BIG SANDY RIVER, GREEN RIVER							
P5397.0R	BLACK JOE LAKE RESERVOIR	UNITED STATES OF AMERICA;	03/21/1935	IRR_SW	1101.800AF	· 0	032N-103W-17-	23771	CR CR01/316
	SLATE CREEK, TRIBUTARIES OF G	REEN RIVER							
T7830.0- P468.0D P468.0D P469.0D P12723.0D P12724.0D P3721.0E P20520.0D	SAM MARTIN DITCH GRAHAM NO. 1 DITCH GRAHAM NO. 1 DITCH GRAHAM NO. 2 DITCH GRAHAM NO. 2 DITCH GRAHAM NO. 2 DITCH NORTH DITCH ENLARGED MARTIN NO. 2 DITCH SLATE CREEK NO. 1 DITCH	SAMUEL MARTIN; WILLIAM GRAHAM; KATE GRAHAM; WILLIAM GRAHAM; KATE GRAHAM; ISABEL JAMIESON; ISABEL JAMIESON; MARION WITHERSPOON; EDWARD TELIAFERRO;	12/31/1889 04/28/1893 04/28/1893 04/28/1893 04/28/1893 09/09/1914 09/09/1914 12/21/1916 10/24/1950	IRR_SW DOM_SW, IRR_SW DOM_SW, IRR_SW DOM_SW, IRR_SW IRR_SW IRR_SW IRR_SW IRR_SW	$\begin{array}{c} 0.850\\ 0.150\\ 0.600\\ 0.230\\ 0.900\\ 0.990\\ 0.340\\ 1.270\\ 0.450\\ \end{array}$	60 10.8 42.7 16.8 63 24 89 32	023N-113W-15-NWNW 023N-114W-26-SENE 023N-114W-26-SENE 023N-113W-20-SENW 024N-113W-20-SENW 024N-115W-32-NWSW 024N-115W-32-NWSW 023N-113W-15-NWNW 023N-114W-26-NESE	7830 21032 21033 21034 21035 15203 15204 17246 27009	CR CC24/022 CR CC49/322 CR CC49/323 CR CC49/324 CR CC49/325 CR CC39/244 CR CC39/244 CR CC39/244 CR CC42/418 CR CC66/179

Big Sandy Watershed, Level I Study

APPENDIX C

Adjudicated Surface Water Rights within the Big Sandy Watershed

BIG SANDY WATERSHED LEVEL I STUDY - WATER RIGHTS ADJUDICATION TAB SHEET

ORIGINAL SUPPLY
SUPPLEMENTAL SUPPLY
SECONDARY SUPPLY
STOCK RESERVOIR
RESERVOIR

PERMIT No.	FACILITY NAME	APPROPRIATOR	PRIORITY	C.F.S. / AF	ACRES	CR No.
BIG SANDY	RIVER, TRIBUTARIES OF GREEN R	IVER				
T4313.0-	FRANCIS DITCH	THOMAS FRANCIS;	12/31/1886	0.84	58.90	CR CC36/829
T4314.0-	PIPER FRANCIS DITCH ACT FRANCIS DITCH	SOPHIA A COX;	12/31/1886	0.86	60.00	CR CC36/830
T4315.0-	FRANCIS NO 2 DITCH ACT FRANCIS DITCH	THOMAS FRANCIS;	12/31/1887	1.99	139.30	CR CC36/831
P2957.0D	JOHNSON AND GASSWINT (BIG SANDY) DITCH	ROSS REED;	12/12/1900	0.47	33.00	CR CC62/182
P3566.0D	TUNNEL DITCH ACT BIG SANDY DITCH	DUNTON SHEEP COMPANY;	11/25/1901	5.00	350.00	CR CC66/333
DE710.0D	EDEN CANAL NO. 1	EDEN VALLEY IRRIGATION DISTRICT & BUREAU OF	11/24/1002	112.01		
P3718.0D	EDEN GANAL NU. 1	RECLAMATION;	11/24/1903	113.01	7912.14	CR CC/4/203
05710.00		EDEN VALLEY IRRIGATION DISTRICT & BUREAU OF	11/24/1903	0.00	55.20	00.007.000
P5718.0D	EDEN CANAL NO. 1	RECLAMATION;		0.00		CR CC /4/203
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	SHELLEY HARPER:	11/24/1903	0.99	69.80	CR CC90/191
P5718 0D	EDEN NO. 1 CANAL ACT MEANS CANAL	RADOSEVICH LIVESTOCK, L.L.C.	11/24/1903	1.06	74 00	CR CC90/193
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	RADOSEVICH LIVESTOCK LC	11/24/1903	2 12	148.80	CR CC91/037
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	DERYL SWEAT:	11/24/1903	1.14	79 70	CR CC92/195
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	SHARON K AND WILLIAM J SMITH II'X BAR T RANCH	11/24/1903	2.08	145.80	CR CC92/238
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	SOFLIA BOSERICH	11/24/1903	0.50	35 10	CR CC58/330
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	O FINI FY	11/24/1903	0.47	32.60	CR CC58/331
10710.00		STATE BOARD OF LAND COMMISSIONERS: AUGUST	11/2 1/1703	0.47	02.00	000000000
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	HENNECKE;	11/24/1903	2.48	173.80	CR CC58/332
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	LUTHER MCNALLEY;	11/24/1903	1.13	79.10	CR CC58/333
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	JOHN COPPES;	11/24/1903	0.18	12.30	CR CC58/018
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	JOHN FRULLO; PETE FRULLO; MIKE FRULLO;	11/24/1903	0.95	66.30	CR CC58/019
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	CLARENCE JENSEN;	11/24/1903	0.55	38.40	CR CC58/020
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	ALEXANDER LISZEWSKI;	11/24/1903	0.57	40.00	CR CC58/021
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	LEO SKORCZ;	11/24/1903	0.55	38.70	CR CC58/023
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	Mrs MINNIE SITZMAN;	11/24/1903	0.26	18.32	CR CC58/024
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	JACK TOMICICH;	11/24/1903	1.07	75.10	CR CC58/025
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	BIG SANDY LIVESTOCK COMPANY;	11/24/1903	0.49	34.50	CR CC58/131
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	JOHN CARLSON;	11/24/1903	1.09	75.96	CR CC58/132
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	JOSEPH HUDAK;	11/24/1903	0.50	34.80	CR CC58/133
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	FRED NELSON;	11/24/1903	1.09	76.50	CR CC58/135
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	ESTATE OF BERTHA E. SAVAGE:	11/24/1903	1.07	75.00	CR CC58/137
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	ABEL VIGIL;	11/24/1903	1.10	77.00	CR CC58/138
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	ANDREW ARNOTT;	11/24/1903	0.53	36.70	CR CC52/509
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	BLAIR HAY LAND AND LIVESTOCK COMPANY	11/24/1903	1.26	88.30	CR CC57/376
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	BLAIR HAY LAND AND LIVESTOCK COMPANY:	11/24/1903	1.91	134.10	CR CC57/377
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	R. BONNETT;	11/24/1903	1.63	114.29	CR CC57/378
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	CHARLES BROWN;	11/24/1903	1.03	72.20	CR CC57/379
P5718.0D	EDEN NO. 1 CANAL	ANN DEWEY;	11/24/1903	0.57	40.00	CR CC57/380
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	CLARA FISCUS;	11/24/1903	0.98	68.80	CR CC57/381
P5718.0D	EDEN NO. 1 CANAL ACT MFANS CANAL	WILSON FISCUS:	11/24/1903	0,80	55.80	CR CC57/382
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	JESSE ENGLE;	11/24/1903	0.34	24.10	CR CC57/383
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	LYNN GRANDY:	11/24/1903	0.52	36.60	CR CC57/384
P5718 0D	EDEN NO. 1 CANAL ACT MEANS CANAL	ROBERT GREIG:	11/24/1903	3.20	224.30	CR CC57/385
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	A. M. HAFFY:	11/24/1903	3.78	264.60	CR CC57/386
P5718 0D	EDEN NO. 1 CANAL ACT MEANS CANAL	JAMES HODSON:	11/24/1903	0.57	40.00	CR CC57/387
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	D_IOSLIN:	11/24/1903	0.56	39.60	CR CC57/389
P5718 0D	EDEN NO. 1 CANAL ACT MEANS CANAL		11/2//1903	1.06	72.00	CR CC57/300
P5718 0D	EDEN NO. 1 CANAL ACT MEANS CANAL	MARGARET MCCOMAS	11/2//1002	1 11	78.00	CR CC57/301
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	FLLA MCMURRY	11/24/1903	1.02	71.40	CR CC57/392
P5718 0D	EDEN NO. 1 CANAL ACT MEANS CANAL	VERN MCMURRY	11/2//1903	1.02	74 70	CR CC57/302
P5718 0D			11/24/1903	2 15	150.60	CR CC57/395
P5718 0D	EDEN NO. 1 CANAL ACT MEANS CANAL	NELSON	11/2/1/1903	1 13	70.09	CR CC57/395
D5710.0D			11/24/1903	1.13	76.00	CR CC57/390
13710.00		ESTATE OF C. A. PETERSON' ESTATE OF ARRIE F	11/24/1703	1.10	10.70	CK CC3//39/
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	PETERSON:	11/24/1903	1.14	80.00	CR CC57/398
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	A. PIERCE;	11/24/1903	0.55	38.70	CR CC57/399
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	ED. SASS;	11/24/1903	0.64	45.00	CR CC57/400
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	JOHN SKORCZ; LEO SKORCZ;	11/24/1903	1.07	75.00	CR CC57/401

P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	SUPERIOR LUMBER COMPANY;	11/24/1903	0.98	69.20	CR CC57/402
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	FRED TAUCHER;	11/24/1903	1.06	74.10	CR CC57/403
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	JOSEPH TOMICICH;	11/24/1903	0.54	37.60	CR CC57/404
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	L. TROVATTEN;	11/24/1903	6.54	458.20	CR CC57/405
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	W. WRIGHT;	11/24/1903	2.14	150.10	CR CC57/406
P5/18.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	UNIVERSITY OF WYOMING;	11/24/1903	2.10	147.30	CR CC59/368
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	PAUL JUEL;	11/24/1903	2.08	74.20	CR CC39/285
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	A MERSHON	11/24/1903	2 14	1/9.60	CR CC47/041
P5718.0D			11/24/1903	0.51	35.60	CR CC47/242
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	I YNN GRANDY	11/24/1903	2 18	152 40	CR CC47/349
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	WILLIAM WRIGHT:	11/24/1903	3.94	275.90	CR CC46/448
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	FRANK STIMSON;	11/24/1903	0.99	69.10	CR CC46/165
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	FRED MEYER;	11/24/1903	1.13	79.30	CR CC49/309
P5718.0D	EDEN NO. 1 DITCH ACT MEANS CANAL	LYNN GRANDY;	11/24/1903	0.55	38.70	CR CC52/261
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	J. STEWARD;	11/24/1903	1.03	72.40	CR CC45/623
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	NORTH SIDE STATE BANK;	11/24/1903	1.79	125.30	CR CC44/720
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	T. ANDERSON;	11/24/1903	1.01	70.96	CR CC44/721
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	BANKS BRADY;	11/24/1903	1.04	73.10	CR CC44/722
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	JOHN CARLSON;	11/24/1903	2.62	183.70	CR CC44/723
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	J. HENDRICKS;	11/24/1903	0.98	68.30	CR CC44/724
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	Mrs J. ADCOCK;	11/24/1903	1.11	78.00	CR CC44/725
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	C. ANDERSON;	11/24/1903	1.09	76.50	CR CC44/726
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	A. WILLIAMS;	11/24/1903	1.11	77.70	CR CC44/727
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	JAMES HODSON;	11/24/1903	0.57	40.00	CR CC44/728
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	NATHAN HODSON;	11/24/1903	1.14	80.00	CR CC44/730
P5/18.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	HARRISON OLIVER;	11/24/1903	2.18	152.40	CR CC44/731
P5/18.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	H. BRANSON;	11/24/1903	0.54	38.10	CR CC44/732
P5/18.0D	EDEN NO. 1 CANAL ACT MEANS CANAL		11/24/1903	1.08	/5.60	CR CC44/733
P3710.0D	EDEN NO. 1 CANAL ACT MEANS CANAL		11/24/1903	1.04	72.00	CR CC44/735
P3710.0D	EDEN NO. 1 CANAL ACT MEANS CANAL		11/24/1903	6.06	196.00	CR CC44/730
P5718.0D			11/24/1903	0.48	400.90 33.80	CR CC44/737
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	EDWARD KRAUTLAGER	11/24/1903	0.40	39.80	CR CC44/739
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	C.JUFT:	11/24/1903	4.37	305.90	CR CC44/740
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	JESSE ENGLE:	11/24/1903	1.08	75.80	CR CC44/742
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	G. HENDERSON;	11/24/1903	1.79	125.40	CR CC44/743
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	GILBERT KEELER;	11/24/1903	3.19	223.60	CR CC44/744
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	H. ENGLE;	11/24/1903	1.05	73.90	CR CC44/745
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	ARTHUR SAVAGE;	11/24/1903	2.16	151.20	CR CC44/746
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	EDWARD SASS;	11/24/1903	3.02	211.90	CR CC44/747
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	JOSEPHINE DEARTH;	11/24/1903	2.21	154.80	CR CC44/748
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	FLOYD ANDERSON;	11/24/1903	0.55	38.30	CR CC44/749
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	I. DEARTH;	11/24/1903	3.40	238.30	CR CC44/750
P5718.0D	EDEN NO. 1 CANAL ACT MEANS CANAL	HARRY GRANDY;	11/24/1903	1.14	40.00	CR CC44/751
P6737.0D	LOUGHMAN DITCH ACT G. AND E. SPRINKLER		6/10/1005	0.01	57.00	CR CC69/014
	I ON POSTON DITCH ACT G AND F SPRINKLER	GAND E LIVESTOCK, INC,	0/10/1903	0.01	57.00	
P6738.0D	SYSTEM	G AND E LIVESTOCK, INC;	6/10/1905	2.31	162.00	CR CC69/015
P6738.0D	LON POSTON DITCH ACT G. AND E. SPRINKLER					CR CC69/016
		G AND E LIVESTOCK, INC;	6/10/1905	0.66	46.00	0000//010
P6739.0D	POSTON-LOUGHMAN DITCH ACT G. AND E.	G AND F LIVESTOCK, INC:	6/10/1905	1.87	130 70	CR CC69/017
D1407.05	ENLARGED JOHNSON AND GASSWINT DITCH		0/4/4005	0.00	140.00	
P1427.0E	(BIG SANDY DITCH)	DUNTON SHEEP COMPANY;	9/4/1905	2.00	140.00	CR CC68/100
P1427.0E	ENLARGED JOHNSON AND GASSWINT DITCH	W M EDWARDS:	9/4/1905	2.00	140.00	CR CC70/081
	(BIG SANDY DITCH)					
P1427.0E	(BIG SANDY DITCH)	E MACK;	9/4/1905	2.22	156.00	CR CC45/205
D1427.0E	ENLARGED JOHNSON AND GASSWINT DITCH		0/4/1005	1 1 /	<u>00 00</u>	CD CC61/200
F 1427.0L	(BIG SANDY DITCH)	C FARRINSON,	9/4/1905	1.14	80.00	CK CC01/366
P818.0R	EDEN IRRIGATION AND LAND CO NO 1 RESERVOIR	EDEN IRRIGATION AND LAND CO;	12/30/1905	18489.93	0.00	CR CR44/752
P947.0R	EDEN NO. 2 RESERVOIR ACT BIG SANDY RESERVOIR	BUREAU OF RECLAMATION; EDEN VALLEY IRRIGATION DISTRICT;	11/9/1906	39700.00	0.00	CR CR09/072
P1775.0E	ENLARGED POSTON DITCH ACT G AND E	G AND E LIVESTOCK, INC.;	9/9/1907	1.19	83.20	CR CC92/164
P1831.0E	ENLARGED LON POSTON DITCH ACIPT G AND E	G AND E LIVESTOCK, INC.;	2/24/1908	0.14	10.00	CR CC69/019
P2466.0E	SPRINKLER SYSTEM ENLARGED LON POSTON DITCH ACIPT G AND E	G AND E LIVESTOCK, INC.:	6/7/1911	0.10	6.90	CR CC69/020
P3100.0F	SPRINKLER SYSTEM ENLARGED JOHNSON AND GASSWINT DITCH	DUNTON SHEEP COMPANY:	1/6/1915	0.29	20.00	CR CC68/101
D12072.0D	(BIG SANDY DITCH)		1/10/1015	1 70	120 50	CD CCAUILU
P12973.0D			1/19/1915	1.72	120.50	CR CC46/166
P3105.0E	ENLARGED FRANCIS DITCH	CHARLES HOWELL;	1/22/1915	1.39	97.40	CR CC43/143

P15588.0D	HOLMES DITCH	MINNIE HOLMES;	8/15/1919	1.11	78.00	CR CC45/523
P15758.0D	CONKLIN DITCH	ALFRED HOLMES;	4/23/1920	1.48	104.00	CR CC44/187
P26141.0D	MINE'S SPRINKLER SYSTEM	RODNEY J. AND JANICE MINES;	6/10/1977	2.00	140.00	CR CC88/169
P32209.0D	D. M. NO. 2 PIPELINE	DONALD S. AND VICKI MILLER;	1/15/1999	0.15	10.60	CR CC83/218
P32209.0D	D. M. NO. 2 PIPELINE	DONALD S. AND VICKI MILLER;	1/15/1999	0.00	59.80	CR CC83/218
P32122.0D	EDEN VALLEY CEMETERY PIPELINE	EDEN VALLEY CEMETERY DISTRICT;	3/15/1999	0.09	6.20	CR CC83/219
P13818.0R	JACK'S RESERVOIR	JACK V MCMURRY REVOCABLE TRUST; MERIAM M MCMURRY REVOCABLE TRUST;	9/28/2010	1.20	0.00	CR CR23/349
		ORIGINAL S	SUPPLY TOTAL:	274.44	<u>C.F.S.</u>	
		SUPPLEMENTAL S	SUPPLY TOTAL:	<u>115.00</u>	ACRES	

 RESERVOIR STORAGE TOTAL:
 58191.13
 ACRE FEET

	-	
91.13	ACRE	FEI

WATER STORED IN BIG SANDY RESERVOIR PERMIT NO. 947, TRIBUTARIES OF BIG SANDY RIVER, GREEN RIVER							
P21403.0D	MEANS CANAL	EDEN VALLEY IRRIGATION DISTRICT; USDI BUREAU OF LAND MANAGEMENT;	4/24/1952	0.00	16842.64	CR CC74/205	
P7751.0E	ENLARGED MEANS CANAL	MORGAN MURDOCK; USDI BUREAU OF RECLAMATION;	1/15/2010	0.18	12.60	CR CC94/308	
P7651.0E	ENL. MEANS CANAL	G AND E LIVESTOCK INC; EDEN VALLEY IRRIGATION AND DRAINAGE DISTRICT; USDI BUREAU OF RECLAMATION;	5/13/2010	0.00	23.90	CR CC92/152	
		SECONDARY S	UPPLY TOTAL:	<u>16879.14</u>	ACRES		

WATER STORED IN EDEN IRRIGATION PERMIT NO. 818, TRIBUTARIES OF BIG SANDY RIVER, GREEN RIVER						
P16814.0D	EDEN NO. 1 CANAL	DERYL SWEAT; USDI BUREAU OF RECLAMATION;	12/30/1905	0.00	79.70	CR CC92/196
P16814.0D	EDEN NO. 1 CANAL	RADOSEVICH LIVESTOCK, L.L.C.;	12/30/1905	0.00	148.80	CR CC91/038
P16814.0D	EDEN NO. 1 CANAL	X BAR T RANCH; SHARON K AND WILLIAM J SMITH II;	12/30/1905	0.00	145.80	CR CC92/239
P16814.0D	EDEN NO. 1 CANAL	RADOSEVICH LIVESTOCK, L.L.C.;	12/30/1905	0.00	74.00	CR CC90/194
P16814.0D	EDEN NO. 1 CANAL	KIM R. BROWN LIVING TRUST; CHRISTOPHER A. AND SHELLEY L. HARPER;	12/30/1905	0.00	69.8	CR CC90/192
P16814.0D	EDEN NO. 1 CANAL	EDEN VALLEY IRRIGATION DISTRICT; BUREAU OF RECLAMATION;	12/30/1905	0.00	7807.34	CR CC74/204
P16814.0D	EDEN NO. 1 CANAL	NORTH SIDE STATE BANK;	12/30/1905	0.00	125.3	CR CC44/753
P16814.0D	EDEN NO. 1 CANAL	T C ANDERSON;	12/30/1905	0.00	70.96	CR CC44/754
P16814.0D	EDEN NO. 1 CANAL	BANKS BRADY;	12/30/1905	0.00	73.1	CR CC44/755
P16814.0D	EDEN NO. 1 CANAL	JOHN CARLSON;	12/30/1905	0.00	183.7	CR CC44/756
P16814.0D	EDEN NO. 1 CANAL	J G HENDRICKS;	12/30/1905	0.00	68.3	CR CC44/757
P16814.0D	EDEN NO. 1 CANAL	Mrs J A ADCOCK;	12/30/1905	0.00	78	CR CC44/758
P16814.0D	EDEN NO. 1 CANAL	C L ANDERSON;	12/30/1905	0.00	76.5	CR CC44/759
P16814.0D	EDEN NO. 1 CANAL	A L WILLIAMS;	12/30/1905	0.00	77.7	CR CC44/760
P16814.0D	EDEN NO. 1 CANAL	JAMES HODSON;	12/30/1905	0.00	40	CR CC44/761
P16814.0D	EDEN NO. 1 CANAL	NATHAN HODSON;	12/30/1905	0.00	80	CR CC44/763
P16814.0D	EDEN NO. 1 CANAL	HARRISON OLIVER;	12/30/1905	0.00	152.4	CR CC44/764
P16814.0D	EDEN NO. 1 CANAL	H R BRANSON;	12/30/1905	0.00	38.1	CR CC44/765
P16814.0D	EDEN NO. 1 CANAL	WILSON FISCUS;	12/30/1905	0.00	75.6	CR CC44/766
P16814.0D	EDEN NO. 1 CANAL	LUCY TALIAFERRO;	12/30/1905	0.00	15	CR CC44/768
P16814.0D	EDEN NO. 1 CANAL	T S TALIAFERRO T;	12/30/1905	0.00	73	CR CC44/769
P16814.0D	EDEN NO. 1 CANAL	T S TALIAFERRO J;	12/30/1905	0.00	486.9	CR CC44/770
P16814.0D	EDEN NO. 1 CANAL	C J TUFFIELD;	12/30/1905	0.00	33.8	CR CC44/771
P16814.0D	EDEN NO. 1 CANAL	EDWARD KRAUTLAGER;	12/30/1905	0.00	39.8	CR CC44/772
P16814.0D	EDEN NO. 1 CANAL	C. JUEL;	12/30/1905	0.00	305.9	CR CC44/773
P16814.0D	EDEN NO. 1 CANAL	JESSE ENGLE;	12/30/1905	0.00	75.8	CR CC44/775
P16814.0D	EDEN NO. 1 CANAL	G W HENDERSON;	12/30/1905	0.00	125.4	CR CC44/776
P16814.0D	EDEN NO. 1 CANAL	GILBERT KEELER;	12/30/1905	0.00	223.6	CR CC44/777
P16814.0D	EDEN NO. 1 CANAL	H. ENGLE;	12/30/1905	0.00	73.9	CR CC44/778
P16814.0D	EDEN NO. 1 CANAL	ARTHUR SAVAGE;	12/30/1905	0.00	151.2	CR CC44/779
P16814.0D	EDEN NO. 1 CANAL	EDWARD SASS;	12/30/1905	0.00	211.9	CR CC44/780
P16814.0D	EDEN NO. 1 CANAL	JOSEPHINE DEARTH;	12/30/1905	0.00	154.8	CR CC44/781
P16814.0D	EDEN NO. 1 CANAL	FLOYD ANDERSON;	12/30/1905	0.00	38.3	CR CC44/782
P16814.0D	EDEN NO. 1 CANAL	I. DEARTH;	12/30/1905	0.00	238.3	CR CC44/783
P16814.0D	EDEN NO. 1 CANAL	HARRY GRANDY;	12/30/1905	0.00	80	CR CC44/784
P16814.0D	EDEN NO. 1 CANAL	J. STEWARD;	12/30/1905	0.00	72.4	CR CC45/624
P16814.0D	EDEN NO. 1 CANAL	FRANK STIMSON;	12/30/1905	0.00	69.1	CR CC46/167
P16814.0D	EDEN NO. 1 CANAL	A. MERSHON;	12/30/1905	0.00	149.6	CR CC47/244
P16814.0D	EDEN NO. 1 CANAL	D. JOSLIN:	12/30/1905	0.00	74.3	CR CC47/042
P16814.0D	EDEN NO. 1 CANAL	WILLIAM WRIGHT:	12/30/1905	0.00	275.9	CR CC47/043
P16814.0D	EDEN NO. 1 CANAL	PAUL JUEL:	12/30/1905	0.00	145.9	CR CC59/286
P16814.0D	EDEN NO. 1 CANAL	UNIVERSITY OF WYOMING:	12/30/1905	0.00	147.3	CR CC59/369
P16814.0D	EDEN NO. 1 CANAL	ANDREW ARNOTT:	12/30/1905	0.00	36.7	CR CC57/407
P16814.0D	EDEN NO. 1 CANAL	BLAIR AND HAY LAND AND LIVESTOCK COMPANY	12/30/1905	0.00	88.3	CR CC57/408
P16814.0D	EDEN NO. 1 CANAL	BLAIR AND HAY LAND AND LIVESTOCK COMPANY	12/30/1905	0.00	134.1	CR CC57/409
P16814.0D	EDEN NO. 1 CANAL	R. BONNETT:	12/30/1905	0.00	114.29	CR CC57/410
P16814.0D	EDEN NO. 1 CANAL	CHARLES BROWN:	12/30/1905	0.00	72.2	CR CC57/411
P16814.0D	EDEN NO. 1 CANAL	JESSE ENGLE;	12/30/1905	0.00	24.1	CR CC57/412

P16814.0D	EDEN NO. 1 CANAL	CLARA FISCUS:	12/30/1905	0.00	68.8	CR CC57/413
P16814.0D	EDEN NO. 1 CANAL	WILSON FISCUS;	12/30/1905	0.00	55.8	CR CC57/414
P16814.0D	EDEN NO. 1 CANAL	LYNN GRANDY:	12/30/1905	0.00	263.3	CR CC57/415
P16814.0D	EDEN NO. 1 CANAL	ROBERT GREIG;	12/30/1905	0.00	224.3	CR CC57/416
P16814.0D	EDEN NO. 1 CANAL	A. M. HAFEY:	12/30/1905	0.00	264.6	CR CC57/417
P16814.0D	EDEN NO. 1 CANAL	JAMES HODSON:	12/30/1905	0.00	40	CR CC57/418
P16814.0D	EDEN NO. 1 CANAL	D. JOSLIN:	12/30/1905	0.00	39.6	CR CC57/419
P16814.0D	EDEN NO. 1 CANAL	LLOYD LAUGHLIN:	12/30/1905	0.00	73.9	CR CC57/420
P16814.0D	EDEN NO. 1 CANAL	MARGARET MCCOMAS;	12/30/1905	0.00	78	CR CC57/421
P16814.0D	EDEN NO. 1 CANAL	ELLA MCMURRY;	12/30/1905	0.00	71.4	CR CC57/422
P16814.0D	EDEN NO. 1 CANAL	VERN MCMURRY:	12/30/1905	0.00	74.7	CR CC57/423
P16814.0D	EDEN NO. 1 CANAL	FRED MEYER;	12/30/1905	0.00	79.3	CR CC57/425
P16814.0D	EDEN NO. 1 CANAL	GUSTAVE NELSON:	12/30/1905	0.00	150.69	CR CC57/426
P16814.0D	EDEN NO. 1 CANAL	NELS NELSON:	12/30/1905	0.00	79.4	CR CC57/427
P16814.0D	EDEN NO. 1 CANAL	ROWE PENNOCK;	12/30/1905	0.00	76.9	CR CC57/428
D16914 0D		ESTATE OF C. A. PETERSON; ESTATE OF ABBIE E.	12/20/1005		00	CB CC57/420
P10614.0D	EDEN NO. I CANAL	PETERSON;	12/30/1903	0.00	00	CR CC5//429
P16814.0D	EDEN NO. 1 CANAL	A. PIERCE;	12/30/1905	0.00	38.7	CR CC57/430
P16814.0D	EDEN NO. 1 CANAL	ED SASS;	12/30/1905	0.00	45	CR CC57/431
P16814.0D	EDEN NO. 1 CANAL	JOHN SKORCZ; LEO SKORCZ;	12/30/1905	0.00	75	CR CC57/432
P16814.0D	EDEN NO. 1 CANAL	SUPERIOR LUMBER COMPANY;	12/30/1905	0.00	69.2	CR CC57/433
P16814.0D	EDEN NO. 1 CANAL	FRED TAUCHER;	12/30/1905	0.00	74.1	CR CC57/434
P16814.0D	EDEN NO. 1 CANAL	JOSEPH TOMICICH;	12/30/1905	0.00	37.6	CR CC57/435
P16814.0D	EDEN NO. 1 CANAL	L. TROVATTEN;	12/30/1905	0.00	458.2	CR CC57/436
P16814.0D	EDEN NO. 1 CANAL	W. WRIGHT;	12/30/1905	0.00	150.1	CR CC57/437
P16814.0D	EDEN NO. 1 CANAL	BIG SANDY LIVESTOCK COMPANY;	12/30/1905	0.00	34.5	CR CC58/139
P16814.0D	EDEN NO. 1 CANAL	JOHN CARLSON;	12/30/1905	0.00	75.96	CR CC58/140
P16814.0D	EDEN NO. 1 CANAL	JOSEPH HUDAK;	12/30/1905	0.00	34.8	CR CC58/141
P16814.0D	EDEN NO. 1 CANAL	FRED NELSON;	12/30/1905	0.00	76.5	CR CC58/143
P16814.0D	EDEN NO. 1 CANAL	ESTATE OF BERTHA E. SAVAGE;	12/30/1905	0.00	75	CR CC58/144
P16814.0D	EDEN NO. 1 CANAL	ABEL VIGIL;	12/30/1905	0.00	77	CR CC58/145
P16814.0D	EDEN NO. 1 CANAL	JOHN COPPES;	12/30/1905	0.00	12.3	CR CC58/026
P16814.0D	EDEN NO. 1 CANAL	JOHN FRULLO; PETE FRULLO; MIKE FRULLO;	12/30/1905	0.00	66.3	CR CC58/027
P16814.0D	EDEN NO. 1 CANAL	CLARENCE JENSEN;	12/30/1905	0.00	38.4	CR CC58/028
P16814.0D	EDEN NO. 1 CANAL	ALEXANDER LISZEWSKI;	12/30/1905	0.00	40	CR CC58/029
P16814.0D	EDEN NO. 1 CANAL	LEO SKORCZ;	12/30/1905	0.00	38.7	CR CC58/030
P16814.0D	EDEN NO. 1 CANAL	MRS MINNIE SITZMAN;	12/30/1905	0.00	18.32	CR CC58/031
P16814.0D	EDEN NO. 1 CANAL	JACK TOMICICH;	12/30/1905	0.00	75.1	CR CC58/032
P16814.0D	EDEN NO. 1 CANAL	SOFIJA BOSERICH;	12/30/1905	0.00	35.1	CR CC58/334
P16814.0D	EDEN NO. 1 CANAL	O. FINLEY;	12/30/1905	0.00	32.6	CR CC58/335
P16814.0D	EDEN NO. 1 CANAL	WYOMING STATE BOARD OF LAND COMMISSIONERS; AUGUST HENNECKE;	12/30/1905	0.00	173.8	CR CC58/336
P16814.0D	EDEN NO. 1 CANAL	LUTHER MCNALLEY;	12/30/1905	0.00	79.1	CR CC58/337
P7752.0E	ENLARGED EDEN CANAL NO. 1	MORGAN MURDOCK; USDI BUREAU OF RECLAMATION;	1/15/2010	0.00	12.6	CR CC94/309
P7650.0E	ENL. EDEN CANAL NO. 1	G AND E LIVESTOCK, INC; EDEN VALLEY IRRIGATION AND DRAINAGE DISTRICT; USDI BUREAU OF RECLAMATION;	5/13/2010	0.00	23.9	CR CC92/153

SECONDARY SUPPLY TOTAL: 16885.46 ACRES

DRY CREEK,	TRIBUTARIES OF BIG SANDY RIV	ER, GREEN RIVER				
P2863.0R	DRY CREEK RESERVOIR	JOHN HAY;	11/28/1911	4.00	0.00	CR CR41/393
		RESERVOIR S	FORAGE TOTAL:	4.00	ACRE FEET	

SANDY DRAW, TRIBUTARIES OF BIG SANDY RIVER, GREEN RIVER								
P13490.0S	JACK AND MERIAM MCMURRY STOCK RESERVOIR	JACK V AND MERIAM M MCMURRY;	6/1/1999	5.63	0.00	CR CR15/385		
		RESERVOIR ST	ORAGE TOTAL:	<u>5.63</u>	ACRE FEET			

WASHINGTO	ON DRAW, TRIBUTARIES OF BIG SA	NDY RIVER, GREEN RIVER				
P4464.0R	BOWEN RESERVOIR	RALPH BOWEN;	7/17/1931	30	0.00	CR CR01/178
P17974.0D	BOWEN DITCH	RALPH BOWEN;	7/17/1931	0.28	0.00	CR CC57/438
P17975.0D	BOWEN DITCH	RALPH BOWEN;	2/13/1932	0.00	20	CR CC57/439
		RESERVOIR ST	ORAGE TOTAL:	<u>30.00</u>	ACRE FEET	
		SECONDARY S	SUPPLY TOTAL:	<u>20.00</u>	ACRES	
		ORIGINAL S	SUPPLY TOTAL:	0.28	<u>C.F.S.</u>	

LUMAN CRE	EK, TRIBUTARIES OF SIXMILE DR	AW, WASHINGTON DRAW, BIG SANDY RI	VER, GREE	N RIVER		
P8684.0D	LUMAN NO. 1 DITCH	ESTATE CHARLES WASHINGTON;	9/11/1908	0.4	27.8	CR CC30/287
P8685.0D	LUMAN NO. 2 DITCH	ESTATE CHARLES WASHINGTON;	9/11/1908	0.34	23.8	CR CC30/288
		ORIGINAL S	UPPLY TOTAL:	0.74	C.F.S.	

TOMICH DRAW, TRIBUTARIES OF WASHINGTON DRAW, BIG SANDY RIVER, GREEN RIVER

P3276.0S	ED TOMICH STOCK RESERVOIR	STEVEN E AND DEBRA TOMICH:	5/18/1960	3.20	0.00	CR CR21/321
		RESERVOIR ST	ORAGE TOTAL:	3.20	ACRE FEET	
DELAMBER	T DRAIN DRAW, TRIBUTARIES OF	WASHINGTON DRAW, BIG SANDY RIVER	GREEN RI	VER		
P24388.0D	DELAMBERT NO. 1 DITCH	BURTON DELAMBERT; CHRISTINE DELAMBERT;	3/21/1974	0.056	100	CR CC79/045
P24389.0D	DELAMBERT NO. 2 DITCH	BURTON DELAMBERT; CHRISTINE DELAMBERT;	3/21/1974	0.056	83	CR CC79/046
		STOCKWATER	SUPPLY TOTAL:	<u>0.11</u>	<u>C.F.S.</u>	
		SUPPLEMENTAL	SUPPLY TOTAL:	<u>183.00</u>	ACRES	
					-	
OX YOKE S	PRINGS, TRIBUTARIES OF OX YOK	E DRAW, WASHINGTON DRAW, BIG SAND	Y RIVER, G	REEN RIVE	R	
P11727.0D	FELIX SCHIESTLER DITCH	FELIX SCHIESTLER;	3/3/1913	0.21	15	CR CC38/203
		ORIGINAL	SUPPLY TOTAL:	0.21	<u>C.F.S.</u>	
UNNAMED	LAKE TRIBUTARIES OF WALTERS	DRAW WASHINGTON DRAW BIG SANDY	PIVER CR	FFN RIVEL)	
P12069 0D	WALTERS DITCH	IOHN HAV	10/11/1913	1 27	89	CR CC42/608
1 12007.00	WIETERO BITON	ORIGINAL	SUPPLY TOTAL:	1.27	C.F.S.	011 00 12/000
					011101	
DEER SPRIM	NG, TRIBUTARIES OF WASHINGTO	N DRAW, BIG SANDY RIVER, GREEN RIVE	R			
P3467.0R	DEER SPRING RESERVOIR	WILLIAM LEWIS;	3/16/1918	4.20	0.00	CR CR42/435
P15018.0D	DEER SPRING DITCH	WILLIAM LEWIS;	3/16/1918	0.14	10	CR CC42/436
		ORIGINAL	SUPPLY TOTAL:	<u>0.14</u>	<u>C.F.S.</u>	
		RESERVOIR ST	ORAGE TOTAL:	4.20	ACRE FEET	
			00000	-		
CHANNEL (DF CARLSON DRAW, TRIBUTARIES	OF CARLSON DRAW, BIG SANDY RIVER,	GREEN RIV	ER	0.00	00.0045/004
P10591.0R	GERKEN RESERVOIR	STEWART GERKEN;	8/15/1997	8.64		CR CR15/384
		<u>RESERVOIR SI</u>	URAGE TUTAL:	8.04	ACREFEET	
EDEN PROI	ECT DRAIN NO 1 TRIBUTARIES O	F CARLSON DRAW BIG SANDY RIVER GE	FEN RIVER	2		
P24983.0D	MCMURRY SPRINKLER IRRIGATION SYSTEM	ROBERT MCMURRY: ANGELA MCMURRY:	4/8/1974	2.62	183.3	CR CC73/238
P10945.0R	S. MINES WILDLIFE RESERVOIR	STEVEN MINES;	11/22/1999	3.58	0.00	CR CR16/224
P32737.0D	COY IRRIGATION SYSTEM (NORTH)	GARY D COY;	5/23/2001	0.36	25	CR CC95/124
P32738.0D	COY IRRIGATION SYSTEM NO. 2	GARY D COY;	5/23/2001	0.10	7	CR CC95/125
		ORIGINAL	SUPPLY TOTAL:	3.08	<u>C.F.S.</u>	
		RESERVOIR ST	ORAGE TOTAL:	<u>3.58</u>	ACRE FEET	
EDEN PROJ	ECT DRAIN NO. 2, TRIBUTARIES O	F CARLSON DRAW, BIG SANDY RIVER, GR		0.00	102.2	CD CC72/220
EDEN PROJ P24984.0D	ECT DRAIN NO. 2, TRIBUTARIES OF	F CARLSON DRAW, BIG SANDY RIVER, GR ROBERT L AND ANGELA MCMURRY;	EEN RIVER 4/8/1974	0.00	183.3	CR CC73/239
EDEN PROJ P24984.0D	ECT DRAIN NO. 2, TRIBUTARIES O	F CARLSON DRAW, BIG SANDY RIVER, GR ROBERT L AND ANGELA MCMURRY; SUPPLEMENTAL	EEN RIVER 4/8/1974 SUPPLY TOTAL:	0.00 <u>183.30</u>	183.3 <u>ACRES</u>	CR CC73/239
EDEN PROJ P24984.0D	ECT DRAIN NO. 2, TRIBUTARIES OF MCMURRY DITCH	F CARLSON DRAW, BIG SANDY RIVER, GR ROBERT L AND ANGELA MCMURRY; SUPPLEMENTAL SANDY RIVER, GREEN RIVER	REEN RIVER 4/8/1974 SUPPLY TOTAL:	0.00 <u>183.30</u>	183.3 <u>ACRES</u>	CR CC73/239
EDEN PROJ P24984.0D LITTLE SAN P3918.0D	ECT DRAIN NO. 2, TRIBUTARIES OF MCMURRY DITCH	F CARLSON DRAW, BIG SANDY RIVER, GR ROBERT L AND ANGELA MCMURRY; SUPPLEMENTAL: SANDY RIVER, GREEN RIVER LITTLE SANDY GRAZING ASSOCIATION;	EEN RIVER 4/8/1974 SUPPLY TOTAL: 5/19/1902	0.00 <u>183.30</u> 6.60	183.3 <u>ACRES</u> 455	CR CC73/239
EDEN PROJ P24984.0D LITTLE SAN P3918.0D P3917.0D	ECT DRAIN NO. 2, TRIBUTARIES OF MCMURRY DITCH NDY CREEK, TRIBUTARIES OF BIG CONTINENTAL DIVIDE DITCH FRANCIS DITCH	F CARLSON DRAW, BIG SANDY RIVER, GR ROBERT L AND ANGELA MCMURRY; SUPPLEMENTAL : SANDY RIVER, GREEN RIVER LITTLE SANDY GRAZING ASSOCIATION; ARTHUR FRANCIS;	EEN RIVER 4/8/1974 SUPPLY TOTAL: 5/19/1902 5/19/1902	0.00 183.30 6.60 1.91	183.3 ACRES 455 134	CR CC73/239 CR CC69/435 CR CC69/435
EDEN PROJ P24984.0D LITTLE SAN P3918.0D P3917.0D P3917.0D	ECT DRAIN NO. 2, TRIBUTARIES OF MCMURRY DITCH NDY CREEK, TRIBUTARIES OF BIG CONTINENTAL DIVIDE DITCH FRANCIS DITCH FRANCIS DITCH	CARLSON DRAW, BIG SANDY RIVER, GR ROBERT L AND ANGELA MCMURRY; SUPPLEMENTAL SANDY RIVER, GREEN RIVER LITTLE SANDY GRAZING ASSOCIATION; ARTHUR FRANCIS; JOSEPH THOMPSON S; THOMAS THOMPSON;	EEN RIVER 4/8/1974 SUPPLY TOTAL: 5/19/1902 5/19/1902 5/19/1902	0.00 183.30 6.60 1.91 1.97	183.3 ACRES 455 134 138	CR CC73/239 CR CC69/435 CR CC19/039 CR CC19/040
EDEN PROJ P24984.0D LITTLE SAN P3918.0D P3917.0D P3917.0D P6297.0D	ECT DRAIN NO. 2, TRIBUTARIES OF MCMURRY DITCH NDY CREEK, TRIBUTARIES OF BIG CONTINENTAL DIVIDE DITCH FRANCIS DITCH FRANCIS DITCH JOHN NELSON DITCH	CARLSON DRAW, BIG SANDY RIVER, GR ROBERT L AND ANGELA MCMURRY; SUPPLEMENTAL SANDY RIVER, GREEN RIVER LITTLE SANDY GRAZING ASSOCIATION; ARTHUR FRANCIS; JOSEPH THOMPSON S; THOMAS THOMPSON; MIDLAND LIVE STOCK CO.;	EEN RIVER 4/8/1974 SUPPLY TOTAL: 5/19/1902 5/19/1902 5/19/1902 9/9/1904	0.00 183.30 6.60 1.91 1.97 1.57	183.3 ACRES 455 134 138 110	CR CC73/239 CR CC69/435 CR CC19/039 CR CC19/040 CR CC35/394
EDEN PROJ P24984.0D P3918.0D P3917.0D P3917.0D P6297.0D P407.0E	ECT DRAIN NO. 2, TRIBUTARIES OF MCMURRY DITCH NDY CREEK, TRIBUTARIES OF BIG CONTINENTAL DIVIDE DITCH FRANCIS DITCH FRANCIS DITCH JOHN NELSON DITCH ENLARGED JOHN NELSON DITCH	CARLSON DRAW, BIG SANDY RIVER, GR ROBERT L AND ANGELA MCMURRY; SUPPLEMENTAL SANDY RIVER, GREEN RIVER LITTLE SANDY GRAZING ASSOCIATION; ARTHUR FRANCIS; JOSEPH THOMPSON S; THOMAS THOMPSON; MIDLAND LIVE STOCK CO.;	EEN RIVER 4/8/1974 SUPPLY TOTAL: 5/19/1902 5/19/1902 5/19/1902 9/9/1904 7/19/1905	0.00 <u>183.30</u> <u>6.60</u> 1.91 1.97 1.57 3.70	183.3 ACRES 455 134 138 110 259	CR CC73/239 CR CC69/435 CR CC19/039 CR CC19/040 CR CC19/040 CR CC35/394 CR CC68/097
EDEN PROJ P24984.0D P3918.0D P3917.0D P3917.0D P6297.0D P1407.0E P1422.0E	ECT DRAIN NO. 2, TRIBUTARIES OF MCMURRY DITCH NDY CREEK, TRIBUTARIES OF BIG CONTINENTAL DIVIDE DITCH FRANCIS DITCH FRANCIS DITCH JOHN NELSON DITCH ENLARGED JOHN NELSON DITCH ENLARGED CONTINENTAL DIVIDE DITCH	CARLSON DRAW, BIG SANDY RIVER, GR ROBERT L AND ANGELA MCMURRY; SUPPLEMENTAL: SANDY RIVER, GREEN RIVER LITTLE SANDY GRAZING ASSOCIATION; ARTHUR FRANCIS; JOSEPH THOMPSON S; THOMAS THOMPSON; MIDLAND LIVE STOCK CO.; MIDLAND LIVE STOCK CO.; HELEN JUEL; HELEN JUEL;	EEN RIVER 4/8/1974 SUPPLY TOTAL: 5/19/1902 5/19/1902 5/19/1902 9/9/1904 7/19/1905 9/7/1905	0.00 <u>183.30</u> <u>6.60</u> 1.91 1.97 1.57 3.70 0.90 2.02	183.3 ACRES 455 134 138 110 259 63 205	CR CC73/239 CR CC69/435 CR CC19/039 CR CC19/040 CR CC35/394 CR CC68/097 CR CC69/024
EDEN PROJ P24984.0D P3918.0D P3917.0D P3917.0D P6297.0D P1407.0E P1422.0E P1422.0E	ECT DRAIN NO. 2, TRIBUTARIES OF MCMURRY DITCH NDY CREEK, TRIBUTARIES OF BIG CONTINENTAL DIVIDE DITCH FRANCIS DITCH FRANCIS DITCH JOHN NELSON DITCH ENLARGED JOHN NELSON DITCH ENLARGED CONTINENTAL DIVIDE DITCH ENLARGED CONTINENTAL DIVIDE DITCH IOSEPH THOMPSON AND SONS DITCH ACT	CARLSON DRAW, BIG SANDY RIVER, GR ROBERT L AND ANGELA MCMURRY; SUPPLEMENTAL: SANDY RIVER, GREEN RIVER LITTLE SANDY GRAZING ASSOCIATION; ARTHUR FRANCIS; JOSEPH THOMPSON S; THOMAS THOMPSON; MIDLAND LIVE STOCK CO.; MIDLAND LIVE STOCK CO.; HELEN JUEL; MAGAGNA BROS., INC.;	SUPPLY TOTAL: 5/19/1902 5/19/1902 5/19/1902 5/19/1902 9/9/1904 7/19/1905 9/7/1905 9/7/1905	0.00 <u>183.30</u> <u>6.60</u> 1.91 1.97 1.57 3.70 0.90 2.93	183.3 ACRES 455 134 138 110 259 63 205	CR CC73/239 CR CC69/435 CR CC19/039 CR CC19/040 CR CC35/394 CR CC68/097 CR CC69/024 CR CC69/026
EDEN PROJ P24984.0D P3918.0D P3917.0D P3917.0D P6297.0D P1407.0E P1422.0E P1422.0E P6933.0D	ECT DRAIN NO. 2, TRIBUTARIES OF MCMURRY DITCH NDY CREEK, TRIBUTARIES OF BIG CONTINENTAL DIVIDE DITCH FRANCIS DITCH FRANCIS DITCH JOHN NELSON DITCH ENLARGED JOHN NELSON DITCH ENLARGED CONTINENTAL DIVIDE DITCH ENLARGED CONTINENTAL DIVIDE DITCH JOSEPH THOMPSON AND SONS DITCH ACT LITTLE SANDY DITCH	CARLSON DRAW, BIG SANDY RIVER, GR ROBERT L AND ANGELA MCMURRY; SUPPLEMENTAL: SANDY RIVER, GREEN RIVER LITTLE SANDY GRAZING ASSOCIATION; ARTHUR FRANCIS; JOSEPH THOMPSON 5; THOMAS THOMPSON; MIDLAND LIVE STOCK CO.; MIDLAND STOCK STOCK CO.; MIDLAND STOCK ST	EEN RIVER 4/8/1974 SUPPLY TOTAL: 5/19/1902 5/19/1902 5/19/1902 9/9/1904 7/19/1905 9/7/1905 9/29/1905	0.00 <u>183.30</u> 6.60 1.91 1.97 1.57 3.70 0.90 2.93 0.88	183.3 ACRES 455 134 138 110 259 63 205 61.6	CR CC73/239 CR CC69/435 CR CC19/039 CR CC19/040 CR CC35/394 CR CC68/097 CR CC69/024 CR CC69/026 CR CC69/436
EDEN PROJ P24984.0D P3918.0D P3917.0D P3917.0D P6297.0D P1407.0E P1422.0E P1422.0E P1422.0E P6933.0D P6977.0D	ECT DRAIN NO. 2, TRIBUTARIES OI MCMURRY DITCH VDY CREEK, TRIBUTARIES OF BIG CONTINENTAL DIVIDE DITCH FRANCIS DITCH FRANCIS DITCH ENLARGED JOHN NELSON DITCH ENLARGED CONTINENTAL DIVIDE DITCH ENLARGED CONTINENTAL DIVIDE DITCH ENLARGED CONTINENTAL DIVIDE DITCH JOSEPH THOMPSON AND SONS DITCH ACT LITTLE SANDY DITCH ZEMBA DITCH	CARLSON DRAW, BIG SANDY RIVER, GR ROBERT L AND ANGELA MCMURRY; SUPPLEMENTAL: SANDY RIVER, GREEN RIVER LITTLE SANDY GRAZING ASSOCIATION; ARTHUR FRANCIS; JOSEPH THOMPSON S; THOMAS THOMPSON; MIDLAND LIVE STOCK CO.; MIDLAND LIVE STOCK CO.; LITTLE SANDY GRAZING ASSOCIATION; MIDLAND LIVE STOCK COMPANY;	SUPPLY TOTAL: 5/19/1902 5/19/1902 5/19/1902 5/19/1902 5/19/1902 9/9/1904 7/19/1905 9/7/1905 9/29/1905 11/6/1905	0.00 183.30 6.60 1.91 1.97 1.57 3.70 0.90 2.93 0.88 6.30	183.3 ACRES 455 134 138 110 259 63 205 61.6 441	CR CC73/239 CR CC69/435 CR CC19/039 CR CC19/040 CR CC35/304 CR CC68/097 CR CC69/024 CR CC69/026 CR CC69/436 CR CC68/098
EDEN PROJ P24984.0D P3918.0D P3917.0D P3917.0D P6297.0D P1407.0E P1422.0E P1422.0E P1422.0E P6933.0D P6977.0D P7085.0D	ECT DRAIN NO. 2, TRIBUTARIES OF MCMURRY DITCH NDY CREEK, TRIBUTARIES OF BIG CONTINENTAL DIVIDE DITCH FRANCIS DITCH FRANCIS DITCH JOHN NELSON DITCH ENLARGED JOHN NELSON DITCH ENLARGED CONTINENTAL DIVIDE DITCH ENLARGED CONTINENTAL DIVIDE DITCH JOSEPH THOMPSON AND SONS DITCH ACT LITTLE SANDY DITCH ZEMBA DITCH JOSEPH THOMPSON AND SONS DITCH ACT	CARLSON DRAW, BIG SANDY RIVER, GR ROBERT L AND ANGELA MCMURRY; SUPPLEMENTAL: SUPPLEMENTAL: SUPPLEMENTAL: SANDY RIVER, GREEN RIVER LITTLE SANDY GRAZING ASSOCIATION; ARTHUR FRANCIS; JOSEPH THOMPSON S; THOMAS THOMPSON; MIDLAND LIVE STOCK CO.; MIDLAND LIVE STOCK COMPANY; HELEN JUEL; MAGAGNA BROS., INC.; LITTLE SANDY GRAZING ASSOCIATION; MIDLAND LIVE STOCK COMPANY; LITTLE SANDY GRAZING ASSOCIATION; MIDLAND LIVE STOCK COMPANY; LITTLE SANDY GRAZING ASSOCIATION;	25/19/1902 5/19/1902 5/19/1902 5/19/1902 5/19/1902 5/19/1902 9/9/1904 7/19/1905 9/7/1905 9/29/1905 11/6/1905 1/2/1906	0.00 183.30 6.60 1.91 1.97 1.57 3.70 0.90 2.93 0.88 6.30 4.52	183.3 ACRES 455 134 138 110 259 63 205 61.6 441 317	CR CC73/239 CR CC69/435 CR CC19/039 CR CC19/040 CR CC35/034 CR CC68/097 CR CC69/024 CR CC69/026 CR CC69/436 CR CC69/437
EDEN PROJ P24984.0D P3918.0D P3917.0D P3917.0D P6297.0D P1407.0E P1422.0E P1422.0E P1422.0E P6933.0D P6977.0D P7085.0D	ECT DRAIN NO. 2, TRIBUTARIES OI MCMURRY DITCH VDY CREEK, TRIBUTARIES OF BIG CONTINENTAL DIVIDE DITCH FRANCIS DITCH FRANCIS DITCH JOHN NELSON DITCH ENLARGED JOHN NELSON DITCH ENLARGED CONTINENTAL DIVIDE DITCH ENLARGED CONTINENTAL DIVIDE DITCH JOSEPH THOMPSON AND SONS DITCH ACT LITTLE SANDY DITCH ZEMBA DITCH JOSEPH THOMPSON AND SONS DITCH ACT LITTLE SANDY DITCH	CARLSON DRAW, BIG SANDY RIVER, GR ROBERT L AND ANGELA MCMURRY; SUPPLEMENTAL: SUPPLEMENTAL: SANDY RIVER, GREEN RIVER LITTLE SANDY GRAZING ASSOCIATION; ARTHUR FRANCIS; JOSEPH THOMPSON S: THOMAS THOMPSON; MIDLAND LIVE STOCK CO.; MIDLAND LIVE STOCK CO.; MIDLAND LIVE STOCK COMPANY; LITTLE SANDY GRAZING ASSOCIATION; MIDLAND LIVE STOCK COMPANY; LITTLE SANDY GRAZING ASSOCIATION;	EEN RIVER 4/8/1974 SUPPLY TOTAL: 5/19/1902 5/19/1902 5/19/1902 9/9/1904 7/19/1905 9/7/1905 9/29/1905 9/29/1905 11/6/1905 1/2/1906	0.00 183.30 6.60 1.91 1.97 1.57 3.70 0.90 2.93 0.88 6.30 4.52	183.3 ACRES 455 134 138 110 259 63 205 61.6 441 317	CR CC73/239 CR CC69/435 CR CC19/039 CR CC19/039 CR CC19/030 CR CC35/394 CR CC69/044 CR CC69/026 CR CC69/026 CR CC69/436 CR CC69/437
EDEN PROJ P24984.0D P3918.0D P3917.0D P6297.0D P1407.0E P1422.0E P1422.0E P6933.0D P6977.0D P6977.0D P7085.0D P1746.0E	ECT DRAIN NO. 2, TRIBUTARIES O MCMURRY DITCH VDY CREEK, TRIBUTARIES OF BIG CONTINENTAL DIVIDE DITCH FRANCIS DITCH FRANCIS DITCH JOHN NELSON DITCH ENLARGED JOHN NELSON DITCH ENLARGED JOHN NELSON DITCH ENLARGED CONTINENTAL DIVIDE DITCH JOSEPH THOMPSON AND SONS DITCH ACT LITTLE SANDY DITCH ZEMBA DITCH JOSEPH THOMPSON AND SONS DITCH ACT LITTLE SANDY DITCH ENLARGED ZEMBA DITCH ACT LITTLE SANDY DITCH	CARLSON DRAW, BIG SANDY RIVER, GR ROBERT L AND ANGELA MCMURRY; SUPPLEMENTAL: SANDY RIVER, GREEN RIVER LITTLE SANDY GRAZING ASSOCIATION; ARTHUR FRANCIS; JOSEPH THOMPSON S; THOMAS THOMPSON; MIDLAND LIVE STOCK CO.; MIDLAND LIVE STOCK COMPANY; LITTLE SANDY GRAZING ASSOCIATION; MIDLAND LIVE STOCK COMPANY; LITTLE SANDY GRAZING ASSOCIATION; JOSEPH THOMPSON S;	EEN RIVER 4/8/1974 SUPPLY TOTAL: 5/19/1902 5/19/1902 5/19/1902 9/9/1904 7/19/1905 9/7/1905 9/7/1905 9/29/1905 11/6/1905 11/6/1905 1/2/1906 6/14/1906	0.00 183.30 6.60 1.91 1.97 1.57 3.70 0.90 2.93 0.88 6.30 4.52 2.74	183.3 ACRES 455 134 138 110 259 63 205 61.6 441 317 192	CR CC73/239 CR CC69/435 CR CC19/039 CR CC19/040 CR CC35/394 CR CC69/024 CR CC69/026 CR CC69/026 CR CC69/436 CR CC69/437 CR CC69/437
EDEN PROJ P24984.0D P3918.0D P3917.0D P6297.0D P1407.0E P1422.0E P1422.0E P6933.0D P6973.0D P6977.0D P7085.0D P1746.0E P1746.0E	ECT DRAIN NO. 2, TRIBUTARIES OI MCMURRY DITCH NDY CREEK, TRIBUTARIES OF BIG CONTINENTAL DIVIDE DITCH FRANCIS DITCH FRANCIS DITCH ENLARGED JOHN NELSON DITCH ENLARGED CONTINENTAL DIVIDE DITCH IJOSEPH THOMPSON AND SONS DITCH ACT LITTLE SANDY DITCH ZEMBA DITCH JOSEPH THOMPSON AND SONS DITCH ACT LITTLE SANDY DITCH ZEMBA DITCH ENLARGED ZEMBA DITCH ACT LITTLE SANDY DITCH ENLARGED ZEMBA DITCH ACT LITTLE SANDY DITCH	CARLSON DRAW, BIG SANDY RIVER, GR ROBERT L AND ANGELA MCMURRY; SUPPLEMENTAL: SANDY RIVER, GREEN RIVER LITTLE SANDY GRAZING ASSOCIATION; ARTHUR FRANCIS; JOSEPH THOMPSON S; THOMAS THOMPSON; MIDLAND LIVE STOCK CO.; MIDLAND LIVE STOCK COMPANY; HELEN JUEL; MAGAGNA BROS., INC.; LITTLE SANDY GRAZING ASSOCIATION; MIDLAND LIVE STOCK COMPANY; LITTLE SANDY GRAZING ASSOCIATION; JOSEPH THOMPSON S; THOMAS THOMPSON S; THOMAS THOMPSON S;	EEN RIVER 4/8/1974 SUPPLY TOTAL: 5/19/1902 5/19/1902 5/19/1902 9/9/1904 7/19/1905 9/7/1905 9/7/1905 9/29/1905 11/6/1905 1/2/1906 6/14/1906	0.00 183.30 6.60 1.91 1.97 1.57 3.70 0.90 2.93 0.88 6.30 4.52 2.74 1.92	183.3 ACRES 455 134 138 110 259 63 205 61.6 441 317 192 135	CR CC73/239 CR CC69/435 CR CC19/039 CR CC19/040 CR CC35/394 CR CC69/024 CR CC69/024 CR CC69/026 CR CC69/436 CR CC69/437 CR CC69/437 CR CC29/006
EDEN PROJ P24984.0D P3918.0D P3917.0D P6297.0D P1407.0E P1422.0E P1422.0E P6933.0D P6973.0D P6977.0D P7085.0D P1746.0E P1746.0E	ECT DRAIN NO. 2, TRIBUTARIES O MCMURRY DITCH NDY CREEK, TRIBUTARIES OF BIG CONTINENTAL DIVIDE DITCH FRANCIS DITCH FRANCIS DITCH JOHN NELSON DITCH ENLARGED JOHN NELSON DITCH ENLARGED CONTINENTAL DIVIDE DITCH ENLARGED CONTINENTAL DIVIDE DITCH ENLARGED CONTINENTAL DIVIDE DITCH JOSEPH THOMPSON AND SONS DITCH ACT LITTLE SANDY DITCH ZEMBA DITCH JOSEPH THOMPSON AND SONS DITCH ACT LITTLE SANDY DITCH ENLARGED ZEMBA DITCH ACT LITTLE SANDY DITCH ENLARGED ZEMBA DITCH ACT LITTLE SANDY DITCH	CARLSON DRAW, BIG SANDY RIVER, GR ROBERT L AND ANGELA MCMURRY; SUPPLEMENTAL: SANDY RIVER, GREEN RIVER LITTLE SANDY GRAZING ASSOCIATION; ARTHUR FRANCIS; JOSEPH THOMPSON S; THOMAS THOMPSON; MIDLAND LIVE STOCK CO.; MIDLAND LIVE STOCK COMPANY; HELEN JUEL; MAGAGNA BROS., INC.; LITTLE SANDY GRAZING ASSOCIATION; MIDLAND LIVE STOCK COMPANY; LITTLE SANDY GRAZING ASSOCIATION; JOSEPH THOMPSON S; THOMAS THOMPSON S; THOMAS THOMPSON;	EEN RIVER 4/8/1974 SUPPLY TOTAL: 5/19/1902 5/19/1902 5/19/1902 9/9/1904 7/19/1905 9/7/1905 9/7/1905 9/29/1905 11/6/1905 11/6/1905 1/2/1906 6/14/1906 2/02/1906	0.00 183.30 6.60 1.91 1.97 1.57 3.70 0.90 2.93 0.88 6.30 4.52 2.74 1.92 4.00	183.3 ACRES 455 134 138 110 259 63 205 61.6 441 317 192 135	CR CC73/239 CR CC69/435 CR CC19/039 CR CC19/040 CR CC35/394 CR CC69/024 CR CC69/024 CR CC69/026 CR CC69/436 CR CC69/437 CR CC69/437 CR CC29/006 CR CC29/007
EDEN PROJ P24984.0D P3918.0D P3917.0D P6297.0D P1407.0E P1422.0E P1422.0E P1422.0E P6933.0D P6973.0D P6977.0D P7085.0D P1746.0E P1746.0E P1746.0E	ECT DRAIN NO. 2, TRIBUTARIES OI MCMURRY DITCH NDY CREEK, TRIBUTARIES OF BIG CONTINENTAL DIVIDE DITCH FRANCIS DITCH FRANCIS DITCH JOHN NELSON DITCH ENLARGED JOHN NELSON DITCH ENLARGED CONTINENTAL DIVIDE DITCH JOSEPH THOMPSON AND SONS DITCH ACT LITTLE SANDY DITCH ZEMBA DITCH JOSEPH THOMPSON AND SONS DITCH ACT LITTLE SANDY DITCH ZEMBA DITCH ENLARGED ZEMBA DITCH ACT LITTLE SANDY DITCH ENLARGED ZEMBA DITCH ACT LITTLE SANDY DITCH	CARLSON DRAW, BIG SANDY RIVER, GR ROBERT L AND ANGELA MCMURRY; SUPPLEMENTAL: SANDY RIVER, GREEN RIVER LITTLE SANDY GRAZING ASSOCIATION; ARTHUR FRANCIS; JOSEPH THOMPSON S; THOMAS THOMPSON; MIDLAND LIVE STOCK CO; MIDLAND LIVE STOCK COMPANY; HELEN JUEL; MAGAGNA BROS., INC.; LITTLE SANDY GRAZING ASSOCIATION; MIDLAND LIVE STOCK COMPANY; LITTLE SANDY GRAZING ASSOCIATION; JOSEPH THOMPSON S; THOMAS THOMPSON S; THOMAS THOMPSON; BLAIR HAY LAND AND LIVESTOCK COMPANY;	EEN RIVER 4/8/1974 SUPPLY TOTAL: 5/19/1902 5/19/1902 5/19/1902 9/9/1904 7/19/1905 9/7/1905 9/29/1905 11/6/1905 1/2/1906 6/14/1906 7/23/1906	0.00 183.30 6.60 1.91 1.97 1.57 3.70 0.90 2.93 0.88 6.30 4.52 2.74 1.92 4.00	183.3 ACRES 455 134 138 110 259 63 205 61.6 441 317 192 135 280 0.00	CR CC73/239 CR CC69/435 CR CC19/039 CR CC19/040 CR CC35/394 CR CC69/024 CR CC69/024 CR CC69/026 CR CC69/436 CR CC69/437 CR CC69/437 CR CC29/006 CR CC29/007 CR CC29/007
EDEN PROJ P24984.0D P3918.0D P3917.0D P3917.0D P6297.0D P1407.0E P1422.0E P1422.0E P1422.0E P6933.0D P6973.0D P7085.0D P1746.0E P1746.0E P1746.0E P17704.0D P1025.0R P9318.0D	ECT DRAIN NO. 2, TRIBUTARIES OI MCMURRY DITCH NDY CREEK, TRIBUTARIES OF BIG CONTINENTAL DIVIDE DITCH FRANCIS DITCH FRANCIS DITCH JOHN NELSON DITCH ENLARGED CONTINENTAL DIVIDE DITCH ENLARGED CONTINENTAL DIVIDE DITCH ENLARGED CONTINENTAL DIVIDE DITCH JOSEPH THOMPSON AND SONS DITCH ACT LITTLE SANDY DITCH ZEMBA DITCH JOSEPH THOMPSON AND SONS DITCH ACT LITTLE SANDY DITCH ENLARGED ZEMBA DITCH ACT LITTLE SANDY DITCH ENLARGED ZEMBA DITCH ACT LITTLE SANDY DITCH ELKHORN DITCH ELKHORN RESERVOIR SCHIESTLER-BRADY DITCH	CARLSON DRAW, BIG SANDY RIVER, GR ROBERT L AND ANGELA MCMURRY; SUPPLEMENTAL: SANDY RIVER, GREEN RIVER LITTLE SANDY GRAZING ASSOCIATION; ARTHUR FRANCIS; JOSEPH THOMPSON S; THOMAS THOMPSON; MIDLAND LIVE STOCK CO; MIDLAND LIVE STOCK COMPANY; HELEN JUEL; MAGAGNA BROS., INC.; LITTLE SANDY GRAZING ASSOCIATION; MIDLAND LIVE STOCK COMPANY; LITTLE SANDY GRAZING ASSOCIATION; JOSEPH THOMPSON S; THOMAS THOMPSON S; THOMAS THOMPSON S; THOMAS THOMPSON; BLAIR HAY LAND AND LIVESTOCK COMPANY; JOE THOMPSON JR. LIVESTOCK CO.; EFLIX SCHESTLEF:	EEN RIVER 4/8/1974 SUPPLY TOTAL: 5/19/1902 5/19/1902 5/19/1902 5/19/1902 9/9/1904 7/19/1905 9/7/1905 9/29/1905 11/6/1905 1/2/1906 6/14/1906 7/23/1906 7/23/1906 9/12/1908	0.00 183.30 6.60 1.91 1.97 1.57 3.70 0.90 2.93 0.88 6.30 4.52 2.74 1.92 4.00 1450.00 1.78	183.3 ACRES 455 134 138 110 259 63 205 61.6 441 317 192 135 280 0.00 125	CR CC73/239 CR CC69/435 CR CC19/039 CR CC19/040 CR CC35/394 CR CC69/024 CR CC69/024 CR CC69/026 CR CC69/436 CR CC69/436 CR CC69/437 CR CC69/437 CR CC29/006 CR CC29/007 CR CC29/007 CR CC69/105 CR CC32/006
EDEN PROJ P24984.0D P3918.0D P3917.0D P3917.0D P6297.0D P1407.0E P1422.0E P1422.0E P1422.0E P6933.0D P6977.0D P7085.0D P1746.0E P1746.0E P1746.0E P1704.0D P1025.0R P9318.0D P9318.0D	ECT DRAIN NO. 2, TRIBUTARIES OI MCMURRY DITCH NDY CREEK, TRIBUTARIES OF BIG CONTINENTAL DIVIDE DITCH FRANCIS DITCH FRANCIS DITCH JOHN NELSON DITCH ENLARGED JOHN NELSON DITCH ENLARGED CONTINENTAL DIVIDE DITCH ENLARGED CONTINENTAL DIVIDE DITCH JOSEPH THOMPSON AND SONS DITCH ACT LITTLE SANDY DITCH ZEMBA DITCH JOSEPH THOMPSON AND SONS DITCH ACT LITTLE SANDY DITCH ENLARGED ZEMBA DITCH ACT LITTLE SANDY DITCH ENLARGED ZEMBA DITCH ACT LITTLE SANDY DITCH ELKHORN RESERVOIR SCHIESTLER-BRADY DITCH	CARLSON DRAW, BIG SANDY RIVER, GR ROBERT L AND ANGELA MCMURRY; SUPPLEMENTAL: SANDY RIVER, GREEN RIVER LITTLE SANDY GRAZING ASSOCIATION; ARTHUR FRANCIS: JOSEPH THOMPSON S; THOMAS THOMPSON; MIDLAND LIVE STOCK CO.; MIDLAND LIVE STOCK COMPANY; HELEN JUEL; MAGAGNA BROS., INC.; LITTLE SANDY GRAZING ASSOCIATION; MIDLAND LIVE STOCK COMPANY; LITTLE SANDY GRAZING ASSOCIATION; JOSEPH THOMPSON S; THOMAS THOMPSON S; THOMAS THOMPSON; BLAIR HAY LAND AND LIVESTOCK COMPANY; JOE THOMPSON JR. LIVESTOCK CO.; FELIX SCHIESTLER; LITTLE SANDY GRAZING ASSOCIATION;	EEN RIVER 4/8/1974 SUPPLY TOTAL: 5/19/1902 5/19/1902 5/19/1902 5/19/1902 9/9/1904 7/19/1905 9/7/1905 9/29/1905 11/6/1905 1/2/1906 6/14/1906 6/14/1906 7/23/1906 9/12/1908 9/12/1908	0.00 183.30 6.60 1.91 1.97 1.57 3.70 0.90 2.93 0.88 6.30 4.52 2.74 1.92 4.00 1450.00 1.78 0.81	183.3 ACRES 455 134 138 110 259 63 205 61.6 441 317 192 135 280 0.00 125 57	CR CC73/239 CR CC69/435 CR CC19/039 CR CC19/040 CR CC35/394 CR CC69/024 CR CC69/024 CR CC69/026 CR CC69/436 CR CC69/436 CR CC69/437 CR CC29/006 CR CC29/007 CR CC29/007 CR CC69/105 CR CC32/006 CR CC32/006 CR CC32/006 CR CC32/006
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P13080.0D	MEYERS NO. 2 DITCH ACT LITTLE SANDY INTAKE CANAL	RUDOLPH CHESNOVAR;	4/26/1915	0.91	63.5	CR CC69/023
P4048.0E	ENLARGED MEYERS NO. 1 DITCH ACT LITTLE SANDY INTAKE CANAL	RUDOLPH CHESNOVAR;	11/12/1919	1.15	80.7	CR CC69/102
P4049.0E	ENLARGED MEYERS NO. 2 DITCH ACT LITTLE SANDY INTAKE CANAL	RUDOLPH CHESNOVAR;	11/12/1919	0.20	14	CR CC69/103
P4600.0E	ENLARGED CHAMBERS DITCH	MR AND MRS WILLIAM A MEYER;	7/25/1928	3.70	259	CR CC52/133
P18979.0D	LITTLE SANDY INTAKE CANAL	UNITED STATES BUREAU OF RECLAMATION;	11/8/1937	0.00	0.00	CR CC66/065
P32187.0D	ANDERSON PUMP NO. 1	Philip Anderson; Hazel Anderson; Kim Anderson; Jaquline Anderson;	10/9/1998	0.22	0.00	CR CC83/220
		ORIGINAL S	SUPPLY TOTAL:	<u>63.16</u>	<u>C.F.S.</u>	
		RESERVOIR ST	ORAGE TOTAL:	<u>1637.00</u>	ACRE FEET	

PACIFIC CRI	EEK, TRIBUTARIES OF LITTLE SAM	NDY CREEK, BIG SANDY RIVER, GREEN R	IVER			
P8091.0D	ARCHIBALD BLAIR DITCH	ARCHIBALD BLAIR;	12/14/1907	4.57	320	CR CC32/394
P10817.0D	PACIFIC CREEK DITCH	JOHN HAY;	6/3/1911	1.14	80	CR CC38/187
P17139.0D	PACIFIC MEADOW DITCH	BLAIR HAY LAND AND LIVESTOCK COMPANY;	8/14/1926	1.05	73.6	CR CC65/077
P17140.0D	HAY ENLARGEMENT OF MCDOWELL DITCH	BLAIR HAY LAND AND LIVESTOCK COMPANY;	9/10/1926	0.00	0.00	CR CC65/078
P4025.0R	PACIFIC NO. 1 RESERVOIR	BLAIR HAY LAND AND LIVESTOCK COMPANY;	8/14/1926	106.91		CR R-2/192
P4026.0R	PACIFIC NO. 2 RESERVOIR	BLAIR HAY LAND AND LIVESTOCK COMPANY;	8/14/1926	1394.21		CR R-2/193
P4500.0E	HAY ENLARGEMENT MCDOWELL DITCH	BLAIR HAY LAND AND LIVESTOCK COMPANY;	3/20/1959		320	CR CC65/028
		ORIGINAL S	SUPPLY TOTAL:	<u>6.76</u>	<u>C.F.S.</u>	
		RESERVOIR ST	ORAGE TOTAL:	<u>1501.12</u>	ACRE FEET	
		SUPPLEMENTAL S		320.00	ACRES	

MANGANES	E SPRING, TRIBUTARIES OF JACK	MORROW CREEK, PACIFIC CREEK, LITT	LE SANDY	CREEK, BIG	SANDY I	RIVER,
GREEN RIVE	CR CR					
P8107.0D	MANGANESE SPRING DITCH	JOHN HAY;	12/4/1907	0.14	10	CR CC29/032
		ORIGINAL S	SUPPLY TOTAL:	<u>0.14</u>	<u>C.F.S.</u>	

FIFTEEN HUNDRED DOLLAR SPRING	, TRIBUTARIES OF JACK MORRO	W CREEK, PACIFIC CREEK, L	ITTLE SA	NDY CRE	EK, BIG
SANDY RIVER, GREEN RIVER					
P8106.0D \$1,500.00 SPRING DITCH	JOHN HAY;	12/4/1907	0.07	5	CR CC29/033
		ORIGINAL SUPPLY TOTAL:	0.07	<u>C.F.S.</u>	
HILLSIDE NO. 1 SPRING, TRIBUTARIE	ES OF BOX DRAW, BOX CANYON	CREEK, JACK MORROW CREE	K. PACIF	IC CREEK	LITTLE
SANDY CREEK, BIG SANDY RIVER, G	REEN RIVER				,
P8108.0D HILLSIDE NO. 1 DITCH	JOHN HAY;	12/4/1907	0.05	4	CR CC29/031
		ORIGINAL SUPPLY TOTAL:	<u>0.05</u>	<u>C.F.S.</u>	
HILLSIDE NO. 2 SPRING, TRIBUTARIE	ES OF BOX DRAW, BOX CANYON	CREEK, JACK MORROW CREE	K, PACIF	IC CREEK	, LITTLE
SANDY CREEK, BIG SANDY RIVER, GI	REEN RIVER				
P8109.0D HILLSIDE NO. 2 DITCH	JOHN HAY;	12/4/1907	0.04	3	CR CC29/030
		ORIGINAL SUPPLY TOTAL:	0.04	<u>C.F.S.</u>	
HILLSIDE NO. 2 SPRING, TRIBUTARIE	ES OF BOX DRAW, BOX CANYON	CREEK, JACK MORROW CREE	K, PACIF	IC CREEK	, LITTLE
SANDY CREEK, BIG SANDY RIVER, GI	REEN RIVER	,			·
P8109.0D HILLSIDE NO. 2 DITCH	JOHN HAY;	12/4/1907	0.13	9	CR CC41/394
		ORIGINAL SUPPLY TOTAL:	<u>0.13</u>	<u>C.F.S.</u>	
HAY NO. 2 SPRING, TRIBUTARIES OF	MOWING MACHINE DRAW, ROO	K CABIN CREEK, JACK MORR	OW CREF	EK. PACIF	IC CREEK.
LITTLE SANDY CREEK, BIG SANDY R	IVER, GREEN RIVER			,	,
P8100.0D HAY NO. 2 DITCH	JOHN HAY;	12/4/1907	0.10	7	CR CC34/383
		ORIGINAL SUPPLY TOTAL:	<u>0.10</u>	<u>C.F.S.</u>	
HAY NO. 1 SPRING, TRIBUTARIES OF	JOE HAY DRAW, ROCK CABIN C	REEK, JACK MORROW CREEK	, PACIFIC	C CREEK,	LITTLE
SANDY CREEK, BIG SANDY RIVER, GI	REEN RIVER			í.	
P8099.0D HAY NO. 1 DITCH	JANE BLAIR;	12/4/1907	0.27	19	CR CC29/036
		ORIGINAL SUPPLY TOTAL:	0.27	<u>C.F.S.</u>	
OREGON BUTTE SPRING NO. 1, TRIBU	JTARIES OF ROCK CABIN CREEP	, JACK MORROW CREEK, PAC	IFIC CRE	EK, LITT	LE SANDY
CREEK, BIG SANDY RIVER, GREEN R	IVER				
P13768.0D OREGON BUTTE SPRING NO. 1	AUGUST FAURE;	12/22/1915	0.20	0	CR CC41/080
		ORIGINAL SUPPLY TOTAL:	0.20	<u>C.F.S.</u>	
CHILTON'S STEAMBOAT MOUNTAIN	SPRINGS, TRIBUTARIES OF SOU	TH FORK JACK MORROW CRE	EK, JACH	MORRO	W CREEK,
DA CIEIC ODEEK I ITTI E CANDY ODE					/
PACIFIC CREEK, LITTLE SANDY CRE	EK, BIG SANDY RIVER, GREEN R	IVER			
P8278.0D GEO. CHILTON DITCH	EK, BIG SANDY RIVER, GREEN R GEORGE CHILTON;	IVER 3/12/1908	0.37	26	CR CC40/691

HAY NO. 4 S	PRING, TRIBUTARIES OF SAW DR	AW, PARNELL CREEK, JACK	MORROW CREEK, PACI	FIC CREEP	K, LITTLE	SANDY
CREEK, BIG	SANDY RIVER, GREEN RIVER		10/4/1003	0.14	0	CD CC34/201
P8102.0D	HAY NU. 4 DITCH	JUHN HAY;		0.11	0.ES	CR CC34/381
			<u>ontoinne oorrer ronne.</u>	0.11	0.1.0.	
HAY NO. 3 S	PRING, TRIBUTARIES OF WAY DR	AW, SAW DRAW, PARNELL (CREEK, JACK MORROW	CREEK, PA	CIFIC CR	EEK,
Delot on	HAY NO 2 DITCH		12/4/1007	0.42	20	CD CC24/202
P0101.0D	HAT NO. 3 DITCH	JOHN HAY;	ORIGINAL SUPPLY TOTAL:	0.43	C.F.S.	CR CC34/302
RESERVOIR	SPRING, TRIBUTARIES OF RESER	RVOIR DRAW, SOUTH FORK J	ACK MORROW CREEK,	JACK MOR	ROW CRE	EEK,
PACIFIC CR	REEK, LITTLE SANDY CREEK, BIG	SANDY RIVER, GREEN RIVE	R 10/4/1007	0.07		CD CC20/020
Pollu.uD	RESERVOIR SPRING DITCH	JOHN HAY;	ORIGINAL SUPPLY TOTAL:	0.07	C.F.S.	CR CC29/029
				· <u> </u>		
SPRING, TR	IBUTARIES OF DRY FORK MCCRA	DY CREEK, JACK MORROW	CREEK, PACIFIC CREEK	K, LITTLE S	ANDY CRI	EEK, BIG
P6448 0D	NO NAME PROVIDED		12/30/190/	0.20	0.00	CR CC/0/689
10440.00		GEORGE CITETON,	ORIGINAL SUPPLY TOTAL:	0.20	<u>C.F.S.</u>	CIX CC+0/007
WHITE HOR	RSE DRAW, TRIBUTARIES OF ALKA	ALI CREEK, PACIFIC CREEK	, LITTLE SANDY CREEK,	BIG SAND	Y RIVER, (GREEN
P1/138.0D	WHITE HORSE DITCH	BLAIR AND HAY LAND AND LIVESTOCK	SUPPLEMENTAL SUPPLY TOTAL	320.00	ACRES	CR CC65/079
			SS. TELMENTAL SUITETTUTAL.	520.00	MORED	
WEST PACE	FIC CREEK, TRIBUTARIES OF PAC	TIFIC CREEK, LITTLE SANDY	CREEK, BIG SANDY RIV	ER, GREEN	N RIVER	
P9362.0S	SHEEP CAMP NO. 1 STOCK RESERVOIR	USDI, BUREAU OF LAND MANAGEMENT	; 4/3/1984	0.70	0.00	CR CR10/313
			RESERVOIR STORAGE TOTAL:	0.70	ACRE FEET	
KERRI DRA	W, TRIBUTARIES OF DRY SANDY	CREEK, LITTLE SANDY CREE	EK, BIG SANDY RIVER, G	REEN RIVE	ER	
P9363.0S	LOST MOUNTAIN STOCK RESERVOIR	USDI, BUREAU OF LAND MANAGEMENT	4/3/1984	14.00	0.00	CR CR10/312
			RESERVOIR STORAGE TOTAL:	14.00	ACRE FEET	
EMIGRANT	SPRINGS, TRIBUTARIES OF DRY S	ANDY CREEK LITTLE SAND	Y CREEK, BIG SANDY RI	VER GREE	EN RIVER	
P6986.0D	EMIGRANT SPRINGS	M. LARSEN;	11/7/1905	0.20	0.00	CR CC40/692
	·		ORIGINAL SUPPLY TOTAL:	0.20	<u>C.F.S.</u>	
TALLS	ADAW ODDING TRIBUTADIES OF	TAN ODEEN DDY CANDY OD		TEK DIC C		
P6988.0D	HALLS MEADOW SPRING	M. LARSEN:	11/7/1905	0.20	0.00	CR CC40/693
			ORIGINAL SUPPLY TOTAL:	0.20	<u>C.F.S.</u>	
JUMBO SPR	ING, TRIBUTARIES OF MONUMEN	T DRAW, HAY CREEK, DRY S	SANDY CREEK, LITTLE S	ANDY CRE	EK, BIG SA	ANDY
P6989.0D	JUMBO SPRING	M. LARSEN;	11/7/1905	0.20	0.00	CR CC40/694
			ORIGINAL SUPPLY TOTAL:	0.20	<u>C.F.S.</u>	
DI216 OP	V, TRIBUTARIES OF LITTLE SAND	Y CREEK, BIG SANDY RIVER	, GREEN RIVER	87.00	0.00	CP CP/0/650
1 12 10.01		WIDEAND ENESTOCK COMPANY,	RESERVOIR STORAGE TOTAL:	87.00	ACRE FEET	CIX CIX40/030
SNOW GUL	CH, TRIBUTARIES OF LONG DRAW	, LITTLE SANDY CREEK, BIO	G SANDY RIVER, GREEN	RIVER	-	
P8250.0D	SNOW GULCH DITCH	MIDLAND LIVE STOCK CO.;		0 00		CR CC32/009
			UNIONAL SUITETTUTAL	0.00	0.1.0.	
PROSPECT	MOUNTAIN SPRINGS, TRIBUTARII	ES OF LONG DRAW, LITTLE S	SANDY CREEK, BIG SANI	OY RIVER,	GREEN RI	VER
P10265.0D		T. TALIAFERRO;	10/9/1907	0.11	8	CR CC38/315
P2010.0R P2011.0R	DUNTON NO. 2 RESERVOIR		2/4/1909	0.50	0.00	CR CR38/316 CR CR38/317
P2012.0R	DUNTON NO. 3 RESERVOIR	T. TALIAFERRO J;	2/4/1909	0.50	0.00	CR CR38/318
P10517.0S	ETCHEVERRY	ALBERT ETCHEVERRY	12/16/1988	0.26	0.00	
			ORIGINAL SUPPLY TOTAL:	0.11	<u>C.F.S.</u>	
			RESERVOIR STURAGE TUTAL	1.70	AURE FEEL	
SPRINGS, T	RIBUTARIES OF LITTLE SANDY CI	REEK, BIG SANDY <mark>RIVER, GR</mark>	EEN RIVER			
P7244.0D	JOSEPH THOMPSON AND SONS NO. 3 DITCH	JOSEPH THOMPSON AND SONS;	6/14/1906	2.14	150	CR CC30/257
			ORIGINAL SUPPLY TOTAL:	2.14	<u>C.F.S.</u>	
U.S. DRAIN	F3. TRIBUTARIES OF BIG SANDY R	IVER. GREEN RIVER				
P32208.0D	D.M. NO. 1 DITCH	DONALD S. AND VICKI MILLER;	1/15/1999	0.18	12.6	CR CC83/217
			ORIGINAL SUPPLY TOTAL:	0.18	<u>C.F.S.</u>	

BORROW D	RAW, TRIBUTARIES OF BIG SAND	Y RIVER, GREEN RIVER				
P10833.0S	ROD MINES STOCK RESERVOIR	ROD MINES AND JAMES MINES AND SONS, INC.;	1/2/1990	19.00	0.00	CR CR13/139
		RESERVOIR ST	ORAGE TOTAL:	19.00	ACRE FEET	
MINECOD	IN TRIBUTABLE OF BOBBOU PR	AW DIC CANDY DIVED OPPEN DIVED				
D22540.0D	MINES DITCH	RODNEY I MINES LIVING TOLIST	2/21/2002	0.00	140	
P12581 0D		RODNEY I MINES LIVING TRUST	3/31/2003	3.76	0.00	CR CR23/350
P7535.0F		RODNEY I MINES LIVING TRUST	1/22/2007	0.00	54.6	CR CC95/127
17333.0L			SUPPLY TOTAL	194.60	ACRES	011 0073/127
		RESERVOIR ST	ORAGE TOTAL:	3.76	ACRE FEET	
		<u></u>				
JONAH GUL	CH, TRIBUTARIES OF BIG SANDY	RIVER, GREEN RIVER				
P3328.0R	JONAH STOCK WATER RESERVOIR	ALONZO POSTON;	6/19/1916	22.68	0.00	CR CR40/652
P7894.0S	SAGEBRUSH NO. 260 STOCK RESERVOIR	USDI, BUREAU OF LAND MANAGEMENT;	9/3/1974	2.50	0.00	CR CR08/082
P12537.0R	JOHN ARAMBEL RESERVOIR	OFFICE OF STATE LANDS & INVESTMENTS;	11/7/2005	343.60	0.00	CR CR24/080
		<u>RESERVOIR ST</u>	ORAGE TOTAL:	<u>368.78</u>	ACRE FEET	
ILIEL SPRIN	G TRIBUTARIES OF IONAH CULC	H BIG SANDY RIVER CREEN RIVER				
P20004 0D	JUEL SPRING PIPF I INF	PAUL JUEL:	11/14/1945	0.01	0.00	CR CC61/331
1 20004.00		ORIGINAL	SUPPLY TOTAL:	0.01	C.F.S.	51(0301/031
				<u></u>		
NORTH SUB	LET MEADOW SPRING, TRIBUTAR	RIES OF JONAH GULCH, BIG SANDY RIVER	, GREEN RI	VER		
P7690.0D	ROSE JUEL DITCH	ROSE JUEL;	3/18/1907	0	0.00	CR CC27/301
		ORIGINALS	SUPPLY TOTAL:	0.00	<u>C.F.S.</u>	
NODEL						
NORTH SEE	PAGE DRAW, TRIBUTARIES OF BI	G SANDY RIVER, GREEN RIVER	11// // 010		105 :	00.001010
P12115.0D	DEWEYDIICH	D. DEWEY;		1.50	105.4	CR CC42/434
		<u>URIGINAL</u>	SUPPLY IUIAL:	1.50	<u>C.F.S.</u>	
WATER HOL	LE DRAW, TRIRITARIES OF RICS	ANDY RIVER, GREEN RIVER				
PIERO		STATE BOARD OF LAND COMMISSIONERS: G AND F	1/14/10/10	10.00	0.00	
P153.0S	ERRAMOUSPE NO. 2 STOCK RESERVOIR	LIVESTOCK, INC.;	1/14/1949	10.20	0.00	CR CR08/484
		RESERVOIR ST	ORAGE TOTAL:	10.20	ACRE FEET	
ELK WASH,	TRIBUTARIES OF BIG SANDY RIV	EK, GREEN KIVEK	10/00/1055	24/ 22	0.00	
P6320.0R	EKKAWUUSPE STUCK RESERVUIR	G AND E LIVESTUCK, INC.;	12/22/1955	346.30		CR CR08/485
		<u>RESERVOIR ST</u>	ONAGE TUTAL:	340.30	AURE FEEL	
SPRINGS, TI	RIBUTARIES OF ELK WASH, BIG SA	ANDY RIVER, GREEN RIVER				
P2015.0R	TALIAFERRO NO. 3 RESERVOIR	WALTER DUNTON;	2/4/1909	0.50	0.00	CR CR34/384
		RESERVOIR ST	ORAGE TOTAL:	0.50	ACRE FEET	
POSTON DR	AW, TRIBUTARIES OF BIG SANDY	RIVER, GREEN RIVER				
P152.0S	ERRAMOUSPE NO. 1 STOCK RESERVOIR	STATE BOARD OF LAND COMMISSIONERS; G AND E	1/14/1949	18.84	0.00	CR CR08/483
		RESERVOIR ST	ORAGE TOTAL	18.84	ACRE FEFT	
SEC. 19 DRA	W, TRIBUTARIES OF POSTON DRA	W, BIG SANDY RIVER, GREEN RIVER				
P8301.0S	SQUARETOP PIT NO. 10-1862 STOCK RESERVOI	R USDI, BUREAU OF LAND MANAGEMENT;	4/11/1977	1.86	0.00	CR CR08/590
			ORAGE TOTAL ·	1 86	ACRE FEET	
		ALSENVOR 31	STATE TOTAL	1.00	MARCH LLI	
A WASH (19-	29-105), TRIBUTARIES OF BIG SAN	DY RIVER, GREEN RIVER				
P12623.0D	ENLARGED ZEMBA DITCH	ADA DUNTON;	8/22/1914	0.00	277.5	CR CC37/464
		SUPPLEMENTALS	SUPPLY TOTAL:	277.50	ACRES	
WASH, TRIE	BUTARIES OF A WASH (19-29-105), B	BIG SANDY RIVER, GREEN RIVER				
P12624.0D	ENLARGED ZEMBA DITCH	ADA DUNTON;	8/22/1914	0.00	277.5	CR CC37/463
		SUPPLEMENTAL S	SUPPLY TOTAL:	<u>277.50</u>	<u>ACRES</u>	
SOLUPETO	DWASH TDIDUTADIES OF WASH	10 20 105) DIC SANDY DIVED ODDEN DUT	D			
P3330 ND	SOUARETOP RESERVOIR	MIDLAND LIVE STOCK CO	6/10/1016	16.00	0.00	CR CR/0/651
1 3337.UK			ORAGE TOTAL	16.00	ACRE FEET	GIV GIV40/031
		ALSERVOIR ST	UNALL IVIAL.	10.00	AUNCILLI	
JIMMY CRE	EK, TRIBUTARIES OF BIG SANDY	RIVER, GREEN RIVER				
P17698.0D	PARKINSON DITCH	C. PARKINSON;	1/22/1930	1.03	72	CR CC61/389
P10077.0R	CHUCK WAGON RESERVOIR	RICHARD SMITH;	6/23/1993	3.00	0.00	CR CR14/428
P10078.0R	CONESTOGA RESERVOIR	RICHARD SMITH;	6/23/1993	4.14	0.00	CR CR14/429
P10079.0R	BUCKBOARD RESERVOIR	RICHARD SMITH;	6/23/1993	3.05	0.00	CR CR14/430

P31304.0D	CHUCK WAGON DITCH	RICHARD SMITH;		6/23/1993	0.00	0.00	CR CC81/173
			ORIGINAL S	UPPLY TOTAL:	<u>8.22</u>	<u>C.F.S.</u>	
			RESERVOIR STO	DRAGE TOTAL:	<u>10.19</u>	ACRE FEET	
EAST JIMM	Y CREEK, TRIBUTARIES OF JIMMY	CREEK, BIG SANDY RIVER,	GREEN RIVE	R			
P10455.0R	JIMMY CREEK RESERVOIR	RICHARD SMITH;		11/1/1996	4.71	0.00	CR CR15/204
			RESERVOIR STO	DRAGE TOTAL:	<u>4.71</u>	ACRE FEET	
LONG DRAV	W, SHEEP AND JOHNS DRAW, TRIB	UTARIES OF BIG SANDY RIV	ER, GREEN RI	VER		-	
P9230.0D	ROSCOE D MACK DITCH	ROSCOE MACK;		7/17/1909	2.28	160	CR CC39/324
			ORIGINAL S	UPPLY TOTAL:	2.28	<u>C.F.S.</u>	
GRANITE G	ULCH, TRIBUTARIES OF BIG SAND	Y RIVER, GREEN RIVER					
P8251.0D	GRANITE GULCH DITCH	MIDLAND LIVE STOCK CO.;		2/13/1908	0.00	0.00	CR CC32/010
			ORIGINAL SI	UPPLY IOTAL:	0.00	<u>C.F.S.</u>	
FLANIGAN	DRAW, TRIBUTARIES OF BIG SAND	DY RIVER, GREEN RIVER		5/12/1001	1 7/	0.00	00.0012/220
P113/8.05	BIG SANDY STUCK RESERVUIR	PETER FLANIGAN;		5/13/1991	1./0		CR CR13/238
			RESERVOIR STU	JRAGE TUTAL:	1.70	ACREFEET	
DUTCH IOF	CDEEV TRIBUTARIES OF SOLLAW	CDEEV BIC SANDY DIVED	CDEEN DIVED				
T4367 0-	LECKIE DITCH	SAMUELLECKIE	GREEN RIVER	06/10/1890	2 11	1/8	CR CA03/155
P709.0F		MARY LECKIE:		10/10/1901	2.11	186	CR CC38/291
P18958.0D	DUTCH JOE DITCH	UNITED STATES OF AMERICA, FOREST	SERVICE:	3/8/1937	1.18	82.44	CR CC58/338
			ORIGINAL S	UPPLY TOTAL:	5.950	C.F.S.	
					<u></u>		
UNNAMED S	SPRING, TRIBUTARIES OF DUTCH J	IOE CREEK, SQUAW CREEK,	BIG SANDY R	IVER, GRE	EN RIVER		
P10300 0D	DUTCH JOE RANGER STATION WATER SUPPLY	UNITED STATES OF AMERICA FOREST	SERVICE	7/1/19/0	0.013	0.00	CR CC58/339
11/3/7.00	SYSTEM PIPELINE	UNITED STATES OF AMERICA, FOREST	SERVICE,	//////	0.013	0.00	CI (CC30/337
			ORIGINAL S	UPPLY TOTAL:	<u>0.013</u>	<u>C.F.S.</u>	
CDASS CDE							
GRASS CRE	ER, I KIBUTAKIES OF SQUAW CRE	EK, BIG SANDY KIVER, GREE		7///1002	0.04	E0	CD CC27/200
P5557.0D	GRASS CREEK DITCH	THOMAS BUYER;			0.84	09	CR CC27/300
			URIGINAL SI	UPPLT TUTAL:	0.64	<u>C.F.S.</u>	
CI FAR CRE	TEK TRIBUTARIES OF RIC SANDY	RIVER CREEN RIVER					
P5398 0R	CLEAR LAKE RESERVOIR			3/21/1035	318.60	0.00	CR CR01/317
1 33 70.010	GEEAK DAKE RESERVOIR	UNITED STATES OF AMERICA,		BAGE TOTAL	318.60	ACRE FEET	CIC CICOTISTI
			<u>ALOLIVOIR OIC</u>		010.00		
BLACK JOF	CREEK, TRIBUTARIES OF BIG SAN	DY RIVER, GREEN RIVER					
P5397.0R	BLACK JOE LAKE RESERVOIR	UNITED STATES OF AMERICA		3/21/1935	1101.80	0.00	CR CR01/316
1.00771010			RESERVOIR STO	RAGE TOTAL	1101 80	ACRF FFFT	1.1 0110 1010
					1101.00		

GRAND TOTAL ORIGINAL SUPPLY:	557.51 C.F.S.
GRAND TOTAL SUPPLEMENTAL SUPPLY:	1870.90 ACRES
GRAND TOTAL SECONDARY SUPPLY:	33,784.60 ACRES
-	
STOCK RESERVOIR STORAGE:	77.95 ACRE-FEET
<u>STOCK RESERVOIR STORAGE:</u> <u>RESERVOIR STORAGE:</u>	77.95 ACRE-FEET 63,636.31 ACRE-FEET
<u>STOCK RESERVOIR STORAGE:</u> <u>RESERVOIR STORAGE:</u> <u>GRAND TOTAL RESERVOIR STORAGE:</u>	77.95 ACRE-FEET 63,636.31 ACRE-FEET 63,714.26 ACRE-FEET
<u>STOCK RESERVOIR STORAGE:</u> <u>RESERVOIR STORAGE:</u> <u>GRAND TOTAL RESERVOIR STORAGE:</u>	77.95 ACRE-FEET 63,636.31 ACRE-FEET 63,714.26 ACRE-FEET
STOCK RESERVOIR STORAGE: RESERVOIR STORAGE: GRAND TOTAL RESERVOIR STORAGE: TRANS-WATERSHED DIVERSION (SUPPLEMENTAL SUPPLY IN)	77.95 ACRE-FEET 63,636.31 ACRE-FEET 63,714.26 ACRE-FEET 320.00 ACRES

Big Sandy Watershed, Level I Study

APPENDIX D

Tabulation of Stock Water Wells within the Big Sandy Watershed

PERMIT No.	PRIORITY DATE	APPLICANT: COMPANY/ LAST NAME	FACILITY NAME	ACTIVE USES
P11393.0P	12/31/1907	WEBSTER	WEBSTER #1	DOM_GW; STK
P11395.0P	12/31/1907	WEBSTER	WESBSTER #3	STK
P18380.0P	12/31/1919	BURTON	BURTON #3	STK
P20205.0P	12/31/1920	BLAIR & HAY LAND & L S CO.	HAY MIDDLE RANCH	DOM_GW; STK
P19303.0P	12/31/1921	HAWLEY	HAWLEY #3	STK
P19304.0P	12/31/1928	HAWLEY	HAWLEY #4	DOM_GW; STK
P23118.0P	6/30/1930	томісн	TOMICH #2	DOM_GW; STK
P16354.0P	12/31/1930	DEARTH	DEARTH #1	DOM_GW; STK
P20204.0P	12/31/1930	BLAIR & HAY LAND & L S CO.	FARSON FARM	DOM_GW; STK
P17353.0P	12/31/1935	KILLION	KILLION #1	DOM_GW; STK
P23911.0P	12/31/1935	STRINGER	STRINGER #1H	DOM_GW; STK
P23912.0P	12/31/1935	STRINGER	STRINGER #2B	DOM_GW; STK
P23117.0P	5/31/1936	томісн	TOMICH #1	DOM_GW; STK
P11405.0P	12/31/1938	томісн	MARY TOMICH #1	STK
P18359.0P	7/31/1940	MITCHELSON	MITCH #2	DOM_GW; STK
P20214.0P	5/25/1946	HARRISON	HARRISONS	DOM_GW; STK
P9367.0P	4/11/1948	Bureau of Land Management	BUCKHORN WELL #307	STK
P9026.0P	12/31/1948	BELL	VIGIL #1	DOM_GW; STK
P6435.0P	12/21/1949	SELLERS	SELLERS #1	DOM_GW; STK
P67.0G	3/3/1950	MCDERMOTT	PATRICIA S. MCDERMOTT #1	IND_GW; IRR_GW; STK
P9366.0P	6/15/1950	USDI - BLM	TELEPHONE CABIN WELL #364	STK
P18360.0P	6/30/1950	MITCHELSON	MITCH #3	DOM_GW; STK
P23119.0P	6/30/1950	томісн	TOMICH #3	DOM_GW; STK
P16352.0P	10/31/1950	JAMIESON	DEARTH #2	STK
P23913.0P	12/31/1950	STRINGER	STRINGER #3F	STK
P113.0G	8/14/1951	USDI - BLM	PATRICK S. MCDERMOTT SODIUMPROSPECTING PERMIT	DOM_GW; IND_GW; IRR_GW; STK
P16355.0P	3/31/1952	BUCHANAN	BUCHANAN #1	DOM_GW; STK
P9951.0P	12/21/1952	HARNS	HARNS #1	DOM_GW; STK
P20761.0P	12/31/1952	MC MURRY	ANGIE MC MURRY 1	DOM_GW; STK
P9027.0P	11/30/1953	BELL	FINLEY #2	STK
P19017.0P	6/15/1956	MATILAINEN	MATILAINEN #1	DOM_GW; STK
P23134.0P	9/30/1956	MCMURRY	MCMURRY #3	DOM_GW; STK
P17026.0P	6/30/1957	HODDER	HODDER RANCH #1	DOM_GW; STK
P12402.0P	6/30/1957	OLSON	OLSON #2	STK
P19796.0P	7/21/1958	HERBST	EDEN AGRICULTURAL SUBSTATION #1	DOM_GW; STK
P18379.0P	3/15/1960	BURTON	BURTON #2	STK
P316.0W	4/8/1960	COPPES	COPPES WELL #1	DOM_GW; IRR_GW; MIS; MUN_GW; STK
P20211.0P	5/31/1960	BOX R RANCHES	BOX R #1	DOM_GW; STK
P10497.0P	9/30/1960	USDI - BLM	ERRAMOUSPE WELL	STK
P20212.0P	5/30/1961	BOX R RANCHES	BOX R #2	STK
P10495.0P	8/30/1961	USDI - BLM	LITTLE COLORADO WELL #10	STK
P10496.0P	10/18/1961	USDI - BLM	LITTLE COLORADO #11	STK
P10494.0P	10/20/1961	USDI - BLM	LITTLE COLORADO WELL #9	STK
P10498.0P	11/19/1961	USDI - BLM	LITTLE COLORADO #12	STK

P843.0W	3/20/1962	MEYER	MEYER #1	IRR_GW; STK
P9369.0P	7/6/1963	USDI - BLM	MUD HOLE WELL #69	STK
P23133.0P	5/20/1964	MCMURRY	MCMURRY #2	STK
P13928.0P	4/12/1966	STOUT	SANDY #1	DOM_GW; STK
P9353.0P	9/1/1966	USDI - BLM	MUD HOLE WELL #629	STK
P9349.0P	9/15/1966	USDI - BLM	MUD HOLE WELL #630	STK
P11406.0P	9/30/1966	томісн	ED TOMICH #2	STK
P9354.0P	10/14/1966	USDI - BLM	STEELE-HITTLE SQUARE TOP WELL	STK
P20203.0P	8/15/1967	BLAIR & HAY LAND & L S CO.	RED'S WELL	DOM_GW; STK
P19306.0P	10/13/1967	HAWLEY	HAWLEY #6	STK
P18383.0P	7/31/1968	BURTON	SISK #2	STK
P20762.0P	9/30/1968	MC MURRY	ANGIE MC MURRY 2	DOM_GW; STK
P18391.0P	4/30/1969	DAHLIN	DEWS #1	DOM_GW; STK
P6567.0W	8/28/1970	SELLERS	SELLERS #2	DOM_GW; STK
P6870.0W	10/20/1970	USDI - BLM	BIG SANDY ALLOTMENT #1	STK
P6871.0W	10/20/1970	USDI - BLM	HIGHWAY ALLOTMENT #1	STK
P6878.0W	10/20/1970	USDI - BLM	NORTH PACIFIC CREEK #1	STK
P6881.0W	10/20/1970	USDI - BLM	FARSON #1	STK
P8521.0W	3/19/1971	USDI - BLM	YELLOW POINT WELL #4082	STK
P9959.0W	8/2/1971	GRANDY-X BAT T CATTLE COMPANY	GRANDY #1	DOM_GW; STK
P9966.0W	8/11/1971	RADOSEVICH	RADOSEVICH #1	DOM_GW; STK
P10061.0W	8/16/1971	OLSON	OLSON #1	DOM_GW; STK
P10062.0W	8/16/1971	HADLEY	HADLEY #2	IRR_GW; STK
CR UW01/186	8/16/1971	HADLEY	HADLEY NO. 2 WELL	IRR_GW; STK
P10135.0W	8/18/1971	COWAN	STAR #7	DOM_GW; STK
P10135.0W P10426.0W	8/18/1971 8/27/1971	COWAN MARK HUFFSTELER REVOCABLE TRUSTEE	STAR #7 MCMURRY #1	DOM_GW; STK DOM_GW; IRR_GW; STK
P10135.0W P10426.0W P10300.0W	8/18/1971 8/27/1971 9/7/1971	COWAN MARK HUFFSTELER REVOCABLE TRUSTEE MCMURRY	STAR #7 MCMURRY #1 BOB MCMURRY #1	DOM_GW; STK DOM_GW; IRR_GW; STK DOM_GW; STK
P10135.0W P10426.0W P10300.0W P10433.0W	8/18/1971 8/27/1971 9/7/1971 9/20/1971	COWAN MARK HUFFSTELER REVOCABLE TRUSTEE MCMURRY MC MURRY	STAR #7 MCMURRY #1 BOB MCMURRY #1 OASIS I	DOM_GW; STK DOM_GW; IRR_GW; STK DOM_GW; STK DOM_GW; STK
P10135.0W P10426.0W P10300.0W P10433.0W P10902.0W	8/18/1971 8/27/1971 9/7/1971 9/20/1971 11/10/1971	COWAN MARK HUFFSTELER REVOCABLE TRUSTEE MCMURRY MC MURRY ERRAMOUSPE BROS. INC.	STAR #7 MCMURRY #1 BOB MCMURRY #1 OASIS I ERRAMOUSPE BROS. #1	DOM_GW; STK DOM_GW; IRR_GW; STK DOM_GW; STK DOM_GW; STK STK
P10135.0W P10426.0W P10300.0W P10433.0W P10902.0W P11398.0W	8/18/1971 8/27/1971 9/7/1971 9/20/1971 11/10/1971 12/1/1971	COWAN MARK HUFFSTELER REVOCABLE TRUSTEE MCMURRY MC MURRY ERRAMOUSPE BROS. INC. GRANDY-X BAT T CATTLE COMPANY	STAR #7 MCMURRY #1 BOB MCMURRY #1 OASIS I ERRAMOUSPE BROS. #1 GRANDY #2	DOM_GW; STK DOM_GW; IRR_GW; STK DOM_GW; STK DOM_GW; STK STK STK STK
P10135.0W P10426.0W P10300.0W P10433.0W P10902.0W P11398.0W P12401.0W	8/18/1971 8/27/1971 9/7/1971 9/20/1971 11/10/1971 12/1/1971 12/10/1971	COWAN MARK HUFFSTELER REVOCABLE TRUSTEE MCMURRY MC MURRY ERRAMOUSPE BROS. INC. GRANDY-X BAT T CATTLE COMPANY TOMICH	STAR #7 MCMURRY #1 BOB MCMURRY #1 OASIS I ERRAMOUSPE BROS. #1 GRANDY #2 ED TOMICH #1	DOM_GW; STK DOM_GW; IRR_GW; STK DOM_GW; STK DOM_GW; STK STK STK DOM_GW; STK
P10135.0W P10426.0W P10300.0W P10433.0W P10902.0W P11398.0W P12401.0W P13927.0W	8/18/1971 8/27/1971 9/7/1971 9/20/1971 11/10/1971 12/1/1971 12/10/1971 5/11/1972	COWAN MARK HUFFSTELER REVOCABLE TRUSTEE MCMURRY ERRAMOUSPE BROS. INC. GRANDY-X BAT T CATTLE COMPANY TOMICH STOUT	STAR #7 MCMURRY #1 BOB MCMURRY #1 OASIS I ERRAMOUSPE BROS. #1 GRANDY #2 ED TOMICH #1 SANDY #2	DOM_GW; STK DOM_GW; IRR_GW; STK DOM_GW; STK DOM_GW; STK STK STK DOM_GW; STK IRR_GW; STK
P10135.0W P10426.0W P10300.0W P10433.0W P10902.0W P11398.0W P12401.0W P13927.0W P13932.0W	8/18/1971 8/27/1971 9/7/1971 9/20/1971 11/10/1971 12/1/1971 12/10/1971 5/11/1972 5/15/1972	COWAN MARK HUFFSTELER REVOCABLE TRUSTEE MCMURRY ERRAMOUSPE BROS. INC. GRANDY-X BAT T CATTLE COMPANY TOMICH STOUT JAMIESON	STAR #7 MCMURRY #1 BOB MCMURRY #1 OASIS I ERRAMOUSPE BROS. #1 GRANDY #2 ED TOMICH #1 SANDY #2 JAMIESON #1	DOM_GW; STK DOM_GW; IRR_GW; STK DOM_GW; STK DOM_GW; STK STK STK DOM_GW; STK IRR_GW; STK DOM_GW; STK
P10135.0W P10426.0W P10300.0W P10433.0W P10902.0W P11398.0W P12401.0W P13927.0W P13932.0W P13980.0W	8/18/1971 8/27/1971 9/7/1971 9/20/1971 11/10/1971 12/1/1971 12/10/1971 5/11/1972 5/15/1972 5/16/1972	COWAN MARK HUFFSTELER REVOCABLE TRUSTEE MCMURRY ERRAMOUSPE BROS. INC. GRANDY-X BAT T CATTLE COMPANY TOMICH STOUT JAMIESON MARTIN	STAR #7 MCMURRY #1 BOB MCMURRY #1 OASIS I ERRAMOUSPE BROS. #1 GRANDY #2 ED TOMICH #1 SANDY #2 JAMIESON #1 MARTIN #1	DOM_GW; STK DOM_GW; IRR_GW; STK DOM_GW; STK DOM_GW; STK STK DOM_GW; STK IRR_GW; STK DOM_GW; STK DOM_GW; STK
P10135.0W P10426.0W P10300.0W P10433.0W P10902.0W P11398.0W P12401.0W P13927.0W P13980.0W P13980.0W	8/18/1971 8/27/1971 9/7/1971 9/20/1971 11/10/1971 12/1/1971 12/10/1971 5/11/1972 5/15/1972 5/16/1972 5/22/1972	COWAN MARK HUFFSTELER REVOCABLE TRUSTEE MCMURRY ERRAMOUSPE BROS. INC. GRANDY-X BAT T CATTLE COMPANY TOMICH STOUT JAMIESON MARTIN DELAMBERT	STAR #7 MCMURRY #1 BOB MCMURRY #1 OASIS I ERRAMOUSPE BROS. #1 GRANDY #2 ED TOMICH #1 SANDY #2 JAMIESON #1 MARTIN #1 DELAMBERT #1	DOM_GW; STK DOM_GW; IRR_GW; STK DOM_GW; STK STK STK DOM_GW; STK IRR_GW; STK DOM_GW; STK DOM_GW; STK DOM_GW; STK
P10135.0W P10426.0W P10300.0W P10433.0W P10902.0W P11398.0W P12401.0W P13927.0W P13980.0W P13980.0W P13980.0W P13980.0W P13985.0W	8/18/1971 8/27/1971 9/7/1971 9/20/1971 11/10/1971 12/1/1971 12/10/1971 5/11/1972 5/15/1972 5/16/1972 5/22/1972 7/3/1972	COWAN MARK HUFFSTELER REVOCABLE TRUSTEE MCMURRY ERRAMOUSPE BROS. INC. GRANDY-X BAT T CATTLE COMPANY TOMICH STOUT JAMIESON MARTIN DELAMBERT MIDLAND LIVESTOCK CO.	STAR #7 MCMURRY #1 BOB MCMURRY #1 OASIS I ERRAMOUSPE BROS. #1 GRANDY #2 ED TOMICH #1 SANDY #2 JAMIESON #1 MARTIN #1 DELAMBERT #1 MIDLAND-EDEN #1	DOM_GW; STK DOM_GW; IRR_GW; STK DOM_GW; STK DOM_GW; STK STK DOM_GW; STK IRR_GW; STK DOM_GW; STK DOM_GW; STK DOM_GW; STK DOM_GW; STK
P10135.0W P10426.0W P10300.0W P10433.0W P10902.0W P11398.0W P12401.0W P13932.0W P13980.0W P13985.0W P14554.0W P14952.0W	8/18/1971 8/27/1971 9/7/1971 9/20/1971 11/10/1971 12/1/1971 12/10/1971 5/11/1972 5/15/1972 5/16/1972 5/22/1972 7/3/1972 8/7/1972	COWAN MARK HUFFSTELER REVOCABLE TRUSTEE MCMURRY ERRAMOUSPE BROS. INC. GRANDY-X BAT T CATTLE COMPANY TOMICH STOUT JAMIESON MARTIN DELAMBERT MIDLAND LIVESTOCK CO. Big Sandy Livestock Co.	STAR #7 MCMURRY #1 BOB MCMURRY #1 OASIS I ERRAMOUSPE BROS. #1 GRANDY #2 ED TOMICH #1 SANDY #2 JAMIESON #1 MARTIN #1 DELAMBERT #1 MIDLAND-EDEN #1 BIG SANDY #1	DOM_GW; STK DOM_GW; IRR_GW; STK DOM_GW; STK STK STK DOM_GW; STK DOM_GW; STK DOM_GW; STK DOM_GW; STK DOM_GW; STK DOM_GW; STK DOM_GW; STK
P10135.0W P10426.0W P10300.0W P10433.0W P10902.0W P11398.0W P12401.0W P13927.0W P13980.0W P13985.0W P14554.0W P14952.0W	8/18/1971 8/27/1971 9/7/1971 9/20/1971 11/10/1971 12/1/1971 12/10/1971 5/11/1972 5/15/1972 5/16/1972 5/22/1972 7/3/1972 8/7/1972	COWAN MARK HUFFSTELER REVOCABLE TRUSTEE MCMURRY MC MURRY ERRAMOUSPE BROS. INC. GRANDY-X BAT T CATTLE COMPANY TOMICH STOUT STOUT JAMIESON MARTIN DELAMBERT MIDLAND LIVESTOCK CO. Big Sandy Livestock Co.	STAR #7 MCMURRY #1 BOB MCMURRY #1 OASIS I ERRAMOUSPE BROS. #1 GRANDY #2 ED TOMICH #1 SANDY #2 JAMIESON #1 MARTIN #1 DELAMBERT #1 MIDLAND-EDEN #1 BIG SANDY #2	DOM_GW; STK DOM_GW; IRR_GW; STK DOM_GW; STK STK STK DOM_GW; STK IRR_GW; STK DOM_GW; STK DOM_GW; STK DOM_GW; STK DOM_GW; STK DOM_GW; STK DOM_GW; STK
P10135.0W P10426.0W P10300.0W P10433.0W P10902.0W P11398.0W P12401.0W P13927.0W P13980.0W P13985.0W P14554.0W P14953.0W P16082.0W	8/18/1971 8/27/1971 9/7/1971 9/20/1971 11/10/1971 12/1/1971 12/10/1971 5/11/1972 5/15/1972 5/15/1972 5/22/1972 7/3/1972 8/7/1972 8/7/1972 10/26/1972	COWAN MARK HUFFSTELER REVOCABLE TRUSTEE MCMURRY ERRAMOUSPE BROS. INC. GRANDY-X BAT T CATTLE COMPANY TOMICH STOUT JAMIESON JAMIESON MARTIN DELAMBERT MIDLAND LIVESTOCK CO. Big Sandy Livestock Co. Big Sandy Livestock Co.	STAR #7 MCMURRY #1 BOB MCMURRY #1 OASIS I ERRAMOUSPE BROS. #1 GRANDY #2 ED TOMICH #1 SANDY #2 JAMIESON #1 MARTIN #1 DELAMBERT #1 MIDLAND-EDEN #1 BIG SANDY #2 BIG SANDY #2 DON #1	DOM_GW; STK DOM_GW; IRR_GW; STK DOM_GW; STK STK STK DOM_GW; STK IRR_GW; STK DOM_GW; STK DOM_GW; STK DOM_GW; STK DOM_GW; STK DOM_GW; STK DOM_GW; STK DOM_GW; STK
P10135.0W P10426.0W P10300.0W P10433.0W P10902.0W P11398.0W P12401.0W P13927.0W P13980.0W P13980.0W P13985.0W P14952.0W P14952.0W P14950.0W	8/18/1971 8/27/1971 9/7/1971 9/20/1971 11/10/1971 12/1/1971 12/10/1971 5/11/1972 5/15/1972 5/16/1972 5/22/1972 7/3/1972 8/7/1972 8/7/1972 10/26/1972	COWAN COWAN MARK HUFFSTELER REVOCABLE TRUSTEE MCMURRY CMURRY ERRAMOUSPE BROS. INC. GRANDY-X BAT T CATTLE COMPANY GTOMICH STOUT JAMIESON MARTIN DELAMBERT MIDLAND LIVESTOCK CO. Big Sandy Livestock Co. Big Sandy Livestock Co. MILLER MITCHELSON	STAR #7 MCMURRY #1 BOB MCMURRY #1 OASIS I ERRAMOUSPE BROS. #1 GRANDY #2 ED TOMICH #1 SANDY #2 JAMIESON #1 MARTIN #1 DELAMBERT #1 MIDLAND-EDEN #1 BIG SANDY #2 BIG SANDY #2 DON #1 MITCH #1	DOM_GW; STK DOM_GW; IRR_GW; STK DOM_GW; STK STK DOM_GW; STK DOM_GW; STK DOM_GW; STK DOM_GW; STK DOM_GW; STK DOM_GW; STK DOM_GW; STK DOM_GW; STK DOM_GW; STK DOM_GW; STK
P10135.0W P10426.0W P10300.0W P10433.0W P10902.0W P11398.0W P12401.0W P13927.0W P13932.0W P13985.0W P14554.0W P14953.0W P16082.0W P17506.0W P23120.0W	8/18/1971 8/27/1971 9/7/1971 9/20/1971 11/10/1971 12/1/1971 12/10/1971 5/11/1972 5/15/1972 5/16/1972 5/22/1972 7/3/1972 8/7/1972 8/7/1972 10/26/1972 12/29/1972	COWAN MARK HUFFSTELER REVOCABLE TRUSTEE MCMURRY CERRAMOUSPE BROS. INC. GRANDY-X BAT T CATTLE COMPANY GRANDY-X BAT T CATTLE COMPANY TOMICH JAMIESON MARTIN DELAMBERT MIDLAND LIVESTOCK CO. Big Sandy Livestock Co. Big Sandy Livestock Co. MILLER MITCHELSON TOMICH	STAR #7 MCMURRY #1 BOB MCMURRY #1 OASIS I ERRAMOUSPE BROS. #1 GRANDY #2 ED TOMICH #1 SANDY #2 JAMIESON #1 MARTIN #1 DELAMBERT #1 MIDLAND-EDEN #1 BIG SANDY #2 DON #1 BIG SANDY #2 DON #1 MITCH #1 TOMICH #4	DOM_GW; STK DOM_GW; IRR_GW; STK DOM_GW; STK STK STK DOM_GW; STK DOM_GW; STK
P10135.0W P10426.0W P10300.0W P10433.0W P10902.0W P11398.0W P12401.0W P13932.0W P13985.0W P13985.0W P14554.0W P14952.0W P16082.0W P17506.0W P23120.0W P19301.0W	8/18/1971 8/27/1971 9/7/1971 9/20/1971 11/10/1971 12/1/1971 12/10/1971 5/11/1972 5/15/1972 5/15/1972 5/22/1972 7/3/1972 8/7/1972 8/7/1972 10/26/1972 12/29/1972 12/29/1972	COWAN MARK HUFFSTELER REVOCABLE TRUSTEE MCMURRY MC MURRY ERRAMOUSPE BROS. INC. GRANDY-X BAT T CATTLE COMPANY TOMICH STOUT JAMIESON JAMIESON MARTIN DELAMBERT MIDLAND LIVESTOCK CO. Big Sandy Livestock Co. Big Sandy Livestock Co. Big Sandy Livestock Co. MILLER MITCHELSON TOMICH	STAR #7 MCMURRY #1 BOB MCMURRY #1 OASIS I ERRAMOUSPE BROS. #1 GRANDY #2 ED TOMICH #1 SANDY #2 JAMIESON #1 MARTIN #1 DELAMBERT #1 MIDLAND-EDEN #1 BIG SANDY #1 BIG SANDY #2 DON #1 MITCH #1 TOMICH #4 HAWLEY #1	DOM_GW; STK DOM_GW; IRR_GW; STK DOM_GW; STK STK STK DOM_GW; STK DOM_GW; STK STK
P10135.0W P10426.0W P10300.0W P10433.0W P10902.0W P11398.0W P12401.0W P13927.0W P13932.0W P13980.0W P13985.0W P14952.0W P14952.0W P17506.0W P23120.0W P19301.0W P22178.0P	8/18/1971 8/27/1971 9/7/1971 9/20/1971 11/10/1971 12/1/1971 12/10/1971 5/11/1972 5/15/1972 5/16/1972 5/22/1972 7/3/1972 8/7/1972 8/7/1972 10/26/1972 12/29/1972 12/29/1972 12/29/1973	COWAN MARK HUFFSTELER REVOCABLE TRUSTEE MCMURRY CMC MURRY ERRAMOUSPE BROS. INC. GRANDY-X BAT T CATTLE COMPANY GTOMICH GTOM	STAR #7 MCMURRY #1 BOB MCMURRY #1 OASIS I ERRAMOUSPE BROS. #1 GRANDY #2 ED TOMICH #1 SANDY #2 JAMIESON #1 MARTIN #1 DELAMBERT #1 MIDLAND-EDEN #1 BIG SANDY #2 BIG SANDY #2 DON #1 BIG SANDY #2 DON #1 HAWLEY #1 AGUIRRE BROTHERS #1	DOM_GW; STK DOM_GW; IRR_GW; STK DOM_GW; STK STK STK DOM_GW; STK DOM_GW; STK
P10135.0W P10426.0W P10300.0W P10433.0W P10902.0W P11398.0W P12401.0W P13927.0W P13980.0W P13985.0W P14554.0W P14953.0W P16082.0W P17506.0W P19301.0W P23120.0W P13987.0P	8/18/1971 8/27/1971 9/7/1971 9/20/1971 11/10/1971 12/1/1971 12/1/1971 5/11/1972 5/15/1972 5/16/1972 5/22/1972 7/3/1972 8/7/1972 8/7/1972 10/26/1972 12/29/1972 12/29/1972 12/29/1973 4/23/1973	COWAN MARK HUFFSTELER REVOCABLE TRUSTEE MCMURRY ERRAMOUSPE BROS. INC. GRANDY-X BAT T CATTLE COMPANY TOMICH STOUT JAMIESON JAMIESON MARTIN DELAMBERT MIDLAND LIVESTOCK CO. Big Sandy Livestock Co. MILLER MITCHELSON TOMICH HAWLEY MARSCHALK	STAR #7 MCMURRY #1 BOB MCMURRY #1 OASIS I ERRAMOUSPE BROS. #1 GRANDY #2 ED TOMICH #1 SANDY #2 JAMIESON #1 MARTIN #1 DELAMBERT #1 MIDLAND-EDEN #1 BIG SANDY #2 BIG SANDY #2 DON #1 BIG SANDY #2 DON #1 MITCH #1 TOMICH #4 HAWLEY #1 AGUIRRE BROTHERS #1 LITTLE SANDY #3	DOM_GW; STK DOM_GW; IRR_GW; STK DOM_GW; STK STK STK DOM_GW; STK DOM_GW; STK
P10135.0W P10426.0W P10300.0W P10902.0W P10902.0W P11398.0W P12401.0W P13927.0W P13932.0W P13980.0W P13980.0W P13980.0W P13980.0W P13980.0W P13980.0W P13980.0W P14952.0W P14952.0W P14952.0W P14952.0W P14953.0W P16082.0W P139301.0W P23897.0P P23895.0P	8/18/1971 8/27/1971 9/7/1971 9/20/1971 11/10/1971 12/1/1971 12/1/1971 5/11/1972 5/15/1972 5/15/1972 5/22/1972 7/3/1972 8/7/1972 8/7/1972 10/26/1972 12/29/1972 12/29/1972 3/30/1973 4/23/1973	COWAN MARK HUFFSTELER REVOCABLE TRUSTEE MCMURRY MC MURRY ERRAMOUSPE BROS. INC. GRANDY-X BAT T CATTLE COMPANY TOMICH STOUT JAMIESON JAMIESON MARTIN DELAMBERT DELAMBERT MIDLAND LIVESTOCK CO. Big Sandy Livestock Co.	STAR #7 MCMURRY #1 BOB MCMURRY #1 OASIS I ERRAMOUSPE BROS. #1 GRANDY #2 ED TOMICH #1 SANDY #2 JAMIESON #1 SANDY #2 JAMIESON #1 DELAMBERT #1 DELAMBERT #1 DELAMBERT #1 BIG SANDY #1 BIG SANDY #2 DON #1 BIG SANDY #2 DON #1 MITCH #1 TOMICH #4 HAWLEY #1 AGUIRRE BROTHERS #1 LITTLE SANDY #3 LITTLE SANDY #1	DOM_GW; STK DOM_GW; IRR_GW; STK DOM_GW; STK STK STK DOM_GW; STK DOM_GW; STK STK DOM_GW; STK STK STK
P10135.0W P10426.0W P10300.0W P10902.0W P11398.0W P12401.0W P13927.0W P13932.0W P13980.0W P13980.0W P13985.0W P14952.0W P14952.0W P14952.0W P14953.0W P12506.0W P23120.0W P13931.0W P23897.0P P23895.0P P23896.0P	8/18/1971 8/27/1971 9/7/1971 9/20/1971 11/10/1971 12/1/1971 12/10/1971 5/11/1972 5/15/1972 5/16/1972 5/22/1972 7/3/1972 8/7/1972 8/7/1972 12/26/1972 12/26/1972 12/29/1972 12/29/1972 3/30/1973 4/23/1973 4/23/1973	COWAN MARK HUFFSTELER REVOCABLE TRUSTEE MCMURRY MC MURRY ERRAMOUSPE BROS. INC. GRANDY-X BAT T CATTLE COMPANY TOMICH STOUT JAMIESON MARTIN DELAMBERT MIDLAND LIVESTOCK CO. Big Sandy Livestock CO. Big	STAR #7 MCMURRY #1 BOB MCMURRY #1 OASIS I ERRAMOUSPE BROS. #1 GRANDY #2 ED TOMICH #1 SANDY #2 JAMIESON #1 MARTIN #1 DELAMBERT #1 MIDLAND-EDEN #1 BIG SANDY #1 BIG SANDY #2 DON #1 BIG SANDY #2 DON #1 MITCH #1 TOMICH #4 HAWLEY #1 AGUIRRE BROTHERS #1 LITTLE SANDY #3 LITTLE SANDY #2	DOM_GW; STK DOM_GW; IRR_GW; STK DOM_GW; STK STK DOM_GW; STK DOM_GW; STK STK STK STK

P25145.0W	12/11/1973	G & E LIVESTOCK INC.	WEST FARM #1	STK
P29870.0W	4/16/1974	LITTLE SANDY GRAZING ASSOC.	LITTLE SANDY #3	STK
P26536.0W	4/25/1974	JONES	JONES #1	DOM_GW; STK
P26862.0P	5/30/1974	USDI - BLM	HIGHWAY SUPPLY WELL #1	STK
P27318.0W	6/28/1974	TAUCHER	TAUCHER #1	DOM_GW; STK
P29309.0W	3/13/1975	MCCARTY	MCCARTY #1	DOM_GW; STK
P29868.0W	4/16/1975	LITTLE SANDY GRAZING ASSOC.	LITTLE SANDY #1	STK
P29869.0W	4/16/1975	LITTLE SANDY GRAZING ASSOC.	LITTLE SANDY #2	STK
P29589.0W	4/23/1975	MILLER	MILLER SPRING #1	STK
P29590.0W	4/23/1975	MILLER	MILLER SPRING #2	STK
P29871.0W	5/8/1975	JONES	JONES #2	DOM_GW; STK
P31516.0W	7/7/1975	LITTLE SANDY GRAZING ASSOC.	LITTLE SANDY #4	STK
P31286.0W	9/30/1975	GAULT	GAULT #1	DOM_GW; STK
P31310.0W	10/24/1975	HARNS	HARNS #2	DOM_GW; STK
P31311.0W	10/28/1975	MINES	MINES #1	DOM_GW; STK
P32552.0W	3/26/1976	FRANKS	FRANKS #1	DOM_GW; STK
P32548.0W	3/29/1976	WATTERSON	WATTERSON #1	DOM_GW; STK
P33544.0W	4/5/1976	MCCRACKEN	MCCRACKEN #1	DOM_GW; STK
P33545.0W	4/5/1976	MCCRACKEN	MCCRACKEN #3	DOM_GW; STK
P33553.0P	5/17/1976	MCCRACKEN	MCCRACKEN #3	DOM_GW; STK
P34383.0W	7/16/1976	BEAN	BEAN #2	STK
P35401.0W	11/9/1976	CLARK	CLARK #2	DOM_GW; STK
P37223.0W	2/9/1977	GERKEN	WOOD #1	DOM_GW; STK
P36893.0W	2/16/1977	MCMURRAY	MCMURRY WELL #5	IRR_GW; STK
P36411.0W	3/4/1977	MCCARTY	MCCARTY #2	DOM_GW; STK
P37950.0W	5/23/1977	SKORCZ	SKORCZ #1	DOM_GW; STK
P38067.0W	5/25/1977	HARRISON	P H HARRISON #1	STK
P38296.0W	6/8/1977	MIDLAND LIVESTOCK COMPANY	MIDLAND #2	STK
P38374.0W	6/10/1977	USDI - BLM	BARNES #1	STK
P38919.0W	7/13/1977	GILROY	GILROY #1	STK
P39468.0W	7/25/1977	APPLEQUIST	APPLEQUIST #1	DOM_GW; STK
P40088.0W	8/15/1977	USDI - BLM	ENL HIGHWAY SUPPLY WELL #1	STK
P41168.0W	11/19/1977	USDI - BLM	DAVIS LUMAN ROAD WATER	STK
P42410.0W	3/16/1978	APPLEQUIST	APPLEQUIST #2	DOM_GW; STK
P42411.0W	3/16/1978	APPLEQUIST	APPLEQUIST #3	DOM_GW; STK
P44532.0W	7/27/1978	APPLEQUIST	APPLEQUIST 4	DOM_GW; STK
P45832.0W	11/8/1978	WILSON	WILSON #1	DOM_GW; STK
P52609.0W	4/30/1979	STANHOPE	STANHOPE WELL #1	DOM_GW; STK
P49097.0W	7/13/1979	GRIFFIN	GRIFFIN #5	DOM_GW; STK
P49284.0W	7/31/1979	JONES	V B JONES #1	DOM_GW; STK
P50384.0W	10/22/1979	MINES	MINES #1	DOM_GW; STK
P51213.0W	2/19/1980	USDI - BLM	PACIFIC CREEK WELL #4514	STK
P51215.0W	2/19/1980	USDI - BLM	SIMPSON GULCH WELL #4517	STK
P51216.0W	2/19/1980	USDI - BLM	EMIGRANT TRAIL WELL #4518	STK
P51217.0W	2/19/1980	USDI - BLM	12 MILE ROAD WELL #4519	STK
P51222.0W	2/19/1980	USDI - BLM	RESERVOIR #4638	STK
P51229.0W	2/19/1980	USDI - BLM	BOUNDARY #4645	STK
P53371.0W	8/25/1980	8 H RANCH	8 H RANCH #1	DOM_GW; STK

P56036.0W	3/11/1981	USDI - BLM	WHITE MTN WELL #2 #4678	STK
P56039.0W	3/11/1981	USDI - BLM	BIG SANDY WELL #2 #4684	STK
P58469.0W	10/16/1981	ΜΑΥΟ	MAYO #1	DOM_GW; STK
P61248.0W	6/9/1982	GRANDPRE	JOJO #1	DOM_GW; STK
P64033.0W	4/27/1983	USDI - BLM	ASPIRATION #4676	STK
P63894.0W	5/4/1983	DELAMBERT	DELAMBERT #2	DOM_GW; STK
P64050.0W	5/16/1983	GRANDY-X BAT T CATTLE COMPANY	GRANDY #4	DOM_GW; STK
P71408.0W	10/28/1985	SIMNACHER	SIMNACHER #1	DOM_GW; STK
P71945.0W	2/19/1986	USDI - BLM	SANDY PASTURE WELL	STK
P71946.0W	2/19/1986	USDI - BLM	WATER HOLE DRAW	STK
P73001.0W	6/11/1986	USDA - National Forest Service	WOOLY BURGER SPRING	STK
P73609.0W	10/30/1986	LUPCHO	LUPCHO #1	DOM_GW; STK
P76398.0W	3/7/1988	MILLER	MILLER #1 WATER	STK
P77405.0W	6/28/1988	PARSONS	PARSONS #1	DOM_GW; STK
P77903.0W	9/6/1988	ETCHEVERRY	SUNSET RANCH #1	DOM_GW; STK
P79427.0W	4/6/1989	RADOSEVICH	SIMS #1	DOM_GW; STK
P79642.0W	5/1/1989	HARNS	STEVEN #1	DOM_GW; STK
P81428.0W	11/20/1989	Schneider	S AND H #1	DOM_GW; STK
P81366.0W	11/29/1989	THE MIDLAND LIVESTOCK CO.	NUMBER 1	STK
P82337.0W	4/27/1990	TAUCHER	TAUCHER #2	DOM_GW; STK
P85489.0W	7/3/1991	LITTLE SANDY GRAZING ASSOCIATION	LITTLE SANDY #5	STK
P85490.0W	7/3/1991	LITTLE SANDY GRAZING ASSOCIATION	LITTLE SANDY #6	STK
P86072.0W	9/9/1991	CANNON	CANNON #1	STK
P86399.0W	10/7/1991	PEDEN	PEDEN #1	DOM_GW; STK
P87266.0W	3/2/1992	MINES & SONS, INC.	MINES & SONS #1	DOM_GW; STK
P87492.0W	3/30/1992	THE MIDLAND LIVE STOCK CO.	ARAMBEL #1	STK
P87493.0W	3/30/1992	THE MIDLAND LIVE STOCK CO.	ARAMBEL #2	STK
P87494.0W	3/30/1992	THE MIDLAND LIVE STOCK CO.	ARAMBEL #3	STK
P87495.0W	3/30/1992	THE MIDLAND LIVE STOCK CO.	ARAMBEL #4	STK
P87496.0W	3/30/1992	THE MIDLAND LIVE STOCK CO.	ARAMBEL #5	STK
P88865.0W	7/15/1992	JUEL	JUEL #3	DOM_GW; STK
P90301.0W	11/30/1992	BLAIR & HAY LAND & LIVESTOCK INC	BLAIR & HAY - STATE #1	STK
P91786.0W	4/21/1993	GERKEN	GERKEN #2	DOM_GW; STK
P92125.0W	6/21/1993	DAVIS	WAPAHOE #1	DOM_GW; STK
P92535.0W	8/18/1993	WY STATE BOARD OF LAND COMMISSIONERS	ZAKOTNIK-STATE #1	STK
P92536.0W	8/19/1993	EATON	EATON #3	DOM_GW; STK
P93038.0W	9/20/1993	PECENKA	LANSBERRY #1	DOM_GW; STK
P95360.0W	5/12/1994	WEBSTER	WEBSTER #1	DOM_GW; STK
P95929.0W	6/27/1994	HANSEN	HANSEN #1	DOM_GW; STK
P96392.0W	7/15/1994	USDI, BUREAU OF LAND MANAGEMENT	TEA KETTLE BUTTE WELL	STK
P97352.0W	9/16/1994	BROADHEAD	BROADHEAD 1	DOM_GW; STK
P97310.0W	10/4/1994	SWEAT	SHERRI 1	DOM_GW; STK
P99283.0W	5/16/1995	RANTA	RANTA #1	DOM_GW; STK
P100741.0W	10/16/1995	LANSBERRY	LANSBERRY #2	DOM_GW; STK
P100779.0W	10/23/1995	TOMICH	ENL T & T #1	STK
P101822.0W	3/22/1996	MCCALLISTER	AARON MCCALLISTER #1	DOM_GW; STK

P106405.0W	6/11/1997	PAULSON	PAULSON #1	DOM_GW; STK
P106719.0W	7/10/1997	MCGUIRE	MCGUIRE #12	DOM_GW; STK
P107223.0W	8/21/1997	PFEILER	PFEILER #1	DOM_GW; STK
P108389.0W	1/2/1998	E-6 RISK MANAGEMENT	E-6 #1	STK
P108622.0W	1/20/1998	GRIFFIN	GRIFFIN #1	STK
P109430.0W	4/1/1998	BLAIR & HAY LAND & LIVESTOCK INC.	BLAIR & HAY #1	STK
P113264.0W	12/4/1998	USDI - BLM	WOLF WELL	STK
P114471.0W	2/26/1999	JONES	JONES #1	DOM_GW; STK
P115320.0W	4/19/1999	HICKS	HFD #1	DOM_GW; STK
P118363.0W	8/30/1999	APPLEQUIST	APPLEQUIST 9	DOM_GW; STK
P121570.0W	12/28/1999	Hale	HALE #2	DOM_GW; STK
P126314.0W	6/14/2000	SABOURIN	SABOURIN #1	DOM_GW; STK
P126612.0W	6/26/2000	EATON	EATON NO. 2	DOM_GW; STK
P132946.0W	3/5/2001	CHENEVERT	PEWTRESS WELL # 1	DOM_GW; STK
P138923.0W	9/12/2001	OWEN	RAY OWEN # 2	STK
P143136.0W	3/13/2002	MCGUIRE	MCGUIRE #13	DOM_GW; STK
P143137.0W	3/13/2002	MCGUIRE	MCGUIRE #14	DOM_GW; STK
P144148.0W	4/3/2002	Aaron's Water Service	ENL. AARON'S WELL # 2	DOM_GW; MIS; STK
P144135.0W	4/29/2002	RYAN	RYAN # 1	DOM_GW; STK
P144381.0W	5/9/2002	OWEN	# 1	STK
P145556.0W	6/28/2002	SMITH	HV SMITH 31	DOM_GW; STK
P145992.0W	7/18/2002	WEBSTER	ENL.OF WEBSTER #1	DOM_GW; STK
P146618.0W	8/28/2002	BERG	BERG # 1	STK
P147913.0W	11/8/2002	G & E LIVESTOCK INC.	JONAH WELL # 1	STK
P151863.0W	6/9/2003	SELLERS	SELLERS #3	DOM_GW; STK
P153654.0W	8/27/2003	ZIEGLER	ZIEGLER #1	DOM_GW; STK
P153839.0W	9/2/2003	HAWS	STACKYARD #1	DOM_GW; STK
P154253.0W	9/25/2003	BLAIR & HAY LAND & LIVESTOCK	EAST BANANA RANCH 1	STK
P154355.0W	9/25/2003	BLAIR AND HAY LAND AND LIVESTOCK	ENL MIDDLE RANCH WELL #1	STK
CR UW15/211	9/25/2003	BLAIR AND HAY LAND AND LIVESTOCK COMPANY	ENL. MIDDLE RANCH WELL NO. 1	STK
P154559.0W	10/14/2003	DUNTON SHEEP COMPANY	ARAMBEL #20	STK
P155402.0W	12/10/2003	USDI - BLM	WWTM 14-24	STK
P155403.0W	12/10/2003	G & E LIVESTOCK INC.	HABANERO FEDERAL WELL #1	STK
P158762.0W	5/6/2004	JOHNSON	BIG SANDY #1	DOM_GW; STK
P159162.0W	5/21/2004	NIX	NIX #1	DOM_GW; STK
P169288.0W	7/27/2005	JONES	JONES #1	DOM_GW; STK
P174627.0W	5/12/2006	МАСК	MACK #2	STK
P176945.0W	8/31/2006	ROACH	ROACH #1	DOM_GW; STK
P177977.0W	10/26/2006	BLAIR AND HAY LAND AND LIVESTOCK	BANANA #2	DOM_GW; STK
P180214.0W	2/22/2007	G & E LIVESTOCK, INC	RADIO TOWER 1-8 WW	STK
P180215.0W	2/22/2007	G & E LIVESTOCK, INC	ANTELOPE 15-23	STK
P183386.0W	9/17/2007	ETCHEVERRY	ETCHEVERRY WELL #2	DOM_GW; STK
P183378.0W	9/26/2007	HARNS	WILLIAM #2	STK
P183712.0W	10/29/2007	SCHEER	DARIN NUMBER TWO	DOM_GW; STK
P185192.0W	2/8/2008	MIDLAND LIVESTOCK COMPANY	MIDLAND NO. 6 WELL	IRR_GW; STK
CR UW22/062	2/8/2008	MIDLAND LIVE STOCK COMPANY	MIDLAND NO. 6 WELL	IRR_GW; STK

P186171.0W	3/24/2008	G & E LIVESTOCK, INC.	ANITA MAE #1	STK
P187705.0W	7/18/2008	BLAIR AND HAY LAND AND LIVESTOCK COMPANY	ENL MIDDLE RANCH WELL NO. 1	STK
CR UW15/212	7/18/2008	BLAIR AND HAY LAND AND LIVESTOCK COMPANY	ENL. MIDDLE RANCH WELL NO. 1	STK
P189402.0W	10/3/2008	BP AMERICA PRODUCTION CO.	CABRITO 9-25	MIS; STK
P189925.0W	3/11/2009	LUX	FARM WELL #1	DOM_GW; STK
P190367.0W	5/1/2009	DUNTON SHEEP COMPANY	FEWE WELL NO. 1	STK
P191117.0W	7/21/2009	G & E LIVESTOCK, INC.	JIO BOUNDARY WELL	STK
P198720.0W	6/3/2010	USDI-BUREAU OF LAND MANAGEMENT	EMIGRANT WELL	STK
P198722.0W	6/3/2010	BUREAU OF LAND MANAGEMENT	BIG BEND PASTURE WELL	STK
P198723.0W	6/3/2010	USDI-BUREAU OF LAND MANAGEMENT	JENSEN WASH WELL	STK
P198725.0W	6/3/2010	USDI-BUREAU OF LAND MANAGEMENT	WEST 191 WELL	STK
P198727.0W	6/3/2010	USDI-BUREAU OF LAND MANAGEMENT	CENTRAL WELL	STK
P195058.0W	2/23/2011	SMITH	J SMITH NO 1	DOM_GW; STK
P195391.0W	3/31/2011	MIDLAND LIVESTOCK COMPANY	MIDLAND WELL 2011-1	STK
P195392.0W	3/31/2011	MIDLAND LIVE STOCK COMPANY	MIDLAND WELL 2011-2	STK
P198059.0W	4/2/2012	GZ LIVESTOCK	STAGECOACH DRAW #10-W	STK
P199078.0W	9/10/2012	G & E LIVESTOCK INC	SOUTH POSTON WELL	STK
P199079.0W	9/10/2012	G & E LIVESTOCK INC	BULL DRAW WELL	STK
P199197.0W	10/17/2012	DUNTON SHEEP COMPANY	DUNTON SHEEP - PROSPECT MOUNTAIN #1 WELL	STK
P199198.0W	10/17/2012	DUNTON SHEEP COMPANY	DUNTON SHEEP - PROSPECT MOUNTAIN #2 WELL	STK
P200682.0W	7/12/2013	JONAH ENERGY LLC	CABRITO 15-25	MIS; STK
P200683.0W	7/12/2013	JONAH ENERGY LLC	CABRITO 3-31	MIS; STK
P200684.0W	7/12/2013	JONAH ENERGY LLC	CABRITO 19F	MIS; STK
P200780.0W	7/23/2013	JONAH ENERGY LLC	RAINBOW 15-32	MIS; STK
P201273.0W	10/28/2013	G & E LIVESTOCK, INC	NORTHEAST POSTON WELL	STK
P201989.0W	3/24/2014	MIDLAND LIVESTOCK CO	ENL. MIDLAND NO.6 WELL	IRR_GW; STK
CR UW22/063	3/24/2014	MIDLAND LIVE STOCK COMPANY	ENL. MIDLAND NO. 6 WELL	IRR_GW; STK
P202024.0W	5/5/2014	КОВВЕ	KOBBE RANCH WELL #2	DOM_GW; STK
P203200.0W	7/11/2014	BURTON H AND CHRISTINE A DELAMBERT REV TRUSTS	DELAMBERT	DOM_GW; IRR_GW; STK
P203228.0W	12/15/2014	BURTON	BURTON #1	DOM_GW; STK
P203249.0W	12/22/2014	MCMURRY RANCH LLC	SKR #3	STK
P203486.0W	2/27/2015	USBLM	SHIPPING CORRAL WELL	STK
P203990.0W	6/1/2015	GOICOLEA	EUSKADI #2015	IRR_GW; STK
P204469.0W	8/27/2015	JONES	JONES #1	DOM_GW;STK
P204560.0W	9/17/2015	EATON	JAMES EATON WELL #11	STK
P204794.0W	10/1/2015	JONAH ENERGY LLC	OVERFILE OF ANTELOPE 15-23	STK
P204886.0W	11/10/2015	DUNTON SHEEP COMPANY	MACK FLAT 2015 WELL	DOM_GW; STK
P205515.0W	4/28/2016	DELAMBERT	ENL. DE LAMBERT NO. 1 WELL	DOM_GW; STK
CR UW22/153	4/28/2016	BURTON HARLEN AND CHRISTINE A DELAMBERT REV TRUSTS	ENL. DELAMBERT NO. 1 WELL	DOM_GW; STK
P206152.0W	9/1/2016	LAZY S RANCH	GENTIAN 3	DOM_GW; STK
P206698.0W	1/30/2017	G & E LIVESTOCK INC	WEST FARM #2	STK
P206968.0W	3/27/2017	SMITH X11 LLC	SMITH X11	STK
	5/9/2017	POLLARD	POLLARD LIVESTOCK WELL	STK

P207989.0W	8/28/2017	DUNTON SHEEP COMPANY	DEWEY #2	STK
P208769.0W	3/26/2018	KIM R BROWN LIVING TRUST	MC WEST STOCK WELL	STK
P209786.0W	9/28/2018	BURRIS	BURRIS#1	DOM_GW; STK
P210794.0W	5/28/2019	КОВВЕ	KOBBE RANCH #1	DOM_GW;STK

Big Sandy Watershed, Level I Study

APPENDIX E

Conceptual-Level Designs, Cost Estimates, and Permit Requirements

SMALL WATER PROJECT INDEX

WATERSHED MANAGEMENT & REHABILITATION PLAN SMALL WATER PROJECT PROGRAM (SWPP) DATABASE

	ACCOUNT I - PROJECT PRIORITIES	ACCOUNT II - PROJECT PRIORITIES
1	Source Water Development	Diversion structures and Spring Developments
2	Storage	Storage
3	Pipelines, Conveyance Facilities, Solar Platforms, and Windmills	Pipelines, Conveyance Facilities, Solar Platforms, and Windmills
4	Irrigation	Irrigation other than above
5	Environmental	Environmental
6	Recreational	Recreational

Account I	(NEW DEVELOPMENT)
Account II	(REHABILITATION)

					SWPP	PLSS LOCATION G			GEODETIC COOP	RDINATES (NAD83)			
PROJECT ID	PROJECT NAME	APPLICANT	EXISTING PERMIT #	PROJECT TYPE	PROJECT PRIORITY	SECTION	ALIQUOT PART	TOWNSHIP (N)	RANGE (W)	LATITUDE (N)	LONGITUDE (W)	OVERALL BENEFIT TO THE WATERSHED	
1	PROSPECT MOUNTAIN #1 WELL	MIDLAND LIVESTOCK COMPANY	P199197.0W	SOURCE WATER DEV.	ACCOUNT I - 1	36	SE/4SW/4	30	105	42°31'20.86"	109°19'04.44"	Air Quality, Wildlife, Range Management & Health	
2	PROSPECT MOUNTAIN #2 WELL	MIDLAND LIVESTOCK COMPANY	P199198.0W	SOURCE WATER DEV.	ACCOUNT I - 1	16	SW/4SW/4	28	105	42°23'41.98"	109°21'09.73"	Air Quality, Wildlife, Range Management & Health	
3	DAVIS LUMAN ROAD WATER WELL	MIDLAND LIVESTOCK COMPANY	P41168.0W	SOURCE WATER DEV.	ACCOUNT I - 1	21	NW/4SW/4	27	108	42°17'59.42"	109°42'06.90"	Air Quality, Wildlife, Range Management & Health	
4	MIDLAND WELL 2011-1	MIDLAND LIVESTOCK COMPANY	P195391.0W	SOURCE WATER DEV.	ACCOUNT I - 1	16	SE/4NE/4	26	107	42°13'51.48"	109°34'14.63"	Air Quality, Wildlife, Range Management & Health	
5	MIDLAND WELL 2011-2	MIDLAND LIVESTOCK COMPANY	P195392.0W	SOURCE WATER DEV.	ACCOUNT I - 1	36	SW/4NE/4	27	108	42°16'21.96"	109°38'06.26"	Air Quality, Wildlife, Range Management & Health	
6	DAVIS - OLD ROAD UNIT #1 WATER WELL	MIDLAND LIVESTOCK COMPANY	P54621.0W (CANCELLED)	SOURCE WATER DEV.	ACCOUNT I - 1	27	NW/4SE/4	27	108	42°17'06.10"	109°40'24.60"	Air Quality, Wildlife, Range Management & Health	
7	HOUSE ON THE FLAT WELL #1	MIDLAND LIVESTOCK COMPANY	NONE	SOURCE WATER DEV.	ACCOUNT I - 1	25	SW/4SW/4	27	107	42°16'41.81"	109°31'28.35"	Air Quality, Wildlife, Range Management & Health	
8	MIDLAND ROCK WELL	MIDLAND LIVESTOCK COMPANY	NONE	SOURCE WATER DEV.	ACCOUNT I - 1	10	NE/4SE/4	27	106	42°19'36.21"	109°26'01.57"	Air Quality, Wildlife, Range Management & Health	
9	MIDLAND DIESEL WELL	MIDLAND LIVESTOCK COMPANY	NONE	SOURCE WATER DEV.	ACCOUNT I - 1	16	SW/4NE/4	27	109	42°19'04.10"	109°48'36.20"	Air Quality, Wildlife, Range Management & Health	
10	MIDLAND PAMONA WELL	MIDLAND LIVESTOCK COMPANY	NONE	SOURCE WATER DEV.	ACCOUNT I - 1	36	NW/4SW/4	27	109	42°16'10.20"	109°45'40.80"	Air Quality, Wildlife, Range Management & Health	
11	J&G DITCH / SHEEP CREEK SIPHON	DUNTON SHEEP COMPANY	P2957.0D	PIPELINE	ACCOUNT I - 3	15	NW/4	30	105	42°34'11.04"	109°20'50.58"	Water Conservation, Clean Energy	
12	J&G DITCH - PHASE I PIPING	DUNTON SHEEP COMPANY	P2957.0D	PIPELINE	ACCOUNT I - 3	15	SW/4	30	105	42°34'00.20"	109°20'58.93"	Water Conservation, Water Quality Improvement	
13	J&G DITCH - PHASE II PIPING	DUNTON SHEEP COMPANY	P2957.0D	PIPELINE	ACCOUNT I - 3	15	W/2SE/4, N/2SW/4	30	105	42°34'34.30"	109°21'19.01"	Water Conservation, Water Quality Improvement	
14	SQUARETOP RESERVOIR REHAB	MIDLAND LIVESTOCK COMPANY	P3339.0R	STORAGE	ACCOUNT II - 2	2	N/2SW/4	29	105	42°30'32.11"	109°20'20.54"	Wildlife, Improved Range Management & Health, Water Conservation	
15	PROSPECT MTN. ALLOTMENT_BLM FENCE No. 1	MIDLAND LIVESTOCK COMPANY	N/A	ENVIRONMENTAL	ACCOUNT I - 5	4	S/2	29	104	42°30'24.96"	109°15'18.65"	Riparian Area Protection and Improvement	
16	PROSPECT MTN. ALLOTMENT- PRIVATE FENCE No. 1	MIDLAND LIVESTOCK COMPANY	N/A	ENVIRONMENTAL	ACCOUNT I - 5	4	SE/4SE/4	29	104	42°30'31.62"	109°14'47.14"	Riparian Area Protection and Improvement	
17	PROSPECT MTN. ALLOTMENT-STATE FENCE No. 1	MIDLAND LIVESTOCK COMPANY	N/A	ENVIRONMENTAL	ACCOUNT I - 5	3	S/2SW/4	29	104	42°30'18.40"	109°14'27.55"	Riparian Area Protection and Improvement	
18	PROSPECT MTN. ALLOTMENT- PRIVATE FENCE No. 2	MIDLAND LIVESTOCK COMPANY	N/A	ENVIRONMENTAL	ACCOUNT I - 5	3	E/2	29	104	42°30'54.84"	109°13'54.36"	Riparian Area Protection and Improvement	
19	PROSPECT MTN. ALLOTMENT-BLM FENCE No. 2	MIDLAND LIVESTOCK COMPANY	N/A	ENVIRONMENTAL	ACCOUNT I - 5	35	SW/4NW/4	30	104	42°31'41.98"	109°13'33.37"	Riparian Area Protection and Improvement	
20	PROSPECT MTN. ALLOTMENT-STATE FENCE No. 2	MIDLAND LIVESTOCK COMPANY	N/A	ENVIRONMENTAL	ACCOUNT I - 5	35	N/2	30	104	42°32'04.44"	109°13'08.04"	Riparian Area Protection and Improvement	
21	EDEN-FARSON FIRE SUPPRESSION SYSTEM	KIM BROWN	N/A	FIRE SUPPRESSION	ACCOUNT I - 1, 3	27	MULTIPLE	25	106	42°06'31.03"	109°26'56.65"	Fire Protection	
22	LITTLE SANDY CREEK CROSSING REHAB	ROBERT CHESNOVAR	NONE	ACCESS	NOT ELIGIBLE	28	SE/4NW/4	26	105	42°12'01.62"	109°20'50.74"	None	
23	BIG SANDY DIVERSION STRUCTURE #1	G&E LIVESTOCK, INC.	P6739.0D	DIVERSION STRUCTURE	ACCOUNT I - 1	4	LOT 3	28	106	42°25'45.82"	109°27'42.75"	Water Conservation	
24	BIG SANDY DIVERSION STRUCTURE #2	G&E LIVESTOCK, INC.	P6739.0D	DIVERSION STRUCTURE	ACCOUNT I - 1	4	LOT 4	28	106	42°25'50.71"	109°28'10.61"	Water Conservation	
25	ERRAMOUSPE SPRING DEVELOPMENT #1	G&E LIVESTOCK, INC.	NONE	SPRING DEVELOPMENT	ACCOUNT I - 1	20	SW/4NW/4	29	106	42°28'10.29"	109°31'04.16"	Water Conservation, Water Quality Improvement, Improved Range Management & Health	

26	ERRAMOUSPE SPRING DEVELOPMENT #2	G&E LIVESTOCK, INC.	NONE	SPRING DEVELOPMENT	ACCOUNT I - 1	25	SW/4SE/4	29	106	42°26'46.06"	109°25'48.08"	Water Conservation, Water Quality Improvement, Improved Range Management & Health
27	BOUNDARY #4645 WELL STOCK WATER TROUGH REHAB	G&E LIVESTOCK, INC.	P51229.0W	STORAGE	ACCOUNT II - 2	25	NE/4NW/4	28	108	42°22'45.07"	109°38'30.13"	Water Conservation, Water Quality Improvement, Improved Range Management & Health
28	MCMURRY DITCH REHAB	MCMURRY RANCH, LLC	P24983.0D	PIPELINE	ACCOUNT II - 3	9	E/2SW/4	24	106	42°04'08.39"	109°25'59.75"	Water Conservation, Water Quality Improvement
29	FRANCIS DITCH CHECK STRUCTURE REHAB	X BAR T RANCH, LLC	T4314	DIVERSION STRUCTURE	ACCOUNT II - 1	3	LOT 1	25	106	42°10'29.74"	109°25'57.00"	Fish Passage, Wildlife Habitat
30	FRANCIS DITCH DIVERSION REHAB	X BAR T RANCH, LLC	T4314	DIVERSION STRUCTURE	ACCOUNT II - 1	3	LOT 1	25	106	42°10'29.41"	109°25'57.22"	Water Conservation
31	DEAD COW FIELD DIVERSION REHAB	X BAR T RANCH, LLC	P3105.0E	DIVERSION STRUCTURE	ACCOUNT II - 1	3	SE/4NE/4	25	106	42°10'17.28"	109°25'58.11"	Water Conservation
32	EAST BIG SANDY SPREADER DIKE DEVELOPMENT	X BAR T RANCH, LLC	P3105.0E	CONVEYANCE FACILITY	ACCOUNT I - 4	10	NE/4	25	106	42°09'34.13"	109°26'11.88"	Wildlife Habitat and Water Conservation
33	FRANCIS DITCH TURNOUT #1	X BAR T RANCH, LLC	P3105.0E	DIVERSION STRUCTURE	ACCOUNT II - 1	10	NE/4SW/4	25	106	42°09'08.96"	109°26'39.43"	Water Conservation
34	FRANCIS DITCH TURNOUT #2	X BAR T RANCH, LLC	P3105.0E	DIVERSION STRUCTURE	ACCOUNT II - 1	10	NW/4NE/4	25	106	42°09'35.81"	109°26'29.50"	Water Conservation
35	FRANCIS DITCH TURNOUT #3	X BAR T RANCH, LLC	P3105.0E	DIVERSION STRUCTURE	ACCOUNT II - 1	10	NW/4NE/4	25	106	42°09'39.07"	109°26'29.71"	Water Conservation
36	FRANCIS DITCH TURNOUT #4	X BAR T RANCH, LLC	P3105.0E	DIVERSION STRUCTURE	ACCOUNT II - 1	3	SW/4SE/4	25	106	42°09'43.65"	109°26'25.80"	Water Conservation
37	FRANCIS DITCH TURNOUT #5	X BAR T RANCH, LLC	P3105.0E	DIVERSION STRUCTURE	ACCOUNT II - 1	3	SW/4SE/4	25	106	42°09'54.45"	109°26'22.70"	Water Conservation
38	FRANCIS DITCH DROP STRUCTURE REHAB	X BAR T RANCH, LLC	P3105.0E	CONVEYANCE FACILITY	ACCOUNT II - 3	10	NE/4SW/4	25	106	42°09'04.81"	109°26'33.32"	Water Conservation
39	FRANCIS DITCH DIVERSION #1	X BAR T RANCH, LLC	P3105.0E	DIVERSION STRUCTURE	ACCOUNT II - 1	10	NE/4SW/4	25	106	42°09'04.35"	109°26'31.95"	Water Conservation
40	FRANCIS DITCH DIVERSION #2	X BAR T RANCH, LLC	P3105.0E	DIVERSION STRUCTURE	ACCOUNT II - 1	10	NE/4SW/4	25	106	42°09'04.45"	109°26'31.81"	Water Conservation
41	LOWER RANCH SPRING DEVELOPMENT	X BAR T RANCH, LLC	NONE	SPRING DEVELOPMENT	ACCOUNT I - 1	15	NE/4NW/4	25	106	42°08'49.35"	109°26'34.24"	Water Conservation and Water Quality Improvement
42	CHAMBERS DITCH CHECK STRUCTURE REHAB	LITTLE SANDY GRAZING ASSOCIATION	P10970.0D	DIVERSION STRUCTURE	ACCOUNT II - 1	2	LOT 2	26	105	42°15'42.16"	109°18'06.94"	Fish Passage, Wildlife Habitat
43	SCHIESTLER-BRADY CHECK STRUCTURE REHAB	LITTLE SANDY GRAZING ASSOCIATION	P9318.0D	DIVERSION STRUCTURE	ACCOUNT II - 1	5	SE/4SW/4	27	104	42°20'09.97"	109°15'04.69"	Fish Passage, Wildlife Habitat
44	LITTLE SANDY WELL #1 REHAB	LITTLE SANDY GRAZING ASSOCIATION	NONE	SOURCE WATER DEV.	ACCOUNT II - 3	25	SW/4NE/4	28	105	42°22'19.69"	109°17'41.68"	Air Quality, Wildlife, Range Management & Health
45	COWAN STOCK RESERVOIR	CLAYTON COWAN	NONE	STORAGE	ACCOUNT I - 2	12	NE/4SE/4	25	106	42°09'06.15"	109°23'47.15"	Wildlife Habitat and Water Conservation
46	JONAH STOCK WATER WELL SOLAR CONVERSION	G&E LIVESTOCK, INC.	NONE	SOURCE WATER DEV.	ACCOUNT I - 1	14	SW/4SW/4	28	108	42°23'56.72"	109°39'46.15"	Air Quality, Wildlife, Range Management & Health
47	BURRIS STOCK WATER WELL No. 2	TOM BURRIS	NONE	SOURCE WATER DEV.	ACCOUNT I - 1	21	SE/4SE/4	24	106	42°02'12.90"	109°25'13.02"	Air Quality, Wildlife, Range Management & Health
48	BURRIS STOCK WATER WELL No. 3	TOM BURRIS	NONE	SOURCE WATER DEV.	ACCOUNT I - 1	21	NE/4SE/4	24	106	42°02'33.70"	109°25'08.68"	Air Quality, Wildlife, Range Management & Health
49	MINES STOCK WATER WELL No. 6	JIM MINES	NONE	SOURCE WATER DEV.	ACCOUNT I - 1	23	SW/4SW/4	26	106	42°12'20.48"	109°25'41.13"	Air Quality, Wildlife, Range Management & Health
50	MINES SPRINKLER SYSTEM DIVERSION REHAB	JIM MINES	P26141.0D	DIVERSION STRUCTURE	ACCOUNT II - 1	35	SW/4NW/4	26	106	42°11'10.11"	109°25'39.06"	Improved Riparian Condition, Water Conservation
51	GURR STOCK WATER WELL DEVELOPMENT	GURR FAMILY RANCH	P20212.0W	SOURCE WATER DEV.	ACCOUNT I - 1	31	NE/4SE/4	25	105	42°05'43.78"	109°22'28.10"	Air Quality, Wildlife, Range Management & Health
52	PROSPECT MTN. ALLOTMENT-STATE FENCE No. 3	MIDLAND LIVESTOCK COMPANY	N/A	ENVIRONMENTAL	ACCOUNT I - 5	35	NW/4	30	104	42°31'43.99"	109°13'20.55"	Riparian Area Protection and Improvement

BIG SANDY WATERSHED STUDY LEVEL I

Owner/Operator: Midland Livestock Company Project Type: Stock Water Well Development Project ID: 1 Project Name: Prospect Mountain #1 Well Location (PLSS): SE/4NW/4 of Sec. 36, T.30N., R.105W. Location (Lat/Long): 42°31'20.86"N, 109°19'04.44"W

ITEM No.	DESCRIPTION	QUANTITY	UNIT	U	NIT COST	T	OTAL COST
1	Mobilization	1	LS	\$	2,100.00	\$	2,100.00
2	Install 300 BBL Water Tank (Supplied by Owner)	1	LS	\$	3,600.00	\$	3,600.00
3	2" SDR-11 Pipe	109	LF	\$	3.50	\$	381.50
4	I/O 50 Solar Disconnect	1	EA	\$	150.00	\$	150.00
5	235 Watt solar panel	6	EA	\$	375.00	\$	2,250.00
6	Solar Rack & Mounting Kit	1	EA	\$	950.00	\$	950.00
7	Solar Equipment/Wiring/Labor	1	LS	\$	5,500.00	\$	5,500.00
8	Transfer Switch Unit	1	EA	\$	200.00	\$	200.00
9	Fit Stock Tanks w/ Fill & Drain Lines	1	LS	\$	2,200.00	\$	2,200.00
10	2" Mechanical Float Valve	1	EA	\$	120.00	\$	120.00
11	Fabricate & Install Sheep Trough	100	LF	\$	30.00	\$	3,000.00
12	Protective Fencing	75	LF	\$	9.00	\$	675.00

PROJECT COMPONENTS (ENGINEER'S ESTIMATE)

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 21,126.50

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 2,600.00
PERMITTING AND MITIGATION:	\$ 350.00
LEGAL FEES:	\$ -
ACQUISTION OF ACCESS AND RIGHTS-OF-WAY:	\$ 600.00
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 3,550.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 21,126.50

	Ŷ	2,112.05
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$	23,239.15
CONTINGENCY (SUBTOTAL #3 X 15%):	\$	3,485.87
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$	26,725.02

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 30,275.02

PERMITTING REQUIREMENTS

Project ID: 1 **Project Name:** Prospect Mountain #1 Well **Land Jurisdiction:** State of Wyoming

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 1 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred. All new tanks shall have escape ramps.

State Engineer's Office

Current Permit: P199197.0W

One (1) stock tank and one (1) trough are currently permitted. The two troughs that exist are operated together as one (1) trough. No additional permitting is required as long as the terms and conditions of the existing permit are followed.

Wyoming Office of State Lands and Investments

An application for construction of improvements should be completed and submitted to said Office after the final design has been developed (Storage Tank, Solar Unit, and Sheep Trough).














Owner/Operator: Midland Livestock Company Project Type: Stock Water Well Development Project ID: 2 Project Name: Prospect Mountain #2 Well Location (PLSS): SW/4SW/4 of Sec. 16, T.28N., R.105W. Location (Lat/Long): 42°23'41.98"N, 109°21'09.73"W

ITEM No.	DESCRIPTION	QUANTITY	UNIT	U	NIT COST	тс	TAL COST
1	Mobilization	1	LS	\$	2,800.00	\$	2,800.00
2	Install 300 BBL Water Tank (Supplied by Owner)	1	LS	\$	3,600.00	\$	3,600.00
3	2" SDR-11 Pipe	1290	LF	\$	3.50	\$	4,515.00
4	I/O 50 Solar Disconnect	1	EA	\$	150.00	\$	150.00
5	235 Watt solar panel	6	EA	\$	375.00	\$	2,250.00
6	Solar Rack & Mounting Kit	1	EA	\$	950.00	\$	950.00
7	Solar Equipment/Wiring/Labor	1	LS	\$	5,500.00	\$	5,500.00
8	Transfer Switch Unit	1	EA	\$	200.00	\$	200.00
9	2" Mechanical Float Valve	1	EA	\$	120.00	\$	120.00
10	Fabricate & Install Sheep Trough	200	LF	\$	35.00	\$	7,000.00
11	Protective Fencing	115	LF	\$	9.00	\$	1,035.00
							100 100 00

PROJECT COMPONENTS (ENGINEER'S ESTIMATE)

TOTAL COMPONENT COST (SUBTOTAL #2):\$28,120.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 3,200.00

PERMITTING AND MITIGATION: \$ 600.00

LEGAL FEES: \$ -

ACQUISTION OF ACCESS AND RIGHTS-OF-WAY: \$ 1,200.00

PRE-CONSTRUCTION COSTS (SUBTOTAL #1): \$ 5,000.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 28,120.00

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 2,812.00

COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3): \$ 30,932.00

CONTINGENCY (SUBTOTAL #3 X 15%): \$ 4,639.80

TOTAL CONSTRUCTION COST (SUBTOTAL #4): \$

40,571.80

35,571.80

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 40.

Project ID: 2 **Project Name:** Prospect Mountain #2 Well **Land Jurisdiction:** State of Wyoming

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 1 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred. All new tanks shall have escape ramps.

State Engineer's Office

Current Permit: P199198.0W

One (1) tank and one (1) trough are currently permitted. The project plans should be submitted to the SEO in order to verify that the change in tank proximity to the well does not constitute the need for additional documentation and permit amendment.

Wyoming Office of State Lands and Investments

An application for construction of improvements should be completed and submitted to said Office after the final design has been developed (Storage Tank, Sheep Trough, Pipelines, and Solar Unit).









INSTALLATION NOTES

AGE No: 5 OF

- 1.) THE END CAP NEAREST TO THE WATER TANK SHALL BE CONSTRUCTED TO RECEIVE WATER SUPPLY PIPING AND MECHANICAL FLOAT VALVE.
- 2.) THE TROUGH END FURTHEST FROM THE WATER TANK SHALL BE FITTED WITH AN 8"x2" THREADED STAND PIPE FOR OVERFLOW AND DRAINING OPERATIONS. AT THE STAND PIPE INVERT, A 2" SDR11 PIPE SHALL BE CONNECTED AT THE TROUGH BASE AND ROUTED TO THE ADJACENT NATURAL DRAINAGE.
- 3.) OVER EXCAVATE KEY-WAYS FOR TROUGH STAND PLACEMENT. BACKFILL WITH CRUSHED ROAD BASE AND GRADE FOR LEVEL INSTALLATION. INSTALL 3-INCH MIN. SECTION OF CRUSHED ROAD BASE AROUND PERIMETER OF ENTIRE TROUGH, EXTENDING 4 FEET FROM TROUGH EDGES.



16 ga. END CAP -

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Owner/Operator: Midland Livestock Company / BLM Project Type: Stock Water Well - Solar Conversion Project ID: 3 Project Name: Davis Luman Road Water Well Location (PLSS): NW/4SW/4, Sec. 21, T27N, R108W Location (Lat/Long): 42°17'59.42"N, 109°42'06.90"W

PROJECT COMPONENTS (ENGINEER'S ESTIMATE)

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST		T	OTAL COST
1	Mobilization	1	LS	\$	1,100.00	\$	1,100.00
2	I/O 50 Solar Disconnect	1	EA	\$	150.00	\$	150.00
3	235 Watt solar panel	6	EA	\$	375.00	\$	2,250.00
4	Solar Rack & Mounting Kit	1	EA	\$	950.00	\$	950.00
5	Solar Equipment/Wiring/Labor	1	LS	\$	5,500.00	\$	5,500.00
6	Protective Fencing	100	LF	\$	9.00	\$	900.00
7	Transfer Switch Unit	1	LS	\$	200.00	\$	200.00
8	Float switch control unit/low water sensor/ power to pump	1	LS	\$	850.00	\$	850.00
TOTAL COMPONENT COST (SUBTOTAL #2):							11,900.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 1,500.00
PERMITTING AND MITIGATION:	\$ 850.00
LEGAL FEES:	\$ -
ACQUISTION OF ACCESS AND RIGHTS-OF-WAY:	\$ -
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 2,350.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 11,900.00

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 1,190.00
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 13,090.00
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 1,963.50
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 15,053.50

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 17,403.50

Project ID: 3 **Project Name:** Davis Luman Road Water Well **Land Jurisdiction:** Bureau of Land Management

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 1 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred.

State Engineer's Office

Current Permit: P41168.0W

The existing improvements are permitted. The power supply change does not warrant additional permitting from the SEO.

Bureau of Land Management

This project consists of converting the well from generator power to solar power only. The fencing and solar array plans should be discussed with the Rock Springs BLM Field Office rangeland resources division to ensure no additional studies are required. A letter of BLM acceptance of the plans should be submitted to the WWDO with the final design, prior to construction.



DAVIS LUMAN ROAD WATER WELL SOLAR POWER CONVERSION PROJECT

GE No: 2 OF

*PROJECT NOTES

1.) INSTALL TRANSFER SWITCH UNIT FOR SOLAR AND BACKUP GENERATOR POWER SUPPLY HOOKUP OPTIONS.

2.) INSTALL APPURTENANT FLOAT SWITCH CONTROL UNIT, LOW WATER LEVEL SENSOR, & POWER CONNECTION TO THE EXISTING SUBMERSIBLE PUMP.







Owner/Operator: Midland Livestock Company / State of Wyoming Project Type: Stock Water Well - Solar Conversion Project ID: 4 Project Name: Midland Well 2011-1 Location (PLSS): SE/4NE/4, Sec. 16, T26N, R107W Location (Lat/Long): 42°13'51.48"N, 109°34'14.63"W

PROJECT COMPONENTS (ENGINEER'S ESTIMATE)

ITEM No.	DESCRIPTION	QUANTITY	UNIT	U	NIT COST	TOTAL COST		
1	Mobilization	1	LS	\$	1,500.00	\$	1,500.00	
2	Remove & Salvage Existing Pump	1	LS	\$	250.00	\$	250.00	
4	I/O 50 Solar Disconnect	1	EA	\$	150.00	\$	150.00	
5	235 Watt solar panel	6	EA	\$	375.00	\$	2,250.00	
6	Solar Rack & Mounting Kit	1	EA	\$	950.00	\$	950.00	
7	Solar Equipment/Wiring/Labor	1	LS	\$	5,500.00	\$	5,500.00	
8	Transfer Switch Unit	1	EA	\$	200.00	\$	200.00	
9	New Submersible pump	1	EA	\$	3,000.00	\$	3,000.00	
10	Float switch control unit/low water sensor/power	1	1.6	÷	050.00	ć	850.00	
10	to pump	Ť	LS	Ş	850.00	Ş	850.00	
TOTAL COMPONENT COST (SUBTOTAL #2):							14.650.00	

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 1,500.00
PERMITTING AND MITIGATION:	\$ 650.00
LEGAL FEES:	\$ -
ACQUISTION OF ACCESS AND RIGHTS-OF-WAY:	\$ 250.00
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 2,400.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 14,650.00

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 1,465.00
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 16,115.00
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 2,417.25
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 18,532.25

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 20,932.25

Project ID: 4 **Project Name:** Midland Well 2011-1 **Land Jurisdiction:** State of Wyoming

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 1 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred.

State Engineer's Office

Current Permit: P195391.0W

The existing improvements are permitted. The power supply change does not warrant additional permitting from the SEO.

Wyoming Office of State Lands and Investments

An application for construction of improvements should be completed and submitted to said Office after the final design has been developed (Solar Unit).

Wyoming Department of Environmental Quality

A general permit for temporary discharge of wastewater (ground water well pump testing and development) should be acquired from the WDEQ. The monitoring and testing as outlined in the permit should be adhered to.





rioverde@wyoming.com



Owner/Operator: Midland Livestock Company / State of Wyoming Project Type: Stock Water Well - Solar Conversion Project ID: 5 Project Name: Midland Well 2011-2 Location (PLSS): SW/4NE/4 Sec. 36, T27N, R108W Location (Lat/Long): 42°16'21.96"N, 109°38'06.26"W

PROJECT COMPONENTS (ENGINEER'S ESTIMATE)

ITEM No.	DESCRIPTION	QUANTITY	UNIT	U U	JNIT COST	T	OTAL COST
1	Mobilization	1	LS	\$	1,600.00	\$	1,600.00
4	I/O 50 Solar Disconnect	1	EA	\$	150.00	\$	150.00
5	235 Watt solar panel	6	EA	\$	375.00	\$	2,250.00
6	Solar Rack & Mounting Kit	1	EA	\$	950.00	\$	950.00
7	Solar Equipment/Wiring/Labor	1	LS	\$	5,500.00	\$	5,500.00
8	Transfer Switch Unit	1	EA	\$	200.00	\$	200.00
9	New Submersible pump (Booster)	1	EA	\$	2,200.00	\$	2,200.00
10	Rebuild protective fence	200	LF	\$	2.50	\$	500.00
11	Float switch control unit/low water sensor/power			ć	850.00	4	950.00
11	to pump		LS	Ş	850.00	ļ L	850.00
TOTAL COMPONENT COST (SUBTOTAL #2):						Ś	14.200.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 1,500.00

PERMITTING AND MITIGATION: \$ 650.00

> LEGAL FEES: \$

ACQUISTION OF ACCESS AND RIGHTS-OF-WAY: \$

PRE-CONSTRUCTION COSTS (SUBTOTAL #1): \$ 2,150.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 14,200.00

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%): \$ 1,420.00

COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3): \$ 15,620.00

> CONTINGENCY (SUBTOTAL #3 X 15%): \$ 2,343.00

TOTAL CONSTRUCTION COST (SUBTOTAL #4): \$ 17,963.00

20,113.00

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$

Project ID: 5 **Project Name:** Midland Well 2011-2 **Land Jurisdiction:** State of Wyoming

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 1 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred.

State Engineer's Office

Current Permit: P195392.0W

The existing improvements are permitted. The power supply does not warrant additional permitting from the SEO as long as the terms and conditions of the existing permit are followed.

Wyoming Office of State Lands and Investments

An application for construction of improvements should be completed and submitted to said Office after the final design has been developed (Solar Unit).

Wyoming Department of Environmental Quality

A general permit for temporary discharge of wastewater (ground water well pump testing and development) should be acquired from the WDEQ. The monitoring and testing as outlined in the permit should be adhered to.



MIDLAND WELL 2011-2 SOLAR POWER CONVERSION PROJECT

*PROJECT NOTES:

1.) INSTALL TRANSFER SWITCH UNIT FOR SOLAR AND BACKUP GENERATOR POWER SUPPLY HOOKUP OPTIONS.

2.) INSTALL SOLAR POWER COMPATIBLE SUBMERSIBLE PUMP (BOOSTER). ALLOW BYPASS OF ARTESIAN FLOWS.

3.) INSTALL APPURTENANT LOW WATER LEVEL SENSOR, & POWER CONNECTION TO THE SUBMERSIBLE PUMP.

SCALE: 1"=50

100 FT

EXISTING SHEEP TROUGH TO REMAIN

> **EXISTING DUAL SPECIES PROTECTIVE** FENCE TO BE RECONSTRUCTED USING SALVAGED MATERIAL WHERE POSSIBLE (200 LF)

EXISTING TANK TO REMAIN

EXISTING TROUGH

MIDLAND WELL 2011-2

SMALL WATER PROJECT ID: 5

LOCATED IN THE SW/4NE/4 OF SEC. 36, T.27N., R.108W.,

SUBLETTE COUNTY, WY

INSTALL SOLAR ARRAY

EXISTING MIDLAND WELL 2011-2: P195392.0W

LOOKING WEST

REVISED

IOB No:

432

CHECKED BY: JS DRAWN BY: MTJ

DESIGNED BY: MT

DATE: 01/21/19

MIDLAND WELL 2011-2: P195392.0W

LOOKING SOUTHWEST



EXISTING TANK





Owner/Operator: Midland Livestock Company / BLM Project Type: Stock Water Well Rehab and Solar Power Conversion Project ID: 6 Project Name: Davis-Old Road Unit #1 Water Well Location (PLSS): NW/4SE/4 Sec. 27, T27N, R108W Location (Lat/Long): 42°17'06.10", 109°40'24.60"

PROJECT COMPONENTS (ENGINEER'S ESTIMATE)

ITEM No.	DESCRIPTION	QUANTITY	UNIT	ι	UNIT COST		OTAL COST
1	Mobilization	1	LS	\$	1,000.00	\$	1,000.00
2	Remove & Haul Off Existing Tank	1	LS	\$	1,000.00	\$	1,000.00
3	Remove Existing Supply Line	1	LS	\$	600.00	\$	600.00
4	Install 10,000 gallon tank (owner supplied)	1	LS	\$	3,600.00	\$	3,600.00
5	2" SDR-11 Pipe	595	LF	\$	3.50	\$	2,082.50
6	Mechanical 2" Float Valve	1	EA	\$	120.00	\$	120.00
7	Protective Fencing	60	LF	\$	9.00	\$	540.00
8	Well Head Protective Cover	1	LS	\$	850.00	\$	850.00
TOTAL COMPONENT COST (SUBTOTAL #2):							9,792,50

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS: \$	2,000.00
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PERMITTING AND MITIGATION: \$ 1,950.00

LEGAL FEES: \$ -

ACQUISTION OF ACCESS AND RIGHTS-OF-WAY: \$

PRE-CONSTRUCTION COSTS (SUBTOTAL #1): \$ 3,950.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 9,792.50

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%): \$ 979.25

COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3): \$ 10,771.75

CONTINGENCY (SUBTOTAL #3 X 15%): \$ 1,615.76

TOTAL CONSTRUCTION COST (SUBTOTAL #4): \$ 12,387.51

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 16,337.51

Project ID: 6 **Project Name:** Davis – Old Road Unit #1 Water Well **Land Jurisdiction:** Bureau of Land Management

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 1 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred. All new tanks shall have escape ramps.

State Engineer's Office

Cancelled Permit: P54621.0W

The existing well was originally used for gas well completions in the 1980's. Since the permit was cancelled, it has been used for stock watering purposes. The well should be flow tested and measured for current capacity and physical properties. An application for permit to appropriate ground water and a statement of completion and description of well should be prepared and submitted to the SEO. Directions for completing these applications are available on the SEO web site under "registering existing stock water wells". A new or revised permit assigned by the SEO should be submitted to the WWDO with the final project design, prior to construction.

Bureau of Land Management

This project consists of rehabilitating the existing well and stock watering system. The current well produces artesian flows with no power input. The proposed fencing, tank replacement, and pipeline alignment plans should be discussed with the Rock Springs BLM Field Office rangeland resources division to ensure no additional studies are required. An on-site inspection of the project will be required as an initial step. A letter of BLM acceptance of the plans should be submitted to the WWDO with the final design, prior to construction.












Owner/Operator: Midland Livestock Company / BLM / State of Wyoming Project Type: Stock Water Well Rehab and Solar Power Conversion Project ID: 7 Project Name: House on the Flat Well #1 Location (PLSS): SW/4SW/4 Sec. 25, T27N, R107W Location (Lat/Long): 42°16'41.81", 109°31'28.35"

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST TOTAL COST									
1	Mobilization	1	LS	\$ 2,000.00	\$	2,000.00								
2	Remove & Salvage Existing Pump	1	LS	\$ 250.00	\$	250.00								
3	Remove Tanker Trailer	1	LS	\$ 1,200.00	\$	1,200.00								
4	Remove Sheep Trough	1	LS	\$ 500.00	\$	500.00								
5	Install 10,000 gal Holding Tank (Owner Supplied)	1	LS	\$ 3,600.00	\$	3,600.00								
6	Well test - total depth, water depth, yield	1	EA	\$ 1,200.00	\$	1,200.00								
7	2" SDR-11 Pipe	80	LF	\$ 3.50	\$	280.00								
8	I/O 50 Solar Disconnect	1	EA	\$ 150.00	\$	150.00								
9	235 Watt solar panel	6	EA	\$ 375.00	\$	2,250.00								
10	Solar Rack & Mounting Kit	1	EA	\$ 950.00	\$	950.00								
11	Solar Equipment/Wiring/Labor	1	LS	\$ 5,500.00	\$	5,500.00								
12	2" Mechanical Float Valve	1	EA	\$ 120.00	\$	120.00								
13	Transfer Switch Unit	1	EA	\$ 200.00	\$	200.00								
14	New Submersible pump	1	EA	\$ 3,000.00	\$	3,000.00								
15	Float switch control unit/low water sensor/power to	1	10	¢ 850.00	ć	850.00								
15	pump	T	T	T	T	1 I	Ţ	T	T	T	LS	\$ 850.00	Ş	850.00
16	Protective Fencing	75	LF	\$ 9.00	\$	675.00								
17	Repair Well House Access Door	1	LS	\$ 450.00	\$	450.00								
18	Fabricate and Install Sheep Trough	230	LF	\$ 35.00	\$	8,050.00								
TOTAL COMPONENT COST (SUBTOTAL #2):						31.225.00								

PROJECT COMPONENTS (ENGINEER'S ESTIMATE)

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$	2,600.00
PERMITTING AND MITIGATION:	\$	2,550.00
LEGAL FEES:	\$	-
ACOUISTION OF ACCESS AND RIGHTS-OF-WAY	Ś	-

ACQUISTION OF ACCESS AND RIGHTS-OF-WAY: 5

PRE-CONSTRUCTION COSTS (SUBTOTAL #1): \$ 5,150.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 31,225.00

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 3,122.50
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 34,347.50
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 5,152.13
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 39,499.63

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 44,649.63

Project ID: 7 Project Name: House on the Flat Well Land Jurisdiction: Bureau of Land Management / State of Wyoming

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 1 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred. All new tanks shall have escape ramps.

State Engineer's Office

Current Permit: None

The existing well has long been used for stock watering purposes. The well should be flow tested and measured for current capacity and physical properties. An application for permit to appropriate ground water and a statement of completion and description of well should be prepared and submitted to the SEO. Directions for completing these applications are available on the SEO web site under "registering existing stock water wells". A new permit assigned by the SEO should be submitted to the WWDO with the final project design, prior to construction.

Bureau of Land Management

This project consists of rehabilitating the existing well and stock watering system. Based on current mapping products, the well itself is located on BLM land and the point of use is located on State land. This project includes the installation of solar panels and replacing the existing storage tank and sheep trough. The proposed fencing, tank replacement, and pipeline alignment plans should be discussed with the Rock Springs BLM Field Office rangeland resources division to ensure no studies are required (environmental assessment). An on-site inspection of the project will be required as an initial step. A letter of BLM acceptance of the plans should be submitted to the WWDO with the final design, prior to construction.

Wyoming Office of State Lands and Investments

An application for construction of improvements should be completed and submitted to said Office after the final design has been developed. A boundary survey may be warranted to ascertain the exact position of the well and appurtenances as they relate to BLM/State lands.

Wyoming Department of Environmental Quality









INSTALLATION NOTES

AGE No: 5 OF



- 2.) THE TROUGH END FURTHEST FROM THE WATER TANK SHALL BE FITTED WITH AN 8"x2" THREADED STAND PIPE FOR OVERFLOW AND DRAINING OPERATIONS. AT THE STAND PIPE INVERT, A 2" SDR11 PIPE SHALL BE CONNECTED AT THE TROUGH BASE AND ROUTED TO THE ADJACENT NATURAL DRAINAGE.
- 3.) OVER EXCAVATE KEY-WAYS FOR TROUGH STAND PLACEMENT. BACKFILL WITH CRUSHED ROAD BASE AND GRADE FOR LEVEL INSTALLATION. INSTALL 3-INCH MIN. SECTION OF CRUSHED ROAD BASE AROUND PERIMETER OF ENTIRE TROUGH, EXTENDING 4 FEET FROM TROUGH EDGES.



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10.00





Owner/Operator: Midland Livestock Company / BLM Project Type: Stock Water Well Solar Conversion Project Name: Midland Rock Well Location (PLSS): NE/4SE/4 Sec. 10, T27N, R106W Location (Lat/Long): 42°19'36.21", 109°26'01.57"

PROJECT COMPONENTS (ENGINEER'S ESTIMATE)

ITEM No.	DESCRIPTION	QUANTITY	UNIT	ι	JNIT COST	Τ/	OTAL COST
1	Mobilization	1	LS	\$	2,000.00	\$	2,000.00
2	Remove & Salvage Existing Pump	1	LS	\$	250.00	\$	250.00
3	Install 10,000 gal Water Tank (Owner Supplied)	1	LS	\$	3,600.00	\$	3,600.00
4	2" SDR-11 Pipe	80	LF	\$	3.50	\$	280.00
5	Well test - total depth, water depth, yield	1	EA	\$	1,200.00	\$	1,200.00
6	I/O 50 Solar Disconnect	1	EA	\$	150.00	\$	150.00
7	235 Watt solar panel	6	EA	\$	375.00	\$	2,250.00
8	Solar Rack & Mounting Kit	1	EA	\$	950.00	\$	950.00
9	Solar Equipment/Wiring/Labor	1	LS	\$	5,500.00	\$	5,500.00
10	Transfer Switch Unit	1	EA	\$	200.00	\$	200.00
11	2" Mechanical Float Valve	1	Ea	\$	120.00	\$	120.00
12	New Submersible pump	1	EA	\$	3,000.00	\$	3,000.00
13	Float switch control unit/low water sensor/power to pump	1	LS	\$	850.00	\$	850.00
14	Protective Fencing	50	LF	\$	9.00	\$	450.00
TOTAL COMPONENT COST (SUBTOTAL #2):						\$	20,800.00

CONSTRUCTION COMPONENTS

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS	S: \$	2,000.00

PERMITTING AND MITIGATION: \$ 1,950.00

LEGAL FEES: \$ -

ACQUISTION OF ACCESS AND RIGHTS-OF-WAY: \$

PRE-CONSTRUCTION COSTS (SUBTOTAL #1): \$ 3,950.00

\$ 20,800.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$

ON ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 2,080.00
ITS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 22,880.00
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 3,432.00
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 26,312.00

30,262.00

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 30

Project ID: 8 **Project Name:** Midland Rock Well **Land Jurisdiction:** Bureau of Land Management

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 1 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred. All new tanks shall have escape ramps.

State Engineer's Office

Current Permit: None

The existing well is not currently permitted with the SEO but has been historically used for stock watering purposes. The well should be flow tested and measured for current capacity and physical properties. An application for permit to appropriate ground water and a statement of completion and description of well should be prepared and submitted to the SEO. Directions for completing these applications are available on the SEO web site under "registering existing stock water wells". A new permit assigned by the SEO should be submitted to the WWDO with the final project design, prior to construction.

Bureau of Land Management

This project consists of installing a new storage tank, solar panel conversion package, and protective fencing. The project plans should be discussed with the Rock Springs BLM Field Office rangeland resources division to evaluate current and proposed conditions. An on-site inspection of the project will be required as an initial step. A letter of BLM acceptance of the plans should be submitted to the WWDO with the final project design, prior to construction.

Wyoming Department of Environmental Quality













Owner/Operator: Midland Livestock Company / State of Wyoming Project Type: Stock Water Well Rehab and Solar Power Conversion Project ID: 9 Project Name: Midland Diesel Well Location (PLSS): SW/4NE/4 Sec. 16, T27N, R109W Location (Lat/Long): 42°19'04.10", 109°48'36.20"

ITEM No.	DESCRIPTION	QUANTITY	UNIT	U	UNIT COST		OTAL COST
1	Mobilization	1	LS	\$	2,000.00	\$	2,000.00
2	Remove Tanker Trailer & haul off	1	LS	\$	2,100.00	\$	2,100.00
3	Remove Sheep Trough, Repair, & Reinstall	1	LS	\$	1,800.00	\$	1,800.00
4	Remove & Salvage Existing Pump	1	LS	\$	250.00	\$	250.00
5	Install 300 BBL Water Tank (Owner Supplied)	1	LS	\$	3,600.00	\$	3,600.00
6	2" SDR-11 Pipe	75	LF	\$	3.50	\$	262.50
7	Well test - yield, total depth, water depth	1	EA	\$	1,200.00	\$	1,200.00
8	I/O 50 Solar Disconnect	1	EA	\$	150.00	\$	150.00
9	235 Watt solar panel	6	EA	\$	375.00	\$	2,250.00
10	Solar Rack & Mounting Kit	1	EA	\$	950.00	\$	950.00
11	Solar Equipment/Wiring/Labor	1	LS	\$	5,500.00	\$	5,500.00
12	Transfer Switch Unit	1	EA	\$	200.00	\$	200.00
13	2" Mechanical Float Valve	1	Ea	\$	120.00	\$	120.00
14	New Submersible pump	1	EA	\$	3,000.00	\$	3,000.00
	Float switch control unit/low water sensor/power to						
15	pump	1	LS	\$	850.00	\$	850.00
16	Protective Fencing	120	LF	\$	9.00	\$	1,080.00
TOTAL COMPONENT COST (SUBTOTAL #2):						\$	25,312.50

PROJECT COMPONENTS (ENGINEER'S ESTIMATE)

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 2,500.00

PERMITTING AND MITIGATION: \$ 1,950.00

LEGAL FEES: \$ -

ACQUISTION OF ACCESS AND RIGHTS-OF-WAY: \$ 575.00

PRE-CONSTRUCTION COSTS (SUBTOTAL #1): \$ 5,025.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 25,312.50

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):\$ 2,531.25COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):\$ 27,843.75

CONTINGENCY (SUBTOTAL #3 X 15%): \$ 4,176.56

TOTAL CONSTRUCTION COST (SUBTOTAL #4): \$ 32,020.31

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 37,045.31

Project ID: 9 **Project Name:** Midland Diesel Well **Land Jurisdiction:** State of Wyoming

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 1 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred.

State Engineer's Office

Current Permit: None

The existing well has long been used for stock watering purposes. The well should be flow tested and measured for current capacity and physical properties. An application for permit to appropriate ground water and a statement of completion and description of well should be prepared and submitted to the SEO. Directions for completing these applications are available on the SEO web site under "registering existing stock water wells". A new permit assigned by the SEO should be submitted to the WWDO with the final project design, prior to construction.

Wyoming Office of State Lands and Investments

An application for construction of improvements should be completed and submitted to said Office after the final design has been developed.

Wyoming Department of Environmental Quality













Owner/Operator: Midland Livestock Company / State of Wyoming Project Type: Stock Water Well Rehab and Solar Power Conversion Project ID: 10 Project Name: Midland Pamona Well Location (PLSS): NW/4SW/4 Sec. 36, T27N, R109W Location (Lat/Long): 42°16'10.20", 109°45'40.80"

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	UNIT COST TOTAL COS	
1	Mobilization	1	LS	\$ 3,000.00	\$	3,000.00
2	Remove Existing Troughs & Well House	1	LS	\$ 1,950.00	\$	1,950.00
3	Repair Platform and Reinstall Existing Tank	1	LS	\$ 1,400.00	\$	1,400.00
4	Remove & Salvage Existing Pump	1	LS	\$ 250.00	\$	250.00
5	2" SDR-11 Pipe	115	LF	\$ 3.50	\$	402.50
6	Well test - total depth, water depth, capacity	1	EA	\$ 1,200.00	\$	1,200.00
7	I/O 50 Solar Disconnect	1	EA	\$ 150.00	\$	150.00
8	235 Watt solar panel	6	EA	\$ 375.00	\$	2,250.00
9	Solar Rack & Mounting Kit	1	EA	\$ 950.00	\$	950.00
10	Solar Equipment/Wiring/Labor	1	LS	\$ 5,500.00	\$	5,500.00
11	2" Mechanical Float Valve	1	EA	\$ 120.00	\$	120.00
12	Transfer Switch Unit	1	EA	\$ 200.00	\$	200.00
13	Fabricate and Install Sheep Trough	250	LF	\$ 35.00	\$	8,750.00
14	New Submersible pump	1	EA	\$ 3,000.00	\$	3,000.00
15	Float switch control unit/low water sensor/power	1	10	¢ 950.00	ć	850.00
15	to pump	T	LS	\$ 850.00	Ş	850.00
16	Protective Fencing	110	LF	\$ 9.00	\$	990.00
TOTAL COMPONENT COST (SUBTOTAL #2):						30.962.50

PROJECT COMPONENTS (ENGINEER'S ESTIMATE)

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$	2,600.00
PERMITTING AND MITIGATION:	\$	1,950.00
LEGAL FEES:	\$	-
	ć	575.00

ISTION OF ACCESS AND RIGHT 5,125.00

PRE-CONSTRUCTION COSTS (SUBTOTAL #1): \$

30,962.50

TOTAL COMPONENT COST (SUBTOTAL #2): \$

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%): \$ 3,096.25 COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3): \$ 34,058.75

CONTINGENCY (SUBTOTAL #3 X 15%): \$ 5,108.81

TOTAL CONSTRUCTION COST (SUBTOTAL #4): \$ 39,167.56

44,292.56

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4):

Project ID: 10 **Project Name:** Midland Pamona Well **Land Jurisdiction:** State of Wyoming

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 1 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred.

State Engineer's Office

Current Permit: None

The existing well has long been used for stock watering purposes. The well should be flow tested and measured for current capacity and physical properties. An application for permit to appropriate ground water and a statement of completion and description of well should be prepared and submitted to the SEO. Directions for completing these applications are available on the SEO web site under "registering existing stock water wells". A new permit assigned by the SEO should be submitted to the WWDO with the final project design, prior to construction.

Wyoming Office of State Lands and Investments

An application for construction of improvements should be completed and submitted to said Office after the final design has been developed.

Wyoming Department of Environmental Quality










INSTALLATION NOTES

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PROJECT EXPLANATION

Project ID: 11 **Project Name:** J&G Ditch / Sheep Creek Siphon **Land Jurisdiction:** Bureau of Land Management

Per applicant testimony, a detailed design of a large siphon project that is proposed for diversion of water from the Johnson and Gasswint Ditch (P 2957.0D, P1427.0E, and P3100.0E) AKA Big Sandy Ditch, to Sheep Creek has been conducted. The conveyance losses experienced through the Big Sandy Ditch is the main reason this project was evaluated. As a secondary benefit, the owner would also like to use the hydraulic energy in the pipeline to generate power for pivot irrigation sprinklers.

Jorgensen Engineering was the company contracted to develop the design and associated cost estimates for the Sheep Creek Siphon. Rio Verde Engineering made several attempts to gain access to the preliminary design and estimates but was not successful. Based on the project type and proposed benefits, the siphon and hydro-power project would qualify under the SWPP program. At their discretion, the owner and contracted firm may utilize the developed design and cost estimates to apply for SWPP funding.

Project ID: 12 Project Name: Johnson & Gasswint Ditch - Phase I Piping Location (PLSS): SW/4 Sec. 15, T30N, R105W Location (Lat/Long): 42°34'00.20", 109°20'58.93"

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST		TOTAL COST	
1	Mobilization	1	LS	\$	14,000.00	\$	14,000.00
2	18" Dia ADS N-12 Sand Sluice Pipe	1190	LF	\$	35.00	\$	41,650.00
3	24" Dia ADS N-12 Pipe	2148	LF	\$	40.00	\$	85,920.00
4	Sand Trap and Cleanout - Type 1	1	EA	\$	4,000.00	\$	4,000.00
5	Sand Trap and Cleanout - Type 2	3	EA	\$	3,800.00	\$	11,400.00
6	Pipe Trench and Backfill	1	LS	\$	1,500.00	\$	1,500.00
TOTAL COMPONENT COST (SUBTOTAL #2):						\$	158,470.00

PROJECT COMPONENTS - ITEMIZED COSTS

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$	3,100.00
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- PERMITTING AND MITIGATION: \$ 2,300.00
 - LEGAL FEES: \$ -
- ACQUISTION OF ACCESS AND RIGHTS-OF-WAY: \$ -
 - PRE-CONSTRUCTION COSTS (SUBTOTAL #1): \$ 5,400.00

158,470.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 15,847.00
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 174,317.00

CONTINGENCY (SUBTOTAL #3 X 15%): \$ 26,147.55

TOTAL CONSTRUCTION COST (SUBTOTAL #4): \$

205,864.55 \$

200,464.55

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4):

Project ID: 12 **Project Name:** J&G Ditch – Phase I Piping **Land Jurisdiction:** State of Wyoming and Dunton Sheep Company

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 10 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred.

State Engineer's Office

Current Permit: P2957.0D

This section of existing ditch sustains substantial seepage losses due to the sandy composition of the hillside traversed. Because the pipe alignment will follow the historic ditch alignment, a change of means of conveyance is not required by the SEO or Board of Control. Further, sand removal from the system is considered to be an item of maintenance where no beneficial use is realized from the sluicing operation.

Wyoming Office of State Lands and Investments

An application for construction of improvements should be completed and submitted to said Office after the final design has been developed.

U.S. Army Corp of Engineers

This project consists of installing pipe and sand removal structures in an upland environment on an existing ditch. As such, the work within the ditch itself does not fall under USACE regulation. However, the manifold and lateral pipelines that will periodically be used to deliver excess sand and water back to the Big Sandy River may trigger jurisdictional permits. Under the 2017 USACE Nationwide Permitting guidelines, this project could potentially fall under NWP 3 – Maintenance. The project plans should be submitted to the Wyoming Regulatory Office for specific evaluation and determination of whether a pre-construction notification and wetland delineation is required. A permit or letter stating that no action is required should be submitted to the WWDO with the final project plans, prior to construction.









Owner/Operator: Dunton Sheep Company / BLM / State of Wyoming **Project Type**: Irrigation / Conveyance Project ID: 13 Project Name: Johnson & Gasswint Ditch - Phase II Piping Location (PLSS): W/2SE/4 & N/2SW/4 Sec. 15, T30N, R105W Location (Lat/Long): 42°34'34.30", 109°21'19.01"

PROJECT COMPONENTS - ITEMIZED COSTS

ITEM No.	DESCRIPTION	QUANTITY	UNIT	ι	JNIT COST	TOTAL COST	
1	Mobilization	1	LS	\$	14,500.00	\$	14,500.00
2	Sand Trap & Cleanout - Type 2	4	EA	\$	3,200.00	\$	12,800.00
3	12" Dia ADS N-12 Pipe	485	LF	\$	30.00	\$	14,550.00
4	24" Dia ADS N-12 Pipe	2752	LF	\$	40.00	\$	110,080.00
5	Pipe Trench/Backfill	1	LS	\$	1,500.00	\$	1,500.00
TOTAL COMPONENT COST (SUBTOTAL #2):						Ś	153.430.00

- PREPARATION OF FINAL DESIGNS & SPECIFICATIONS: \$ 2,600.00
 - 1,200.00 PERMITTING AND MITIGATION: \$
 - LEGAL FEES: \$
 - ACQUISTION OF ACCESS AND RIGHTS-OF-WAY: Ś 1,850.00
 - PRE-CONSTRUCTION COSTS (SUBTOTAL #1): \$ 5,650.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 153,430.00

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%): \$ 15,343.00

COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3): \$ 168,773.00

CONTINGENCY (SUBTOTAL #3 X 15%): \$ 25,315.95

TOTAL CONSTRUCTION COST (SUBTOTAL #4): 5 194,088.95

> \$ 199,738.95

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4):

Project ID: 13 Project Name: J&G Ditch – Phase II Piping Land Jurisdiction: State of Wyoming, Bureau of Land Management, and Dunton Sheep Company

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 10 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred.

State Engineer's Office

Current Permit: P2957.0D

This section of existing ditch sustains substantial seepage losses due to the sandy composition of the traversed area. Because the pipe alignment will follow the historic ditch alignment, a change of means of conveyance is not required by the SEO or Board of Control. Further, sand removal from the system is considered to be an item of maintenance where no beneficial use is realized from the sluicing operation.

Wyoming Office of State Lands and Investments

An application for construction of improvements should be completed and submitted to said Office after the final design has been developed.

Bureau of Land Management

This project consists of installing pipe and sand removal structures in an upland environment on an existing ditch, partially located on BLM administered lands. For normal maintenance operations, no permit is required if all construction is performed within 50 feet of the current disturbance limits of the ditch. However, because this project includes the installation of pipe and sand sluice structures, a Standard Form 299 application will need to be prepared for right-of-way acquisition. In conjunction with this SF-299, a plan of development and appropriate cultural studies will also need to be completed before a right-of-way permit is received from the BLM.







Owner/Operator: Midland Livestock Company / BLM Project Type: Stockwater Reservoir Rehab Project ID: 14 Project Name: Squaretop Reservoir Rehab Location (PLSS): N/2SW/4 Sec. 2, T29N, R105W Location (Lat/Long): 42°30'32.11", 109°20'20.54"

PROJECT COMPONENTS - ITEMIZED COSTS

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST		TOTAL COS	
1	Mobilization	1	LS	\$	8,000.00	\$	8,000.00
2	Remove outlet works	1	LS	\$	600.00	\$	600.00
3	Topsoil Stripping & Placement	3650	SY	\$	2.50	\$	9,125.00
4	Core Trench Excavation and Backfill	2300	CY	\$	10.00	\$	23,000.00
5	Dam Embankment (Ex. & Placement)	450	CY	\$	10.00	\$	4,500.00
7	18" Agridrain Water Control Structure	1	LS	\$	3,900.00	\$	3,900.00
8	Aux. Spillway Grading	1	LS	\$	2,800.00	\$	2,800.00
9	Aux. Spillway Erosion Fabric	1750	SY	\$	2.00	\$	3,500.00
10	Aux. Spillway Riprap	1450	CY	\$	30.00	\$	43,500.00
TOTAL COMPONENT COST (SUBTOTAL #2):						\$	98,925.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 3,500.00
PERMITTING AND MITIGATION:	\$ 350.00
LEGAL FEES:	\$ -
ACQUISTION OF ACCESS AND RIGHTS-OF-WAY:	\$ -
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 3,850.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 98,925.00

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 9,892.50
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 108,817.50
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 16,322.63
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 125,140.13

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 128,990.13

Project ID: 14Project Name: Squaretop Reservoir RehabilitationLand Jurisdiction: Bureau of Land Management and Midland Livestock Company

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 8 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred.

State Engineer's Office

Current Permit: P3339.0R

This project includes the rehabilitation of an existing on-channel dam located partially on private and federal (BLM) lands. The dam was originally constructed in 1916 and has since lost all reservoir capacity due to erosion. The proposed rehabilitation plan does not deviate from the permitted construction and control of water. No additional storage is being proposed. An application to correct the record (ACR-2) should be completed and submitted to the SEO prior to construction as the emergency spillway and outlet works design will be altered. The ACR-2 will be required to keep the state records updated.

Bureau of Land Management

This project is partially located on BLM lands. The BLM Rock Springs Field Office was contacted and because this is a rehabilitation of an existing structure and no alterations to the general function of the reservoir is being proposed, no additional permitting is requiremed

Other Considerations

The reservoir is located on the channel of Squaretop Wash and is considered to be an ephemeral stream. No plant species that would indicate the presence of wetlands was observed on the project site visit in 2018. No fish or aquatic species exist in Squaretop Wash. Therefore, no permitting is required from the WYGFD or USACE.







HYDROLOGY

1.) STORM DATA

RAINFALL DEPTH BY RETURN PERIOD (IN) - DERIVED FROM PRECIPITATION - FREQUENCY ATLAS OF THE WESTERN UNITED STATES VOLUME II - WYOMING

2 - YR: 1.4 5 - YR: 1.8 10 - YR: 2.0 25 - YR: 2.4 50 - YR: 2.8 100 - YR: 3.0

RAINFALL DISTRIBUTION TYPE: TYPE II

SQUARETOP RESERVOIR DRAINAGE BASIN: 4.62 SQUARE MILES AVERAGE SLOPE: 1.9%

2.) LAND USE AND CURVE NUMBER DETAILS

DRAINAGE BASIN: SAGEBRUSH (W/ GRASS UNDERSTORY)

HYDROLOGIC SOIL GROUP C (FAIR)

CURVE NUMBER (CN): 63

3.) TIME OF CONCENTRATION

WIN TR-55 OUTPUT: 1.136 HR

PEAK FLOW OUTPUT: 390.21 CFS

SPILLWAY HYDRAULICS

1.) INPUT

SHAPE: TRAPEZOIDAL CREST SLOPE: 0.01 FT/FT MANNING'S n: 0.028 DEPTH OF FLOW: 1.50 FT SPILLWAY DEPTH: 5.0 FT BOTTOM WIDTH: 40.0 FT SIDE SLOPES: 2:1

2.) COMPUTED RESULTS

FLOWRATE: 407 CFS VELOCITY: 6.67 FPS FLOW AREA: 61.125 SF FLOW PERIMETER: 43.35 FT HYDRAULIC RADIUS: 1.41 FT PERCENT FULL: 30%

CONSTRUCTION SCHEDULE

TOPSOIL STRIPPING / GRUBBING: 5,400 SY

CORE TRENCH EXCAVATION & REPLACEMENT: 2,300 CY

ADDITIONAL EXCAVATION & PLACEMENT FOR DAM CREST RAISE: 450 CY

EXISTING OUTLET WORKS REMOVAL: 1 LS

NEW WATER LEVEL CONTROL STRUCTURE: 1 EA

EMERGENCY SPILLWAY: GRADING: 1 LS EROSION CONTROL FABRIC: 1,750 SY RIP-RAP: 1,450 CY

TOPSOIL REPLACEMENT: 3,650 SY

BIG SANDY WATERSHED - LEVEL I STUDY SQUARETOP RESERVOIR REHABILITATION PROJECT SMALL WATER PROJECT ID: 14 LOCATED IN SEC. 2, T.29N., R.105W., 6TH P.M., SUBLETTE COUNTY, WY

\mathcal{M}	RIO	VERDE
307) 367-2826	ENGI PINEDA	NEERING

Owner/Operator: Midland Livestock Company / BLM Project Type: Riparian Area Fencing Project ID: 15 Project Name: Prospect Allotment Fencing Project_BLM Fence No. 1 Segment Location (PLSS): S/2 Sec. 4, T29N, R104W Location (Lat/Long): 42°30'24.96", 109°15'18.65"

PROJECT COMPONENTS (ENGINEER'S ESTIMATE)

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST		TOTAL COST	
1	Mobilization	1	LS	\$	1,400.00	\$	1,400.00
2	Site Prep / Clearing	1	LS	\$	2,600.00	\$	2,600.00
3	Line Fencing	3054	LF	\$	5.60	\$	17,102.40
4	End-Panels	3	EA	\$	250.00	\$	750.00
5	Corner Panels	1	EA	\$	400.00	\$	400.00
6	Gates	1	EA	\$	350.00	\$	350.00
TOTAL COMPONENT COST (SUBTOTAL #2):						\$	22,602.40

- PREPARATION OF FINAL DESIGNS & SPECIFICATIONS: \$ 1,500.00
 - PERMITTING AND MITIGATION: \$ 3,650.00
 - LEGAL FEES: \$ -
 - ACQUISTION OF ACCESS AND RIGHTS-OF-WAY: \$ -
 - PRE-CONSTRUCTION COSTS (SUBTOTAL #1): \$ 5,150.00
 - TOTAL COMPONENT COST (SUBTOTAL #2): \$ 22,602.40
- CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%): \$ 2,260.24
 - COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3): \$ 24,862.64
 - CONTINGENCY (SUBTOTAL #3 X 15%): \$ 3,729.40
 - TOTAL CONSTRUCTION COST (SUBTOTAL #4): \$ 28,592.04

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 33,742.04

Project ID: 15 **Project Name:** Prospect Mountain Allotment_BLM Fence No. 1 **Land Jurisdiction:** Bureau of Land Management

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 12 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred. Coordination with WGFD on fence design is strongly encouraged.

Bureau of Land Management

As this project is located on BLM administered lands, an initial site visit should be conducted with appropriate personnel from the BLM Rock Springs Field Office. An Environmental Assessment will be required as part of this proposed project and may substantially impact the time required to permit the project.

Wyoming Game and Fish Department

Due to the proximity of this project relative to a known Mule Deer migration corridor, the WYGFD will provide comments and have recommendations on the fence design and construction thereof. A letter of approval/recommendation from said Department should be submitted to the WWDO along with the final project plans and specifications, prior to construction.









Owner/Operator: Midland Livestock Company / Little Sandy Grazing Association Project Type: Riparian Area Fencing Project ID: 16 Project Name: Prospect Allotment Fencing Project_Private Fence No. 1 Segment Location (PLSS): SE/4SE/4 Sec. 4, T29N, R104W Location (Lat/Long): 42°30'31.62", 109°14'47.14"

PROJECT COMPONENTS (ENGINEER'S ESTIMATE)

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST		TOTAL COST	
1	Mobilization	1	LS	\$	1,800.00	\$	1,800.00
2	Site Prep / Clearing	1	LS	\$	2,300.00	\$	2,300.00
3	Creek Crossing	1	EA	\$	6,400.00	\$	6,400.00
4	Line Fencing	2643	LF	\$	5.60	\$	14,800.80
5	End-Panels	2	EA	\$	250.00	\$	500.00
6	Corner Panels	3	EA	\$	400.00	\$	1,200.00
7	Gates	2	EA	\$	350.00	\$	700.00
TOTAL COMPONENT COST (SUBTOTAL #2):						Ś	27.700.80

- PREPARATION OF FINAL DESIGNS & SPECIFICATIONS: \$ 1,500.00
 - PERMITTING AND MITIGATION: \$ 650.00

LEGAL FEES: \$ -

- ACQUISTION OF ACCESS AND RIGHTS-OF-WAY: \$ -
 - PRE-CONSTRUCTION COSTS (SUBTOTAL #1): \$ 2,150.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 27,700.80

- CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%): \$ 2,770.08
 - COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3): \$ 30,470.88
 - CONTINGENCY (SUBTOTAL #3 X 15%): \$ 4,570.63
 - TOTAL CONSTRUCTION COST (SUBTOTAL #4): \$ 35,041.51

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 37,191.51

Project ID: 16 **Project Name:** Prospect Mountain Allotment_Private Fence No. 1 **Land Jurisdiction:** Little Sandy Grazing Association

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 12 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred. Coordination with WGFD on fence design is strongly encouraged.

Wyoming Game and Fish Department

Due to the proximity of this project relative to a known Mule Deer migration corridor, the WYGFD will provide comments and have recommendations on the fence design and construction thereof. A letter of approval/recommendation from said Department should be submitted to the WWDO along with the final project plans and specifications, prior to construction.









Owner/Operator: Midland Livestock Company / State of Wyoming Project Type: Riparian Area Fencing Project ID: 17 Project Name: Prospect Allotment Fencing Project_State Fence No. 1 Segment Location (PLSS): S/2SW/4 Sec. 3, T29N, R104W Location (Lat/Long): 42°30'18.40", 109°14'27.55"

PROJECT COMPONENTS (ENGINEER'S ESTIMATE)

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST		TOTAL COST	
1	Mobilization	1	LS	\$	1,500.00	\$	1,500.00
2	Site Prep / Clearing	1	LS	\$	3,400.00	\$	3,400.00
3	Line Fencing	3972	LF	\$	5.60	\$	22,243.20
4	End-Panels	2	EA	\$	250.00	\$	500.00
5	Corner Panels	1	EA	\$	400.00	\$	400.00
6	Gates	2	EA	\$	350.00	\$	700.00
TOTAL COMPONENT COST (SUBTOTAL #2):						\$	28,743.20

- PREPARATION OF FINAL DESIGNS & SPECIFICATIONS: \$ 1,500.00
 - PERMITTING AND MITIGATION: \$ 650.00
 - LEGAL FEES: \$ -
 - ACQUISTION OF ACCESS AND RIGHTS-OF-WAY: \$ -
 - PRE-CONSTRUCTION COSTS (SUBTOTAL #1): \$ 2,150.00
 - TOTAL COMPONENT COST (SUBTOTAL #2): \$ 28,743.20
- CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%): \$ 2,874.32
 - COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3): \$ 31,617.52
 - CONTINGENCY (SUBTOTAL #3 X 15%): \$ 4,742.63
 - TOTAL CONSTRUCTION COST (SUBTOTAL #4): \$ 36,360.15

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 38,510.15

Project ID: 17 **Project Name:** Prospect Mountain Allotment_State Fence No. 1 **Land Jurisdiction:** State of Wyoming

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 12 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred. Coordination with WGFD on fence design is strongly encouraged.

Wyoming Game and Fish Department

Due to the proximity of this project relative to a known Mule Deer migration corridor, the WYGFD will provide comments and have recommendations on the fence design and construction thereof. A letter of approval/recommendation from said Department should be submitted to the WWDO along with the final project plans and specifications, prior to construction.








Owner/Operator: Midland Livestock Company / State of Wyoming Project Type: Riparian Area Fencing Project ID: 18 Project Name: Prospect Allotment Fencing Project_Private Fence No. 2 Segment Location (PLSS): E/2 Sec. 3, T29N, R104W Location (Lat/Long): 42°30'54.84", 109°13'54.36"

PROJECT COMPONENTS (ENGINEER'S ESTIMATE)

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST		TOTAL COST	
1	Mobilization	1	LS	\$	4,000.00	\$	4,000.00
2	Site Prep / Clearing	1	LS	\$	9,700.00	\$	9,700.00
3	Line Fencing	11320	LF	\$	5.60	\$	63,392.00
4	End-Panels	2	EA	\$	250.00	\$	500.00
5	Corner Panels	6	EA	\$	400.00	\$	2,400.00
6	Gates	4	EA	\$	350.00	\$	1,400.00
TOTAL COMPONENT COST (SUBTOTAL #2):						\$	81,392.00

- PREPARATION OF FINAL DESIGNS & SPECIFICATIONS: \$ 1,500.00
 - PERMITTING AND MITIGATION: \$ 650.00
 - LEGAL FEES: \$ -
 - ACQUISTION OF ACCESS AND RIGHTS-OF-WAY: \$ -
 - PRE-CONSTRUCTION COSTS (SUBTOTAL #1): \$ 2,150.00
 - TOTAL COMPONENT COST (SUBTOTAL #2): \$ 81,392.00
- CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%): \$ 8,139.20
 - COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3): \$ 89,531.20
 - CONTINGENCY (SUBTOTAL #3 X 15%): \$ 13,429.68
 - TOTAL CONSTRUCTION COST (SUBTOTAL #4): \$ 102,960.88

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 105,110.88

Project ID: 18 Project Name: Prospect Mountain Allotment_Private Fence No. 2 Land Jurisdiction: Midland Livestock Company

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 12 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred. Coordination with WGFD on fence design is strongly encouraged.

Wyoming Game and Fish Department

Due to the proximity of this project relative to a known Mule Deer migration corridor, the WYGFD will provide comments and have recommendations on the fence design and construction thereof. A letter of approval/recommendation from said Department should be submitted to the WWDO along with the final project plans and specifications, prior to construction.









Owner/Operator: Midland Livestock Company / BLM Project Type: Riparian Area Fencing Project ID: 19 Project Name: Prospect Allotment Fencing Project_BLM Fence No. 2 Segment Location (PLSS): SW/4NW/4 Sec. 35, T30N, R104W Location (Lat/Long): 42°31'41.98", 109°13'33.37"

PROJECT COMPONENTS (ENGINEER'S ESTIMATE)

ITEM No.	DESCRIPTION	QUANTITY	UNIT	ι	JNIT COST	TOTAL COST		
1	Mobilization	1	LS	\$	1,600.00	\$	1,600.00	
2	Site Prep / Clearing	1	LS	\$	1,300.00	\$	1,300.00	
3	Line Fencing	545	LF	\$	5.60	\$	3,052.00	
4	Buck and Rail Fencing	900	LF	\$	8.50	\$	7,650.00	
5	Creek Crossing	1	EA	\$	6,400.00	\$	6,400.00	
6	End-Panels	2	EA	\$	250.00	\$	500.00	
7	Gates	1	EA	\$	350.00	\$	350.00	
TOTAL COMPONENT COST (SUBTOTAL #2):						\$	20,852.00	

- PREPARATION OF FINAL DESIGNS & SPECIFICATIONS: \$ 1,500.00
 - PERMITTING AND MITIGATION: \$ 2,500.00

LEGAL FEES: \$ -

ACQUISTION OF ACCESS AND RIGHTS-OF-WAY: \$ -

PRE-CONSTRUCTION COSTS (SUBTOTAL #1): \$ 4,000.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 20,852.00

- CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%): \$ 2,085.20
 - COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3): \$ 22,937.20
 - CONTINGENCY (SUBTOTAL #3 X 15%): \$ 3,440.58
 - TOTAL CONSTRUCTION COST (SUBTOTAL #4): \$ 26,377.78

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 30,377.78

Project ID: 19 **Project Name:** Prospect Mountain Allotment_BLM Fence No. 2 **Land Jurisdiction:** Bureau of Land Management

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 12 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred. Coordination with WGFD on fence design is strongly encouraged.

Bureau of Land Management

As this project is located on BLM administered lands, an initial site visit should be conducted with appropriate personnel from the BLM Rock Springs Field Office. An Environmental Assessment (EA) will be required as part of this proposed project and may substantially impact the time required to permit the project.

Wyoming Game and Fish Department

Due to the proximity of this project relative to a known Mule Deer migration corridor, the WYGFD will provide comments and have recommendations on the fence design and construction thereof. A letter of approval/recommendation from said Department should be submitted to the WWDO along with the final project plans and specifications, prior to construction.









Owner/Operator: Midland Livestock Company / State of Wyoming Project Type: Riparian Area Fencing Project ID: 20 Project Name: Prospect Allotment Fencing Project_State Fence No. 2 Segment Location (PLSS): N/2 Sec. 35, T30N, R104W Location (Lat/Long): 42°32'04.44", 109°13'08.04"

PROJECT COMPONENTS (ENGINEER'S ESTIMATE)

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST		T/	OTAL COST
1	Mobilization	1	LS	\$	3,000.00	\$	3,000.00
2	Site Prep / Clearing	1	LS	\$	6,000.00	\$	6,000.00
3	Line Fencing	7019	LF	\$	5.60	\$	39,306.40
4	End-Panels	2	EA	\$	250.00	\$	500.00
5	Corner Panels		EA	\$	400.00	\$	400.00
6	Gates	3	EA	\$	350.00	\$	1,050.00
TOTAL COMPONENT COST (SUBTOTAL #2):						\$	50,256.40

- PREPARATION OF FINAL DESIGNS & SPECIFICATIONS: \$ 1,500.00
 - PERMITTING AND MITIGATION: \$ 650.00
 - LEGAL FEES: \$ -
 - ACQUISTION OF ACCESS AND RIGHTS-OF-WAY: \$ -
 - PRE-CONSTRUCTION COSTS (SUBTOTAL #1): \$ 2,150.00
 - TOTAL COMPONENT COST (SUBTOTAL #2): \$ 50,256.40
- CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%): \$ 5,025.64
 - COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3): \$ 55,282.04
 - CONTINGENCY (SUBTOTAL #3 X 15%): \$ 8,292.31
 - TOTAL CONSTRUCTION COST (SUBTOTAL #4): \$ 63,574.35
 - TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 65,724.35

Project ID: 20 **Project Name:** Prospect Mountain Allotment_State Fence No. 2 **Land Jurisdiction:** State of Wyoming

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 12 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred. Coordination with WGFD on fence design is strongly encouraged.

Wyoming Game and Fish Department

Due to the proximity of this project relative to a known Mule Deer migration corridor, the WYGFD will provide comments and have recommendations on the fence design and construction thereof. A letter of approval/recommendation from said Department should be submitted to the WWDO along with the final project plans and specifications, prior to construction.









PROJECT EXPLANATION

Project ID: 21 **Project Name:** Eden-Farson Fire Suppression System **Land Jurisdiction:** State of Wyoming

The interested land owner believes that the Level I and Level II Master Plans conducted for the Farson (Eden) Water Supply conducted in 2012 and 2015, respectively, do not adequately address fire suppression alternatives. There are zoning restrictions for commercial and industrial developments in Sweetwater County related to fire suppression. The interested land owner believes that a completed fire suppression system would help boost the local economy and allow more development to occur in the Farson-Eden area. Said land owner also believes that fire suppression systems were not adequately evaluated as part of those two (2) studies referenced above. Because these studies are complete, RVE believes that a formal request should be made to the WWDC for a specific study relative to fire suppression in the Eden-Farson area. The previously defined studies were focused heavily on groundwater for potable water supply systems. Regarding fire suppression, surface water may be also be considered a viable source if evaluated in the future.

It can be inferred that one (1) or more cisterns would be required as part of this system to sustain adequate flows. An individual analysis of a fire suppression system was not conducted as part of the Big Sandy Watershed – Level I Study due to the unknown nature of funding and community support. Project alternatives and preliminary designs may be eligible for state funding if the proper application process is completed.

Owner/Operator: Robert Chesnovar Project Type: Transportation Route Rehab Project ID: 22 Project Name: Little Sandy Creek Crossing Rehab Location (PLSS): SE/4NW/4 Sec. 28, T26N, R105W Location (Lat/Long): 42°12'01.62", 109°20'50.74"

PROJECT COMPONENTS - ITEMIZED COSTS

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST		Т	OTAL COST
1	Mobilization	1	LS	\$	1,700.00	\$	1,700.00
2	Misc. Excavation & Placement	18	CY	\$	10.00	\$	180.00
3	Remove Existing Culverts	1	LS	\$	800.00	\$	800.00
4	Import Crushed Base for Foundation	50	TN	\$	28.00	\$	1,400.00
5	Install Class 50 Armorflex	1350	SF	\$	10.50	\$	14,175.00
TOTAL COMPONENT COST (SUBTOTAL #2):						\$	18,255.00

- PREPARATION OF FINAL DESIGNS & SPECIFICATIONS: \$ 3,500.00
 - PERMITTING AND MITIGATION: \$ 650.00
 - LEGAL FEES: \$ -
 - ACQUISTION OF ACCESS AND RIGHTS-OF-WAY: \$ -
 - PRE-CONSTRUCTION COSTS (SUBTOTAL #1): \$ 4,150.00

18,255.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$

- CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%): \$ 1,825.50 COMPONENTS AND ENGINEERING COSTS (**SUBTOTAL #3**): \$ 20,080.50 CONTINGENCY (SUBTOTAL #3 X 15%): \$ 3,012.08
 - CONTINGENCY (SUBTOTAL #3 X 15%): \$ 3,012
 - TOTAL CONSTRUCTION COST (SUBTOTAL #4): \$ 23,092.58

AL #4): \$ 27,242.58

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4):

Project ID: 22 **Project Name:** Little Sandy Creek Crossing Rehab **Land Jurisdiction:** Private

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 8 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred.

Other Considerations

The subject creek crossing does not qualify under the Small Water Project Program. Alternative designs incorporating culvert(s) or clear span bridge decks may be pursued. As this crossing is not technically the main stem of Little Sandy Creek, it may be viewed as rehabilitative work associated with the existing reservoir and function thereof. The USACE should be contacted for final determination.





WASHOUT (LOOKING EAST)

UNPERMITTED RESERVOIR

HISTORIC CREEK CROSSING & AUXILLIARY SPILLWAY

WASHOUT (LOOKING UPSTREAM)

WASHOUT (LOOKING UPSTREAM)

SCALE: 1"=3,000 FT

3,000 FT

M

DRAWN BY: MTJ CHECKED BY: MCE

DATE: 06/13/19 REVISED:

10B No: 4327 9AGE No: 2 OF BIG SANDY WATERSHED - LEVEL I STUDY LITTLE SANDY CREEK CROSSING REHAB SMALL WATER PROJECT ID: 22 LOCATED IN THE SE/4 NW/4 OF SEC. 28, T.26N., R.105W., SWEETWATER COUNTY, WY

6,000 FT

(307) 367-2826 rioverde@wyoming.com



Owner/Operator: G & E Livestock, Inc. Project Type: New Diversion Structure and Conveyance Project ID: 23 Project Name: Big Sandy Diversion Structure #1 Location (PLSS): Lot 3, Section 4, T28N, R106W Location (Lat/Long): 42°25'45.82"N, 109°27'42.75"W

PROJECT COMPONENTS (ENGINEER'S ESTIMATE)

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST		TOTAL COST	
1	Mobilization	1	LS	\$	2,500.00	\$	2,500.00
2	Head Gate Structure	1	LS	\$	3,400.00	\$	3,400.00
3	Pond Inlet & Outlet Ditch	490	LF	\$	2.00	\$	980.00
4	Diversion Pond (excavation and haul off)	1900	CY	\$	8.00	\$	15,200.00
5	4" Dia. HDPE Pipe	773	LF	\$	5.50	\$	4,251.50
6	Pump Platform	1	LS	\$	1,300.00	\$	1,300.00
TOTAL COMPONENT COST (SUBTOTAL #2):						\$	27,631.50

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$	3,500.00
	- T	-,

PERMITTING AND MITIGATION: \$ 1,300.00

LEGAL FEES: \$

ACQUISTION OF ACCESS AND RIGHTS-OF-WAY: \$

PRE-CONSTRUCTION COSTS (SUBTOTAL #1): \$ 4,800.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 27,631.50

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 2,763.15
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 30,394.65
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 4,559.20
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 34,953.85

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39,753.85

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$

Project ID: 23 **Project Name:** Big Sandy Diversion Structure #1 **Land Jurisdiction:** G&E Livestock, Inc.

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Items 1 and 10 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred.

State Engineer's Office

Current Permit: P6739.0D

After consultation with the SEO, the new point of diversion may be constructed as designed without petitioning for a change of point of diversion from the Board of Control due to the fact that there is a record POD (G & E Sprinkler System) in the same aliquot part and in close proximity to the proposed POD. Additionally, as long as the proposed pond is constructed to impound less than 1 acre-foot of water, an SW-3 reservoir application is not required. It should be noted that further consultation with the SEO should be considered after the final design is complete.

U.S. Army Corps of Engineer's

Due to this project being located in a flood plain and the appearance that wetland plant species exist in the area, the USACE should be contacted once the final design is complete. Because the pumping pond is proposed for pit-type construction, with no fill, the pond can be constructed without a Nationwide Permit (NWP). The inlet ditch, outlet ditch, pipeline, and pump base will require a wetland delineation and pre-construction notification (PCN) for submittal to the USACE. No mitigation requirements are expected. It is assumed that the pipeline will fall under NWP 14 and that the pump base and ditch(s) will fall under NWP 40. A USACE letter of acceptance should be submitted to the WWDO with the final design, prior to construction.









Owner/Operator: G & E Livestock, Inc. Project Type: New Diversion Structure and Conveyance Project ID: 24 Project Name: Big Sandy Diversion Structure #2 Location (PLSS): Lot 4, Section 4, T28N, R106W Location (Lat/Long): 42°25'50.71"N, 109°28'10.61"W

PROJECT COMPONENTS (ENGINEER'S ESTIMATE)

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST		Τ/	OTAL COST
1	Mobilization	1	LS	\$	2,700.00	\$	2,700.00
2	Head Gate Structure	1	LS	\$	3,400.00	\$	3,400.00
3	Pond Inlet & Outlet Ditch	290	LF	\$	2.00	\$	580.00
4	Diversion Pond (excavation & haul off)	2100	CY	\$	8.00	\$	16,800.00
5	4" Dia HDPE Pipe	983	LF	\$	5.50	\$	5,406.50
6	Pump Platform	1	LS	\$	1,300.00	\$	1,300.00
TOTAL COMPONENT COST (SUBTOTAL #2):						\$	30,186.50

- PREPARATION OF FINAL DESIGNS & SPECIFICATIONS: \$ 3,500.00
 - PERMITTING AND MITIGATION: \$ 1,300.00
 - LEGAL FEES: \$ -
 - ACQUISTION OF ACCESS AND RIGHTS-OF-WAY: \$ -
 - PRE-CONSTRUCTION COSTS (SUBTOTAL #1): \$ 4,800.00
 - TOTAL COMPONENT COST (SUBTOTAL #2): \$ 30,186.50
- CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%): \$ 3,018.65
- COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3): \$ 33,205.15
 - CONTINGENCY (SUBTOTAL #3 X 15%): \$ 4,980.77
 - TOTAL CONSTRUCTION COST (SUBTOTAL #4): \$ 38,185.92

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 42,985.92

Project ID: 24 **Project Name:** Big Sandy Diversion Structure #2 **Land Jurisdiction:** G&E Livestock, Inc.

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Items 1 and 10 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred.

State Engineer's Office

Current Permit: P6739.0D and P1831.0E

After consultation with the SEO, the new point of diversion may be constructed as designed without petitioning for a change of point of diversion from the Board of Control due to the fact that there is a record POD (G & E Sprinkler System) in the same aliquot part and in close proximity to the proposed POD. Additionally, as long as the proposed pond is constructed to impound less than 1 acre-foot of water, an SW-3 reservoir application is not required. It should be noted that further consultation with the SEO should be considered after the final design is complete.

U.S. Army Corps of Engineer's

Due to this project being located in a flood plain and the appearance that wetland plant species exist in the area, the USACE should be contacted once the final design is complete. Because the pumping pond is proposed for pit-type construction, with no fill, the pond can be constructed without a Nationwide Permit (NWP). The inlet ditch, outlet ditch, pipeline, and pump base will require a wetland delineation and pre-construction notification (PCN) for submittal to the USACE. No mitigation requirements are expected. It is assumed that the pipeline will fall under NWP 14 and that the pump base and ditch(s) will fall under NWP 40. A USACE letter of acceptance should be submitted to the WWDO with the final design, prior to construction.








BIG SANDY DIVERSION STRUCTURE #2

DESIGN PIPELINE PROFILE



Owner/Operator: G & E Livestock, Inc. / State of Wyoming Project Type: Stock Water Spring Development Project ID: 25 Project Name: Erramouspe Spring Development #1 Location (PLSS): SW/4NW/4 Sec. 20, T29N, R106W Location (Lat/Long): 42°28'10.29"N, 109°31'04.16"W

ENGINEER'S ESTIMATE

PROJECT COMPONENTS - ITEMIZED COSTS

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST		TOTAL COST	
1	Mobilization	1	LS	\$	1,900.00	\$	1,900.00
2	2" SDR-11 Pipe	333	LF	\$	3.50	\$	1,165.50
3	4" SDR-11 Pipe	120	LF	\$	5.50	\$	660.00
4	Spring Collection System	1	LS	\$	3,400.00	\$	3,400.00
5	Install Tire Trough (complete)	1	LS	\$	13,000.00	\$	13,000.00
6	Protective Fencing	200	LF	\$	9.00	\$	1,800.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 21,925.50

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$	2,650.00
PERMITTING AND MITIGATION:	\$	1,450.00
LEGAL FEES:	\$	-
ACQUISTION OF ACCESS AND RIGHTS-OF-WAY:	\$	-
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$	4,100.00
TOTAL COMPONENT COST (SUBTOTAL #2):	\$	21,925.50
CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$	2,192.55
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$	24,118.05
CONTINGENCY (SUBTOTAL #3 X 15%):	\$	3,617.71
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$	27,735.76
TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4)	Å	94 995 56

BTOTAL #1 + SUBTOTAL #4): \$ 31,835.76 TOTAL PROJECT COST (S

Project ID: 25 **Project Name:** Erramouspe Spring Development #1 **Land Jurisdiction:** State of Wyoming

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 11 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred.

State Engineer's Office

Current Permit: None

As this project involves the development of an existing spring for stock water purposes, an application for permit to appropriate ground water should be submitted to the SEO. The SEO permit should then be submitted to the WWDO with the final project plans, prior to construction. Following construction, a statement of completion and proof of appropriation and beneficial use of groundwater should be completed and submitted to the SEO – Groundwater Division.

Wyoming Office of State Lands and Investments

An application for construction of improvements should be completed and submitted to said Office after the final design has been developed.

U.S. Army Corp of Engineer's

A project plan set should be submitted to the USACE Wyoming Regulatory Office for review prior to final submission to the WWDO. Due to the small quantity of fill associated with the installation of the spring collector, and the fact that the pipeline and trough will be located on uplands, a wetland delineation is not anticipated as a requirement. However, final determination rests with the Wyoming Regulatory Office. A USACE letter of acceptance should be submitted to the WWDO with the final design, prior to construction.



LOOKING NORTHWEST AT SPRING SOURCE CONSTRUCT 200 LF OF PROTECTIVE FENCING (SEE SHEET 5)

SPRING OUTLET-SUPPLY PIPE VALVE

> 13 LF: 2" SDR-11 BYPASS LINE

320 LF: 2" SDR-11 SUPPLY LINE

INSTALL SPRING COLLECTION SYSTEM (SEE SHEET 4)

NATURAL SPRING COURSE

60 LF: 4" SDR-11

OVERFLOW LINE



LOOKING NORTHWEST TOWARDS SPRING SOURCE

> GRADE LEVEL PRIOR TO . TROUGH INSTALLATION

INSTALL TIRE TROUGH (SEE SHEET 3)

50 FT 100 FT

SCALE: 1"=50 FT

REVISED:

OB No: 4327 AGE No: 2 OF (60 LF: 4" SDR-11 DRAIN LINE









TO TROUGH ¹/₄" MESH G.I. SCREEN **OR INVERTED 90° ELBOW** IMPERVIOUS CONCRETE BARRIER CROSS SECTION A-A' N.T.S. EXCAVATED TRENCH

-0.50

1.50

W/ CLEAN DRAIN ROCK

4" PERFORATED PIPE (CAPPED COLLECTOR)

FIELD

AIR VENT

4" SOLID PIPE

(INLET SUPPLY)

PLAN VIEW

N.T.S.

30" I.D. N-12 ADS

DUAL WALL HDPE PIPE

INSTALL UNION FITTING

2" SDR-11 OUTLET PIPE

NATURAL GRADE

2" SDR-11 BYPASS PIPE W/

REMOVABLE PLUG

TO DAYLIGHT DRAIN

30" I.D. ADS

HDPE PIPE

2" SDR-11 OUTLET

Δ

INSTALL UNION

FITTING

¹/" MESH G.I. SCREEN

PIPE TO TROUGH



Owner/Operator: G & E Livestock, Inc. / BLM Project Type: Stock Water Spring Development Project ID: 26 Project Name: Erramouspe Spring Development #2 Location (PLSS): SW/4SE/4 Sec. 25, T29N, R106W Location (Lat/Long): 42°26'46.06"N, 109°25'48.08"W

ENGINEER'S ESTIMATE

PROJECT COMPONENTS - ITEMIZED COSTS

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST		TOTAL COST	
1	Mobilization	1	LS	\$	2,000.00	\$	2,000.00
2	2" SDR-11 Pipe	113	LF	\$	3.50	\$	395.50
3	4" SDR-11 Pipe	80	LF	\$	6.00	\$	480.00
4	Spring Collection System	1	EA	\$	3,500.00	\$	3,500.00
5	Tire Trough	1	EA	\$	13,000.00	\$	13,000.00
6	Protective Fence	200	LF	\$	9.00	\$	1,800.00

 TOTAL COMPONENT COST (SUBTOTAL #2):
 \$ 21,175.50

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 2,000.00
PERMITTING AND MITIGATION:	\$ 1,450.00
LEGAL FEES:	\$ -
ACQUISTION OF ACCESS AND RIGHTS-OF-WAY:	\$ -
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 3,450.00
TOTAL COMPONENT COST (SUBTOTAL #2):	\$ 21,175.50
CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 2,117.55
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 23,293.05

CONTINGENCY (SUBTOTAL #3 X 15%): \$ 3,493.96

TOTAL CONSTRUCTION COST (SUBTOTAL #4): \$ 26,787.01

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 30,237.01

Project ID: 26 Project Name: Erramouspe Spring Development #2 Land Jurisdiction: State of Wyoming

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 11 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred.

State Engineer's Office

Current Permit: None

As this project involves the development of an existing spring for stock water purposes, an application for permit to appropriate ground water should be submitted to the SEO. The SEO permit should then be submitted to the WWDO with the final project plans, prior to construction. Following construction, a statement of completion and proof of appropriation and beneficial use of groundwater should be completed and submitted to the SEO – Groundwater Division.

Wyoming Office of State Lands and Investments

An application for construction of improvements should be completed and submitted to said Office after the final design has been developed.

United States Army Corp of Engineers

A project plan set should be submitted to the USACE Wyoming Regulatory Office for review prior to final submission to the WWDO. Due to the small quantity of fill associated with the installation of the spring collector, and the fact that the pipeline and trough will be located on uplands, a wetland delineation and pre-construction notification are not being anticipated as a requirement. However, final determination rests with the Wyoming Regulatory Office. A USACE letter of acceptance should be submitted to the WWDO with the final design, prior to construction.











Owner/Operator: G & E Livestock, Inc. / BLM Project Type: Stock Water Trough Rehab Project ID: 27 Project Name: Boundary #4645 Well Stock Water Trough Rehab Location (PLSS): NE/4NW/4 Sec. 25, T28N, R108W Location (Lat/Long): 42°22'45.07"N, 109°38'30.13"W

ENGINEER'S ESTIMATE

PROJECT COMPONENTS - ITEMIZED COSTS

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST		TOTAL COST	
1	Mobilization	1	LS	\$	3,500.00	\$	3,500.00
2	Remove & Salvage Existing Tanks	3	EA	\$	500.00	\$	1,500.00
3	Temporary Diversion Pipe	1	LS	\$	750.00	\$	750.00
4	Fill Eroded Area	115	CY	\$	20.00	\$	2,300.00
5	Crushed Base	35	TN	\$	30.00	\$	1,050.00
6	Install Tire Troughs	2	EA	\$	13,000.00	\$	26,000.00
7	4" SDR-11 Pipe	127	LF	\$	5.50	\$	698.50

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 35,798.50

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 2,000.00
PERMITTING AND MITIGATION:	\$ 2,650.00
LEGAL FEES:	\$ -
ACQUISTION OF ACCESS AND RIGHTS-OF-WAY:	\$ -
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 4,650.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 35,798.50

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):\$ 3,579.85COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):\$ 39,378.35CONTINGENCY (SUBTOTAL #3 X 15%):\$ 5,906.75TOTAL CONSTRUCTION COST (SUBTOTAL #4):\$ 45,285.10

49,935.10

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4):

Project ID: 27 **Project Name:** Boundary #4645 Well Stock Water Trough Rehab **Land Jurisdiction:** Bureau of Land Management

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 1 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred.

State Engineer's Office

Current Permit: P51229.0W

The current well is fully functional and does not require any rehabilitative work. The point of use is not subject to change. Therefore, no additional permitting through the SEO is warranted.

Bureau of Land Management

The existing stock water troughs were built in cooperation with the BLM Rock Springs Field Office in recent years. The troughs have failed, purportedly due to broken water supply lines which feed the troughs. It is believed that the pipe(s) were broken due to frost action. An on-site meeting has been scheduled for the summer of 2019 between the operator (G&E Livestock, Inc.), Sublette County Conservation District personnel, and the owner (BLM). At this meeting, a potential borrow source in proximity to the project site should be evaluated for use in rehabilitating the trough system. According to the BLM under the Federal Land Policy and Management Act (FLPMA), this may trigger an Environmental Assessment (EA) based on the location and proximity of the potential borrow site. If an EA is found to be required, a cultural study of the potential borrow site will be part of the assessment. Additionally, the new trough layout and final design requires approval from the Rock Springs Field Office prior to construction.











THE DEPICTED TROUGH AND WATER SUPPLY SYSTEM IS INTENDED FOR SEASONAL USE ONLY. THE PLUMBING SHOULD BE INSTALLED WITH ADEQUATE GRADIENT AND DRAIN VALVES TO FACILITATE PROPER DRAINAGE.





- 3.) POUR CONCRETE AROUND ADS PIPE, OVERFLOW PIPE, DRAIN PIPE, AND WORK UNDER INTERIOR EDGE OF TIRE. FINISH THE TOP SURFACE OF CONCRETE TO FORM A LEVEL PAD ACROSS THE TROUGH BOTTOM.
- 4.) *PROVIDE AN ESCAPE DEVICE FOR SMALL BIRDS AND ANIMALS THAT MAY BECOME ENTRAPPED. A RAMP CONSTRUCTED OF A PIECE OF EXPANDED METAL EXTENDING FROM THE WATER SURFACE TO THE TOP SIDEWALL OR A FLOAT CONSISTING OF A PIECE OF LUMBER ARE TWO DEVICES THAT COULD BE USED.
- 5.) EXTEND CRUSHED ROAD BASE PAD 6 FT. OUT FROM EXTERIOR TIRE EDGE

*DESIGN BASED ON NRCS STANDARDIZED DRAWING AND DESIGN INPUT FROM BROGAN HYDROLOGIC CONSULTING. DESIGN MUST BE ADAPTED TO MEET SITE SPECIFIC CONDITIONS.

JOB No: 4327 PAGE No: 6 OF 6	DATE: 06/13/19 REVISED:	CHECKED BY: MCE	DRAWN BY: MTJ	DESIGNED BY: MIJ
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BIG SANDY WATERSHED - LEVEL I STUDY BOUNDARY #4645 WELL STOCK WATER TROUGH REHAB SMALL WATER PROJECT ID: 27 LOCATED IN THE NE/4NW/4 OF SEC. 25, T.28N., R.108W., SUBLETTE COUNTY, WY



Owner/Operator: McMurry Ranch. LLC Project Type: Ditch Rehab Project ID: 28 Project Name: McMurry Ditch Rehab Location (PLSS): E/2SW/4 Sec. 9, T24N, R106W Location (Lat/Long): 42°04'08.39"N, 109°25'59.75"W

PROJECT COMPONENTS - ITEMIZED COSTS

ITEM No.	DESCRIPTION	QUANTITY	UNIT	U	UNIT COST		OTAL COST
1	Mobilization	1	LS	\$	2,000.00	\$	2,000.00
2	Pipe Bedding & Profile Work	1	LS	\$	1,300.00	\$	1,300.00
3	Install 24" ADS N-12 Pipe	600	LF	\$	40.00	\$	24,000.00
TOTAL COMPONENT COST (SUBTOTAL #2):						\$	27,300.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS.] 5	\$ 1,000.00
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- PERMITTING AND MITIGATION: \$ 350.00
 - LEGAL FEES: \$ _
- ACQUISTION OF ACCESS AND RIGHTS-OF-WAY: \$ 250.00
 - PRE-CONSTRUCTION COSTS (SUBTOTAL #1): \$ 1,600.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 27,300.00

- 2,730.00
- CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%): \$
 - COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3): \$ 30,030.00
 - CONTINGENCY (SUBTOTAL #3 X 15%): \$ 4,504.50
 - TOTAL CONSTRUCTION COST (SUBTOTAL #4): \$ 34,534.50

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 36,134.50

Project ID: 28 **Project Name:** McMurry Ditch Rehab **Land Jurisdiction:** McMurry Ranch, LLC

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Items 1 and 10 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred.

State Engineer's Office

Current Permit: P24983.0D

This section of existing ditch sustains substantial seepage losses due to the sandy composition of the raised ditch profile embankment. Because the pipe will be placed along the historic ditch alignment, a change of means of conveyance is not required by the SEO or Board of Control.









Owner/Operator: X Bar T Ranch, LLC Project Type: Irrigation - Diversion Rehabilitation Project ID: 29 Project Name: Francis Ditch Check Structure Rehab Location (PLSS): Lot 1 Sec. 3, T25N, R106W Location (Lat/Long): 42°10'29.74"N, 109°25'57.00"W

ENGINEER'S ESTIMATE

PROJECT COMPONENTS - ITEMIZED COSTS

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST		TOTAL COST	
1	Mobilization	1	LS	\$	6,500.00	\$	6,500.00
2	Concrete Removal & Haul Off	18	CY	\$	120.00	\$	2,160.00
3	Temporary Access & Haul Road Const.	1	LS	\$	1,450.00	\$	1,450.00
4	Misc. Excavation & Placement	40	CY	\$	32.00	\$	1,280.00
5	Rock Vane & Scour Pool Construction	1	LS	\$	43,000.00	\$	43,000.00
6	Rock Placement for Bank Stabilization	13	CY	\$	200.00	\$	2,600.00
7	Backfill Import & Placement	200	CY	\$	26.00	\$	5,200.00
TOTAL COMPONENT COST (SUBTOTAL #2):							62.190.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS: \$ 3,800.00

> PERMITTING AND MITIGATION: \$ 950.00

> > LEGAL FEES: \$ -

ACQUISTION OF ACCESS AND RIGHTS-OF-WAY: \$

PRE-CONSTRUCTION COSTS (SUBTOTAL #1): \$

62,190.00

4,750.00

-

TOTAL COMPONENT COST (SUBTOTAL #2): \$

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%): \$ 6,219.00

COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3): \$ 68,409.00

CONTINGENCY (SUBTOTAL #3 X 15%): \$ 10,261.35 78,670.35

TOTAL CONSTRUCTION COST (SUBTOTAL #4): \$

83,420.35

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$

Project ID: 29 **Project Name:** Francis Ditch Check Structure Rehab **Land Jurisdiction:** X Bar T Ranch, LLC

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 10 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred.

State Engineer's Office

Current Permits: T4313, T4314, T4315, and P3105.0E

Proposed activities include the removal of the impaired concrete check structure and the construction of one (1) rock cross vane (for irrigation diversion/fish passage), and reshaping the adjacent banks to accept the rock vane. Approximately 1,500 SF (0.03 Ac.) of Big Sandy River will be permanently impacted. As the point of diversion is not subject to change, no additional permitting from the SEO or BOC is required.

Eden Valley Irrigation and Drainage District

Prior to construction, the final project plans and specifications should be submitted to the District for review and comment. Specifically, the construction time-frame should be discussed and agreed upon so that controlled releases from Big Sandy Reservoir do not cause issues during construction.

U.S. Army Corp of Engineer's

A project plan set should be submitted to the USACE Wyoming Regulatory Office for review prior to final submission to the WWDO. Based on the concept design, the proposed activities are considered to be routine maintenance that do not require Department of the Army authorization because Part 323.4(a)(3) of the regulations states that the following activities are exempt:

"Discharges associated with siphons, pumps, headgates, wingwalls, weirs, diversion structures, and such other facilities as are appurtenant and functionally related to irrigation ditches are included in this exemption."

A letter of acknowledgment and final determination from the Department of the Army should be submitted to the WWDO along with the final project plans and specifications.












Owner/Operator: X Bar T Ranch, LLC Project Type: Irrigation - Diversion Rehabilitation Project ID: 30 Project Name: Francis Ditch Diversion Rehab Location (PLSS): Lot 1 Sec. 3, T25N, R106W Location (Lat/Long): 42°10'29.41"N, 109°25'57.22"W

ENGINEER'S ESTIMATE

PROJECT COMPONENTS - ITEMIZED COSTS

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST		UNIT COST		T	OTAL COST
1	Mobilization	1	LS	\$	2,100.00	\$	2,100.00		
2	Head Gate Removal & Disposal	1	LS	\$	850.00	\$	850.00		
3	Misc. Excavation and Placement	10	CY	\$	32.00	\$	320.00		
4	12" I.D. N-12 Pipe	18	LF	\$	30.00	\$	540.00		
5	Head Gate Fabrication	1	LS	\$	13,500.00	\$	13,500.00		
6	Head Gate Installation	1	LS	\$	3,200.00	\$	3,200.00		

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 20,510.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS: \$ 2,100.00

PERMITTING AND MITIGATION: \$ 950.00

LEGAL FEES: \$ -

ACQUISTION OF ACCESS AND RIGHTS-OF-WAY: \$ -

PRE-CONSTRUCTION COSTS (SUBTOTAL #1): \$ 3,050.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 20,510.00

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%): \$ 2,051.00

COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3): \$ 22,561.00

CONTINGENCY (SUBTOTAL #3 X 15%): \$ 3,384.15

TOTAL CONSTRUCTION COST (SUBTOTAL #4): \$ 25,945.15

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 28,995.15

Project ID: 30 **Project Name:** Francis Ditch Diversion Rehab **Land Jurisdiction:** X Bar T Ranch, LLC

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 10 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred.

State Engineer's Office

Current Permits: T4313, T4314, T4315, and P3105.0E

Proposed activities include the removal of the impaired head gate and the construction and installation of a new head gate, including a sand sluice (by pass) control. Minor reshaping of the adjacent banks along the Big Sandy River is also proposed. Approximately 300 SF (0.007 Ac.) of Big Sandy River will be permanently impacted. As the point of diversion is not subject to change, no additional permitting from the SEO or BOC is required.

Eden Valley Irrigation and Drainage District

Prior to construction, the final project plans and specifications should be submitted to the District for review and comment. Specifically, the construction time-frame should be discussed and agreed upon so that controlled releases from Big Sandy Reservoir do not cause issues during construction.

U.S. Army Corp of Engineer's

A project plan set should be submitted to the USACE Wyoming Regulatory Office for review prior to final submission to the WWDO. Based on the concept design, the proposed activities are considered to be routine maintenance that do not require Department of the Army authorization because Part 323.4(a)(3) of the regulations states that the following activities are exempt:

"Discharges associated with siphons, pumps, headgates, wingwalls, weirs, diversion structures, and such other facilities as are appurtenant and functionally related to irrigation ditches are included in this exemption."













Owner/Operator: X Bar T Ranch, LLC Project Type: Irrigation - Diversion Rehabilitation Project ID: 31 Project Name: Dead Cow Field Diversion Rehab Location (PLSS): SE/4NE/4 Sec. 3, T25N, R106W Location (Lat/Long): 42°10'17.28"N, 109°25'58.11"W

ENGINEER'S ESTIMATE

PROJECT COMPONENTS - ITEMIZED COSTS

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST		T	OTAL COST
1	Mobilization	1	LS	\$	3,000.00	\$	3,000.00
2	Install Headgate & Diversion Structure	1	EA	\$	4,500.00	\$	4,500.00
3	12" Dia HDPE Pipe	645	LF	\$	30.00	\$	19,350.00
4	Construct Open Channel Ditch	1160	LF	\$	3.00	\$	3,480.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 30,330.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 2,000.00
PERMITTING AND MITIGATION:	\$ 650.00
LEGAL FEES:	\$ -
ACQUISTION OF ACCESS AND RIGHTS-OF-WAY:	\$ -
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 2,650.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 30,330.00

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 3,033.00
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 33,363.00
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 5,004.45
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 38,367.45

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 41,017.45

Project ID: 31 **Project Name:** Dead Cow Field Diversion Rehab **Land Jurisdiction:** X Bar T Ranch, LLC

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 10 of said executive order, this project is considered to be an exempt activity. No sagebrush exists within the limits of the Dead Cow Field. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred.

State Engineer's Office

Current Permits: T4313, T4314, T4315, & P3105.0E

Proposed activities include the removal of the impaired diversion structure and the construction and installation of a new head gate as well as open channel and piped conveyance feature. Approximately 645 LF of pipe and 1160 LF of open channel ditch is proposed for construction. This feature is a lateral off of the Francis Ditch and does not warrant additional permits from the SEO or BOC, so long as the diversion from the Big Sandy River does not exceed the permitted flow rates.

U.S. Army Corp of Engineer's

A project plan set should be submitted to the USACE Wyoming Regulatory Office for review prior to final submission to the WWDO. Based on the concept design, the proposed activities are considered to be routine maintenance that do not require Department of the Army authorization because Part 323.4(a)(3) of the regulations states that the following activities are exempt:

"Discharges associated with siphons, pumps, headgates, wingwalls, weirs, diversion structures, and such other facilities as are appurtenant and functionally related to irrigation ditches are included in this exemption."









Owner/Operator: X Bar T Ranch, LLC Project Type: Irrigation Project ID: 32 Project Name: East Big Sandy Spreader Dike Development Location (PLSS): NE/4 Sec. 10, T25N, R106W Location (Lat/Long): 42°09'34.13"N, 109°26'11.88"W

ENGINEER'S ESTIMATE

PROJECT COMPONENTS - ITEMIZED COSTS

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST		T	OTAL COST
1	Mobilization	1	LS	\$	1,800.00	\$	1,800.00
2	Spreader Dike	1250	LF	\$	32.00	\$	40,000.00
3	Spreader Ditch	850	LF	\$	3.00	\$	2,550.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 44,350.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$	4,800.00
PERMITTING AND MITIGATION:	\$	3,550.00
LEGAL FEES:	\$	-
ACQUISTION OF ACCESS AND RIGHTS-OF-WAY:	\$	-
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$	8,350.00
IOTAL COMPONENT COST (SUBIOTAL #2):	Ş	44,350.00

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%): \$ 4,435.00

COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3): \$ 48,785.00

CONTINGENCY (SUBTOTAL #3 X 15%): \$ 7,317.75

TOTAL CONSTRUCTION COST (SUBTOTAL #4): \$ 56,102.75

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 64,452.75

Project ID: 32 **Project Name:** East Big Sandy Spreader Dike Development **Land Jurisdiction:** X Bar T Ranch, LLC

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 10 of said executive order, this project is considered to be an exempt activity, excluding the conversion of sagebrush habitats to new irrigated lands. A Habitat Evaluation should be conducted prior to final design work due to the possibility of habitat conversion exception. This initial evaluation will enable the project engineer to more appropriately configure the spreader dikes so as not to interfere with sensitive habitat areas, if so determined. If sagebrush is to be converted, mitigation will be necessary and should be accounted for in the overall project cost. Additionally, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred.

State Engineer's Office

Current Permit: P3105.0E

Proposed activities include the construction of several new dikes as well as open channel conveyance features for the effective irrigation of permitted lands. The proposed network is fed from a lateral off of the Enl. Francis Ditch and does not warrant additional permits from the SEO or BOC, so long as the diversion from the Big Sandy River does not exceed the permitted flow rates.

U.S. Army Corp of Engineer's

A project plan set should be submitted to the USACE Wyoming Regulatory Office for review prior to final submission to the WWDO. Based on initial site investigations, no wetlands exist where the proposed dikes and ditches are proposed for construction. The Department of the Army will make the final determination. For the concept design estimate, some cost for wetland delineation, mapping, and reporting was included in-case the Department of the Army determines that it is necessary.





SWEETWATER COUNTY, WY

(307) 367-2826 rioverde@wyoming.com



Owner/Operator: X Bar T Ranch, LLC Project Type: Diversion Structure Rehab Project ID: 33 Project Name: Francis Ditch Turnout #1 Location (PLSS): NE/4SW/4 Sec. 10, T25N, R106W Location (Lat/Long): 42°09'08.96"N, 109°26'39.43"W

ENGINEER'S ESTIMATE

PROJECT COMPONENTS - ITEMIZED COSTS

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST		TC	DTAL COST
1	Mobilization	1	LS	\$	700.00	\$	700.00
2	Removal of Existing Structure	1	EA	\$	650.00	\$	650.00
3	Misc. Excavation & Placement	8	CY	\$	32.00	\$	256.00
4	Ditch Turnout Structure and Installation	1	LS	\$	3,950.00	\$	3,950.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 5,556.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 975.00
PERMITTING AND MITIGATION:	\$ 350.00
LEGAL FEES:	\$ -
ACQUISTION OF ACCESS AND RIGHTS-OF-WAY:	\$ -
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 1,325.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 5,556.00

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 555.60
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 6,111.60
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 916.74
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 7,028.34

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 8,353.34

Project ID: 33 **Project Name:** Francis Ditch Turnout #1 **Land Jurisdiction:** X Bar T Ranch, LLC

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 10 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred.

State Engineer's Office

Current Permits: T4313, T4314, T4315, & P3105.0E

Proposed activities include the removal of the impaired diversion structure and the construction and installation of a new diversion control structure. This turnout is a historic structure on the Francis Ditch and does not warrant additional permits from the SEO or BOC, so long as the diversion from the Big Sandy River does not exceed the permitted flow rates.

U.S. Army Corp of Engineer's

A project plan set should be submitted to the USACE Wyoming Regulatory Office for review prior to final submission to the WWDO. Based on the concept design, the proposed activities are considered to be routine maintenance that do not require Department of the Army authorization because Part 323.4(a)(3) of the regulations states that the following activities are exempt:

"Discharges associated with siphons, pumps, headgates, wingwalls, weirs, diversion structures, and such other facilities as are appurtenant and functionally related to irrigation ditches are included in this exemption."







Owner/Operator: X Bar T Ranch, LLC Project Type: Diversion Structure Rehab Project ID: 34 Project Name: Francis Ditch Turnout #2 Location (PLSS): NW/4NE/4 Sec. 10, T25N, R106W Location (Lat/Long): 42°09'35.81"N, 109°26'29.50"W

ENGINEER'S ESTIMATE

PROJECT COMPONENTS - ITEMIZED COSTS

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST		тс	OTAL COST
1	Mobilization	1	LS	\$	700.00	\$	700.00
2	Removal of Existing Structure	1	EA	\$	650.00	\$	650.00
3	Misc. Excavation & Placement	8	CY	\$	32.00	\$	256.00
4	Ditch Turnout Structure and Installation	1	LS	\$	3,950.00	\$	3,950.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 5,556.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 975.00
PERMITTING AND MITIGATION:	\$ 350.00
LEGAL FEES:	\$ -
ACQUISTION OF ACCESS AND RIGHTS-OF-WAY:	\$ -
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 1,325.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 5,556.00

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 555.60
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 6,111.60
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 916.74
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 7,028.34

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 8,353.34

Project ID: 34 **Project Name:** Francis Ditch Turnout #2 **Land Jurisdiction:** X Bar T Ranch, LLC

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 10 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred.

State Engineer's Office

Current Permits: T4313, T4314, T4315, & P3105.0E

Proposed activities include the removal of the impaired diversion structure and the construction and installation of a new diversion control structure. This turnout is a historic structure on the Francis Ditch and does not warrant additional permits from the SEO or BOC, so long as the diversion from the Big Sandy River does not exceed the permitted flow rates.

U.S. Army Corp of Engineer's

A project plan set should be submitted to the USACE Wyoming Regulatory Office for review prior to final submission to the WWDO. Based on the concept design, the proposed activities are considered to be routine maintenance that do not require Department of the Army authorization because Part 323.4(a)(3) of the regulations states that the following activities are exempt:

"Discharges associated with siphons, pumps, headgates, wingwalls, weirs, diversion structures, and such other facilities as are appurtenant and functionally related to irrigation ditches are included in this exemption."







Owner/Operator: X Bar T Ranch, LLC Project Type: Diversion Structure Rehab Project ID: 35 Project Name: Francis Ditch Turnout #3 Location (PLSS): NW/4NE/4 Sec. 10, T25N, R106W Location (Lat/Long): 42°09'39.07"N, 109°26'29.71"W

ENGINEER'S ESTIMATE

PROJECT COMPONENTS - ITEMIZED COSTS

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST		TOTAL COST	
1	Mobilization	1	LS	\$	700.00	\$	700.00
2	Removal of Existing Structure	1	EA	\$	650.00	\$	650.00
3	Misc. Excavation & Placement	8	CY	\$	32.00	\$	256.00
4	Ditch Turnout Structure and Installation	1	LS	\$	3,950.00	\$	3,950.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 5,556.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 975.00
PERMITTING AND MITIGATION:	\$ 350.00
LEGAL FEES:	\$ -
ACQUISTION OF ACCESS AND RIGHTS-OF-WAY:	\$ -
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 1,325.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 5,556.00

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 555.60
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 6,111.60
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 916.74
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 7,028.34

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 8,353.34

Project ID: 35 **Project Name:** Francis Ditch Turnout #3 **Land Jurisdiction:** X Bar T Ranch, LLC

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 10 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred.

State Engineer's Office

Current Permits: T4313, T4314, T4315, & P3105.0E

Proposed activities include the removal of the impaired diversion structure and the construction and installation of a new diversion control structure. This turnout is a historic structure on the Francis Ditch and does not warrant additional permits from the SEO or BOC, so long as the diversion from the Big Sandy River does not exceed the permitted flow rates.

U.S. Army Corp of Engineer's

A project plan set should be submitted to the USACE Wyoming Regulatory Office for review prior to final submission to the WWDO. Based on the concept design, the proposed activities are considered to be routine maintenance that do not require Department of the Army authorization because Part 323.4(a)(3) of the regulations states that the following activities are exempt:

"Discharges associated with siphons, pumps, headgates, wingwalls, weirs, diversion structures, and such other facilities as are appurtenant and functionally related to irrigation ditches are included in this exemption."







PROPOSED FRANCIS DITCH TURNOUT #3

BIG SANDY RIVER

200 FT

SCALE: 1"=100 FT

DESIGNED BY: MTJ

100 FT

DRAWN BY: MTJ CHECKED BY: MCE DATE: 04/02/19 REVISED: JOB No: 4327 PAGE No: 2 OF 3

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BIG SANDY WATERSHED - LEVEL I STUDY FRANCIS DITCH TURNOUT #3 SMALL WATER PROJECT ID: 35 LOCATED IN THE NW/4NE/4 OF SEC. 10, T.25N., R.106W., SWEETWATER COUNTY, WY

(307) 367-2826 rioverde@wyoming.com


Owner/Operator: X Bar T Ranch, LLC Project Type: Diversion Structure Rehab Project ID: 36 Project Name: Francis Ditch Turnout #4 Location (PLSS): SW/4SE/4 Sec. 3, T25N, R106W Location (Lat/Long): 42°09'43.65"N, 109°26'25.80"W

ENGINEER'S ESTIMATE

PROJECT COMPONENTS - ITEMIZED COSTS

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST		тс	DTAL COST
1	Mobilization	1	LS	\$	700.00	\$	700.00
2	Removal of Existing Structure	1	EA	\$	650.00	\$	650.00
3	Misc. Excavation & Placement	8	CY	\$	32.00	\$	256.00
4	Ditch Turnout Structure and Installation	1	LS	\$	3,950.00	\$	3,950.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 5,556.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 975.00
PERMITTING AND MITIGATION:	\$ 350.00
LEGAL FEES:	\$ -
ACQUISTION OF ACCESS AND RIGHTS-OF-WAY:	\$ -
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 1,325.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 5,556.00

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 555.60
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 6,111.60
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 916.74
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 7,028.34

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 8,353.34

Project ID: 36 **Project Name:** Francis Ditch Turnout #4 **Land Jurisdiction:** X Bar T Ranch, LLC

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 10 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred.

State Engineer's Office

Current Permits: T4313, T4314, T4315, & P3105.0E

Proposed activities include the removal of the impaired diversion structure and the construction and installation of a new diversion control structure. This turnout is a historic structure on the Francis Ditch and does not warrant additional permits from the SEO or BOC, so long as the diversion from the Big Sandy River does not exceed the permitted flow rates.

U.S. Army Corp of Engineer's

A project plan set should be submitted to the USACE Wyoming Regulatory Office for review prior to final submission to the WWDO. Based on the concept design, the proposed activities are considered to be routine maintenance that do not require Department of the Army authorization because Part 323.4(a)(3) of the regulations states that the following activities are exempt:

"Discharges associated with siphons, pumps, headgates, wingwalls, weirs, diversion structures, and such other facilities as are appurtenant and functionally related to irrigation ditches are included in this exemption."







Owner/Operator: X Bar T Ranch, LLC Project Type: Diversion Structure Rehab Project ID: 37 Project Name: Francis Ditch Turnout #5 Location (PLSS): SW/4SE/4 Sec. 3, T25N, R106W Location (Lat/Long): 42°09'54.45"N, 109°26'22.70"W

ENGINEER'S ESTIMATE

PROJECT COMPONENTS - ITEMIZED COSTS

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST		TC	DTAL COST
1	Mobilization	1	LS	\$	700.00	\$	700.00
2	Removal of Existing Structure	1	EA	\$	650.00	\$	650.00
3	Misc. Excavation & Placement	8	CY	\$	32.00	\$	256.00
4	Ditch Turnout Structure and Installation	1	LS	\$	3,950.00	\$	3,950.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 5,556.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 975.00
PERMITTING AND MITIGATION:	\$ 350.00
LEGAL FEES:	\$ -
ACQUISTION OF ACCESS AND RIGHTS-OF-WAY:	\$ -
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 1,325.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 5,556.00

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 555.60
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 6,111.60
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 916.74
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 7,028.34

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 8,353.34

Project ID: 37 **Project Name:** Francis Ditch Turnout #5 **Land Jurisdiction:** X Bar T Ranch, LLC

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 10 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred.

State Engineer's Office

Current Permits: T4313, T4314, T4315, & P3105.0E

Proposed activities include the removal of the impaired diversion structure and the construction and installation of a new diversion control structure. This turnout is a historic structure on the Francis Ditch and does not warrant additional permits from the SEO or BOC, so long as the diversion from the Big Sandy River does not exceed the permitted flow rates.

U.S. Army Corp of Engineer's

A project plan set should be submitted to the USACE Wyoming Regulatory Office for review prior to final submission to the WWDO. Based on the concept design, the proposed activities are considered to be routine maintenance that do not require Department of the Army authorization because Part 323.4(a)(3) of the regulations states that the following activities are exempt:

"Discharges associated with siphons, pumps, headgates, wingwalls, weirs, diversion structures, and such other facilities as are appurtenant and functionally related to irrigation ditches are included in this exemption."







Owner/Operator: X Bar T Ranch, LLC Project Type: Conveyance Structure Rehab Project ID: 38 Project Name: Francis Ditch Drop Structure Rehab Location (PLSS): NE/4SW/4 Sec. 10, T25N, R106W Location (Lat/Long): 42°09'04.81"N, 109°26'33.32"W

ENGINEER'S ESTIMATE

PROJECT COMPONENTS - ITEMIZED COSTS

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST		тс	OTAL COST
1	Mobilization	1	LS	\$	750.00	\$	750.00
2	Remove Existing Concrete Drop Structure	1	LS	\$	500.00	\$	500.00
3	Fabricate Drop Structure	1	EA	\$	3,600.00	\$	3,600.00
4	Drop Structure Installation	1	LS	\$	1,800.00	\$	1,800.00
5	Riprap Installation	5	SY	\$	80.00	\$	400.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 7,050.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 1,950.00
PERMITTING AND MITIGATION:	\$ 350.00
LEGAL FEES:	\$ -
ACQUISTION OF ACCESS AND RIGHTS-OF-WAY:	\$ -
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 2,300.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 7,050.00

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 705.00
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 7,755.00
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 1,163.25
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 8,918.25

11,218.25

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$

Project ID: 38 **Project Name:** Francis Ditch Drop Structure Rehab **Land Jurisdiction:** X Bar T Ranch, LLC

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 10 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred.

State Engineer's Office

Current Permits: T4313, T4314, T4315, & P3105.0E

Proposed activities include the removal of the impaired structure and the construction and installation of a new drop structure. This structure is located on the Francis Ditch and does not warrant additional permits from the SEO or BOC, so long as the diversion from the Big Sandy River does not exceed the permitted flow rates.

U.S. Army Corp of Engineer's

A project plan set should be submitted to the USACE Wyoming Regulatory Office for review prior to final submission to the WWDO. Based on the concept design, the proposed activities are considered to be routine maintenance that do not require Department of the Army authorization because Part 323.4(a)(3) of the regulations states that the following activities are exempt:

"Discharges associated with siphons, pumps, headgates, wingwalls, weirs, diversion structures, and such other facilities as are appurtenant and functionally related to irrigation ditches are included in this exemption."









Owner/Operator: X Bar T Ranch, LLC Project Type: Diversion Structure Rehab Project ID: 39 Project Name: Francis Ditch Diversion #1 Location (PLSS): NE/4SW/4 Sec. 10, T25N, R106W Location (Lat/Long): 42°09'04.35"N, 109°26'31.95"W

ENGINEER'S ESTIMATE

PROJECT COMPONENTS - ITEMIZED COSTS

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST		TOTAL COST	
1	Mobilization	1	LS	\$	500.00	\$	500.00
2	Remove & Salvage Existing CMP	1	EA	\$	250.00	\$	250.00
3	Conc. Check Structure	1	LS	\$	1,600.00	\$	1,600.00
4	Check Structure Installation	1	LS	\$	450.00	\$	450.00
TOTAL COMPONENT COST (SUBTOTAL #2):						Ś	2.800.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 950.00

PERMITTING AND MITIGATION: \$ 350.00

> LEGAL FEES: \$ -

ACQUISTION OF ACCESS AND RIGHTS-OF-WAY: \$

PRE-CONSTRUCTION COSTS (SUBTOTAL #1): \$ 1,300.00

2,800.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 280.00

COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3): \$ 3,080.00

> CONTINGENCY (SUBTOTAL #3 X 15%): \$ 462.00

TOTAL CONSTRUCTION COST (SUBTOTAL #4): \$ 3,542.00

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): 5 4,842.00

Project ID: 39 **Project Name:** Francis Ditch Diversion #1 **Land Jurisdiction:** X Bar T Ranch, LLC

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 10 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred.

State Engineer's Office

Current Permits: T4313, T4314, T4315, & P3105.0E

Proposed activities include the removal of the impaired diversion structure and the construction and installation of a new diversion control structure. This turnout is a historic structure on the Francis Ditch and does not warrant additional permits from the SEO or BOC, so long as the diversion from the Big Sandy River does not exceed the permitted flow rates.

U.S. Army Corp of Engineer's

A project plan set should be submitted to the USACE Wyoming Regulatory Office for review prior to final submission to the WWDO. Based on the concept design, the proposed activities are considered to be routine maintenance that do not require Department of the Army authorization because Part 323.4(a)(3) of the regulations states that the following activities are exempt:

"Discharges associated with siphons, pumps, headgates, wingwalls, weirs, diversion structures, and such other facilities as are appurtenant and functionally related to irrigation ditches are included in this exemption."







Owner/Operator: X Bar T Ranch, LLC Project Type: Diversion Structure Rehab Project ID: 40 Project Name: Francis Ditch Diversion #2 Location (PLSS): NE/4SW/4 Sec. 10, T25N, R106W Location (Lat/Long): 42°09'04.45"N, 109°26'31.81"W

ENGINEER'S ESTIMATE

PROJECT COMPONENTS - ITEMIZED COSTS

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST		т	DTAL COST
1	Mobilization	1	LS	\$	500.00	\$	500.00
2	Realign Ditch	1	LS	\$	650.00	\$	650.00
3	Conc. Check Structure	1	EA	\$	1,600.00	\$	1,600.00
4	Check Structure Installation	1	LS	\$	450.00	\$	450.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 3,200.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 1,100.00
PERMITTING AND MITIGATION:	\$ 350.00
LEGAL FEES:	\$ -
ACQUISTION OF ACCESS AND RIGHTS-OF-WAY:	\$ -
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 1,450.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 3,200.00

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 320.00
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 3,520.00
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 528.00
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 4,048.00

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 5,498.00

Project ID: 40 **Project Name:** Francis Ditch Diversion #2 **Land Jurisdiction:** X Bar T Ranch, LLC

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 10 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred.

State Engineer's Office

Current Permits: T4313, T4314, T4315, & P3105.0E

Proposed activities include the removal of the impaired diversion structure and the construction and installation of a new diversion control structure. This turnout is a historic structure on the Francis Ditch and does not warrant additional permits from the SEO or BOC, so long as the diversion from the Big Sandy River does not exceed the permitted flow rates.

U.S. Army Corp of Engineer's

A project plan set should be submitted to the USACE Wyoming Regulatory Office for review prior to final submission to the WWDO. Based on the concept design, the proposed activities are considered to be routine maintenance that do not require Department of the Army authorization because Part 323.4(a)(3) of the regulations states that the following activities are exempt:

"Discharges associated with siphons, pumps, headgates, wingwalls, weirs, diversion structures, and such other facilities as are appurtenant and functionally related to irrigation ditches are included in this exemption."







Owner/Operator: X Bar T Ranch, LLC Project Type: Diversion Structure Rehab Project ID: 41 Project Name: Lower Ranch Spring Development Location (PLSS): NE/4NW/4 Sec. 15, T25N, R106W Location (Lat/Long): 42°08'49.35"N, 109°26'34.24"W

ENGINEER'S ESTIMATE

PROJECT COMPONENTS - ITEMIZED COSTS

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	т	OTAL COST
1	Mobilization	1	LS	\$2,800.00	\$	2,800.00
2	2" SDR-11 Pipe	180	LF	\$3.50	\$	630.00
3	I/O 50 Solar Disconnect	1	EA	\$150.00	\$	150.00
4	235 Watt solar panel	4	EA	\$375.00	\$	1,500.00
5	Solar Rack & Mounting Kit	1	EA	\$950.00	\$	950.00
6	Solar Equipment/Wiring/Labor	1	LS	\$5 <i>,</i> 500.00	\$	5,500.00
7	Stock Water Trough	1	EA	\$13,000.00	\$	13,000.00
8	New Submersible pump	1	EA	\$3,000.00	\$	3,000.00
0	Float switch control unit/low water	1	10	¢9Ε0 00	ć	8E0 00
9	sensor/power to pump	Ţ	LS	3030.00	Ş	650.00
10	Protective Fencing	160	LF	\$9.00	\$	1,440.00

 TOTAL COMPONENT COST (SUBTOTAL #2):
 \$ 29,820.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 2,650.00
PERMITTING AND MITIGATION:	\$ 1,200.00
LEGAL FEES:	\$ -
ACQUISTION OF ACCESS AND RIGHTS-OF-WAY:	\$ -
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 3,850.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 29,820.00

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 2,982.00
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 32,802.00
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 4,920.30
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 37,722.30

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 41,572.30

Project ID: 41 **Project Name:** Lower Ranch Spring Development **Land Jurisdiction:** X Bar T Ranch, LLC

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 11 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred.

State Engineer's Office

Current Permit: None

As this project involves the development of an existing spring for stock water purposes, an application for permit to appropriate ground water should be submitted to the SEO. The SEO permit should then be submitted to the WWDO with the final project plans, prior to construction. Following construction, a statement of completion and proof of appropriation and beneficial use of groundwater should be completed and submitted to the SEO – Groundwater Division.

U.S. Army Corp of Engineer's

A project plan set should be submitted to the USACE Wyoming Regulatory Office for review prior to final submission to the WWDO. The existing spring is currently captured by an open bottom trough. No modification to the trough is proposed except for the installation of a pump and diversion piping. Little to no fill is required around the trough therefore, a wetland delineation is not anticipated as a requirement.









Owner/Operator: Little Sandy Grazing Association Project Type: Irrigation - Diversion Rehabilitation Project ID: 42 Project Name: Chambers Ditch Check Structure Rehab Location (PLSS): Lot 2 Sec. 2, T26N, R105W Location (Lat/Long): 42°15'42.16"N, 109°18'06.94"W

ENGINEER'S ESTIMATE

PROJECT COMPONENTS - ITEMIZED COSTS

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST		T	OTAL COST
1	Mobilization	1	LS	\$	1,500.00	\$	1,500.00
2	Check Structure Removal / Recycle	1	LS	\$	1,200.00	\$	1,200.00
3	Fabricate & Install Sluice Structure	1	LS	\$	3,100.00	\$	3,100.00
4	Misc. Excavation & Placement	12	CY	\$	25.00	\$	300.00
5	Rock Vane & Scour Pool Construction	1	LS	\$	18,200.00	\$	18,200.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 24,300.00

	-	
PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$	2,750.00
PERMITTING AND MITIGATION:	\$	650.00
LEGAL FEES:	\$	-
ACQUISTION OF ACCESS AND RIGHTS-OF-WAY:	\$	-
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$	3,400.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 24,300.00

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 2,430.00
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 26,730.00
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 4,009.50
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 30,739.50

34,139.50

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$

Project ID: 42 **Project Name:** Chambers Ditch Check Structure Rehab **Land Jurisdiction:** Little Sandy Grazing Association

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 10 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred.

State Engineer's Office

Current Permits: P10970.0D & P4600.0E

Proposed activities include the removal of the impaired rock check structure and the construction of one (1) rock cross vane (for irrigation diversion/fish passage), and reshaping the adjacent banks to accept the rock vane. Approximately 400 SF (0.01 Ac.) of Little Sandy Creek will be permanently impacted. As the point of diversion is not subject to change, no additional permitting from the SEO or BOC is required.

U.S. Army Corp of Engineer's

A project plan set should be submitted to the USACE Wyoming Regulatory Office for review prior to final submission to the WWDO. Based on the concept design, the proposed activities are considered to be routine maintenance that do not require Department of the Army authorization because Part 323.4(a)(3) of the regulations states that the following activities are exempt:

"Discharges associated with siphons, pumps, headgates, wingwalls, weirs, diversion structures, and such other facilities as are appurtenant and functionally related to irrigation ditches are included in this exemption."












Owner/Operator: Little Sandy Grazing Association Project Type: Irrigation - Diversion Rehabilitation Project ID: 43 Project Name: Schiestler-Brady Ditch Check Structure Rehab Location (PLSS): SE/4SW/4 Sec. 5, T27N, R104W Location (Lat/Long): 42°20'09.97"N, 109°15'04.69"W

ENGINEER'S ESTIMATE

PROJECT COMPONENTS - ITEMIZED COSTS

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST		T	OTAL COST
1	Mobilization	1	LS	\$	1,500.00	\$	1,500.00
2	Check Structure Removal/Recycle	1	LS	\$	500.00	\$	500.00
3	Misc. Excavation & Placement	20	CY	\$	32.00	\$	640.00
4	Fabricate & Install Sluiceway Structure	1	EA	\$	3,200.00	\$	3,200.00
5	Rock Vane & Scour Pool Construction	1	LS	\$	28,400.00	\$	28,400.00
6	Backfill Import & Placement	42	CY	\$	26.00	\$	1,092.00
TOTAL COMPONENT COST (SUBTOTAL #2):					\$	35,332.00	

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 35,332.00

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 3,533.20
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 38,865.20
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 5,829.78
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 44,694.98

48,544.98

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$

Project ID: 43 **Project Name:** Schiestler-Brady Ditch Check Structure Rehab **Land Jurisdiction:** Little Sandy Grazing Association

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 10 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred.

State Engineer's Office

Current Permits: P9318.0D & P2623.0E

Proposed activities include the removal of the impaired rock check structure and the construction of one (1) rock cross vane (for irrigation diversion/fish passage), and reshaping the adjacent banks to accept the rock vane. Approximately 400 SF (0.01 Ac.) of Little Sandy Creek will be permanently impacted. As the point of diversion is not subject to change, no additional permitting from the SEO or BOC is required.

U.S. Army Corp of Engineer's

A project plan set should be submitted to the USACE Wyoming Regulatory Office for review prior to final submission to the WWDO. Based on the concept design, the proposed activities are considered to be routine maintenance that do not require Department of the Army authorization because Part 323.4(a)(3) of the regulations states that the following activities are exempt:

"Discharges associated with siphons, pumps, headgates, wingwalls, weirs, diversion structures, and such other facilities as are appurtenant and functionally related to irrigation ditches are included in this exemption."

A letter of acknowledgment and final determination from the Department of the Army should be submitted to the WWDO along with the final project plans and specifications.













PROJECT EXPLANATION

Project ID: 44 **Project Name:** Little Sandy Well #1 Rehab **Land Jurisdiction:** Bureau of Land Management

This project was introduced as a well rehabilitation by the constituent. Prior to commencing with an actual rehab concept, the lease holder performed a pump test on the well. The water availability and yield was found to be insufficient for livestock watering needs. Based on this research and testing, the owner requested that the project be disregarded.

Owner/Operator: Cowan, Clayton Project Type: Stock Water Reservoir Project ID: 45 Project Name: Cowan Stock Reservoir Location (PLSS): NE/4SE/4 Sec. 12, T25N, R106W Location (Lat/Long): 42°09'06.15"N, 109°23'47.15"W

ENGINEER'S ESTIMATE

PROJECT COMPONENTS - ITEMIZED COSTS

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST		Т	TOTAL COST	
1	Mobilization	1	LS	\$	6,000.00	\$	6,000.00	
2	Unclassified Excavation and Stockpile	12500	CY	\$	8.00	\$	100,000.00	

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 106,000.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 1,500.00
PERMITTING AND MITIGATION:	\$ 1,250.00
LEGAL FEES:	\$ -
ACQUISTION OF ACCESS AND RIGHTS-OF-WAY:	\$ -
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 2,750.00

\$ 106,000.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 10,600.00

COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3): \$ 116,600.00

CONTINGENCY (SUBTOTAL #3 X 15%): \$ 17,490.00

TOTAL CONSTRUCTION COST (SUBTOTAL #4): \$ 134,090.00

136,840.00

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 136

Project ID: 45 **Project Name:** Cowan Stock Reservoir **Land Jurisdiction:** Cowan, Clayton

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 8 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred.

State Engineer's Office

Current Permit: None

This project includes the construction of a stock water reservoir on private lands. The reservoir will be built with pit-type construction techniques. An SW-4 application should be completed and submitted to the SEO prior to construction. The approved permit should be submitted to the WWDO along with the final project plans and specifications. Following construction, a notice of completion of construction should be completed and submitted to the SEO – Surface Water Division.

Eden Valley Irrigation and Drainage District

Because this reservoir is located within the District, the final project plans and specifications should be submitted to them for review and comment. The SEO will require said comments prior to approval of the application and the issuance of a permit. It is recommended that the final project plans be brought to a regularly scheduled District meeting to discuss the reservoir capacity and flow through characteristics prior to submittal to the SEO.







Owner/Operator: G & E Livestock, Inc. Project Type: Stock Water Well Rehab and Solar Power Conversion Project ID: 46 Project Name: Jonah Stock Water Well Solar Conversion Location (PLSS): SW/4SW/4 Sec. 14, T28N, R108W Location (Lat/Long): 42°23'56.72"N, 109°39'46.15"W

ENGINEER'S ESTIMATE

PROJECT COMPONENTS - ITEMIZED COSTS

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	т	OTAL COST
1	Mobilization	1	LS	\$3,000.00	\$	3,000.00
2	Remove Stock Tanks	2	EA	\$500.00	\$	1,000.00
3	Remove Storage Tanks	3	EA	\$500.00	\$	1,500.00
4	Remove Windmill	1	EA	\$500.00	\$	500.00
5	Remove Sheep Trough	1	EA	\$500.00	\$	500.00
6	1 1/4" SDR-11 Pipe	80	LF	\$3.50	\$	280.00
7	4" SDR-11 Drain Pipe	300	LF	\$5.50	\$	1,650.00
8	Well test - total depth, yield	1	LS	\$1,000.00	\$	1,000.00
10	Water Trough	1	LS	\$13,000.00	\$	13,000.00
11	I/O 50 Solar Disconnect	1	EA	\$150.00	\$	150.00
12	235 Watt solar panel	6	EA	\$375.00	\$	2,250.00
13	Solar Rack & Mounting Kit	1	EA	\$950.00	\$	950.00
14	Solar Equipment/Wiring/Labor	1	LS	\$5,500.00	\$	5,500.00
15	New Submersible pump	1	EA	\$3,000.00	\$	3,000.00
16	Float switch control unit/low water	1	10	έ 9ΕΟ ΟΟ		
	sensor/power to pump		LS	\$850.00	\$	850.00
17	Protective Fencing	90	LF	\$9.00	\$	810.00

 TOTAL COMPONENT COST (SUBTOTAL #2):
 \$ 35,940.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 1,450.00
PERMITTING AND MITIGATION:	\$ 1,250.00
LEGAL FEES:	\$ -
ACQUISTION OF ACCESS AND RIGHTS-OF-WAY:	\$ -
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 2,700.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 35,940.00

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 3,594.00
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 39,534.00
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 5,930.10
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 45,464.10

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 48,164.10

Project ID: 46 **Project Name:** Jonah Stock Water Well Solar Conversion **Land Jurisdiction:** G & E Livestock, Inc.

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 1 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred. All new tanks shall have escape ramps.

State Engineer's Office

Current Permit: None

The existing well is not currently permitted with the SEO but has been historically used for stock watering purposes. The well should be flow tested and measured for current capacity and physical properties. An application for permit to appropriate ground water and a statement of completion and description of well should be prepared and submitted to the SEO. Directions for completing these applications are available on the SEO web site under "registering existing stock water wells". A new permit assigned by the SEO should be submitted to the WWDO with the final project design, prior to construction.

Wyoming Department of Environmental Quality

A general permit for temporary discharge of wastewater (ground water well pump testing and development) should be acquired from the WDEQ. The monitoring and testing as outlined in the permit should be adhered to.



REMOVE & DISPOSE OF EXISTING SHEEP TROUGH:

> REMOVE & SALVAGE EXISTING CATTLE STOCK TANKS (2):

SUBJECT JONAH STOCK WATER WELL

076-54

130

REMOVE & DISPOSE OF EXISTING WIND MILL

REMOVE & DISPOSE OF EXISTING STORAGE TANKS (3)

JONAH STOCK WATER RESERVOIR: P3328.0R

100 FEET

SCALE: 1"=100 FEET

200 FEE1

CATTLE STOCK TANKS

REVISED: JOB No: 4327

AGE No: 2 OF

DATE: 05/13/19

DRAWN BY: MTJ CHECKED BY: MCE DESIGNED BY: MT.

STORAGE TANKS -





EXISTING JONAH STOCK WATER WELL



SUBLETTE COUNTY, WY

(307) 367-2826 PINEDALE, WYOMING rioverde@wyoming.com

DISCLAIMER:

FIELD VERIFICATION IS NEEDED REGARDING WATER ZONES, STATIC WATER LEVEL, WATER YIELD, & DRAW DOWN. ACTUAL WELL DEPTHS ARE TO BE DETERMINED PRIOR TO FINAL DESIGN.



DESIGNED BY: MTJ
DRAWN BY: MTJ
CHECKED BY: MCE
DATE: 05/13/19
REVISED:
JOB No: 4327
PAGE No: 4 OF 8

BIG SANDY WATERSHED - LEVEL I STUDY JONAH STOCK WATER WELL SOLAR CONVERSION SMALL WATER PROJECT ID: 46 LOCATED IN THE SW/4SW/4 OF SEC. 14, T.28N., R.108W., SUBLETTE COUNTY, WY







5.) EXTEND CRUSHED ROAD BASE PAD 6 FT. OUT FROM EXTERIOR TIRE EDGE

*DESIGN BASED ON NRCS STANDARDIZED DRAWING AND DESIGN INPUT FROM BROGAN HYDROLOGIC CONSULTING. DESIGN MUST BE ADAPTED TO MEET SITE SPECIFIC CONDITIONS.

BIG SANDY WATERSHED - LEVEL I STUDY JONAH STOCK WATER WELL SOLAR CONVERSION SMALL WATER PROJECT ID: 46 LOCATED IN THE SW/4SW/4 OF SEC. 14, T.28N., R.108W., SUBLETTE COUNTY, WY







Owner/Operator: Burris, Tom Project Type: Stock Water Well Development Project ID: 47 Project Name: Burris Stock Water Well No. 2 Location (PLSS): SE/4SE/4 Sec. 21, T24N, R106W Location (Lat/Long): 42°02'12.90"N, 109°25'13.02"W

ENGINEER'S ESTIMATE

PROJECT COMPONENTS - ITEMIZED COSTS

ITEM No.	DESCRIPTION	QUANTITY	UNIT	ι	JNIT COST	VIT COST TOTAL CO	
1	Mobilization	1	LS	\$	3,200.00	\$	3,200.00
2	1 1/4" SDR-11 Pipe	45	LF	\$	2.50	\$	112.50
3	4" SDR-11 Pipe	710	LF	\$	5.50	\$	3,905.00
4	Water Trough	1	EA	\$	13,000.00	\$	13,000.00
5	Well Drilling & Development	110	LF	\$	75.00	\$	8,250.00
6	Well test - total depth, water depth, capacity	1	EA	\$	1,500.00	\$	1,500.00
7	I/O 50 Solar Disconnect	1	EA	\$	150.00	\$	150.00
8	235 Watt solar panel	6	EA	\$	375.00	\$	2,250.00
9	Solar Rack & Mounting Kit	1	EA	\$	950.00	\$	950.00
10	Solar Equipment/Wiring/Labor	1	LS	\$	5,500.00	\$	5,500.00
11	New Submersible pump	1	EA	\$	3,000.00	\$	3,000.00
10	Float switch control unit/low water sensor/power	1	10	ć	850.00	ć	850.00
12	to pump	T	LS	Ş	850.00	Ş	850.00
13	Protective Fencing	70	LF	\$	9.00	\$	630.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 43,297.50

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 2,100.00
PERMITTING AND MITIGATION:	\$ 850.00
LEGAL FEES:	\$ -
ACQUISTION OF ACCESS AND RIGHTS-OF-WAY:	\$ -
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 2,950.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 43,297.50

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 4,329.75
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 47,627.25
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 7,144.09
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 54,771.34

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 57,721.34

Project ID: 47 **Project Name:** Burris Stock Water Well No. 2 **Land Jurisdiction:** Burris, Tom

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 1 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred. All new tanks shall have escape ramps.

State Engineer's Office

Current Permit: None

An application for permit to appropriate groundwater (UW 5) should be prepared and submitted to the SEO – Groundwater Division before finalizing the project plans. Following construction, a statement of completion and description of well (UW 6) and a proof of appropriation and beneficial use of ground water form (UW 8) should be prepared and submitted to the SEO. Directions for completing these applications are available on the SEO web site under "Groundwater Applications, Forms and Instructions". Once issued, the new well permit (UW 5) should be submitted to the WWDO with the final project design, prior to construction.

Wyoming Department of Environmental Quality

A general permit for temporary discharge of wastewater (ground water well pump testing and development) should be acquired from the WDEQ. The monitoring and testing as outlined in the permit should be adhered to.





DISCLAIMER:

FIELD VERIFICATION IS NEEDED REGARDING WATER ZONES, STATIC WATER LEVEL, WATER YIELD, & DRAW DOWN. ACTUAL WELL DEPTHS ARE TO BE DETERMINED PRIOR TO FINAL DESIGN.



PAGE No: 3 OF 7	REVISED:	DATE: 05/13/19	CHECKED BY: MCE	DRAWN BY: MTJ	DESIGNED BY: MTJ
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BIG SANDY WATERSHED - LEVEL I STUDY BURRIS STOCK WATER WELL # 2 SMALL WATER PROJECT ID: 48 LOCATED IN THE SE/4SE/4 OF SEC. 21, T.24N., R.106W., SWEETWATER COUNTY, WY







*DESIGN BASED ON NRCS STANDARDIZED DRAWING AND DESIGN INPUT FROM BROGAN HYDROLOGIC CONSULTING. DESIGN MUST BE ADAPTED TO MEET SITE SPECIFIC CONDITIONS.

CHECKED BY: MCE DATE: 05/13/19 DATE: 05/13/19 REVISED: JOB No: 4327 PAGE No: 5 OF 7
DRAWN BY: MTJ
DESIGNED BY: MTJ

BIG SANDY WATERSHED - LEVEL I STUDY BURRIS STOCK WATER WELL # 2 SMALL WATER PROJECT ID: 48 LOCATED IN THE SE/4SE/4 OF SEC. 21, T.24N., R.106W., SWEETWATER COUNTY, WY

(307) 367-2826 rioverde@wyoming.com




Owner/Operator: Burris, Tom Project Type: Stock Water Well Development Project ID: 48 Project Name: Burris Stock Water Well No. 3 Location (PLSS): NE/4SE/4 Sec. 21, T24N, R106W Location (Lat/Long): 42°02'33.70"N, 109°25'08.68"W

ENGINEER'S ESTIMATE

PROJECT COMPONENTS - ITEMIZED COSTS

ITEM No.	DESCRIPTION	QUANTITY	UNIT	l	UNIT COST 1		UNIT COST		OTAL COST
1	Mobilization	1	LS	\$	4,000.00	\$	4,000.00		
2	1 1/4" SDR-11 Pipe	45	LF	\$	2.00	\$	90.00		
3	4" SDR-11 Pipe	420	LF	\$	5.50	\$	2,310.00		
4	Water Trough	1	EA	\$	13,000.00	\$	13,000.00		
5	Well Drilling & Development	110	LF	\$	75.00	\$	8,250.00		
6	Well test - total depth, water depth, capacity	1	EA	\$	1,500.00	\$	1,500.00		
7	I/O 50 Solar Disconnect	1	EA	\$	150.00	\$	150.00		
8	235 Watt solar panel	6	EA	\$	375.00	\$	2,250.00		
9	Solar Rack & Mounting Kit	1	EA	\$	950.00	\$	950.00		
10	Solar Equipment/Wiring/Labor	1	LS	\$	5,500.00	\$	5,500.00		
11	New Submersible pump	1	EA	\$	3,000.00	\$	3,000.00		
10	Float switch control unit/low water sensor/power	1	10	ć	F00.00	ć	E00.00		
12	to pump	T	LS	Ş	500.00	Ş	500.00		
13	Protective Fencing	50	LF	\$	9.00	\$	450.00		

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 41,950.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 2,100.00
PERMITTING AND MITIGATION:	\$ 850.00
LEGAL FEES:	\$ -

ACQUISTION OF ACCESS AND RIGHTS-OF-WAY: \$ -

PRE-CONSTRUCTION COSTS (SUBTOTAL #1): \$ 2,950.00

41,950.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 4,195.00
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 46,145.00
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 6,921.75
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 53,066.75

\$ 56,016.75

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4):

Project ID: 48 **Project Name:** Burris Stock Water Well No. 3 **Land Jurisdiction:** Burris, Tom

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 1 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred. All new tanks shall have escape ramps.

State Engineer's Office

Current Permit: None

An application for permit to appropriate groundwater (UW 5) should be prepared and submitted to the SEO – Groundwater Division before finalizing the project plans. Following construction, a statement of completion and description of well (UW 6) and a proof of appropriation and beneficial use of ground water form (UW 8) should be prepared and submitted to the SEO. Directions for completing these applications are available on the SEO web site under "Groundwater Applications, Forms and Instructions". Once issued, the new well permit (UW 5) should be submitted to the WWDO with the final project design, prior to construction.

Wyoming Department of Environmental Quality

A general permit for temporary discharge of wastewater (ground water well pump testing and development) should be acquired from the WDEQ. The monitoring and testing as outlined in the permit should be adhered to.





DISCLAIMER:

FIELD VERIFICATION IS NEEDED REGARDING WATER ZONES, STATIC WATER LEVEL, WATER YIELD, & DRAW DOWN. ACTUAL WELL DEPTH MAY VARY.



Т

BIG SANDY WATERSHED - LEVEL I STUDY BURRIS STOCK WATER WELL # 3 SMALL WATER PROJECT ID: 48 LOCATED IN THE SE/4SE/4 OF SEC. 21, T.24N., R.106W., SWEETWATER COUNTY, WY







*DESIGN BASED ON NRCS STANDARDIZED DRAWING AND DESIGN INPUT FROM BROGAN HYDROLOGIC CONSULTING. DESIGN MUST BE ADAPTED TO MEET SITE SPECIFIC CONDITIONS.

BIG SANDY WATERSHED - LEVEL I STUDY BURRIS STOCK WATER WELL # 3 SMALL WATER PROJECT ID: 48 LOCATED IN THE SE/4SE/4 OF SEC. 21, T.24N., R.106W., SWEETWATER COUNTY, WY







Owner/Operator: Mines, Jim Project Type: Stock Water Well Development Project ID: 49 Project Name: Mines Stock Water Well No. 6 Location (PLSS): SW/4SW/4 Sec. 23, T26N, R106W Location (Lat/Long): 42°12'20.48"N, 109°25'41.13"W

ENGINEER'S ESTIMATE

PROJECT COMPONENTS - ITEMIZED COSTS

ITEM No.	DESCRIPTION	QUANTITY	UNIT	J	JNIT COST	OTAL COST	
1	Mobilization	1	LS	\$	4,000.00	\$	4,000.00
2	1 1/4" SDR-11 Pipe	15	LF	\$	2.00	\$	30.00
3	2" SDR-11 Pipe	50	LF	\$	2.50	\$	125.00
4	4" SDR-11 Pipe	200	LF	\$	5.50	\$	1,100.00
5	Water Trough	1	EA	\$	13,000.00	\$	13,000.00
6	Well Drilling & Development	180	LF	\$	75.00	\$	13,500.00
7	Well test - total depth, water depth, capacity	1	EA	\$	1,500.00	\$	1,500.00
8	I/O 50 Solar Disconnect	1	EA	\$	150.00	\$	150.00
9	235 Watt solar panel	6	EA	\$	375.00	\$	2,250.00
10	Solar Rack & Mounting Kit	1	EA	\$	950.00	\$	950.00
11	Solar Equipment/Wiring/Labor	1	LS	\$	5,500.00	\$	5,500.00
12	New Submersible pump	1	EA	\$	3,000.00	\$	3,000.00
13	Float switch control unit/low water	1	10	ć	850.00	ć	850.00
	sensor/power to pump	L L	LS	Ş	650.00	Ŷ	850.00
14	Protective Fencing	150	LF	\$	9.00	\$	1,350.00

 TOTAL COMPONENT COST (SUBTOTAL #2):
 \$ 47,305.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 2,650.00
PERMITTING AND MITIGATION:	\$ 1,350.00
LEGAL FEES:	\$ -
ACQUISTION OF ACCESS AND RIGHTS-OF-WAY:	\$ -
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 4,000.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 47,305.00

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 4,730.50
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 52,035.50
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 7,805.33
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 59,840.83

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 63,840.83

Project ID: 49 **Project Name:** Mines Stock Water Well No. 6 **Land Jurisdiction:** Mines, Jim

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 1 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred. All new tanks shall have escape ramps.

State Engineer's Office

Current Permit: None

An application for permit to appropriate groundwater (UW 5) should be prepared and submitted to the SEO – Groundwater Division before finalizing the project plans. Following construction, a statement of completion and description of well (UW 6) and a proof of appropriation and beneficial use of ground water form (UW 8) should be prepared and submitted to the SEO. Directions for completing these applications are available on the SEO web site under "Groundwater Applications, Forms and Instructions". Once issued, the new well permit (UW 5) should be submitted to the WWDO with the final project design, prior to construction.

Wyoming Department of Environmental Quality

A general permit for temporary discharge of wastewater (ground water well pump testing and development) should be acquired from the WDEQ. The monitoring and testing as outlined in the permit should be adhered to.





DISCLAIMER:

FIELD VERIFICATION IS NEEDED REGARDING WATER ZONES, STATIC WATER LEVEL, WATER YIELD, & DRAW DOWN. ACTUAL WELL DEPTHS ARE TO BE DETERMINED PRIOR TO FINAL DESIGN.



BIG SANDY WATERSHED - LEVEL I STUDY MINES STOCK WATER WELL No. 6 SMALL WATER PROJECT ID: 49 LOCATED IN THE SW/4SW/4 OF SEC. 23, T.26N., R.106W., SWEETWATER COUNTY, WY







LOCATED IN THE SW/4SW/4 OF SEC. 23, T.26N., R.106W., SWEETWATER COUNTY, WY

DATE: REVISED:

: 06/13/19

JOB No: 4327 AGE No: 5 OF 8

CHECKED BY: MCE

ENGINEERING (307) 367-2826 PINEDALE, WYOMING rioverde@wyoming.com







Owner/Operator: Mines, Jim Project Type: Diversion Structure Rehab Project ID: 50 Project Name: Mines Sprinkler System Diversion Rehab Location (PLSS): SW/4NW/4 Sec. 35, T26N, R106W Location (Lat/Long): 42°11'10.11"N, 109°25'39.06"W

ENGINEER'S ESTIMATE PROJECT COMPONENTS - ITEMIZED COSTS

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST		тс	DTAL COST
1	Mobilization	1	LS	\$	4,500.00	\$	4,500.00
2	Remove CMP	1	LS	\$	400.00	\$	400.00
3	Misc. Excavation & Placement	15	CY	\$	10.00	\$	150.00
4	Construct Right Abutment & Rock Lined Channel	1	LS	\$	6,300.00	\$	6,300.00
5	Install 12" D ₅₀ Riprap	38	CY	\$	52.00	\$	1,976.00
6	Install Erosion Fabric (geotextile)	90	SY	\$	5.00	\$	450.00
7	Excavate Diversion Pool & Haul Off	110	CY	\$	16.00	\$	1,760.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 15,536.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 2,900.00
PERMITTING AND MITIGATION:	\$ 950.00
LEGAL FEES:	\$ -
ACQUISTION OF ACCESS AND RIGHTS-OF-WAY:	\$ -
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 3,850.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 15,536.00

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%): \$ 1,553.60 COMPONENTS AND ENGINEERING COSTS (**SUBTOTAL #3**): \$ 17,089.60

CONTINGENCY (SUBTOTAL #3 X 15%):

TOTAL CONSTRUCTION COST (SUBTOTAL #4): \$ 19,653.04

23,503.04

2,563.44

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 23,5

Project ID: 50 **Project Name:** Mines Sprinkler System Diversion Rehab **Land Jurisdiction:** Mines, Jim

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 10 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred.

State Engineer's Office

Current Permits: P26141.0D

Proposed activities include the removal of the impaired CMP, the rehabilitation of the right check structure abutment, the reconstruction of the diversion pond (suction point), and reshaping the adjacent Big Sandy River banks to accept the erosion control structure. Approximately 600 SF (0.013 Ac.) of Big Sandy River will be permanently impacted. As the point of diversion is not subject to change, no additional permitting from the SEO or BOC is required.

Eden Valley Irrigation and Drainage District

Prior to construction, the final project plans and specifications should be submitted to the District for review and comment. Specifically, the construction time-frame should be discussed and agreed upon so that controlled releases from Big Sandy Reservoir do not cause issues during construction.

U.S. Army Corp of Engineer's

A project plan set should be submitted to the USACE Wyoming Regulatory Office for review prior to final submission to the WWDO. Based on the concept design, the proposed activities are considered to be routine maintenance that do not require Department of the Army authorization because Part 323.4(a)(3) of the regulations states that the following activities are exempt:

"Discharges associated with siphons, pumps, headgates, wingwalls, weirs, diversion structures, and such other facilities as are appurtenant and functionally related to irrigation ditches are included in this exemption."

A letter of acknowledgment and final determination from the Department of the Army should be submitted to the WWDO along with the final project plans and specifications.









Owner/Operator: Gurr Family Ranch Project Type: Stock Water Well Development Project ID: 51 Project Name: Gurr Stock Water Well Development Location (PLSS): NE/4SE/4 Sec. 31, T25N, R105W Location (Lat/Long): 42°05'43.78"N, 109°22'28.10"W

ENGINEER'S ESTIMATE

PROJECT COMPONENTS - ITEMIZED COSTS

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	Т	OTAL COST
1	Mobilization	1	LS	\$2,400.00	\$	2,400.00
2	Well Test - total depth, depth to water, yield	1	LS	\$500.00	\$	500.00
3	Install 300 BBL Water Tank	1	LS	\$5,600.00	\$	5,600.00
4	1-1/4" SDR-11 Piope	110	LF	\$2.00	\$	220.00
5	2" SDR-11 Pipe	825	LF	\$3.50	\$	2,887.50
6	4" SDR-11 Pipe	85	LF	\$5.50	\$	467.50
7	Water Trough	1	LS	\$13,000.00	\$	13,000.00
8	I/O 50 Solar Disconnect	1	EA	\$150.00	\$	150.00
9	235 Watt solar panel	4	EA	\$375.00	\$	1,500.00
10	Solar Rack & Mounting Kit	1	EA	\$950.00	\$	950.00
11	Solar Equipment/Wiring/Labor	1	LS	\$5,500.00	\$	5,500.00
12	2" Mechanical Float Valve	1	EA	\$120.00	\$	120.00
13	New Submersible Pump	1	LS	\$3,000.00	\$	3,000.00
1.4	Float switch control unit/low water sensor/ power	1	10			
14	to pump		LS	\$850.00	\$	850.00
15	Protective Fencing	70	LF	\$9.00	\$	630.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 37,775.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS: \$ 2,200.00

PERMITTING AND MITIGATION: \$ 650.00

LEGAL FEES: \$ -

ACQUISTION OF ACCESS AND RIGHTS-OF-WAY: \$ -

PRE-CONSTRUCTION COSTS (SUBTOTAL #1): \$ 2,850.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 37,775.00

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):\$ 3,777.50COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):\$ 41,552.50

CONTINGENCY (SUBTOTAL #3 X 15%): \$ 6,232.88

TOTAL CONSTRUCTION COST (SUBTOTAL #4): \$ 47,785.38

\$ 50,635.38

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 50,

Project ID: 51 **Project Name:** Gurr Stock Water Well Development **Land Jurisdiction:** Gurr Family Ranch

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 1 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred. All new tanks shall have escape ramps.

State Engineer's Office

Current Permit: P20212.0W

The existing improvements are permitted. The plans showing modification of power supply, storage, conveyance, and location of stock tank should be submitted and/or discussed with the SEO – Groundwater Division. No substantial permit mapping preparation or costs are expected.

Wyoming Department of Environmental Quality

A general permit for temporary discharge of wastewater (ground water well pump testing and development) should be acquired from the WDEQ. The monitoring and testing as outlined in the permit should be adhered to.







INSTALL 35 LF OF 2" DIA. SDR-11 OVERFLOW PIPE

DRAWN BY: MTJ

JOB No: 4327

AGE No: 3 OF

DATE: 06/10/19 CHECKED BY: MCE WATER AVAILABILITY NOTES: ESTIMATED PUMP SETTING: 90' ESTIMATED STATIC WATER SURFACE: 5' ESTIMATED WELL BOTTOM : 140' **REQUIRED SYSTEM FLOW RATE: 11 GPM**

> INSTALL 110 LF OF 1-1/4" DIA. SDR-11 WATER SUPPLY PIPE FROM WELL TO TANK





RIO VERDE ENGINEERING (307) 367-2826 PINEDALE, WYOMING rioverde@wyoming.com





SWEETWATER COUNTY, WY

PAGE No: 5 OF a IOB No: 4327

(307) 367-2826 PINEDALE, WYOMING rioverde@wyoming.com






BIG SANDY WATERSHED STUDY LEVEL I

Owner/Operator: Midland Livestock Company / State of Wyoming Project Type: Riparian Area Fencing Project ID: 52 Project Name: Prospect Allotment Fencing Project_State Fence No. 3 Segment Location (PLSS): NW/4 Sec. 35, T30N, R104W Location (Lat/Long): 42°31'43.99", 109°13'20.55"

PROJECT COMPONENTS (ENGINEER'S ESTIMATE)

ITEM No.	DESCRIPTION	QUANTITY	UNIT	ι	JNIT COST	T	OTAL COST
1	Mobilization	1	LS	\$	1,300.00	\$	1,300.00
2	Site Prep / Clearing	1	LS	\$	2,500.00	\$	2,500.00
3	Line Fencing	2449	LF	\$	5.60	\$	13,714.40
4	End-Panels	4	EA	\$	250.00	\$	1,000.00
5	Corner Panels	1	EA	\$	400.00	\$	400.00
6	Gates	2	EA	\$	350.00	\$	700.00
7	Creek Crossing	1	EA	\$	6,400.00	\$	6,400.00
8	Buck and Rail Fencing	500	LF	\$	8.50	\$	4,250.00
-	T	OTAL COMPO	NENT COST	· (SU	BTOTAL #2):	\$	30.264.40

- PREPARATION OF FINAL DESIGNS & SPECIFICATIONS: \$ 1,500.00
 - PERMITTING AND MITIGATION: \$ 2,100.00

LEGAL FEES: \$ -

ACQUISTION OF ACCESS AND RIGHTS-OF-WAY: \$ -

PRE-CONSTRUCTION COSTS (SUBTOTAL #1): \$ 3,600.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 30,264.40

- CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%): \$ 3,026.44
- COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3): \$ 33,290.84
 - CONTINGENCY (SUBTOTAL #3 X 15%): \$ 4,993.63
 - TOTAL CONSTRUCTION COST (SUBTOTAL #4): \$ 38,284.47
 - TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 41,884.47

PERMITTING REQUIREMENTS

Project ID: 52 Project Name: Prospect Mountain Allotment_Alternative State Fence No. 3 Land Jurisdiction: State of Wyoming

Greater Sage-Grouse Core Area Protection (Executive Order 2015-4)

This project is located in sage grouse core area. Under Attachment C – Item 12 of said executive order, this project is considered to be an exempt activity. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to determine the proximity of this project to occupied leks. If the project is found to be within 0.6 miles of an occupied lek, construction may be allowed from July 1 through March 14, after a habitat evaluation has occurred. Coordination with WGFD on fence design is strongly encouraged.

Wyoming Game and Fish Department

Due to the proximity of this project relative to a known Mule Deer migration corridor, the WYGFD will provide comments and have recommendations on the fence design and construction thereof. A letter of approval/recommendation from said Department should be submitted to the WWDO along with the final project plans and specifications, prior to construction.









Big Sandy Watershed, Level I Study

APPENDIX F

Small Water Projects Program Process



THE STATE OF WYOMING Water Development Commission

6920 YELLOWTAIL ROAD TELEPHONE: (307) 777-7626 CHEYENNE, WY 82002



2017 WATER DEVELOPMENT PROGRAM APPLICATION

SMALL WATER PROJECT PROGRAM

The purpose of the Small Water Project Program (SWPP) is to participate with land management agencies and sponsoring entities in providing incentives for improving watershed condition and function. Projects eligible for grant funding assistance include the construction or rehabilitation of small reservoirs, wells, pipelines and conveyance facilities, springs, solar platforms, irrigation works, windmills, wetland developments, environmental (as defined in the Criteria), Rural Community Fire Suppression, and Recreational. Projects should improve watershed condition and function and provide benefit for wildlife, livestock and the environment. Projects may provide improved water quality, riparian habitat, habitat for fish and wildlife and address environmental concerns by providing water supplies to support plant and animal species or serve to improve natural resource conditions. Refer to the operating criteria of the SWPP which provides the Wyoming Water Development Commission (WWDC) and the Wyoming Water Development Office (WWDO) with general standards for evaluating and prioritizing applications for funding from the SWPP:

http://wwdc.state.wy.us/small_water_projects/SWPPopCriteria.html

Applications to this program must be received by January 1 of each calendar year. Applications meeting criteria requirements will be considered during the regularly scheduled WWDC meeting in March.

APPLICATION

of Entity	3. Phone	4. Date
Street Address)		
7. County	8. State	9. Zip Code
f Different From Above)		
erson (Type or Print Name)	12. Phone 13	3. Email
I (Type or Print Name)	15. Signature of Authorized Official	16. Date
prepared by someone other t	than the contact person, please provi	de the following:
18. Affiliation	19. Phone	20. Email
	of Entity Street Address) 7. County If Different From Above) Person (Type or Print Name) I (Type or Print Name) <i>prepared by someone other a</i> 18. Affiliation	of Entity 3. Phone Street Address) 7. County 7. County 8. State If Different From Above) 9 Person (Type or Print Name) 12. Phone 1 (Type or Print Name) 15. Signature of Authorized Official prepared by someone other than the contact person, please provide 18. Affiliation 19. Phone

21. Project Components (Please identify all applicable components.)

Type ₁	Quantity	New Development	Rehabilitation	Latitude (Required)	Longitude (Required)
Small Reservoir					
Well					
Solar Platforms					
Pipeline					
Tank					
Spring Development					
Wetland					
Environmental					
Irrigation					
Windmill					
Rural Community Fire Suppression					
Recreational					

1. The project types listed in the above table will be considered eligible as defined by the Small Water Projects Program Criteria. Environmental projects are defined as those that provide for stream bank stability, water quality improvements, or erosion protection.

22. Legal Description (Optional)

Township	Range	Section	Quarter Section
Township	Range	Section	Quarter Section
Township	Range	Section	Quarter Section
Township	Range	Section	Quarter Section

23. Project Description

Planning for Small Water Projects may be generated by a WWDC watershed. Provide all information necessary to accurately describe the proposed project and its eligibility per operating criteria. Additional information may be attached to this application as necessary.

24. Public Benefit

Wyoming statute 99-3-1903(k)(viii)(c) and 99-3-1904(m)(viii)(c) requires all Small Water Project Sponsors to substantiate the public benefit that is to be derived from the proposed project. Please provide all information necessary to accurately document public benefit from the proposed project. Additional information may be attached as necessary.



25. Project Participants

Please list all project participants (e. g.: District, NRCS, WWNRT, BLM, Landowner, etc.), and their type of participation (e.g.: technical, financial, project oversight, etc.).

6. Who is the owner of the project?
7. Who owns the land on which the project is to be built?
8. How many acres will benefit from this project?
9. What is the total estimated project cost?
0. Was the project identified in a WWDC Watershed Study? □ Yes □ No If yes, what was the name of
the Study?

31. Project Readiness

Projects that have completed the following requirements prior to application may request a "Shovel-Ready" designation and may be considered as a funding priority at the Commission's discretion:

- Project designs and specifications
- Permit procurement
- State and federal agency notifications
- Land procurement, right of way, or easement acquisition
- Have finalized all other financial agreements

To indicate an interest in seeking a Shovel-Ready designation, please complete and attach the Project Sponsor Checklist, Well Evaluation, and Hydrologic Evaluation forms that are available at the following website:

http://wwdc.state.wy.us/small_water_projects/small_water_project.html

Additionally, please list all supporting documentation for a Shovel-Ready designation that is being attached. (If the Sponsor is not seeking a Shovel-Ready designation, this section may be left blank.)



32. Sage Grouse

Is the project located in a Sage Grouse Core Area or within 1/4 mile from an active lek?	Yes	🗆 No
Sage Grouse Core Area information can be found on the following website: http://nrex.wy	o.gov/	

33. Signature

By signing below, the Sponsor understands and agrees with the conditions set forth in the operating criteria of the Small Water Project Program:

Signature (Sponsor Representative)

Date

Operating Criteria of the Small Water Project Program of the Wyoming Water Development Program

A. Introduction:

The purpose of the Small Water Project Program (SWPP) is to participate with land management agencies and sponsoring entities in providing incentives for improving watershed condition and function. Projects eligible for SWPP grant funding assistance include the construction or rehabilitation of small reservoirs, wells, pipelines and conveyance facilities, springs, solar platforms, irrigation works, windmills and wetland developments. Projects should improve watershed condition and function and provide benefit for wildlife, livestock and the environment. Projects may provide improved water quality, riparian habitat, habitat for fish and wildlife and address environmental concerns by providing water supplies to support plant and animal species or serve to improve natural resource conditions.

These criteria provide the Wyoming Water Development Commission (WWDC) and the Wyoming Water Development Office (WWDO) with general standards for evaluating and prioritizing applications for funding from the SWPP. In addition, the criteria serve as a tool to coordinate with the public and other state and federal agencies.

B. Legal and Institutional Constraints:

1. Sponsoring Entity: Pursuant to W.S. 99-3-1903(k)(i) and W.S. 99-3 $1904(m)(i)^1$, funding is available only to eligible public entities.

2. Eligible public entities are defined by state statute and include, but are not limited to, conservation districts, watershed improvement districts, water conservancy districts, irrigation districts, municipalities, a joint business council of the Eastern Shoshone and Northern Arapaho Indian Tribes, the Business Council of the Eastern Shoshone Indian Tribe, the Business Council of the Northern Arapaho Indian Tribe, or other approved assessment districts formed in accordance with Wyoming law.

3. Project Description: Pursuant to W.S. 99-3-1903(k)(iii) and W.S. 99-3-1904(m)(iii), the SWPP may provide for construction or rehabilitation and replacement of small dams, windmills, spring development, pipelines, etc., to impound, develop and convey water for livestock, wildlife, irrigation, environmental and recreational purposes.

4. Project Funding: Pursuant to W.S. 99-3-1903(k)(vii) and 99-3-1904(m)(vii), a small project is a project where estimated construction or rehabilitation costs, permit procurement, construction engineering and project land procurement are one hundred thirty-five thousand dollars (\$135,000.00) or less and where the maximum financial contribution from the commission is thirty-five thousand dollars (\$35,000.00) or less.

¹ For reference and identification only special statute numbers [appearing in Title "99" of the Wyoming Statutes] have been assigned to selected water projects by the Legislative Service Office.

C. Small Water Project Program Definitions:

1. Small Reservoir: Small reservoirs may be eligible for funding through the SWPP.

2. Well: A well may be eligible for funding depending on the depth of the well and scope of the project. Projects that propose to drill into unproven aquifers, as determined by the WWDO, may be eligible for the SWPP at the discretion of the WWDC. Such discretion will be exercised in cases including, but not limited to, cases where the well does not meet the minimum requirements of the project in terms of quality and quantity.

The determination of unproven aquifer status will be clearly communicated by the WWDO prior to the issuance of notice to proceed so the project sponsor may decide to cancel the project before funding is committed. If the sponsor decides to proceed with a well into an unproven aquifer they should be prepared to pay the drilling cost with the understanding that reimbursement for eligible expenses will be contingent upon meeting minimum water quality and quantity requirements.

3. Solar Platforms: Construction of solar platforms may be eligible for funding through the SWPP.

4. Pipelines and Conveyance Facilities: Rehabilitation of existing pipelines or conveyance facilities or construction of new pipelines or conveyance facilities may be eligible for funding through the SWPP.

5. Springs: Improving flows of existing springs and installation of collection facilities associated with springs may be eligible for funding through the SWPP.

6. Wetland Development: Development of wetlands where multiple benefits accrue may be eligible for funding through the SWPP.

7. Environmental: Projects that provide for stream bank stability, water quality improvements, or erosion protection may be eligible for funding through the SWPP.

8. Irrigation: Irrigation projects may be eligible for funding through the SWPP.

9. Windmill: Rehabilitation of existing windmills or construction of new windmills may be eligible for funding through the SWPP.

10. Rural Community Fire Suppression: Supply and storage projects for rural community fire suppression may be considered for funding through the SWPP.

11. Recreational: Projects for recreational purposes may be considered for SWPP funding.

D. Application and Evaluation Process:

1. Small water projects must adequately demonstrate a public benefit. Public benefit may be demonstrated for projects included in WWDC Watershed Studies. Eligible projects may be located on Federal, State, public, or private lands.

2. Applications shall be received by January 1 of each calendar year. Applications meeting criteria requirements will be considered during the regularly scheduled WWDC meeting in March. Applications shall include a project application, detailed project description, description of public benefit, outline of financial and technical contributions, project location map, project cost estimates and any letters of authorization or commitment of participation that may be available from other funding sources.

3. Projects that improve watershed condition and function, provide multiple benefits, and meet the funding criteria specified in W.S. 99-3-1903(k)(vii) or W.S. 99-3-1904(m)(vii), as described in B.4 herein, are eligible for consideration.

4. The sponsoring entity will be required to address the WWDC and provide testimony and other additional supporting evidence that justifies SWPP funding whenever the public benefit documentation, as required in W.S. 99-3-1903(k)(viii)(c) and W.S. 99-3-1904(m)(viii)(c), submitted with the application is deemed to be insufficient by the WWDO.

5. In order to establish priorities for both New Development and Rehabilitation projects, and to utilize available program funds effectively and efficiently, it is necessary to develop priorities. A project's priority will be assigned based the projects primary purpose, secondary benefits may be considered at the Commission's discretion. Project priorities in order of preference, are defined as follows.

Account I Project Priorities

- (1.) Source Water Development
- (2.) Storage
- (3.) Pipelines, Conveyance Facilities, Solar Platforms, and Windmills
- (4.) Irrigation
- (5.) Environmental
- (6.) Recreational

Account II Project Priorities

- (1.) Diversion structures and Spring Developments
- (2.) Storage
- (3.) Pipelines, Conveyance Facilities, Solar Platforms, and Windmills
- (4.) Irrigation other than the above
- (5.) Environmental
- (6.) Recreational
- 6. Projects that have completed the following requirements prior to application

will be classified as "Shovel Ready", and may be considered as a funding priority at the Commission's discretion.

- Permit procurement
- State and Federal agency notifications
- Land procurement, right of way, or easement acquisition
- Have finalized all other financial agreements

To establish completion of the above listed requirements, the project applicant may be asked to submit additional documentation as determined by the Commission at the time of application.

7. In the case of limited funding for this program the WWDC will prioritize the applications.

8. The Commission may take into consideration a Sponsor's existing back log of previously funded projects that are not completed, when awarding grants for new projects.

E. Project Development:

1. The sponsoring entity shall adhere to appropriate design standards for small water projects. Plans may be provided by the NRCS, an appropriate land management agency or a registered Professional Engineer and/or registered Professional Geologist.

2. Project water rights shall be in good standing with the State of Wyoming prior to construction of the project.

3. If the sponsoring entity initiates the construction process without prior written notification by the Commission, the sponsoring entity shall bear all costs resulting from said action.

F. Program Expenditures:

1. Project Description: Projects that develop unused and/or unappropriated water will be considered SWPP New Development Projects and will be funded from SWPP Account I, which is funded by appropriations from Water Development Account I [W.S. 41-2-124(a)(i)]. Projects that improve completed water projects, decrease operation and maintenance costs, and/or improve efficiency of use of existing water supplies will be considered SWPP Rehabilitation Projects and will be funded from SWPP Account II , which is funded by appropriations from Water Development Account II [W.S. 41-2-124(a)(i)].

2. Project Funding: W.S. 99-3-1903(k)(vii) and W.S. 99-3-1904(m)(vii) as described in B.4 herein, establish the funding limitations for the SWPP.

3. Activities eligible for SWPP funding include design, permit procurement, project land procurement, construction engineering (design and construction inspections), project materials and invoiced contractor expenses. In-kind contributions are only eligible for installation of project materials that were purchased specifically for the project as documented by invoices.

4. Required permits and clearances shall be obtained prior to construction of the project. Copies of the final permits and clearances must be submitted to the WWDO before the WWDO will issue the notice to proceed for construction. WWDC funds may be used as necessary to secure the technical assistance required to complete permitting activities before construction commences.

5. The sponsoring entity shall provide the WWDO an operation and maintenance plan for the estimated life of the project.

6. SWPP funds shall not be used to refinance projects that have already been completed. SWPP funds shall not be used to augment the operating budget of a sponsor or any other entity. Maintenance costs, as determined by the WWDO, are not eligible expenditures under the SWPP. SWPP funding is limited to a one-time construction of a new project or a single rehabilitation of an existing project.

7. A Project Agreement between the WWDC and the sponsoring entity, which documents the roles and responsibilities of the project participants, must be finalized prior to expenditure of SWPP funds. Changes, modifications, revisions or amendments to the Project Agreement may be granted by the WWDC.

process.

8.

Construction contractors shall be selected using a competitive bid

9. Upon project completion, WWDC funds will be disbursed when a certified bill is received from the sponsoring entity including statement of completion, before and after photographs, project longitude/latitude coordinates and the affidavit of publication documenting the required notices of final settlement were published pursuant to W.S. 16-6-116.

10. If the sponsoring entity submits a certified bill, WWDC funds can be disbursed for a component of a project upon receipt of a certification by the project engineer that the component provides a beneficial use and functions in the manner intended. Retainage on the cost of the component may be held until conditions described in F.9 are met.

11. Upon receipt of WWDC funds, the sponsoring entity shall promptly pay outstanding obligations.

12. Unexpended funds allocated under the Project Agreement will revert to SWPP Account I or SWPP Account II, as appropriate, upon the expiration date of the Project Agreement. Expiration dates may be extended in writing by the WWDC.

Big Sandy Watershed, Level I Study

APPENDIX G

NRCS Soil Unit Code Definitions

Map Unit	Map Unit Name
Symbol	
50	Bosler sandy loam, 0 to 1 percent slope
51	Bosler-Hooper complex, 0 to 2 percent slopes
52	Clowers-Debone-Edlin complex, 0 to 3 percent slopes
53	Debone-Shellcreek variant complex, 0 to 2 percent
54	Debone variant-Shellcreek variant complex, 0 to 1
55	Diamondville-Forelle sandy loams, 0 to 3 percent slopes
56	Edlin fine sandy loam, 0 to 1 percent slopes
57	Edlin fine sandy loam, 1 to 6 percent slopes
58	Edlin-Cotopaxi complex, gently sloping and duned
59	Edlin-Huguston complex, 6 to 30 percent slopes
60	Elk Mountain sandy loam, 0 to 1 percent slopes
61	Elk Mountain sandy loam, 1 to 6 percent slopes
62	Farson sandy loam, 0 to 1 percent slopes
63	Farson sandy loam, 1 to 3 percent slopes
64	Farson sandy loam, wet, 0 to 1 percent slopes
65	Farson-Means sandy loams, 3 to 10 percent slopes
66	Farson variant gravelly sandy loam, 0 to 1 percent slop es
67	Fluvaquents, 0 to 3 percent slopes
68	Forelle sandy loam, 0 to 1 percent slopes
69	Forelle-Diamondville sandy loams, 3 to 6 percent slopes
70	Gunbarrel loamy sand, 0 to 1 percent slopes
71	Haterton loam, 1 to 10 percent slopes
72	Haterton, thin solum-Haterton complex, 10 to 30 percent slopes
73	Hooper-Hooper, overblown complex, 0 to 1 percent slopes
74	Kandaly fine sand, 3 to 20 percent slopes
75	Kandaly-Youjay complex, duned and gently sloping
76	Littlebear loamy sand, 0 to 2 percent slopes
77	Means-Farson sandy loams, 0 to 1 percent slopes
78	Means-Farson sandy loams, 1 to 3 percent slopes
79	Means variant sandy loam, 0 to 1 percent slopes
80	Mishak-Mishak variant complex, 0 to 3 percent slopes
81	Quealman-Fluvaquents complex, 0 to 3 percent slopes
82	Shellcreek silty clay, 0 to 1 percent slopes
83	Shellcreek silty clay, non-sodic, 0 to 1 percent slopes
84	Shellcreek silty clay, non-sodic, 1 to 3 percent slopes
85	Sobson-Pepton-Edlin complex, 0 to 6 percent slopes
86	Space City loamy sand, 0 to 3 percent slopes
87	Space City loamy sand, 8 to 30 percent slopes
88	Vonason loamy sand, 0 to 1 percent slopes
89	Vonason loamy sand, 1 to 3 percent slopes
90	Vonason loamy sand, 3 to 6 percent slopes

Map Unit	Map Unit Name
Symbol	
91	Vonason-Cotopaxi complex, nearly level and duned
92	Worfman-Diamondville sandy loams, 0 to 6 percent slopes
93	Pits, borrow and gravel
94	Water
104	Almy loam, 0 to 6 percent slopes
105	Almy-Monbutte-Rallod complex, 1 to 10 percent slopes
111	Badland
116	Blackhall-Rock outcrop complex, steep
117	Blackhall-Carmody association, hilly
119	Bluerim-Onason complex, hilly
128	Cific-Hoodle complex, sloping
131	Coalmont-Milren-Cragosen complex, rolling
132	Conpeak-Rock outcrop-Cryluha complex, hilly
134	Coutis fine sandy loam, rolling
138	Cragosen-Bosler-Cushool association, rolling
139	Cryluha-Conpeak association, 1 to 15 percent slopes
140	Cushool-Rock River association, 2 to 8 percent slopes
155	Mollic Glossocryalfs, loamy-skeletal, mixed-Typic Haplocryepts, loamy-skeletal,
100	mixed-Vertic Haplocryalfs, fine, smectitic complex, 0 to 30 percent slopes
155	Haplaquolls-Aquic Ustifluvents complex, nearly level
157	Havre-Absher-Forelle loams, 0 to 6 percent slopes
158	Havre-Forelle-Glendive complex, 0 to 3 percent slopes
162	Hoodle-Rock outcrop complex, 1 to 8 percent slopes
163	Hoodle-Gelkie association, 2 to 15 percent slopes
166	Irigul-Midelight-Rock outcrop association, rolling
167	Irigul-Rock outcrop complex, steep
169	Luhon-Rock River-Forelle complex, undulating
171	Lymanson-Abston-Gelkie association, hilly
172	Lymanson-Conpeak association, rolling
184	Pishkun variant-Hoodle complex, hilly
189	Rallod-Rock outcrop-Seaverson complex, hilly
198	Rock outcrop-Mosroc complex, hilly
202	Flygare-Owlcan-Savar families, complex, 0 to 30 percent slopes
202	Ryan Park loamy fine sand, undulating
204	Ryark sandy loam, 1 to 6 percent slopes
206	Sandbranch-Ryan Park variant-Poposhia complex, 1 to 8 percent slopes
211	Thermopolis-Sinkson complex, 3 to 30 percent slopes
214	Tisworth-Ryan Park-Countryman complex, undulating
217	Uhl-Gelkie loams, 1 to 8 percent slopes
218	Venapass-Uhl-Absher loams, 1 to 6 percent slopes
228	Zeomont loamy sand, hilly

Map Unit	Map Unit Name
231	Water
400	Playas draft
400	Gasson gravelly sandy loam 0 to 6 percent slopes draft
414	Kandaly-Youjay-Westyaco complex 0 to 20 percent slopes draft
405	Haterton-Bock outroon, shale complex, 8 to 20 percent slopes draft
1000	Water
1100	Water
1100	Thibadeau-Lauzer-Zealot complex. 0 to 4 percent clopes
1101	Meaver mucky peat 0 to 4 percent slopes
1105	Overwhich accasionally flooded Overwhich rarely flooded complex. 0 to 2 percent
1114	slopes
1115	Furniss-Foxcreek complex, 0 to 2 percent slopes
1116	Turson loam, 1 to 5 percent slopes
1205	Jurvannah complex, 0 to 2 percent slopes
1701	Alpine Cirques, Rock Outcrop-Tundra-Willow Complex
1801	Alpine Ridges, Rubble Land-Tundra Complex
2101	Gunsone family-Mountairy complex, 0 to 4 percent slopes
2114	Alex-Mooseflat complex, 0 to 2 percent slopes
2114	Gasson-Cambarge-Pepal complex, 0 to 6 percent slopes draft
2117	Leckie-Overwhich complex, 0 to 3 percent slopes
2121	Raghorn sandy loam, 0 to 3 percent slopes
2122	Sandflat-Pitchstone complex, 0 to 2 percent slopes
2202	Lauzer-Zealot-Mountairy complex, 0 to 4 percent slopes
2203	Bonhigh-Figuorsand, family-Cusheet complex, 0 to 4 percent slopes
2205	Raghigh-Cacklin-Glendive complex, 0 to 4 percent slopes
2207	Ryark-Hawkstone-Cotha complex, 0 to 5 percent slopes
2208	Sweetlette sandy loam, 1 to 8 percent slopes
2213	Kayso loamy sand, 0 to 4 percent slopes
2215	Zealot-Lauzer complex, 1 to 6 percent slopes
2216	Lauzer-Trudau complex, 1 to 8 percent slopes
2218	Natherman fine sandy loam, 0 to 4 percent slopes
2219	Toddcan mucky peat, 0 to 2 percent slopes
2221	Sandbranch sandy loam, 0 to 2 percent slopes
2227	Webbville loam, 1 to 3 percent slopes
2243	Poposhia-Redgap complex, 0 to 10 percent slopes draft
2304	Figuore-Scravo-Jemdilon complex, 1 to 8 percent slopes
2305	Pitchstone-Sandflat complex, 2 to 8 percent slopes
2308	Forelle-Bluerim-Cotha complex, 1 to 6 percent slopes
2314	Scooby-Fola complex, 2 to 10 percent slopes
2332	Killpecker-Hatermus-Haterton complex, 1 to 10 percent slopes draft
2344	Subsummit Moraines, Subalpine Fir Complex

Map Unit	Map Unit Name
Symbol	
2351	Subsummit Moraines, Meadow-Grassland Complex
2401	Hoofer-Hoofer, moist complex, 2 to 35 percent slopes
2401	Subsummit Uplands, Rock Outcrop-Tundra-Willow Complex
2416	Cambarge-Pepal complex, 0 to 6 percent slopes draft
2436	Pepal-Teagulf complex, 0 to 6 percent slopes draft
2443	Subsummit Uplands, Spruce/Fir-Willow-Rock Outcrop Complex
2461	Subsummit Uplands, Tundra-Willow-Rock Outcrop Complex
2461	Rock outcropdraft
2465	Gasson-Rock Outcrop-Huguston complex, 3 to 30 percent slopes draft
2468	Kandaly-Huguston-Teagulf complex, 4 to 15 percent slopes draft
2511	Subsummit Bottoms, Willow-Meadow Complex
2601	Subsummit Sideslopes, Rock Outcrop-Whitebark Pine-Spruce/Fir Complex
2602	Subsummit Sideslopes, Rock Outcrop-Whitebark Pine-Subalpine Fir Complex
2641	Subsummit Sideslopes, Spruce/Fir Complex
3203	Brushfire-Tomichi-Tine complex, 0 to 6 percent slopes
3303	Berlake-Braziel, very bouldery complex, 1 to 8 percent slopes
3401	Bowen-Kezar-Pineisle complex, 2 to 15 percent slopes, extremely bouldery
3410	Chrisman-Debone complex, 0 to 3 percent slopes draft
3601	Pointer, rubbly-Willsod, extremely bouldery complex, 2 to 20 percent slopes
3701	Pointer-Lateral complex, 12 to 60 percent slopes, extremely bouldery
3701	Roto-Birney-Elvor complex, 10 to 30 percent slopes draft
4201	Cusheet family-Roto complex, 2 to 6 percent slopes
4602	Buddsoft very gravelly fine sandy loam, 15 to 60 percent slopes, extremely stony
5203	Golphco-Chickenhill-Bronec complex, 1 to 6 percent slopes
5204	Jonah, noncalcareous surface-Buckloaf complex, 1 to 4 percent slopes
5303	Bonhigh-Golphco complex, 1 to 6 percent slopes
5313	Squaretop-Bonhigh-Foreright complex, 2 to 8 percent slopes
5322	Foreright-Brickner-Bonhigh complex, 2 to 8 percent slopes
5326	Cortyzack-Ryedraw complex, 2 to 15 percent slopes
5328	Natherman fine sandy loam family, 2 to 6 percent slopes
5331	Sandbranch-Alcova family complex, 1 to 6 percent slopes
5332	Juel-Sandbranch-Ravenhole complex, 1 to 8 percent slopes
5333	Jonah-Ravenhole-Buckloaf complex, 1 to 6 percent slopes
5334	Sweetlette-Blackhall complex, 1 to 6 percent slopes
5336	Forelle-Pinelli complex, 2 to 15 percent slopes
5337	Raghorn sandy loam, 4 to 8 percent slopes
5341	Vermillion-Quealy complex, 1 to 15 percent slopes draft
5342	Surdal-Barbarela-Goldhill complex, 3 to 15 percent slopes
5343	Raghorn-Foreleft complex, 2 to 20 percent slopes
5344	Bondoe-Sandflat-Spang complex, 2 to 15 percent slopes
5345	Pilotpeak-Bruja complex, 1 to 10 percent slopes draft

Map Unit	Man Unit Nama
Symbol	Map Onit Name
5402	Bluemod-Zagplat-Hoofer complex, 1 to 10 percent slopes
5405	Bluemod-Figuorsand-Foreright complex, 1 to 8 percent slopes
5409	Yodlow-Forelle-Warfman complex, 1 to 10 percent slopes
5412	Tabersand-Bonhigh-Brickner complex, 2 to 20 percent slopes
5415	Diamondville-Chaperton-Luhon complex, 1 to 6 percent slopes
5417	Badland-Bonhigh complex, 2 to 20 percent slopes
5418	Golphco-Mountairy complex, 4 to 15 percent slopes
5419	Jemdilon-Foresand-Buddsoft complex, 2 to 15 percent slopes
5425	Evanston-Pagoda complex, 2 to 15 percent slopes
5430	Diamondville-Oasiswell-Forelle complex, 1 to 10 percent slopes
5437	Broback-Golphco-Foreleft complex, 5 to 15 percent slopes
5438	Bruja-Pilotpeak-Sobson complex, 2 to 35 percent slopes draft
5439	Pilotpeak-Cryluha complex, 4 to 25 percent slopes draft
5440	Shaboom-Drygulch-Pitchstone complex, 8 to 35 percent slopes
5501	Volborg-Oysterridge-Oysterridge family complex, 4 to 15 percent slopes
5504	Forelle-Bluerim-Worfman complex, 2 to 35 percent slopes
5507	Bonhigh-Cackmod complex, 1 to 10 percent slopes
5521	Golphco-Pinehill complex, 6 to 25 percent slopes
5531	Chinatown-Tabyago complex, 10 to 45 percent slopes
5601	Hoofer-Badland-Bonhigh-Zagplat complex, 4 to 25 percent slopes
5602	Foreright-Cusheet complex, 4 to 25 percent slopes
5604	Forelle-Blazon, extremely stony-Cushool complex, 4 to 35 percent slopes
5608	Mountairy-Polaris-Figuorsand-Badland complex, 15 to 60 percent slopes
5620	Bruja, extremely flaggy-Sweetlette complex, 4 to 30 percent slopes
5702	Badland-Rock outcrop complex
5703	Foursees-Badland complex, 8 to 45 percent slopes
5705	Sanditch-Rock outcrop complex, 8 to 40 percent slopes
5706	Rock outcrop-Southace complex, 25 to 80 percent slopes
5707	Breeton-Owenfort, rubbly-Burrfoot, rubbly complex, 35 to 70 percent slopes
7038	Badland-Hatermus complex, 3 to 30 percent slopes draft
7111	Southeast Mountains Floodplains, Willow-Meadow Complex
7112	Southeast Mountains Floodplains, Meadow Complex
7201	Opitz gravelly sandy loam, 1 to 6 percent slopes
7202	Rodell-Zonite-Rock outcrop complex, 4 to 25 percent slopes
7222	Southeast Mountains Pediments, Big Sagebrush-Aspen Complex
7241	Southeast Mountains Pediments, Subalpine Fir
7251	Southeast Mountains Terraces, Grassland
7331	Southeast Mountains Moraines, Aspen-Subalpine Fir Complex
7341	Southeast Mountains Till Plains, Subalpine Fir Complex
7342	Southeast Mountains Moraines, Subalpine Fir-Meadow Complex
7343	Southeast Mountains Moraines, Subalpine Fir Complex

Map Unit	Map Unit Name
Symbol	
7401	Opitz-Wissikihon complex, 5 to 25 percent slopes
7402	Beavmid-Whiteacorn complex, 4 to 20 percent slopes
7403	Whiteacorn-Beavmid complex, 2 to 8 percent slopes
7501	Worock-Jaegie-Swede complex, 6 to 25 percent slopes
7502	Blackbear, rubbly-Branham, rubbly-Bobowic complex, 4 to 25 percent slopes
7503	Ansel-Odark-Sebud, bouldery complex, 6 to 30 percent slopes
7504	Tepecreek-Wix complex, 15 to 40 percent slopes
7511	Southeast Mountains Bottoms, Meadow Complex
7601	Norriston, rubbly-Ellena, extremely stony-Rock outcrop complex, 15 to 50 percent slopes
7602	Southeast Mountains Sideslopes, Rock Outcrop-Subalpine Fir Complex
7602SU	Vanwirt, extremely bouldery-Ansel, extremely bouldery-Rock outcrop complex, 20 to 60 percent slopes
7603	Vanwirt, extremely bouldery-Rock outcrop-Lolon, extremely bouldery complex, 15 to 60 percent slopes
7604	Vanwirt, extremely bouldery-Ansel, very bouldery-Kezar, extremely bouldery complex, 10 to 50 percent slopes
7621	Southeast Mountains Sideslopes, Big Sagebrush-Douglas fir-Rock Outcrop Complex
7632	Southeast Mountains Sideslopes, Aspen-Big Sagebrush Complex
7641	Southeast Mountains Sideslopes, Douglas Fir-Rock Outcrop Complex
7642	Southeast Mountains Sideslopes, Subalpine Fir-Aspen Complex
7644	Southeast Mountains Sideslopes, Subalpine Fir-Meadow Complex
7645	Southeast Mountains Sideslopes, Subalpine Fir-Aspen-Meadow Complex
7701	Rock outcrop-Surdal, extremely bouldery-Wix, extremely stony complex, 15 to 50 percent slopes
7801	Mountairy-Hawksell complex, 0 to 8 percent slopes
7802	Mountairy-Hawksell complex, 8 to 25 percent slopes
7805	Redgap-Subwater complex, 0 to 5 percent slopes
7806	Hawkstone-Alcova complex, 5 to 20 percent slopes
7809	Cowestglen sand, 0 to 5 percent slopes
7810	Maysprings-Cowestglen complex, 0 to 5 percent slopes
7815	Raghigh-Cacklin-Overlandtrail complex, 0 to 4 percent slopes
7816	Gunsone-Overlandtrail-Mudduck family complex, 0 to 2 percent slopes
7817	Gunsone-Overlandtrail complex, 0 to 4 percent slopes
7818	Gunsone-Ulric complex, 2 to 8 percent slopes
8002	Glaciers & Snowfields
8003	Rock Outcrop
8004	Rubble Land
8302	Subwater-Merna-Jonsouth complex, 1 to 6 percent slopes
8401	Sandbranch-Kandaly complex, 1 to 10 percent slopes
9114	Harshinger, occasionally flooded-Harshinger, rarely flooded complex, 0 to 4 percent slopes

Map Unit	
Symbol	Map Onit Name
9202	Sandbranch-Obadia-Forelle complex, 0 to 4 percent slopes
9203	Diamondville-Cushool-Edlin complex, 0 to 4 percent slopes
9207	Cacklin-Hawksell-Cackmod complex 0 to 2 percent slopes
9213	Farson loamy sand, 0 to 4 percent slopes
9215	Debone-Sandbranch complex, 1 to 6 percent slopes
9216	Sandbranch-Scooby complex, 1 to 8 percent slopes
9308	Foreright-Bluemod-Cackmod complex, 1 to 6 percent slopes
9321	Boettcher-Cushool-Sandbranch complex, 1 to 6 percent slopes
9325	Bodorumpe-Ravenhole complex, 1 to 10 percent slopes
9331	Lauzer-Mountairy complex, 1 to 6 percent slopes
9332	Jewel-Lauzer-Figuore complex, 1 to 8 percent slopes
9402	Bluerim-Zagpeed-Worfman complex, 1 to 10 percent slopes
9405	Bluerim-Ravenhole-Forelle complex, 1 to 8 percent slopes
9408	Zagplat sandy loam, 1 to 8 percent slopes
9409	Yodlow-Forelle-Worfman complex, 1 to 10 percent slopes
9419	Fonce-Taffom-Twocabin complex, 2 to 15 percent slopes
9504	Foreright-Bonhigh-Hoofer complex, 2 to 35 percent slopes
9507	Diamondville-Cotha-Worfman complex, 1 to 10 percent slopes
9519	Fonce-Brownsto-Twocabin complex, 4 to 25 percent slopes
9601	Worfman-Zagpeed-Badland complex, 4 to 25 percent slopes
9702	Badland-Rock outcrop-Ulric complex, 15 to 35 percent slopes
DA	Denied Access
NOTCOM	No Digital Data Available
W	Water

Map Unit	Map Unit Name
Symbol	
50	Bosler sandy loam, 0 to 1 percent slope
51	Bosler-Hooper complex, 0 to 2 percent slopes
52	Clowers-Debone-Edlin complex, 0 to 3 percent slopes
53	Debone-Shellcreek variant complex, 0 to 2 percent
54	Debone variant-Shellcreek variant complex, 0 to 1
55	Diamondville-Forelle sandy loams, 0 to 3 percent slopes
56	Edlin fine sandy loam, 0 to 1 percent slopes
57	Edlin fine sandy loam, 1 to 6 percent slopes
58	Edlin-Cotopaxi complex, gently sloping and duned
59	Edlin-Huguston complex, 6 to 30 percent slopes
60	Elk Mountain sandy loam, 0 to 1 percent slopes
61	Elk Mountain sandy loam, 1 to 6 percent slopes
62	Farson sandy loam, 0 to 1 percent slopes
63	Farson sandy loam, 1 to 3 percent slopes
64	Farson sandy loam, wet, 0 to 1 percent slopes
65	Farson-Means sandy loams, 3 to 10 percent slopes
66	Farson variant gravelly sandy loam, 0 to 1 percent slop es
67	Fluvaquents, 0 to 3 percent slopes
68	Forelle sandy loam, 0 to 1 percent slopes
69	Forelle-Diamondville sandy loams, 3 to 6 percent slopes
70	Gunbarrel loamy sand, 0 to 1 percent slopes
71	Haterton loam, 1 to 10 percent slopes
72	Haterton, thin solum-Haterton complex, 10 to 30 percent slopes
73	Hooper-Hooper, overblown complex, 0 to 1 percent slopes
74	Kandaly fine sand, 3 to 20 percent slopes
75	Kandaly-Youjay complex, duned and gently sloping
76	Littlebear loamy sand, 0 to 2 percent slopes
77	Means-Farson sandy loams, 0 to 1 percent slopes
78	Means-Farson sandy loams, 1 to 3 percent slopes
79	Means variant sandy loam, 0 to 1 percent slopes
80	Mishak-Mishak variant complex, 0 to 3 percent slopes
81	Quealman-Fluvaquents complex, 0 to 3 percent slopes
82	Shellcreek silty clay, 0 to 1 percent slopes
83	Shellcreek silty clay, non-sodic, 0 to 1 percent slopes
84	Shellcreek silty clay, non-sodic, 1 to 3 percent slopes
85	Sobson-Pepton-Edlin complex, 0 to 6 percent slopes
86	Space City loamy sand, 0 to 3 percent slopes
87	Space City loamy sand, 8 to 30 percent slopes
88	Vonason loamy sand, 0 to 1 percent slopes
89	Vonason loamy sand, 1 to 3 percent slopes
90	Vonason loamy sand, 3 to 6 percent slopes

Map Unit	Map Unit Name
Symbol	
91	Vonason-Cotopaxi complex, nearly level and duned
92	Worfman-Diamondville sandy loams, 0 to 6 percent slopes
93	Pits, borrow and gravel
94	Water
104	Almy loam, 0 to 6 percent slopes
105	Almy-Monbutte-Rallod complex, 1 to 10 percent slopes
111	Badland
116	Blackhall-Rock outcrop complex, steep
117	Blackhall-Carmody association, hilly
119	Bluerim-Onason complex, hilly
128	Cific-Hoodle complex, sloping
131	Coalmont-Milren-Cragosen complex, rolling
132	Conpeak-Rock outcrop-Cryluha complex, hilly
134	Coutis fine sandy loam, rolling
138	Cragosen-Bosler-Cushool association, rolling
139	Cryluha-Conpeak association, 1 to 15 percent slopes
140	Cushool-Rock River association, 2 to 8 percent slopes
155	Mollic Glossocryalfs, loamy-skeletal, mixed-Typic Haplocryepts, loamy-skeletal,
155	mixed-Vertic Haplocryalfs, fine, smectitic complex, 0 to 30 percent slopes
155	Haplaquolls-Aquic Ustifluvents complex, nearly level
157	Havre-Absher-Forelle loams, 0 to 6 percent slopes
158	Havre-Forelle-Glendive complex, 0 to 3 percent slopes
162	Hoodle-Rock outcrop complex, 1 to 8 percent slopes
163	Hoodle-Gelkie association, 2 to 15 percent slopes
166	Irigul-Midelight-Rock outcrop association, rolling
167	Irigul-Rock outcrop complex, steep
169	Luhon-Rock River-Forelle complex, undulating
171	Lymanson-Abston-Gelkie association, hilly
172	Lymanson-Conpeak association, rolling
184	Pishkun variant-Hoodle complex, hilly
189	Rallod-Rock outcrop-Seaverson complex, hilly
198	Rock outcrop-Mosroc complex, hilly
202	Flygare-Owlcan-Savar families, complex, 0 to 30 percent slopes
202	Ryan Park loamy fine sand, undulating
204	Ryark sandy loam, 1 to 6 percent slopes
206	Sandbranch-Ryan Park variant-Poposhia complex, 1 to 8 percent slopes
211	Thermopolis-Sinkson complex, 3 to 30 percent slopes
214	Tisworth-Ryan Park-Countryman complex, undulating
217	Uhl-Gelkie loams, 1 to 8 percent slopes
218	Venapass-Uhl-Absher loams, 1 to 6 percent slopes
228	Zeomont loamy sand, hilly

Map Unit	Map Unit Name
231	Water
400	Playas draft
400	Gasson gravelly sandy loam 0 to 6 percent slopes draft
414	Kandaly-Youjay-Westyaco complex 0 to 20 percent slopes draft
405	Haterton-Bock outroon, shale complex, 8 to 20 percent slopes draft
1000	Water
1100	Water
1100	Thibadeau-Lauzer-Zealot complex. 0 to 4 percent clopes
1101	Meaver mucky peat 0 to 4 percent slopes
1105	Overwhich accasionally flooded Overwhich rarely flooded complex. 0 to 2 percent
1114	slopes
1115	Furniss-Foxcreek complex, 0 to 2 percent slopes
1116	Turson loam, 1 to 5 percent slopes
1205	Jurvannah complex, 0 to 2 percent slopes
1701	Alpine Cirques, Rock Outcrop-Tundra-Willow Complex
1801	Alpine Ridges, Rubble Land-Tundra Complex
2101	Gunsone family-Mountairy complex, 0 to 4 percent slopes
2114	Alex-Mooseflat complex, 0 to 2 percent slopes
2114	Gasson-Cambarge-Pepal complex, 0 to 6 percent slopes draft
2117	Leckie-Overwhich complex, 0 to 3 percent slopes
2121	Raghorn sandy loam, 0 to 3 percent slopes
2122	Sandflat-Pitchstone complex, 0 to 2 percent slopes
2202	Lauzer-Zealot-Mountairy complex, 0 to 4 percent slopes
2203	Bonhigh-Figuorsand, family-Cusheet complex, 0 to 4 percent slopes
2205	Raghigh-Cacklin-Glendive complex, 0 to 4 percent slopes
2207	Ryark-Hawkstone-Cotha complex, 0 to 5 percent slopes
2208	Sweetlette sandy loam, 1 to 8 percent slopes
2213	Kayso loamy sand, 0 to 4 percent slopes
2215	Zealot-Lauzer complex, 1 to 6 percent slopes
2216	Lauzer-Trudau complex, 1 to 8 percent slopes
2218	Natherman fine sandy loam, 0 to 4 percent slopes
2219	Toddcan mucky peat, 0 to 2 percent slopes
2221	Sandbranch sandy loam, 0 to 2 percent slopes
2227	Webbville loam, 1 to 3 percent slopes
2243	Poposhia-Redgap complex, 0 to 10 percent slopes draft
2304	Figuore-Scravo-Jemdilon complex, 1 to 8 percent slopes
2305	Pitchstone-Sandflat complex, 2 to 8 percent slopes
2308	Forelle-Bluerim-Cotha complex, 1 to 6 percent slopes
2314	Scooby-Fola complex, 2 to 10 percent slopes
2332	Killpecker-Hatermus-Haterton complex, 1 to 10 percent slopes draft
2344	Subsummit Moraines, Subalpine Fir Complex

Map Unit	Map Unit Name
Symbol	
2351	Subsummit Moraines, Meadow-Grassland Complex
2401	Hoofer-Hoofer, moist complex, 2 to 35 percent slopes
2401	Subsummit Uplands, Rock Outcrop-Tundra-Willow Complex
2416	Cambarge-Pepal complex, 0 to 6 percent slopes draft
2436	Pepal-Teagulf complex, 0 to 6 percent slopes draft
2443	Subsummit Uplands, Spruce/Fir-Willow-Rock Outcrop Complex
2461	Subsummit Uplands, Tundra-Willow-Rock Outcrop Complex
2461	Rock outcropdraft
2465	Gasson-Rock Outcrop-Huguston complex, 3 to 30 percent slopes draft
2468	Kandaly-Huguston-Teagulf complex, 4 to 15 percent slopes draft
2511	Subsummit Bottoms, Willow-Meadow Complex
2601	Subsummit Sideslopes, Rock Outcrop-Whitebark Pine-Spruce/Fir Complex
2602	Subsummit Sideslopes, Rock Outcrop-Whitebark Pine-Subalpine Fir Complex
2641	Subsummit Sideslopes, Spruce/Fir Complex
3203	Brushfire-Tomichi-Tine complex, 0 to 6 percent slopes
3303	Berlake-Braziel, very bouldery complex, 1 to 8 percent slopes
3401	Bowen-Kezar-Pineisle complex, 2 to 15 percent slopes, extremely bouldery
3410	Chrisman-Debone complex, 0 to 3 percent slopes draft
3601	Pointer, rubbly-Willsod, extremely bouldery complex, 2 to 20 percent slopes
3701	Pointer-Lateral complex, 12 to 60 percent slopes, extremely bouldery
3701	Roto-Birney-Elvor complex, 10 to 30 percent slopes draft
4201	Cusheet family-Roto complex, 2 to 6 percent slopes
4602	Buddsoft very gravelly fine sandy loam, 15 to 60 percent slopes, extremely stony
5203	Golphco-Chickenhill-Bronec complex, 1 to 6 percent slopes
5204	Jonah, noncalcareous surface-Buckloaf complex, 1 to 4 percent slopes
5303	Bonhigh-Golphco complex, 1 to 6 percent slopes
5313	Squaretop-Bonhigh-Foreright complex, 2 to 8 percent slopes
5322	Foreright-Brickner-Bonhigh complex, 2 to 8 percent slopes
5326	Cortyzack-Ryedraw complex, 2 to 15 percent slopes
5328	Natherman fine sandy loam family, 2 to 6 percent slopes
5331	Sandbranch-Alcova family complex, 1 to 6 percent slopes
5332	Juel-Sandbranch-Ravenhole complex, 1 to 8 percent slopes
5333	Jonah-Ravenhole-Buckloaf complex, 1 to 6 percent slopes
5334	Sweetlette-Blackhall complex, 1 to 6 percent slopes
5336	Forelle-Pinelli complex, 2 to 15 percent slopes
5337	Raghorn sandy loam, 4 to 8 percent slopes
5341	Vermillion-Quealy complex, 1 to 15 percent slopes draft
5342	Surdal-Barbarela-Goldhill complex, 3 to 15 percent slopes
5343	Raghorn-Foreleft complex, 2 to 20 percent slopes
5344	Bondoe-Sandflat-Spang complex, 2 to 15 percent slopes
5345	Pilotpeak-Bruja complex, 1 to 10 percent slopes draft

Map Unit	Man Unit Name
Symbol	
5402	Bluemod-Zagplat-Hoofer complex, 1 to 10 percent slopes
5405	Bluemod-Figuorsand-Foreright complex, 1 to 8 percent slopes
5409	Yodlow-Forelle-Warfman complex, 1 to 10 percent slopes
5412	Tabersand-Bonhigh-Brickner complex, 2 to 20 percent slopes
5415	Diamondville-Chaperton-Luhon complex, 1 to 6 percent slopes
5417	Badland-Bonhigh complex, 2 to 20 percent slopes
5418	Golphco-Mountairy complex, 4 to 15 percent slopes
5419	Jemdilon-Foresand-Buddsoft complex, 2 to 15 percent slopes
5425	Evanston-Pagoda complex, 2 to 15 percent slopes
5430	Diamondville-Oasiswell-Forelle complex, 1 to 10 percent slopes
5437	Broback-Golphco-Foreleft complex, 5 to 15 percent slopes
5438	Bruja-Pilotpeak-Sobson complex, 2 to 35 percent slopes draft
5439	Pilotpeak-Cryluha complex, 4 to 25 percent slopes draft
5440	Shaboom-Drygulch-Pitchstone complex, 8 to 35 percent slopes
5501	Volborg-Oysterridge-Oysterridge family complex, 4 to 15 percent slopes
5504	Forelle-Bluerim-Worfman complex, 2 to 35 percent slopes
5507	Bonhigh-Cackmod complex, 1 to 10 percent slopes
5521	Golphco-Pinehill complex, 6 to 25 percent slopes
5531	Chinatown-Tabyago complex, 10 to 45 percent slopes
5601	Hoofer-Badland-Bonhigh-Zagplat complex, 4 to 25 percent slopes
5602	Foreright-Cusheet complex, 4 to 25 percent slopes
5604	Forelle-Blazon, extremely stony-Cushool complex, 4 to 35 percent slopes
5608	Mountairy-Polaris-Figuorsand-Badland complex, 15 to 60 percent slopes
5620	Bruja, extremely flaggy-Sweetlette complex, 4 to 30 percent slopes
5702	Badland-Rock outcrop complex
5703	Foursees-Badland complex, 8 to 45 percent slopes
5705	Sanditch-Rock outcrop complex, 8 to 40 percent slopes
5706	Rock outcrop-Southace complex, 25 to 80 percent slopes
5707	Breeton-Owenfort, rubbly-Burrfoot, rubbly complex, 35 to 70 percent slopes
7038	Badland-Hatermus complex, 3 to 30 percent slopes draft
7111	Southeast Mountains Floodplains, Willow-Meadow Complex
7112	Southeast Mountains Floodplains, Meadow Complex
7201	Opitz gravelly sandy loam, 1 to 6 percent slopes
7202	Rodell-Zonite-Rock outcrop complex, 4 to 25 percent slopes
7222	Southeast Mountains Pediments, Big Sagebrush-Aspen Complex
7241	Southeast Mountains Pediments, Subalpine Fir
7251	Southeast Mountains Terraces, Grassland
7331	Southeast Mountains Moraines, Aspen-Subalpine Fir Complex
7341	Southeast Mountains Till Plains, Subalpine Fir Complex
7342	Southeast Mountains Moraines, Subalpine Fir-Meadow Complex
7343	Southeast Mountains Moraines, Subalpine Fir Complex

Map Unit	Map Unit Name
Symbol	
7401	Opitz-Wissikihon complex, 5 to 25 percent slopes
7402	Beavmid-Whiteacorn complex, 4 to 20 percent slopes
7403	Whiteacorn-Beavmid complex, 2 to 8 percent slopes
7501	Worock-Jaegie-Swede complex, 6 to 25 percent slopes
7502	Blackbear, rubbly-Branham, rubbly-Bobowic complex, 4 to 25 percent slopes
7503	Ansel-Odark-Sebud, bouldery complex, 6 to 30 percent slopes
7504	Tepecreek-Wix complex, 15 to 40 percent slopes
7511	Southeast Mountains Bottoms, Meadow Complex
7601	Norriston, rubbly-Ellena, extremely stony-Rock outcrop complex, 15 to 50 percent slopes
7602	Southeast Mountains Sideslopes, Rock Outcrop-Subalpine Fir Complex
7602SU	Vanwirt, extremely bouldery-Ansel, extremely bouldery-Rock outcrop complex, 20 to 60 percent slopes
7603	Vanwirt, extremely bouldery-Rock outcrop-Lolon, extremely bouldery complex, 15 to 60 percent slopes
7604	Vanwirt, extremely bouldery-Ansel, very bouldery-Kezar, extremely bouldery complex, 10 to 50 percent slopes
7621	Southeast Mountains Sideslopes, Big Sagebrush-Douglas fir-Rock Outcrop Complex
7632	Southeast Mountains Sideslopes, Aspen-Big Sagebrush Complex
7641	Southeast Mountains Sideslopes, Douglas Fir-Rock Outcrop Complex
7642	Southeast Mountains Sideslopes, Subalpine Fir-Aspen Complex
7644	Southeast Mountains Sideslopes, Subalpine Fir-Meadow Complex
7645	Southeast Mountains Sideslopes, Subalpine Fir-Aspen-Meadow Complex
7701	Rock outcrop-Surdal, extremely bouldery-Wix, extremely stony complex, 15 to 50
7801	Mountairy-Hawksell complex 0 to 8 percent slopes
7802	Mountairy-Hawksell complex, 8 to 25 percent slopes
7805	Redgan-Subwater complex, 0 to 5 percent slopes
7806	Hawkstone-Alcova complex, 5 to 20 percent slopes
7809	Cowestglen sand 0 to 5 percent slopes
7810	Maysprings-Cowestglen complex 0 to 5 percent slopes
7815	Raghigh-Cacklin-Overlandtrail complex 0 to 4 percent slopes
7816	Gunsone-Overlandtrail-Mudduck family complex 0 to 2 percent slopes
7817	Gunsone-Overlandtrail complex, 0 to 4 percent slopes
7818	Gunsone-Ulric complex, 2 to 8 percent slopes
8002	Glaciers & Snowfields
8003	Back Outcrop
8004	Rubble Land
8302	Subwater-Merna-Ionsouth complex 1 to 6 percent slopes
8401	Sandbranch-Kandaly complex, 1 to 10 percent slopes
9114	Harshinger, occasionally flooded-Harshinger, rarely flooded complex, 0 to 4 percent slopes

Map Unit	Ndew Linit News
Symbol	Map Unit Name
9202	Sandbranch-Obadia-Forelle complex, 0 to 4 percent slopes
9203	Diamondville-Cushool-Edlin complex, 0 to 4 percent slopes
9207	Cacklin-Hawksell-Cackmod complex 0 to 2 percent slopes
9213	Farson loamy sand, 0 to 4 percent slopes
9215	Debone-Sandbranch complex, 1 to 6 percent slopes
9216	Sandbranch-Scooby complex, 1 to 8 percent slopes
9308	Foreright-Bluemod-Cackmod complex, 1 to 6 percent slopes
9321	Boettcher-Cushool-Sandbranch complex, 1 to 6 percent slopes
9325	Bodorumpe-Ravenhole complex, 1 to 10 percent slopes
9331	Lauzer-Mountairy complex, 1 to 6 percent slopes
9332	Jewel-Lauzer-Figuore complex, 1 to 8 percent slopes
9402	Bluerim-Zagpeed-Worfman complex, 1 to 10 percent slopes
9405	Bluerim-Ravenhole-Forelle complex, 1 to 8 percent slopes
9408	Zagplat sandy loam, 1 to 8 percent slopes
9409	Yodlow-Forelle-Worfman complex, 1 to 10 percent slopes
9419	Fonce-Taffom-Twocabin complex, 2 to 15 percent slopes
9504	Foreright-Bonhigh-Hoofer complex, 2 to 35 percent slopes
9507	Diamondville-Cotha-Worfman complex, 1 to 10 percent slopes
9519	Fonce-Brownsto-Twocabin complex, 4 to 25 percent slopes
9601	Worfman-Zagpeed-Badland complex, 4 to 25 percent slopes
9702	Badland-Rock outcrop-Ulric complex, 15 to 35 percent slopes
DA	Denied Access
NOTCOM	No Digital Data Available
W	Water