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Funding for WRDS and the creation of this electronic document was provided by the Wyoming Water Development Commission (http://wwdc.state.wy.us)

FINAL REPORT
for
BLACKS FORK RIVER WATERSHED STUDY, LEVEL I

PHASE I
HAMS FORK

Prepared for:

Wyoming Water Development Commission
6920 Yellowtail Road
Cheyenne, WY 82002

Prepared by:

Anderson Consulting Engineers, Inc.
375 E. Horsetooth Road, Bldg. 5
Fort Collins, CO 80525
(ACE Project No. WYWDC34)

January 2015

ANDERSON CONSULTING ENGINEERS, INC.
Civil • Water Resources • Environmental

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I. INTRODUCTION AND OVERVIEW

1.1 Introduction

The Blacks Fork Watershed Level I Investigation was completed on behalf of the Uinta, Lincoln and Sweetwater County Conservation Districts. The primary goal of the was to combine all existing data with data collected and generated from this study to form a comprehensive Watershed Management and Rehabilitation Plan. The purpose and objectives of the project are itemized below:

- *Facilitate consensus building among the Advisory Committee, the Conservation District, landowners and the Wyoming Water Development Commission.*
- *Facilitate public participation.*
- *Conduct an evaluation and description of the Blacks Fork River watershed, including quantity and quality of surface water resources, and riparian/upland conditions.*
- *Conduct a geomorphic investigation of the primary channels within the watershed and identify potential mitigation measures to improve impaired channel reaches.*
- *Conduct an irrigation system inventory and develop a rehabilitation plan for those ditches expressing an interest to participate.*
- *Conduct an evaluation of water storage needs and opportunities to augment water available for livestock and wildlife.*
- *Develop a watershed management plan which identifies problem areas within the watershed and proposes practical economic solutions.*
- *Identify permits easements and clearances necessary for plan implementation.*
- *Develop cost estimates for improvements.*
- *Complete an economic Analysis and evaluate alternative sources of funding.*

The project study area is defined as the subbasin of the Upper Green River delineated by the Blacks Fork River Watershed (HUC 14040107) and Muddy Creek (HUC 14040108). In addition, the Henrys Fork / Upper Green-Flaming Gorge watershed (HUC 14040106) and smaller subbasins directly tributary to Flaming Gorge Reservoir were included. Figure 1.1-1 shows the general location of the watershed within the State of Wyoming.

1.2 Project Management and Report Organization

Due to the vast extent of the project study area and the range of conditions found within it, completion of the project was divided into three geographical phases, each with its own report volume containing information pertinent specifically to that region. A fourth volume, the Basinwide Summary, contains information deemed more appropriate for discussion at the basinwide watershed level as well as a collation of all watershed plan components reported in the individual volumes.

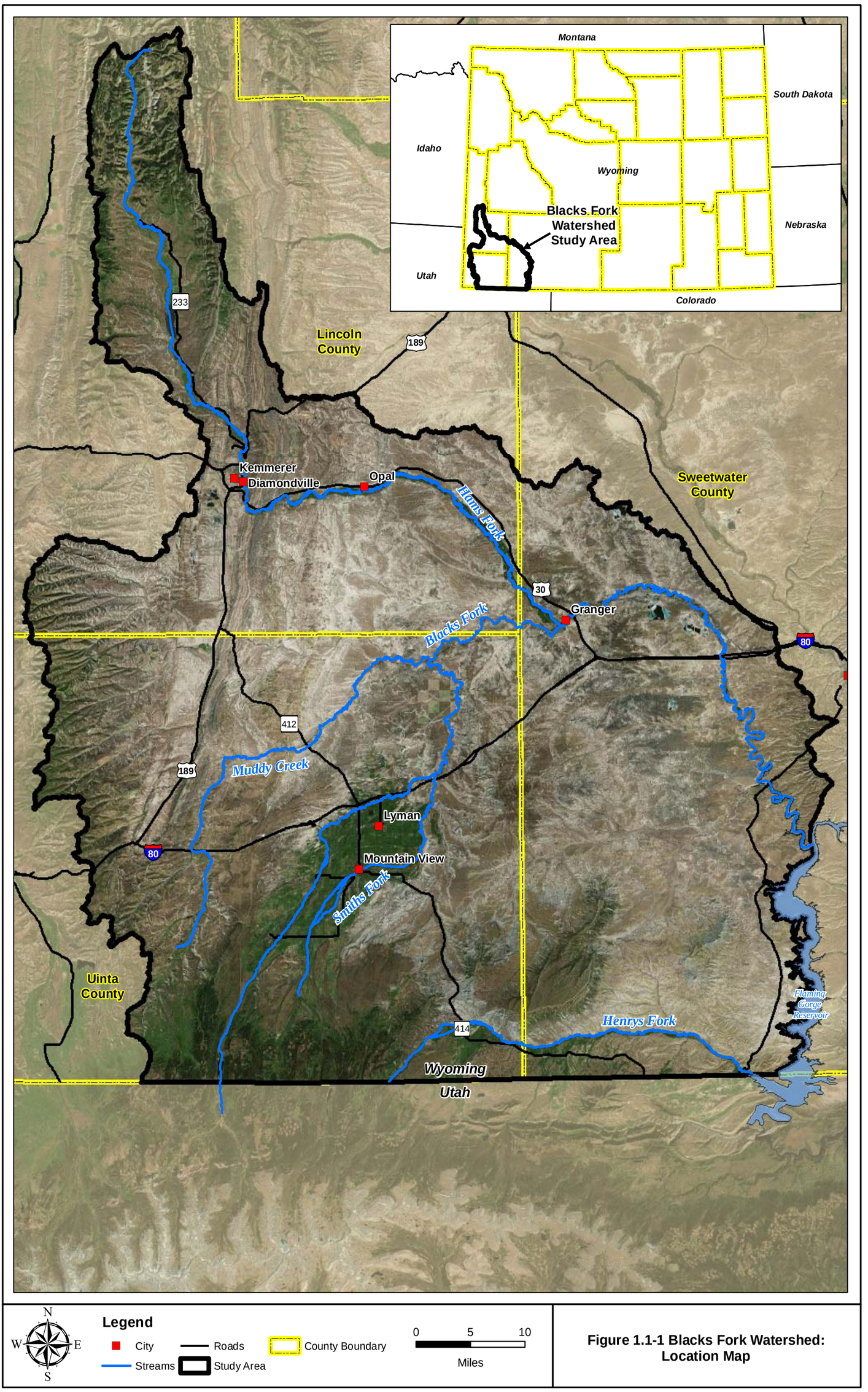


Figure 1.1-1 Blacks Fork Watershed: Location Map

As indicated in Figure 1.2-1 and tabulated in Table 1.2-1, the project study area was divided into three subregions defined as follows:

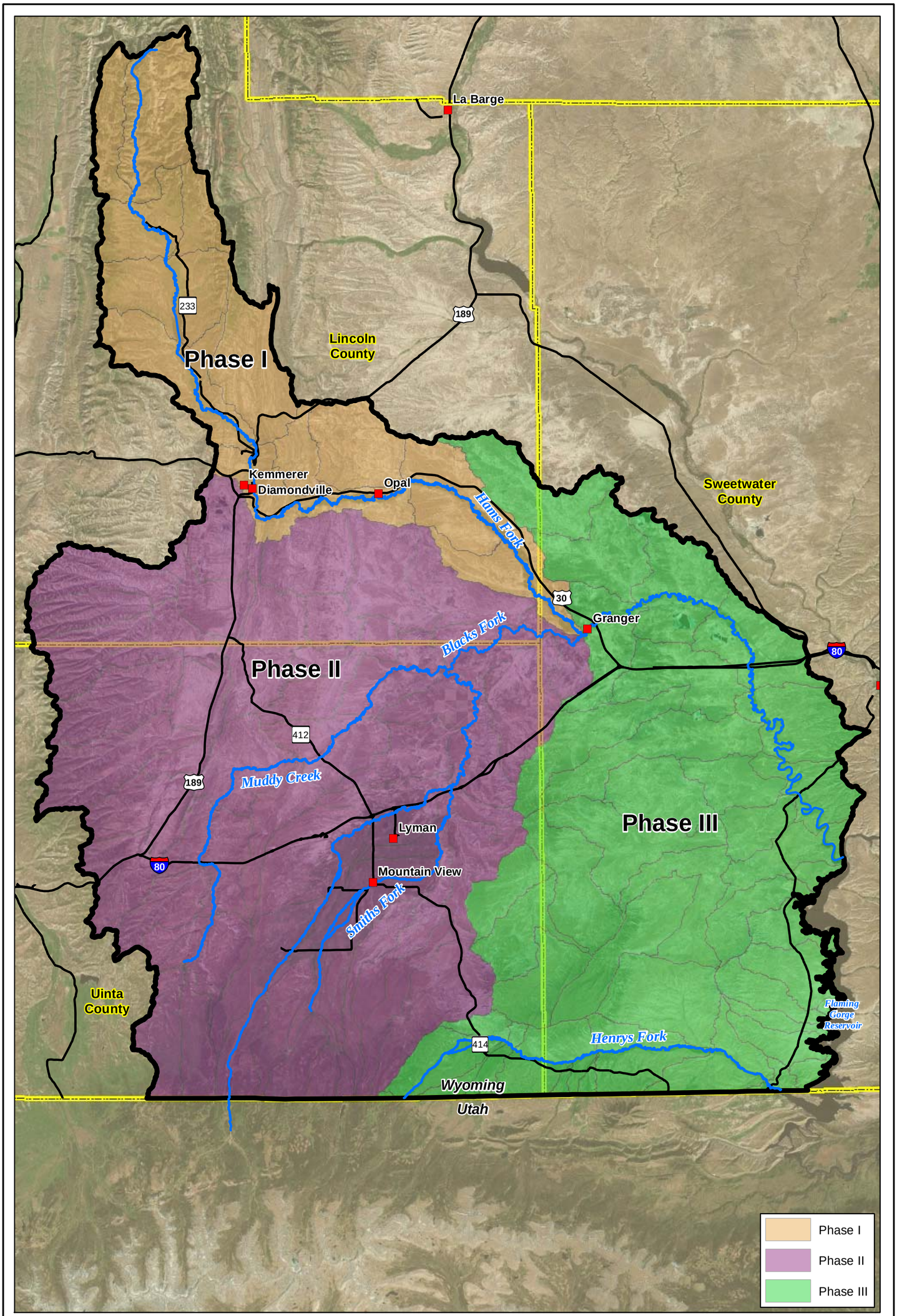
Phase I	Hams Fork	(Volume I)
Phase II	Upper Blacks Fork	(Volume II)
Phase III	Lower Blacks Fork	(Volume III)

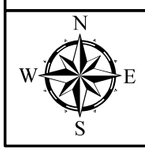
This volume of the project report presents the Phase 1: Hams Fork watershed inventory and watershed management plan.

Throughout this report, reference will be made where the reader should refer to Volumes I, II, or III for more specific information. Likewise, Volumes I, II, and III cross reference back to the Basinwide Volume where appropriate.

Table 1.2-1 Blacks Fork Watershed Investigation, Level 1: Project Phases.

Phase	10th Order HUC	Watershed Name
Phase I:	**1404010706**	**Upper Hams Fork**
	1404010707	**Lower Hams Fork**
Phase II:	1404010803	Albert Creek
	1404010703	Cottonwood Creek
	1404010705	Dry Muddy Creek
	1404010802	Little Muddy Creek
	1404010704	Middle Blacks Fork
	1404010801	Muddy Creek
	1404010702	Smiths Fork
	1404010701	Upper Blacks Fork
Phase III:	1404010710	Big Dry Creek
	1404010708	Lower Blacks Fork
	1404010604	Lower Henrys Fork
	1404010602	Middle Flaming Gorge Reservoir
	1404010709	Sevenmile Gulch
	1404010603	Upper Henrys Fork





Legend

City
Roads
County Boundary
Streams

0 5 10
Miles

Figure 1.2-1 Blacks Fork Watershed: Project Phases

II. Phase I Study Area Description and Inventory

2.1 Overview

This chapter of the Blacks Fork Watershed Level I Investigation is intended to be used in conjunction with the Basinwide volume of the watershed study report; it was not created as a standalone document. Where appropriate, the reader is directed to the Basinwide volume for pertinent information.
As indicated in Figure 2.1-1, the Phase I study area has been subdivided into two subregions:

- Upper Hams Fork
- Lower Hams Fork

In the following paragraphs, various datasets are discussed in accordance with these subregions. The purpose of this effort is to enable data evaluation at a greater level of detail than would be provided when discussing the Phase I study area as a whole.

2.2 Land Uses and Activities

2.2.1 Land Ownership

The total land area within the Phase I study area is approximately 397,749 acres (621.5 square miles). Figure 2.2-1 presents a map indicating the various land ownership categories within the Phase I study area. Lincoln County comprises 98 percent of the Phase I study area with Sweetwater County making up the remaining 2 percent (Figure 2.2-2).

Land ownership information was obtained from the Bureau of Land Management (BLM) and the assessor's offices of the two counties involved and incorporated into the project GIS. According to this data, approximately 251.6 square miles (40.5 percent) of the study area is owned and administered by the Bureau of Land Management (BLM). The second largest land owner category is private individuals with approximately 220 square miles (35.4 percent). The United States Forest Service owns and administers 113.6 square miles (18.3 percent) of land in the Phase I study area. The State of Wyoming (33.8 square miles or 5.4 percent) rounds out the surface ownership within the study area. A pie chart displaying the relative percentage of land ownership within the watershed is presented as Figure 2.2-3.

The southeastern portion of the study area from Kemmerer east to Granger is dominated by an area referred to as the "checkerboard". The checkerboard is a landownership pattern resulting from alternating federal and private land ownership. This pattern is a remnant of the Union Pacific Act of 1862 with which Congress granted every other section (one square mile) of land within ten miles of the railroad to the Union Pacific, which tried to sell it to raise capital for railroad construction. The strip along the railroad was later extended to twenty miles. The premise was that land values would increase following railroad construction and that the railroad company could then sell the land at a profit (BLM, 2014 at www.blm.gov).

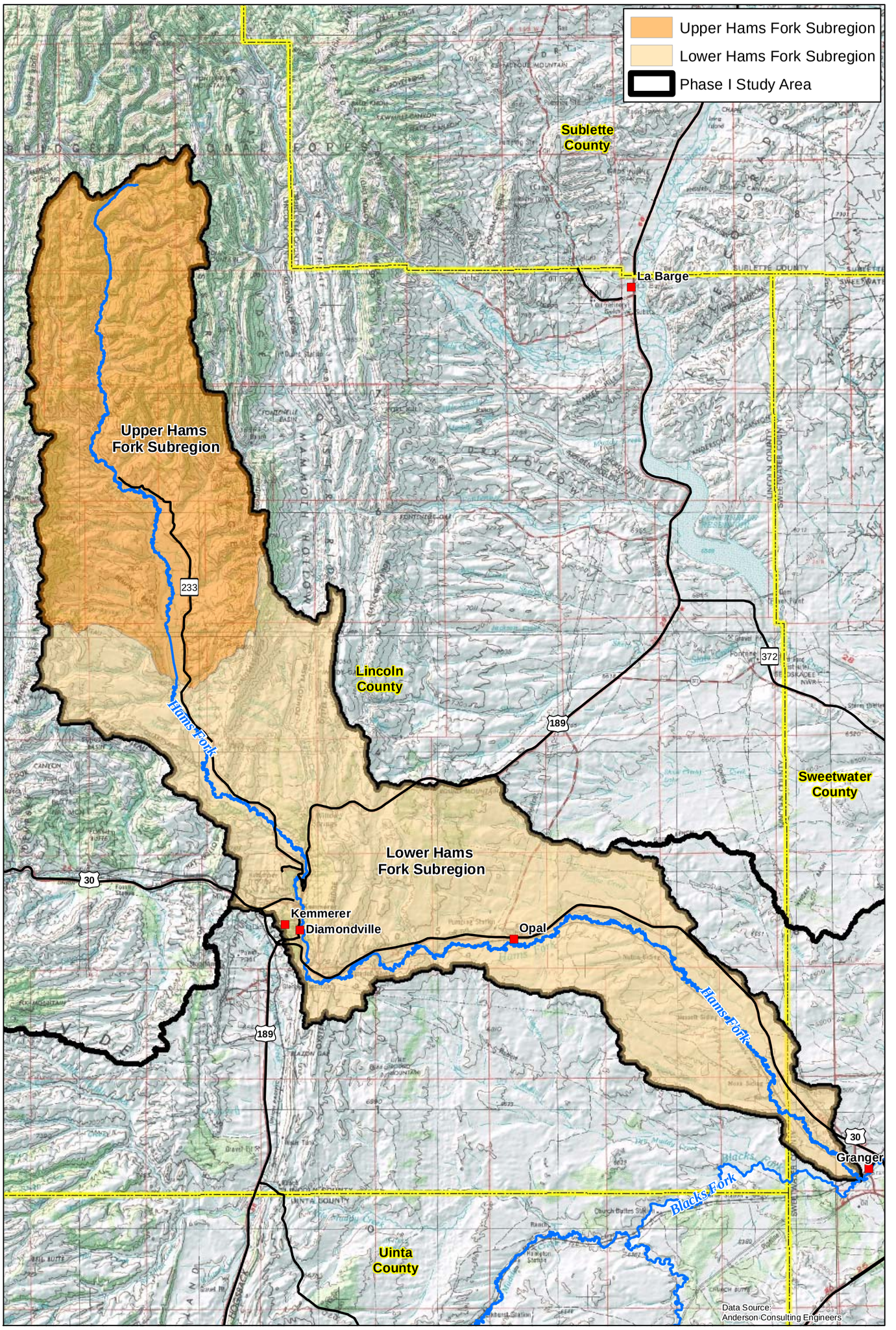


Figure 2.1-1 Blacks Fork Watershed Phase I: Phase Boundary and Subregions

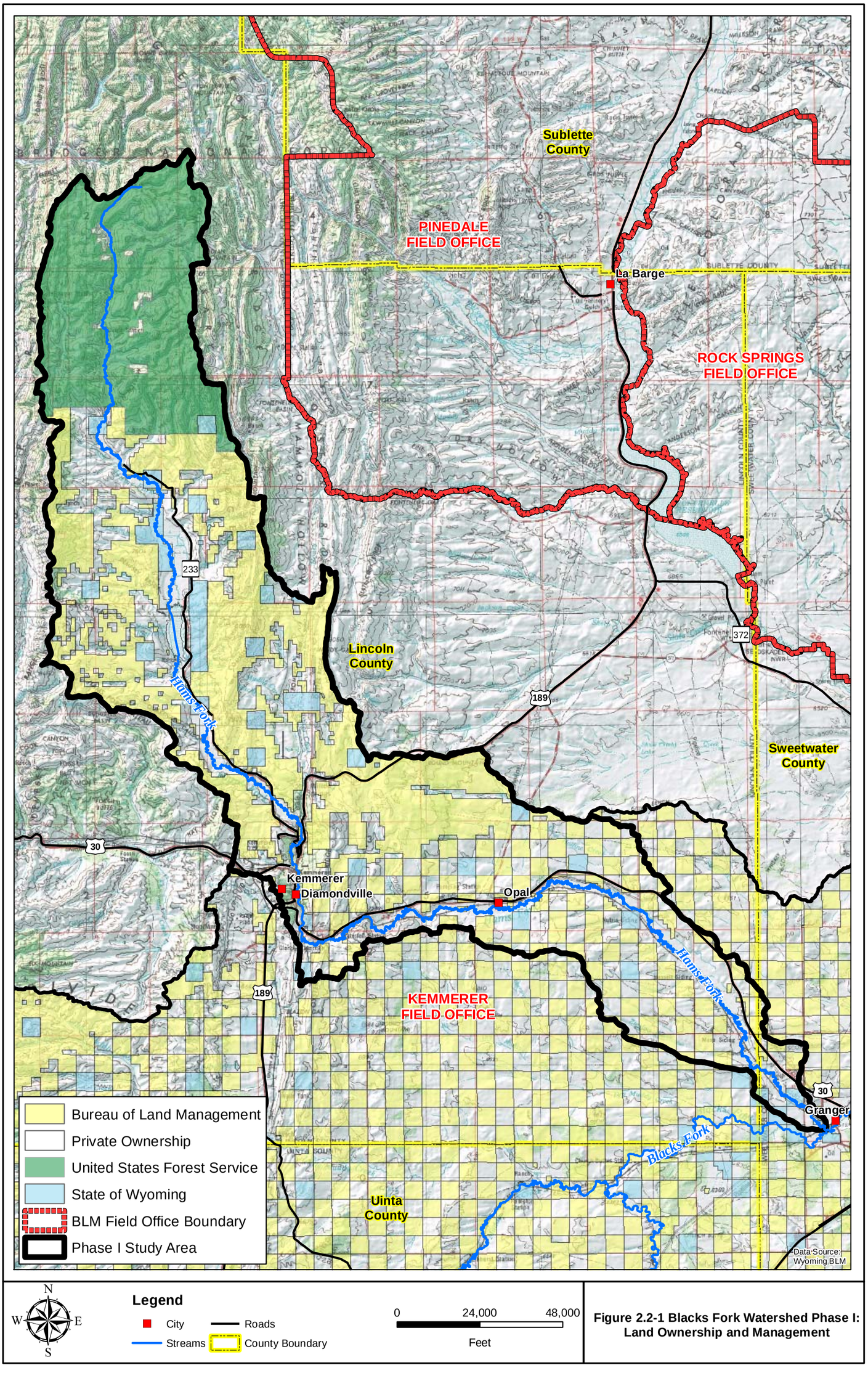


Figure 2.2-1 Blacks Fork Watershed Phase I: Land Ownership and Management

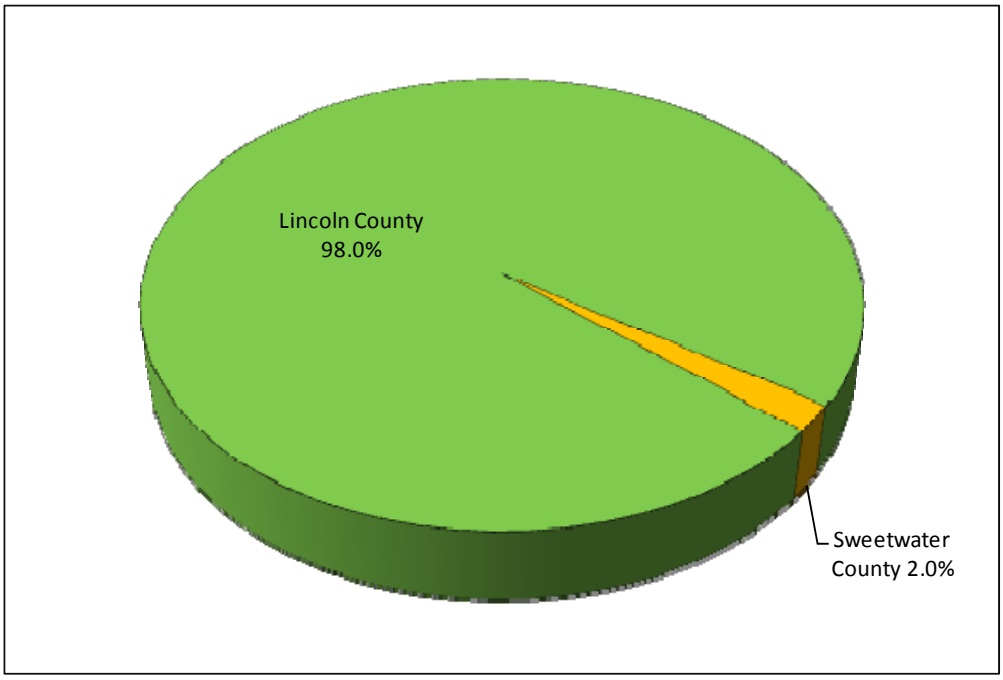


Figure 2.2-2 Distribution of Phase I Study Area among Counties.

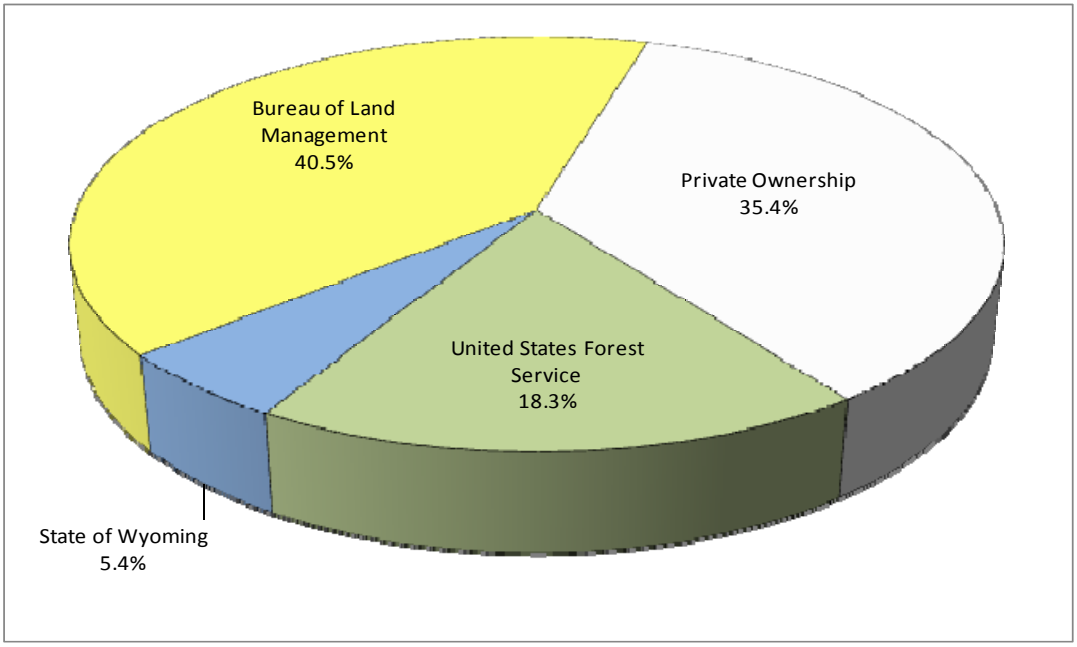


Figure 2.2-3 Distribution of Land Ownership within the Phase I Study Area.

Note: The Project GIS includes detailed land ownership information (name, address, etc.) for individual parcels in Lincoln and Sweetwater Counties. The data were obtained directly from the respective county assessor's offices and reflect ownership status as of the dates of their retrieval (Fall of 2013).

2.2.2 Range Conditions/Grazing Practices

2.2.2.1 Grazing Allotments Administration

Grazing on federal lands within the Phase I study area is administered by the United States Forest Service and the Bureau of Land Management. The USFS-administered allotments (sometimes referred to as rangeland management units or RMUs) are located at higher elevations within the Bridger-Teton National Forest on the northern edge of the study area. There are 12 USFS individual allotments and 45 BLM allotments as indicated in Figure 2.2-4. These allotments consist entirely of federal lands. Note that some of these allotments may be located primarily in adjacent watersheds and "spill" over the watershed divide. Appendix 2A lists the allotments and pertinent data associated with them. The BLM allotments are administered by the Kemmerer Field Office located in Kemmerer, Wyoming. (Kemmerer Resource Management Plan approved in 2010). The USFS Rangeland Management Units are administered by the Bridger-Teton National Forest (Kemmerer Ranger District) in Kemmerer, Wyoming.

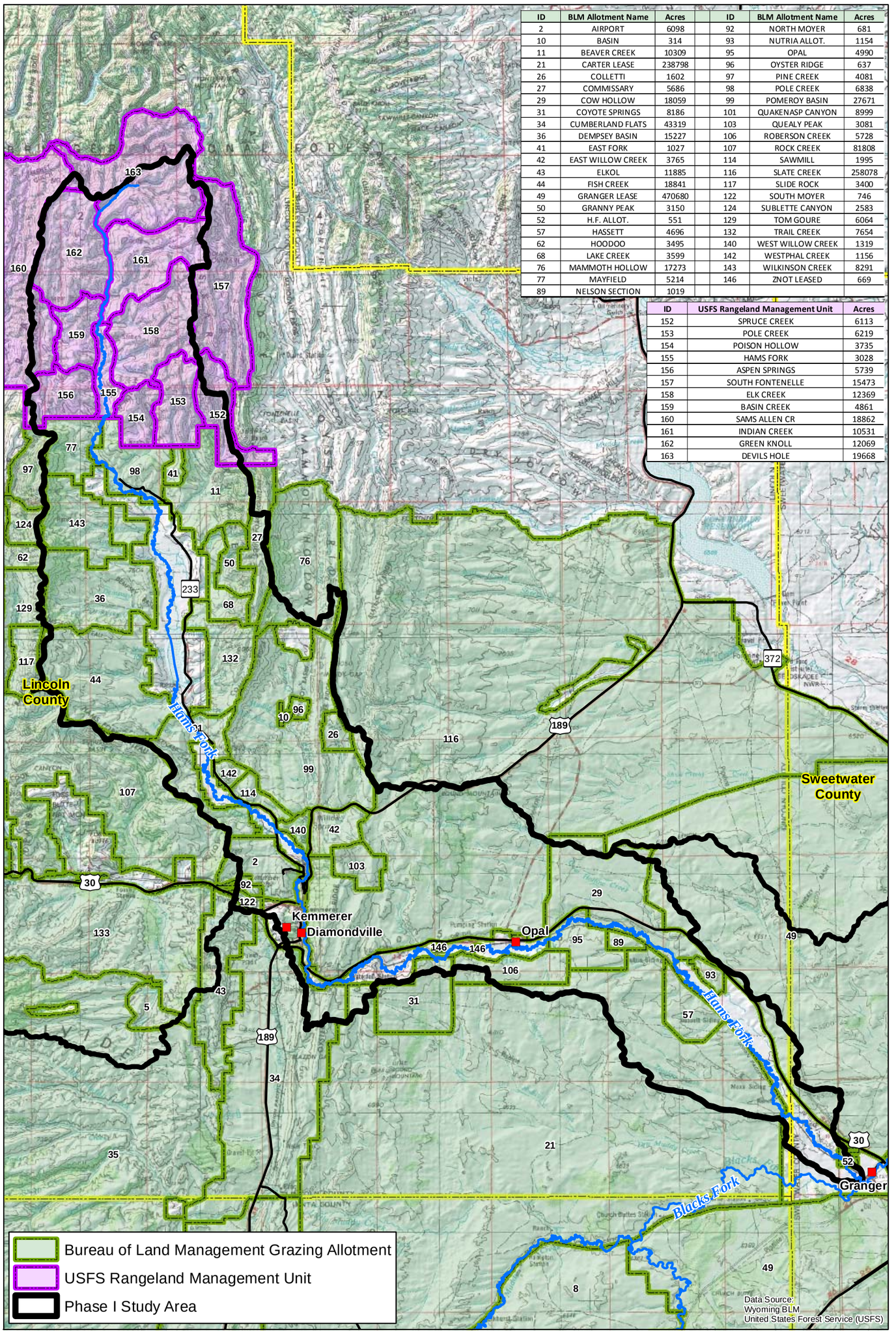
2.2.2.2 Existing Water Supply

The methodologies regarding the development and evaluation of the existing water sources data are presented in the Blacks Fork Basinwide Volume, please refer that volume for in depth description regarding the development of the data presented here.

The data indicates the presence of 322 stock reservoirs/ponds within the Phase I study area. Figure 2.2-5 displays a map of the study area showing the results of the reservoir analysis and classification. Based upon this analysis, it appears that a minimum of 206 reservoirs remain "functional" water sources and 70 are "potential" water sources. This analysis also indicates that 46 reservoirs are "non-functional" water sources as they are either breached, sediment filled, or in need of site visits to determine their status. Appendix 2B presents these results in a tabular format.

Numerous additional water supply projects have been developed throughout the study area in support of livestock and wildlife. These include construction of wells with designated stock use, guzzlers, pipelines, etc. These generally incorporate some sort of livestock watering facility such as large bottomless concrete stock tanks.

Based upon the reservoir analysis effort, mapping data obtained from the BLM and the SEO office, and landowner input, the existing water sources are displayed in Figure 2.2-6. Note that this feature does NOT include surface water sources such as perennial streams, intermittent streams, or springs because a



ID	BLM Allotment Name	Acres	ID	BLM Allotment Name	Acres
2	AIRPORT	6098	92	NORTH MOYER	681
10	BASIN	314	93	NUTRIA ALLOT.	1154
11	BEAVER CREEK	10309	95	OPAL	4990
21	CARTER LEASE	238798	96	OYSTER RIDGE	637
26	COLLETTI	1602	97	PINE CREEK	4081
27	COMMISSARY	5686	98	POLE CREEK	6838
29	COW HOLLOW	18059	99	POMEROY BASIN	27671
31	COYOTE SPRINGS	8186	101	QUAKENASP CANYON	8999
34	CUMBERLAND FLATS	43319	103	QUEALY PEAK	3081
36	DEMPSEY BASIN	15227	106	ROBERSON CREEK	5728
41	EAST FORK	1027	107	ROCK CREEK	81808
42	EAST WILLOW CREEK	3765	114	SAWMILL	1995
43	ELKOL	11885	116	SLATE CREEK	258078
44	FISH CREEK	18841	117	SLIDE ROCK	3400
49	GRANGER LEASE	470680	122	SOUTH MOYER	746
50	GRANNY PEAK	3150	124	SUBLETTE CANYON	2583
52	H.F. ALLOT.	551	129	TOM GOURE	6064
57	HASSETT	4696	132	TRAIL CREEK	7654
62	HOODOO	3495	140	WEST WILLOW CREEK	1319
68	LAKE CREEK	3599	142	WESTPHAL CREEK	1156
76	MAMMOTH HOLLOW	17273	143	WILKINSON CREEK	8291
77	MAYFIELD	5214	146	ZNOT LEASED	669
89	NELSON SECTION	1019			

ID	USFS Rangeland Management Unit	Acres
152	SPRUCE CREEK	6113
153	POLE CREEK	6219
154	POISON HOLLOW	3735
155	HAMS FORK	3028
156	ASPEN SPRINGS	5739
157	SOUTH FONTENELLE	15473
158	ELK CREEK	12369
159	BASIN CREEK	4861
160	SAMS ALLEN CR	18862
161	INDIAN CREEK	10531
162	GREEN KNOLL	12069
163	DEVILS HOLE	19668

Figure 2.2-4 Blacks Fork Watershed Phase I: BLM Grazing Allotments and USFS Rangeland Management Units

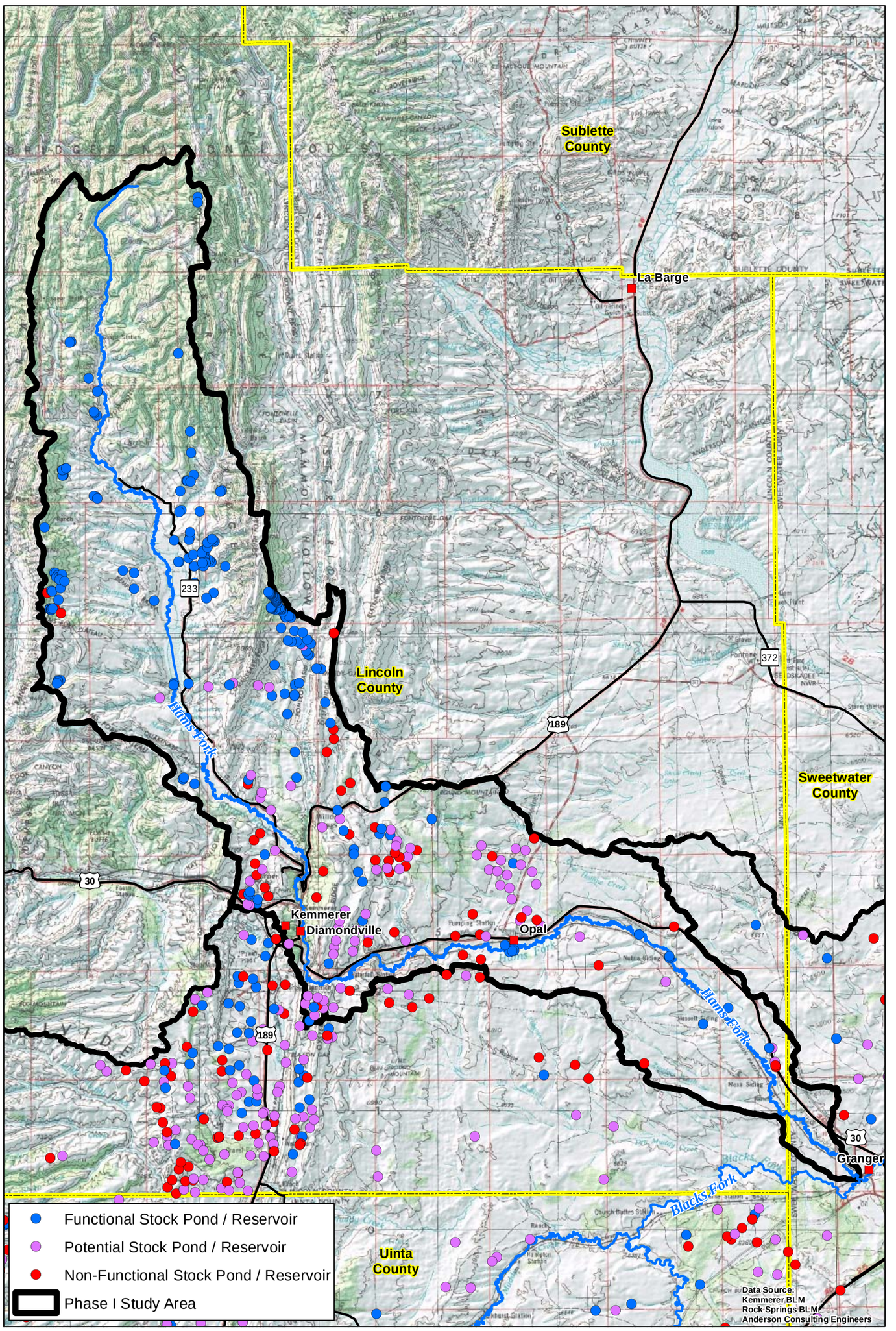


Figure 2.2-5 Blacks Fork Watershed Phase I: Stock Reservoir Evaluation

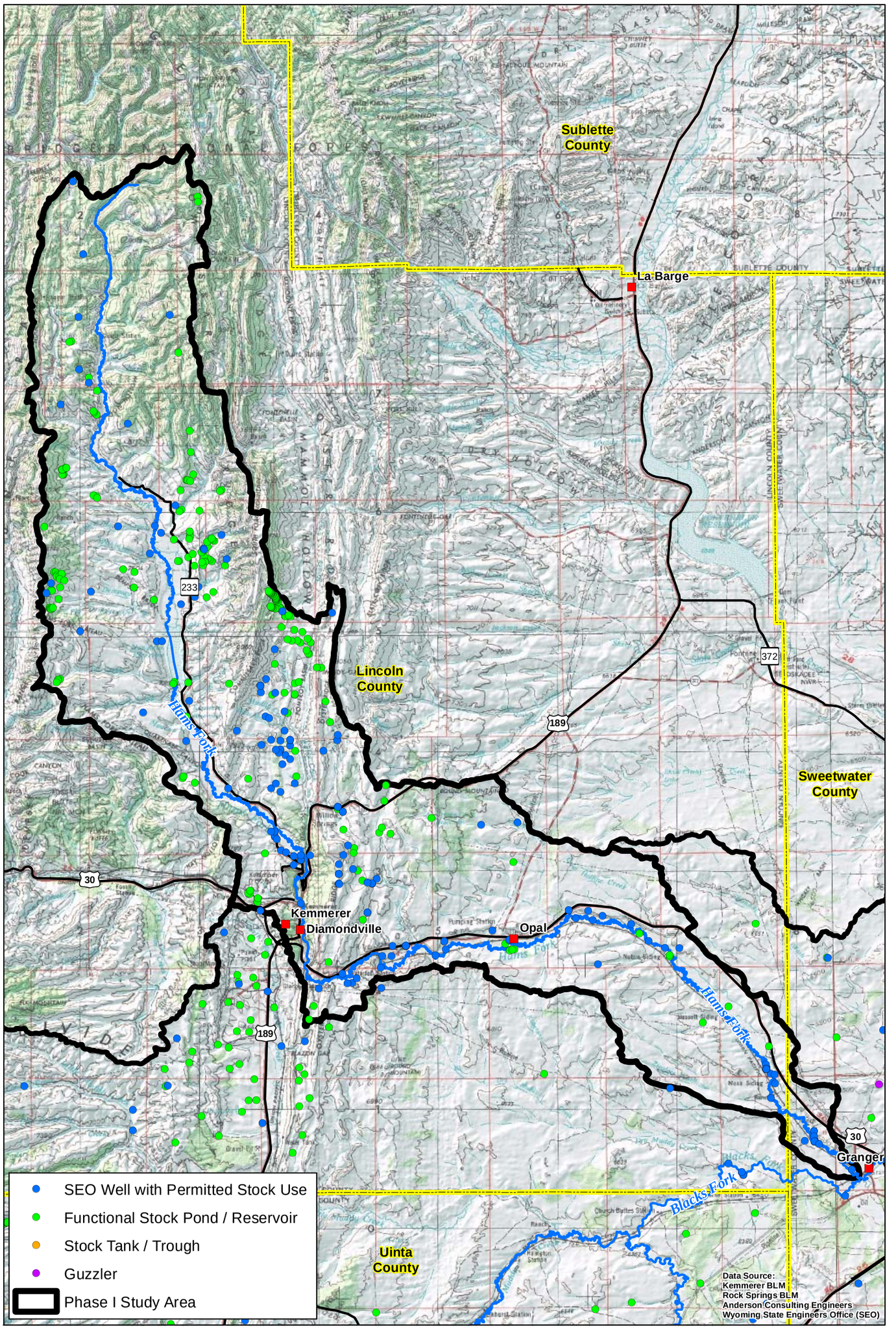


Figure 2.2-6 Blacks Fork Watershed Phase I: Existing Upland Water Sources

primary objective of this study is to reduce reliance upon these sources. Because they do not presently appear to provide sources of water to livestock or wildlife, reservoirs which appeared to be either breached, filled with sediment, or otherwise non-functioning, are not included in this figure.

2.2.2.3 Ecological Site Descriptions

The concepts and descriptions of Ecological Sites are covered in the Blacks Fork Watershed Basinwide report. Please refer to the Umbrella report for more information.

Based upon the mapping which is available for the Phase I study area (Figure 2.2-7), there are several ecological sites which are predominant. These ecological sites are:

- Loamy (Ly) 7-9" Green River and Great Divide Basins
- Loamy (Ly) 10-14" Foothills and Basins West
- Shallow Loamy (SwLy) 7-9" Green River and Great Divide Basins

The following descriptions of the Historic Climax Plant Communities (HCPC) associated with these ESDs are extracted from the NRCS descriptions (NRCS, 2008).

Loamy (Ly) 7-9" Green River and Great Divide Basins

The Historic Climax Plant Community (HCPC) for this Ecological Site is the Mixed Grass/Big Sagebrush Plant Community. *Suitable thermal and escape cover for mule deer may be limited due to the low height of woody plants. However, sagebrush, which can approach 15% protein and 40-60% digestibility, provides important winter forage for mule deer and antelope. Year-round habitat is provided for sage grouse and many other sagebrush obligate species such as the sage sparrow, Brewer's sparrow, sage thrasher, pygmy rabbit, sagebrush vole, horned lizard, and pronghorn antelope. Other birds that would frequent this plant community include horned larks and golden eagles.*

The Big Sagebrush/Bunchgrass Plant Community: This plant community may be useful for the same wildlife that would use the Historic Climax Plant Community.

The Big Sagebrush/Rhizomatous Wheatgrass Plant Community: This plant community may be beneficial for the same wildlife that would use the Historic Climax Plant Community. However, the plant community composition is less diverse, and thus, less apt to meet the seasonal needs of these animals.

The Douglas Rabbitbrush/Rhizomatous Wheatgrass Plant Community: These communities provide limited forage for antelope and mule deer due to low production and lack of sagebrush. They may be used as a foraging site by sage grouse if proximal to woody cover.

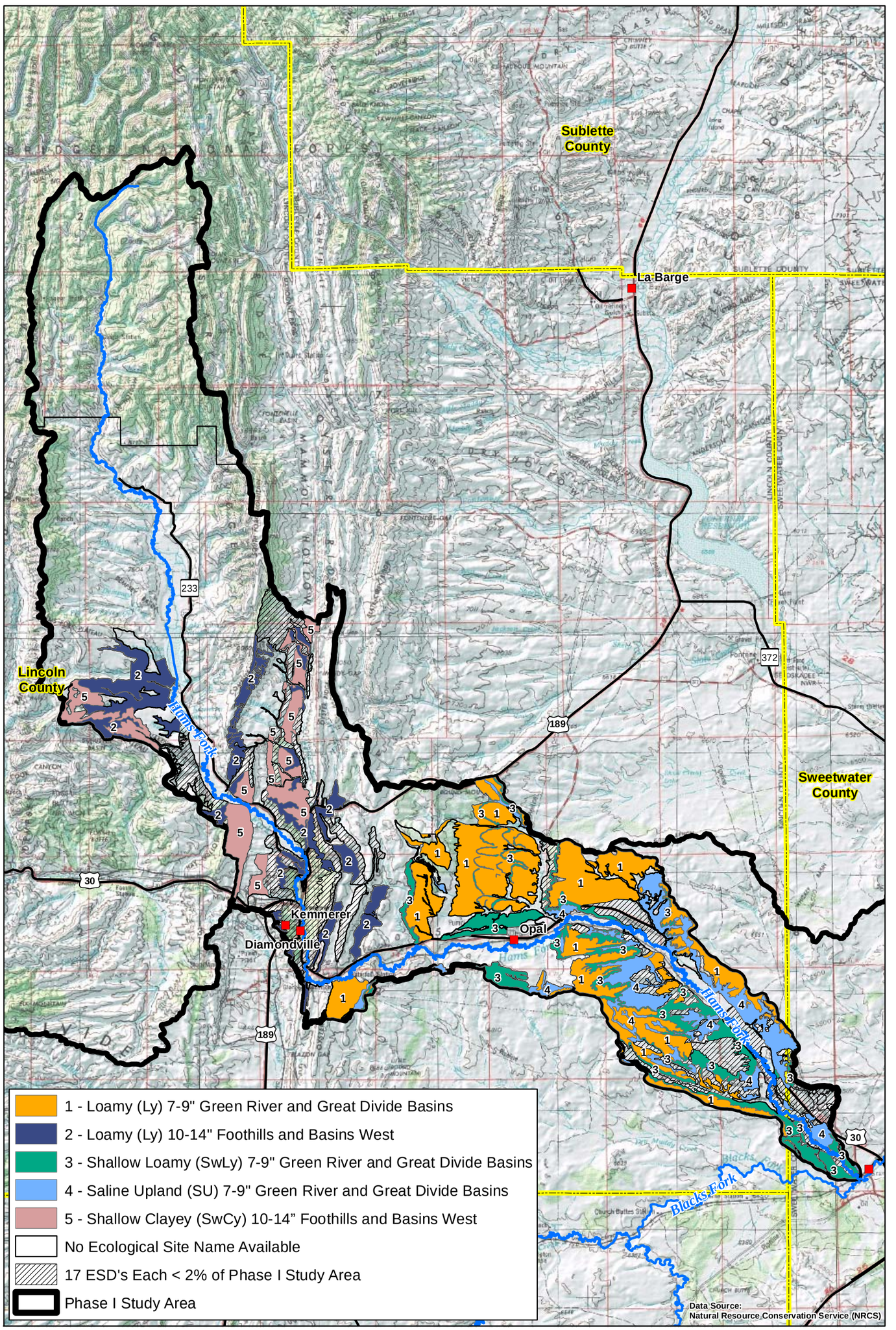


Figure 2.2-7 Blacks Fork Watershed Phase I: Predominant Ecological Sites of Management Relevance

The ESD suggests suggests stocking rates for cattle under continuous season-long grazing under normal growing conditions. These are conservative estimates that should be used only as guidelines in the initial stages of the conservation planning process. Often, the current plant composition does not entirely match any particular plant community (as described in this ecological site description). Because of this, a field visit is recommended, in all cases, to document plant composition and production. More precise carrying capacity estimates should eventually be calculated using this information along with animal preference data, particularly when grazers other than cattle are involved. Under more intensive grazing management, improved harvest efficiencies can result in an increased carrying capacity. The following production and stocking notes are presented by the NRCS:

- *Mixed Grass/Big Sagebrush (HCPC) 300-700 lb./ac and .15 AUM/ac*
- *Big Sagebrush/Bunchgrass 100-500 lb./ac and .1 AUM/ac*
- *Big Sagebrush/Rhizomatous Wheatgrass 100-300 lb./ac and .05 AUM/ac*
- *Douglas Rabbitbrush/Rhizomatous Wheatgrass 50-250 lb./ac and .03 AUM/ac*

Note: Values based on continuous, season-long grazing by cattle under average growing conditions.

Grazing by domestic livestock is one of the major income-producing industries in the area. Rangeland in this area may provide yearlong forage for cattle, sheep, or horses. During the dormant period, the forage for livestock use needs to be supplemented with protein because the quality does not meet minimum livestock requirements.

Loamy (Ly) 10-14" Foothills and Basins West

The Historic Climax Plant Community (HCPC) for this Ecological Site is the Mixed Grass/Big Sagebrush Plant Community. This plant community provides suitable thermal and escape cover for mule deer, elk, and antelope. Sagebrush, which can approach 15% protein and 40-60% digestibility, provides important winter forage for mule deer and antelope. Year-round habitat is provided for sage grouse and many other sagebrush obligate species such as the sage sparrow, Brewer's sparrow, sage thrasher, pygmy rabbit, sagebrush vole, horned lizard, and pronghorn antelope. Other birds that would frequent this plant community include horned larks and golden eagles.

The Big Sagebrush/Bunchgrass Plant Community: This plant community may be useful for the same wildlife that would use the Historic Climax Plant Community.

The Big Sagebrush/Rhizomatous Wheatgrass Plant Community: This plant community may be beneficial for the same wildlife that would use the Historic Climax Plant Community. However, the plant community composition is less diverse, and thus, less apt to meet the seasonal needs of these animals.

The Rabbitbrush/Rhizomatous Wheatgrass Plant Community: This plant community provides limited forage for antelope and mule deer due to low production and lack of sagebrush. The site may be used as a foraging site by sage grouse if proximal to woody cover.

The ESD suggests stocking rates for cattle under continuous season-long grazing under normal growing conditions. These are conservative estimates that should be used only as guidelines in the initial stages of the conservation planning process. Often, the current plant composition does not entirely match any particular plant community (as described in this ecological site description). Because of this, a field visit is recommended, in all cases, to document plant composition and production. More precise carrying capacity estimates should eventually be calculated using this information along with animal preference data, particularly when grazers other than cattle are involved. Under more intensive grazing management, improved harvest efficiencies can result in an increased carrying capacity. The following production and stocking notes are presented by the NRCS:

- *Mixed Grass/Big Sagebrush (HCPC) 600-1400 lb./ac and .33 AUM/ac*
- *Big Sagebrush/Bunchgrass 400-1200 lb./ac and .25 AUM/ac*
- *Big Sagebrush/Rhizomatous Wheatgrass 100-800 lb./ac and .15 AUM/ac*
- *Rabbitbrush/Rhizomatous Wheatgrass 100-500 lb./ac and .08 AUM/ac*

Note: Values based on continuous, season-long grazing by cattle under average growing conditions.

Grazing by domestic livestock is one of the major income-producing industries in the area. Rangeland in this area may provide yearlong forage for cattle, sheep, or horses. During the dormant period, the forage for livestock use needs to be supplemented with protein because the quality does not meet minimum livestock requirements.

Shallow Loamy (SwLy) 7-9" Green River and Great Divide Basins

The Historic Climax Plant Community (HCPC) for this Ecological Site is the Bluebunch/Winterfat Plant Community (HCPC). Suitable thermal and escape cover for most wildlife is limited due to the low height and density of woody plants. However, winterfat provides important winter forage for mule deer and antelope. Open and bare ridges are suitable locations for sage grouse leks. Year-round habitat is provided for sage grouse and many other sagebrush obligate species such as the sage sparrow, Brewer's sparrow, sage thrasher, pygmy rabbit, sagebrush vole, horned lizard, and pronghorn antelope. Other birds that would frequent this plant community include horned larks and golden eagles.

The Low Sagebrush/Rhizomatous Wheatgrass Plant Community may be beneficial for the same wildlife that would use the Historic Climax Plant Community. However, the plant community composition is less diverse, and thus, less apt to meet the seasonal needs of these animals.

The Low Sagebrush/Cheatgrass Plant Community may be beneficial for the same wildlife that would use the Historic Climax Plant Community. However, the plant community composition is less diverse, and thus, less apt to meet the seasonal needs of these animals.

The ESD suggests stocking rates for cattle under continuous season-long grazing under normal growing conditions. These are conservative estimates that should be used only as guidelines in the initial stages of the conservation planning process. Often, the current plant composition does not entirely match any

particular plant community (as described in this ecological site description). Because of this, a field visit is recommended, in all cases, to document plant composition and production. More precise carrying capacity estimates should eventually be calculated using this information along with animal preference data, particularly when grazers other than cattle are involved. Under more intensive grazing management, improved harvest efficiencies can result in an increased carrying capacity. The following production and stocking notes are presented by the NRCS:

- *Bluebunch Wheatgrass/Winterfat (HCPC) 200-450 lb./ac and .11 AUM/ac*
- *Low Sagebrush/Rhizomatous Wheatgrass 100-300 lb./ac and .06 AUM/ac*
- *Low Sagebrush/Cheatgrass 50-200 lb./ac and .03 AUM/ac*

Note: Values based on continuous, season-long grazing by cattle under average growing conditions.

Grazing by domestic livestock is one of the major income-producing industries in the area. Rangeland in this area may provide yearlong forage for cattle, sheep, or horses. During the dormant period, the forage for livestock use needs to be supplemented with protein because the quality does not meet minimum livestock requirements.

2.2.3 Mining and Mineral Resources

At the time of this report, there were twelve mine permits on record with the WDEQ within the Phase I study area (Table 2.2-1). Eight of these were active permits associated with sand and/or gravel operations. Three sand and/or gravel mines were classified as terminated and released and one as forfeited. Figure 2.2-8 displays the locations of these mines.

In addition to current WDEQ records, there are numerous abandoned mine features within the study area; also indicated in Figure 2.2-8. These features are related to the area's historic mining legacy when reclamation standards were either less stringent than today's regulatory environment or non-existent. The Wyoming Department of Environmental Quality, Abandoned Mine Lands Division (AML) mission is to mitigate safety hazards and repair environmental damage from past mining activities, and to assist communities impacted by mining. Many of the sites within the study area are eligible for mitigation through the AML program (Figure 2.2-9).

Figure 2.2-9 WDEQ Abandoned Coal Mine along Willow Creek (Phase I Study Area).

Most of the abandoned mine sites in the Phase I study area are associated with coal mining activities. These features include a variety of mining-related hazards including open pits, spoil piles, etc. In addition, environmental impacts associated with the historic mines may still exist.

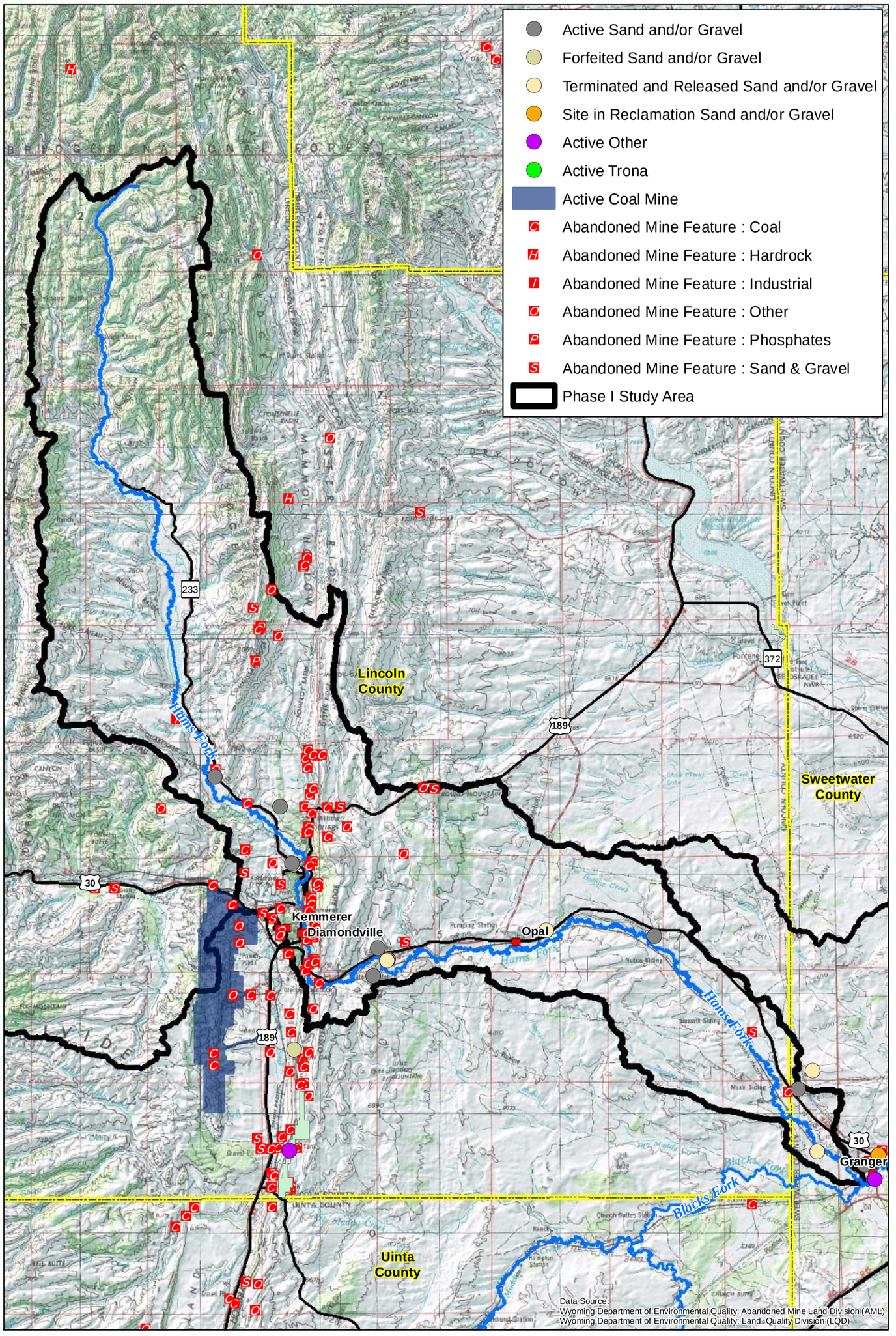


Figure 2.2-8 Blacks Fork Watershed Phase I: Current Mine Permits and Abandoned Mine Lands

Table 2.2-1 Tabulation of Existing Mine Permits Phase I Study Area (WDEQ, 2014).

Permit Number	Company Name	Mine Name	Mine Type	Mineral	Status
SP0787	WIND RIVER MATERIALS LLC	SCHULTHESS	Small Mine Permit	Sand and/or Gravel	Active
ET1533	BASIC ENERGY SERV LP	UINTA DEVELOPMENT CO	Limited Mining Operation	Sand and/or Gravel	Active
ET1367	FOX, BOB	FOX DEVELOPMENT	Limited Mining Operation	Sand and/or Gravel	Active
ET1435	KEMMERER, CITY OF		Limited Mining Operation	Sand and/or Gravel	Active
ET1439	FLARE CONST INC	DAVISON	Limited Mining Operation	Sand and/or Gravel	Active
ET1457	PROFFIT, CLINT	DAVISON	Limited Mining Operation	Sand and/or Gravel	Active
ET1483	FOX, ROBERT FOX MATERIALS LLC		Limited Mining Operation	Sand and/or Gravel	Active
SP0759	WIND RIVER MATERIALS LLC	LINCOLN	Small Mine Permit	Sand and/or Gravel	Active
ET1224	BLAZE-ON CONSTRUCTION	AIRPORT PIT	Limited Mining Operation	Sand and/or Gravel	Forfeited
ET1342	BENNETT, R S CONST CO INC		Limited Mining Operation	Sand and/or Gravel	Terminated and Released
ET1137	FIRST ENERGY SERV CO	ARNOLD LARSON	Limited Mining Operation	Sand and/or Gravel	Terminated and Released
ET0775	WIND RIVER MATERIALS LLC	SCHULTHESS	Limited Mining Operation	Sand and/or Gravel	Terminated and Released

2.2.4 Wildlife

2.2.4.1 General

The Wyoming Game and Fish Department (WGFD) maps the seasonal ranges by herd unit for each big game species and makes special note of areas listed as crucial habitat and parturition areas (birthing areas). WGF's Crucial habitat or range is defined as those seasonal ranges or habitats (mostly winter range) that have been documented as the determining factor in a population's ability to maintain itself at a certain level over a long period of time.

In the Phase I study area the primary big game present are antelope, elk, moose and mule deer. According to the Game and Fish data provided, all four of the big game species will utilize the entire study area as seasonal range. Within Phase I study area, approximately 117,717 acres (roughly 30 percent of the study area) have been determined to be crucial habitat for one or more of antelope, elk, moose or mule deer. The majority of this crucial range is concentrated along the Hams Fork river corridor, with the crucial range acreage increasing as you near the confluence with the Blacks Fork River. The only species shown to have parturition areas within the study is elk. These birthing areas are located mostly on public lands north and west of Lake Viva Naughton in the upper part of the study area.

Figures 2.2-10 through 2.2-13 display the WGF seasonal range, crucial range, parturition areas, migration corridors and migration barriers for antelope, elk, moose, and mule deer within and immediately adjacent to the study area. Examination of these figures shows that while the entire study area is classified as seasonal range for all of the big game species, the crucial habitat for these species is limited to the river corridor and adjacent lands previously mentioned along the Hams Fork River.

The Wyoming Natural Diversity Database (WYNDD) lists numerous non-game species of concern within the study area, including amphibians, birds, mammals, fish, molluscs and reptiles. Originally initiated by the Nature Conservancy, the WYNDD became a research and service unit of the University of Wyoming in 1998. In order to more accurately analyze the distribution of the species of concern, the study areas have

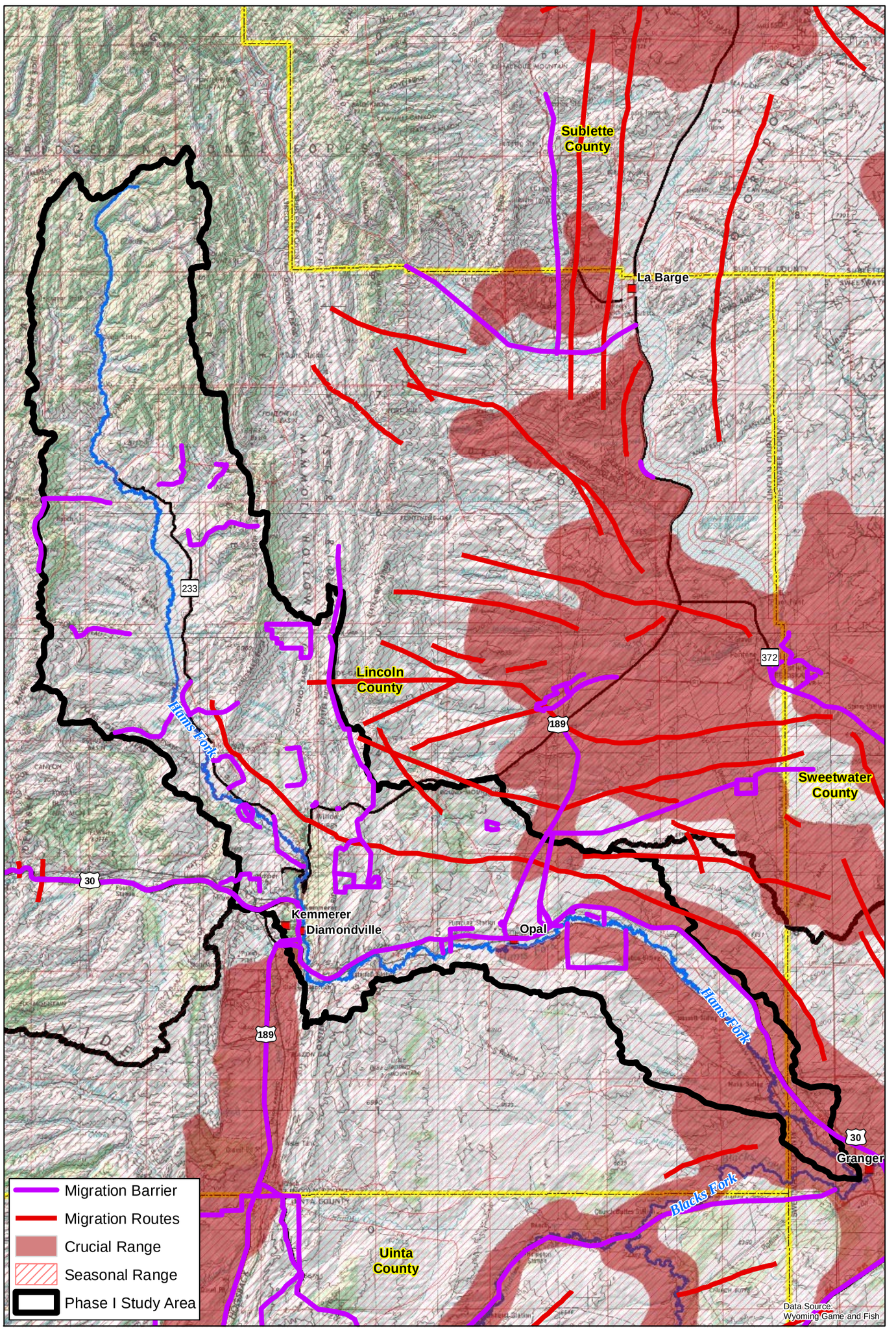


Figure 2.2-10 Blacks Fork Watershed Phase I: Antelope Habitat

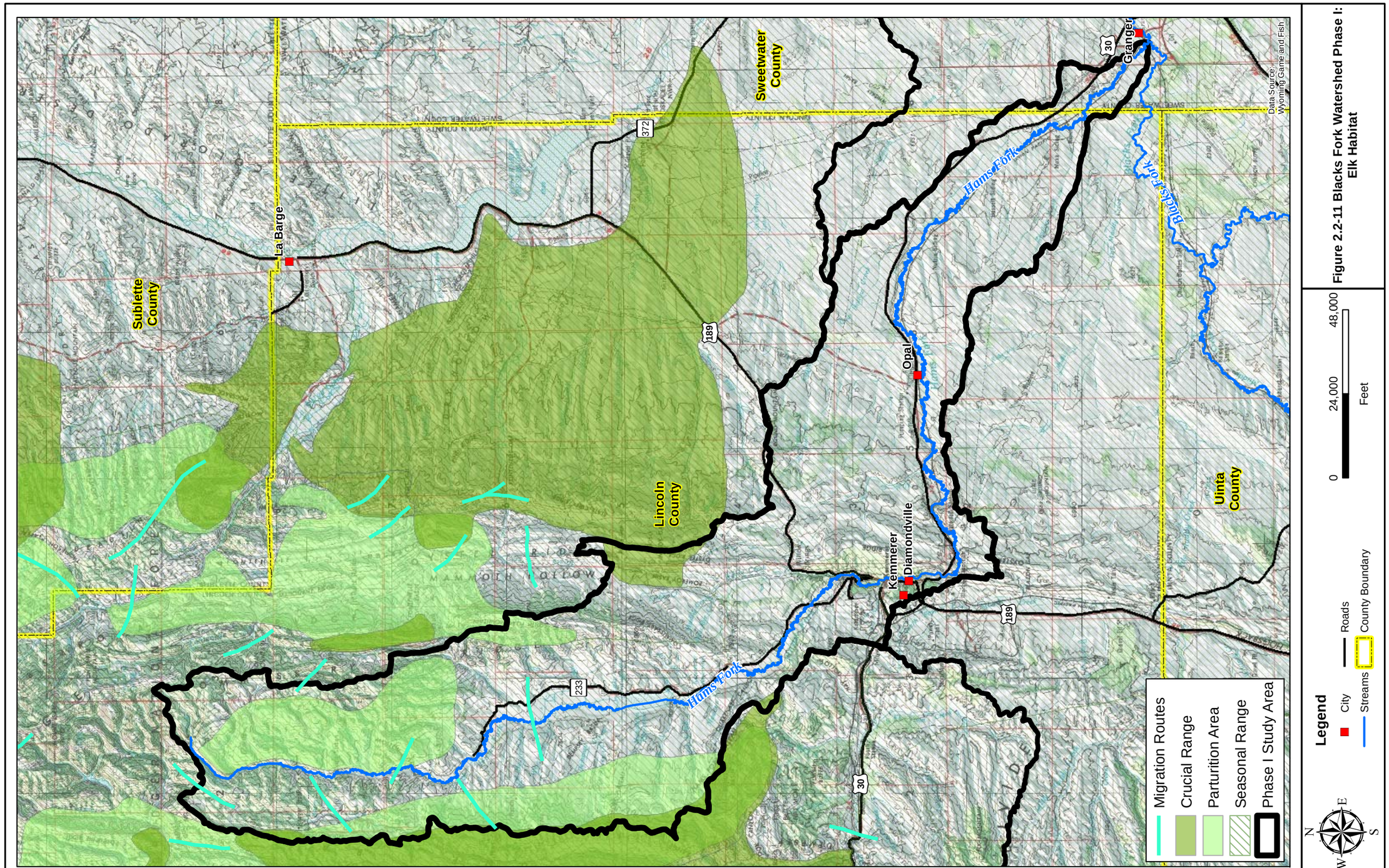


Figure 2.2-11 Blacks Fork Watershed Phase I: Elk Habitat

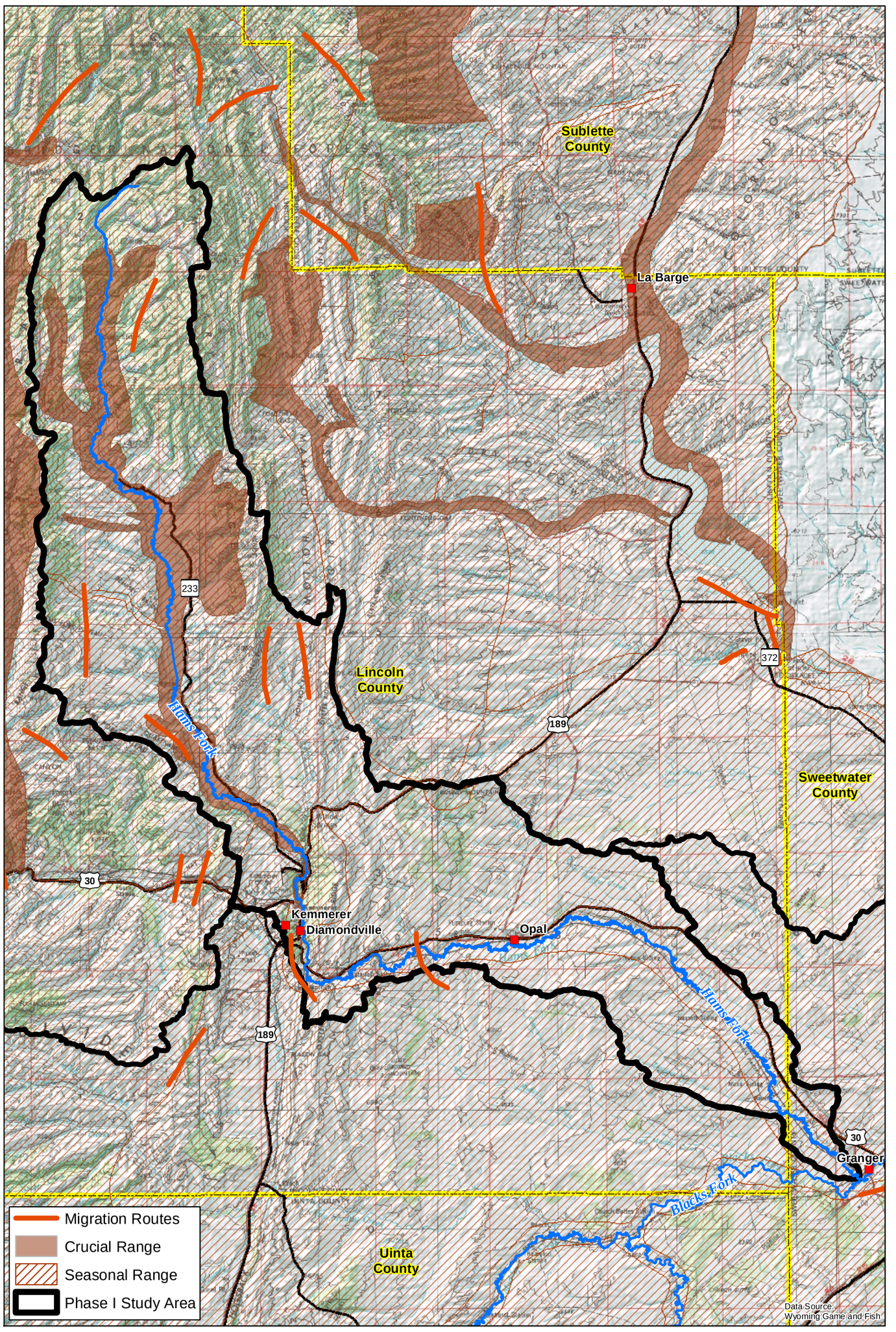


Figure 2.2-12 Blacks Fork Watershed Phase I: Moose Habitat

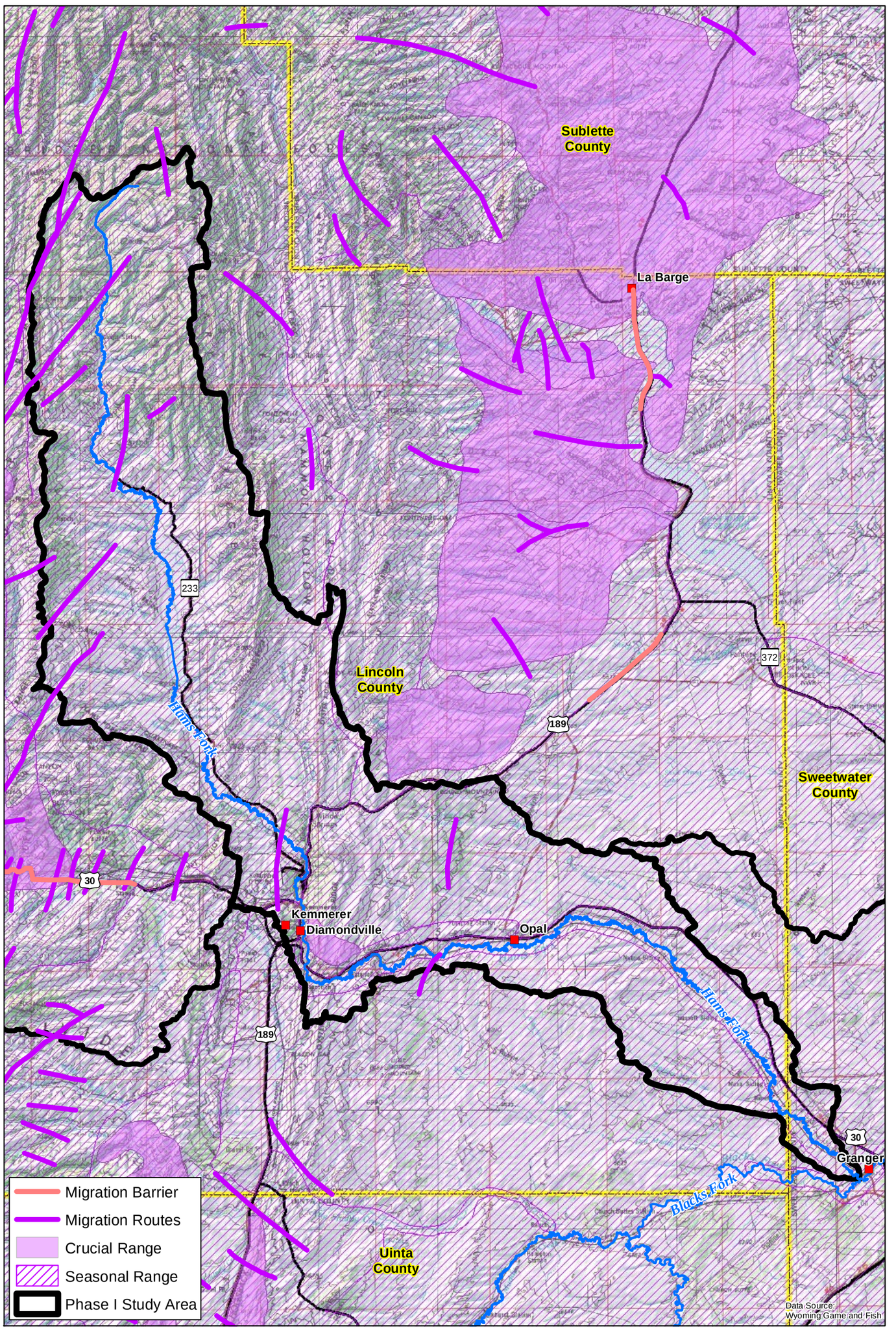


Figure 2.2-13 Blacks Fork Watershed Phase I: Mule Deer Habitat

been broken into subregions based on their physiographic characteristics. The Phase I study area has been broken in to two subregions: Upper Hams Fork and Lower Hams Fork. Table 2.2-2 presents the results of a database query conducted by the WYNDD for the subregions. Included in this list are all species of concern or species of potential concern which have been documented in the subregions. Review of the list shows that there are two endangered species known to have been observed within the study area; the Whooping Crane (Grus americana), and the Black Footed Ferret (Mustela nigripes). There are also two species listed as threatened within the study area; the Canada Lynx (Lynx Canadensis), and the Gray Wolf (Canis Lupus). The Greater Sage-Grouse is also found within the study area and is considered a species of concern.

2.2.4.2 Sage Grouse

Areas of known greater sage grouse (*Centrocercus urophasianus*) leks are displayed in Figure 2.2-14. The sage grouse does not receive federal or state protection at this time; however, it is recognized as a sensitive species / species of concern by the BLM and a species of concern by WGFD. In August 2008, Executive Order 2008-2 was signed by the Governor which stresses additional management consideration to sage grouse and sage grouse habitat statewide. The order includes requirements of state agencies to encourage development outside of the core areas and to focus management to the greatest extent possible on the maintenance and enhancements of habitat within them. The core sage grouse population areas within the study area are also delineated in Figure 2.2-14. As is evident in this figure, the sage grouse core areas affect primarily the land located in the northwest portions of the study area. Of the 100,837 acres of sage grouse core area located in the Phase I study area 83,000 of it is located on BLM, State and private lands surrounding Lake Viva Naughton. While there are occupied sage grouse leks located in the central portion of the study area (as seen in Figure 2.2-14), these are not considered part of the core areas by the Wyoming Game and Fish Department.

The BLM definition of a sensitive species is as follows: species that could easily become endangered or extinct in the state, including: (a) species under status review by the FWS/National Marine and Fisheries Service; (b) species whose numbers are declining so rapidly that Federal listing may become necessary; (c) species with typically small or fragmented populations; and (d) species inhabiting specialized refuge or other unique habitats.

WGFD lists the greater sage grouse as: species that are widely distributed, with population status or trends unknown but suspected to be stable; habitat restricted or vulnerable but no recent or on-going significant loss; species likely sensitive to human disturbance. *The sage grouse is not listed as a Threatened or Endangered species and does not receive any protections from the Endangered Species Act; however, BLM and WGFD have developed restrictions/recommendations to help protect the sage grouse.*

Table 2.2-2 Wyoming Natural Diversity Database: Wildlife Species in the Phase I Study Area.

Common Name	Scientific Name	Subregion		Listing Status	Tracked/ Watched
		Upper Hamms Fork	Lower Hamms Fork		
Amphibians					
Columbia Spotted Frog	Rana luteiventris		x		Tracked
Eastern Clade Western Toad	Anaxyrus boreas - Eastern Clade	x	x	Petition Under Review (UR)	Tracked
Northern Leopard Frog	Lithobates pipiens	x	x	Not Warranted for Listing (NW)	Tracked
Tiger Salamander	Ambystoma mavortium	x	x		Watched
Birds					
American Avocet	Recurvirostra americana		x		Watched
American Bittern	Botaurus lentiginosus	x	x		Tracked
American Dipper	Cinclus mexicanus	x			Watched
American Three-toed Woodpecker	Picoides dorsalis		x		Tracked
American White Pelican	Pelecanus erythrorhynchos	x	x		Tracked
Ash-throated Flycatcher	Myiarchus cinerascens		x		Watched
Bald Eagle	Haliaeetus leucocephalus	x	x	Delisted, formally monitored (DM)	Tracked
Black-crowned Night-Heron	Nycticorax nycticorax	x	x		Watched
Black-throated Gray Warbler	Setophaga nigrescens		x		Tracked
Boreal Owl	Aegolius funereus		x		Tracked
Brewer's Sparrow	Spizella breweri	x	x		Watched
Bufflehead	Bucephala albeola	x			Watched
Burrowing Owl	Athene cunicularia	x	x		Tracked
Bushtit	Psaltriparus minimus		x		Tracked
California Gull	Larus californicus	x			Watched
Canyon Wren	Catherpes mexicanus		x		Watched
Clark's Grebe	Aechmophorus clarkii		x		Tracked
Common Goldeneye	Bucephala clangula	x	x		Watched
Common Loon	Gavia immer	x	x		Tracked
Common Tern	Sterna hirundo		x		Watched
Dark-eyed Junco	Junco hyemalis	x	x		Tracked
Ferruginous Hawk	Buteo regalis	x	x		Tracked
Golden Eagle	Aquila chrysaetos	x	x		Watched
Golden-crowned Kinglet	Regulus satrapa	x			Watched
Grasshopper Sparrow	Ammodramus savannarum		x		Watched
Great Gray Owl	Strix nebulosa	x			Tracked
Greater Sage-Grouse	Centrocercus urophasianus	x	x	Candidate; Warranted but Precluded (C)	Tracked
Hammond's Flycatcher	Empidonax hammondii	x			Watched
Loggerhead Shrike	Lanius ludovicianus		x		Tracked
Long-billed Curlew	Numenius americanus	x	x		Tracked
Merlin	Falco columbarius	x			Watched
Mountain Plover	Charadrius montanus		x	Not Warranted for Listing (NW)	Tracked
Northern Goshawk	Accipiter gentilis	x	x	Not Warranted for Listing (NW)	Tracked
Northern Pygmy-Owl	Glaucidium gnoma	x			Tracked
Osprey	Pandion haliaetus	x	x		Watched
Peregrine Falcon	Falco peregrinus	x	x	Delisted, formally monitored (DM)	Tracked
Ring-necked Duck	Aythya collaris		x		Watched
Sage Thrasher	Oreoscoptes montanus	x	x		Watched
Sagebrush Sparrow	Artemisiospiza nevadensis		x		Tracked
Sandhill Crane	Grus canadensis	x	x		Watched
Short-eared Owl	Asio flammeus		x		Tracked
Trumpeter Swan	Cygnus buccinator	x	x	Not Warranted for Listing (NW)	Tracked
Tundra Swan	Cygnus columbianus	x			Watched
Virginia Rail	Rallus limicola		x		Watched
Virginia's Warbler	Oreothlypis virginiae		x		Tracked
Western Screech-Owl	Megascops kennicottii	x			Watched
White-faced Ibis	Plegadis chihi	x	x		Tracked
White-tailed Ptarmigan	Lagopus leucura	x		Petition Under Review (UR)	Tracked
White-winged Crossbill	Loxia leucoptera		x		Watched
White-winged Crossbill	Loxia leucoptera	x			Watched
Whooping Crane	Grus americana	x	x	Listed Endangered (LE), and Endangered - Nonessential Experimental Population (LEXN)	Tracked
Williamson's Sapsucker	Sphyrapicus thyroideus	x			Tracked
Fish					
Bluehead Sucker	Catostomus discobolus		x		Tracked
Colorado River Cutthroat Trout	Oncorhynchus clarkii pleuriticus	x		Not Warranted for Listing (NW)	Tracked
Flannelmouth Sucker	Catostomus latipinnis		x		Tracked
Mountain Sucker	Catostomus platyrhynchus	x	x		Watched
Mountain Whitefish	Prosopium williamsoni	x	x		Watched
Northern Leatherside Chub	Lepidomeda copei	x	x	Not Warranted for Listing (NW)	Tracked
Roundtail Chub	Gila robusta		x		Tracked
Mammals					
American Marten	Martes americana	x			Watched
American Pika	Ochotona princeps	x		Not Warranted for Listing (NW)	Watched
Black-footed Ferret	Mustela nigripes		x	Listed Endangered (LE), and Endangered - Nonessential Experimental Population (LEXN)	Tracked
Canada Lynx	Lynx canadensis	x		Listed Threatened (LT)	Tracked
Gray Wolf	Canis lupus	x	x	Proposed for Delisting (PD)	Tracked
Little Brown Myotis	Myotis lucifugus	x		Petition Under Review (UR)	Watched
Long-eared Myotis	Myotis evotis	x	x		Watched
North American Water Vole	Microtus richardsoni	x			Tracked
North American Wolverine	Gulo gulo luscus	x		Proposed Threatened (PT)	Tracked
Northern River Otter	Lontra canadensis		x		Tracked
Pygmy Rabbit	Brachylagus idahoensis	x	x	Not Warranted for Listing (NW)	Tracked
Silver-haired Bat	Lasionycteris noctivagans	x	x		Watched
Thirteen-lined Ground Squirrel	Ictidomys tridecemlineatus	x	x		Tracked
Uinta Ground Squirrel	Urocitellus armatus		x		Watched
Western Small-footed Myotis	Myotis ciliolabrum	x			Watched
White-tailed Prairie Dog	Cynomys leucurus		x	Not Warranted for Listing (NW)	Tracked
Wyoming Ground Squirrel	Urocitellus elegans	x			Watched
Molluscs					
Green River Pebblesnail	Fluminicola coloradoensis	x			Tracked
Western Pearlshell	Margaritifera falcata	x			Tracked
Reptiles					
Midget Faded Rattlesnake	Crotalus oreganus concolor		x		Tracked

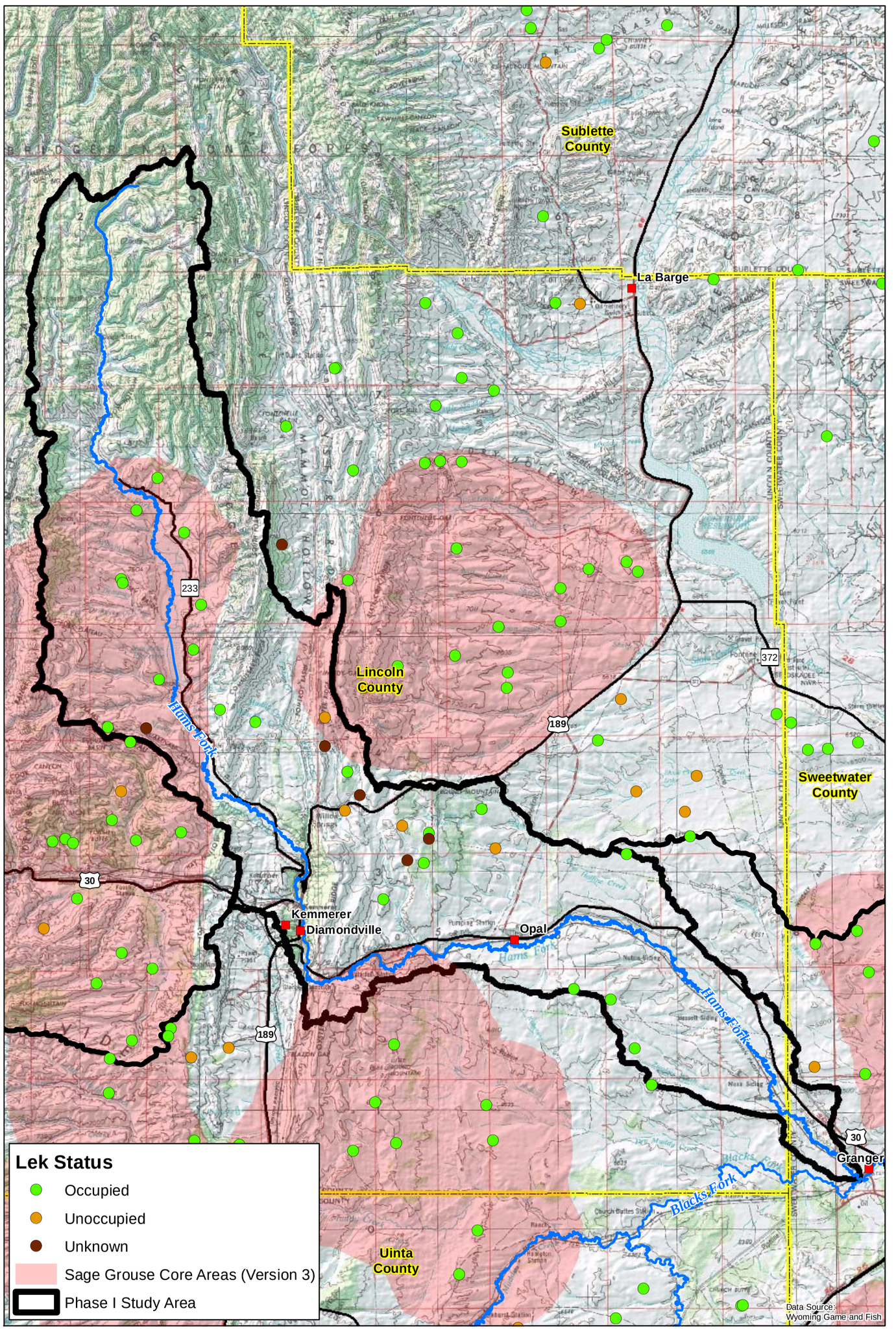


Figure 2.2-14 Blacks Fork Watershed Phase I: Sage Grouse Leks and Core Areas

2.2.4.3 Wild Horses

Following passage of the Wild, Free-Roaming Horse and Burro Act in 1971, BLM was charged with management of wild horses or burros in "herd management areas" (HMAs). The BLM establishes an "appropriate management level" (AML) for each HMA. The AML is the population objective for the HMA that will ensure a "thriving ecological balance among all the users and resources of the HMA". For example, wildlife, livestock, wild horses, vegetation, water, and soil. Wyoming has no wild burros (BLM, 2012). Should any wild horses be found within this study area, they would be removed by BLM.

Within the Phase I study area, there are no HMAs as indicated in Figure 2.2-15.

2.2.4.4 WGF Crucial Habitat Areas

As part of the WGFD Strategic Habitat Plan (2009), areas within the State which have been determined to be Crucial Priority Areas or Enhancement Priority Areas for aquatic , terrestrial and combined terrain were delineated (Figure 2.2-16). "Combined" areas were created where significant overlap occurred between aquatic and terrestrial areas. As defined by WGFD at: http://wgfd.wyo.gov/web2011/wildlife-1000405.aspx

*"**Crucial Priority Areas** 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. The Department will concentrate habitat protection and management activities in these areas."*

***Enhancement Habitat Priority Areas** 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." (*http://wgfd.wyo.gov/web2011/wildlife-1000055.aspx*).*

Review of the *WGF* Crucial Habitat Area Narratives (available at http://wgfd.wyo.gov/web2011/wildlife-1000426.aspx) provides the following information regarding sensitive aquatic, terrestrial and combined areas within the study area. The paragraphs were extracted directly from the narratives for Crucial Habitat Areas found within the project study area.

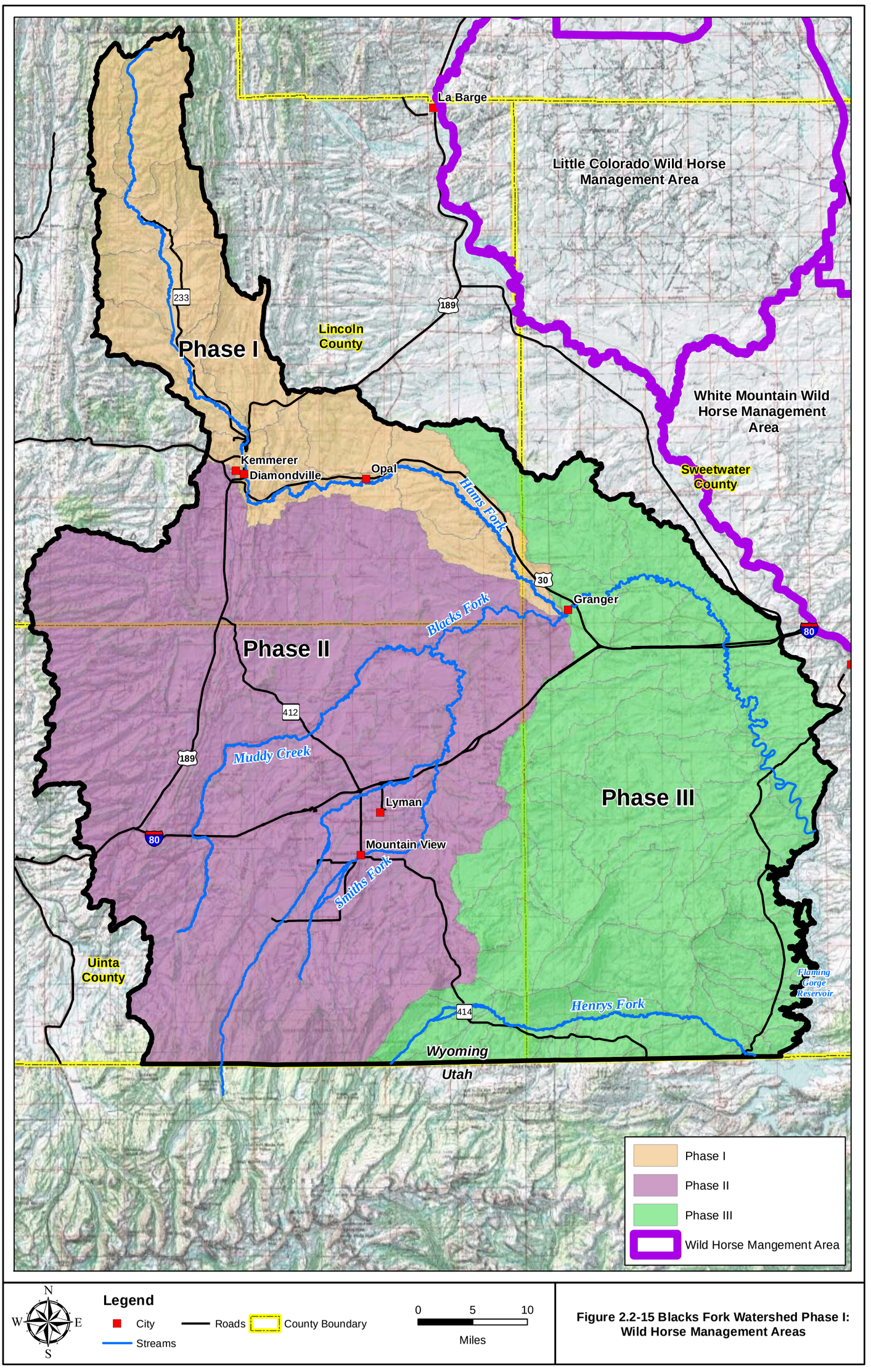


Figure 2.2-15 Blacks Fork Watershed Phase I: Wild Horse Management Areas

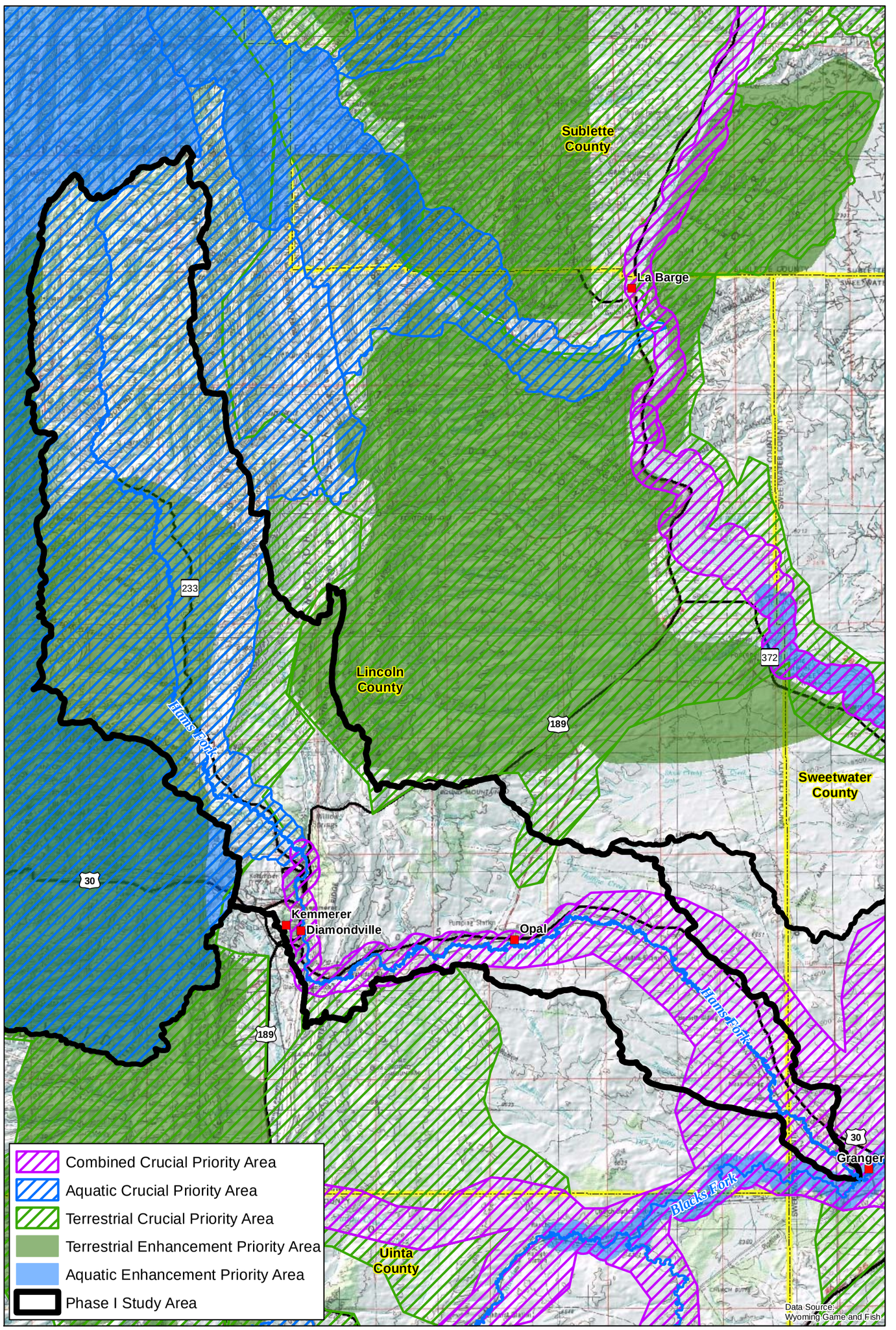


Figure 2.2-16 Blacks Fork Watershed Phase I: Habitat Priority Areas

Upper Hams Fork: Aquatic Crucial Area

- *Reason Selected:*
  The headwaters of the Hams Fork River provide habitat for a genetically pure population of Colorado River cutthroat trout that warrants protection. Several drainages in the crucial area provide important habitat for boreal toads and other amphibians. The crucial area also provides habitat to support popular sport fisheries that is worthy of protection.
- *Primary species or assemblages of species:*
  Colorado River cutthroat trout, boreal toad ,bluehead sucker, flannelmouth sucker, mountain sucker, roundtail chub, Great Basin gopher snake, Great Basin spadefoot toad, northern leopard frog, boreal chorus frog.
- *Solutions or actions:*
  Advocate sound grazing and timber management practices that reduce sediment yield to aquatic habitats and improve watershed function. Promote efforts to enhance watershed segments that maintain potential for restoring aspen, willow, and other woody riparian vegetation. Promote restoration of native tall forb communities where possible throughout the watershed. Encourage expansion of beaver colonies into suitable habitat where populations can be sustained over the long term. Advocate habitat protection in this area, and attempt to minimize habitat impacts created by future energy development and production activities.
- *Additional Information:*
  There are a number of limiting habitat factors in the upper Hams Fork watershed affecting trout abundance. High stream flow fluctuations in the upper drainage tributaries may limit trout abundance and impact reproduction. Many headwater streams also maintain extremely cold water temperatures, limiting upstream fish distribution, spawning success, and juvenile fish survival. Eroding banks in the lower reaches of the river is a concern because most trout cover is restricted to deep, open pools with very little bank cover. The West Fork also has natural habitat limitations because of its intermittent flow patterns, which eliminates many miles of stream habitat. Past and present grazing use appears to have negatively impacted watershed health and function, most notably at the higher elevations. The loss of healthy aspen stands to conifer encroachment is slowly deteriorating potential for watershed productivity and function. Insects are killing conifers throughout the timbered portion of the watershed. A catastrophic wild fire could impact fisheries by warming the water during the fire above lethal thresholds. The abundant vegetation in Viva Naughton Reservoir may limit fish distribution in the hypoliminon and cause anoxic conditions leading to winterkill in portions of the reservoir during some years.

Bear River/Southern Wyoming Range (BRSWR): Terrestrial Crucial Area

- *Reason Selected:*
  Crucial winter range for elk, mule deer, pronghorn and moose, big game migration corridors, Governor's Sage-grouse Implementation Team (GSGIT) sage-grouse core breeding area, and numerous SGCN listed in the Wyoming Comprehensive Wildlife Conservation Strategy Plan.

- *Primary Species or assemblages of species:*
  Mule deer, elk, moose, greater sage-grouse, other sagebrush obligates (including pygmy rabbits), and other SGCN listed in the Wyoming Comprehensive Wildlife Conservation Strategy plan.
- *Solutions or actions:*
  A significant number of habitat treatments have been conducted in the area, primarily to address improving habitats for wintering ungulates and greater sage-grouse. These investments need to be protected and continued in the future. The Department and partners should pursue permanent withdrawals of energy development leases throughout much of this area, particularly in that portion west of Wyoming Highway 189. Application of the Department's Standard Recommendations for Development of Oil and Gas Resources in Crucial and Important Wildlife Habitats and development stipulations under the Governor's sage-grouse core habitats should be applied throughout areas where energy development is permitted. Additional analysis of existing habitats should be conducted to assess the need for treatment and/or improved livestock management. Improvements to grazing operations are needed in some portions of the area, especially on the Rock Creek grazing allotment. Development of a cooperative plans with the USFWS, BLM and grazing permittees to rotate/rest livestock from Rock Creek Ridge to the Cokeville Refuge will enhance and improve habitat for wildlife in this area. Cooperative plans with WYDOT and the UP Railroad needs to continue to enhance migration and reduce mule deer vehicle collisions in the Nugget Canyon area along US Highway 30.Conservation easement opportunities should be pursued where possible.
- *Additional Information:*
  This area is under increasing threat from a variety of energy development proposals, including wind farms, oil and gas development, and major energy corridors. Efforts to preserve this area from these threats and to improve livestock management need to continue to protect the world-class wildlife values in this area. US Highway 30 has undergone significant revision to reduce mule deer-vehicle collisions and maintain traditional migration corridors for the world-renowned Wyoming Range Mule Deer Herd. Major habitat types include sagebrush-grassland, mixed mountain shrubs, aspen, mixed conifer and true mountain mahogany. Large stands of curlleaf mountain mahogany also exist in portions of the area.

Fontenelle: Terrestrial Crucial Area

- *Reason Selected:*
  Mule deer, elk, moose, Governor's Sage-grouse Implementation Team (GSGIT) sage-grouse core breeding area, other sagebrush obligates (including pygmy rabbits), and other SGCN listed in the Wyoming Comprehensive Wildlife Conservation Strategy plan.
- *Primary Species or assemblages of species:*
  Mule deer, moose, elk, pronghorn, greater sage-grouse, willow/cottonwood riparian obligates, sagebrush obligates and other SGCN listed in the Wyoming Comprehensive Wildlife Conservation Strategy plan.

- *Solutions or actions:*
  A significant number of habitat treatments have been conducted in the Fontenelle Habitat Priority Area, primarily to address improving habitats for wintering ungulates and greater sage-grouse. These investments need to be protected and continued in the future. The Department and partners should pursue permanent withdrawals of energy development leases throughout much of this area, particularly in that portion west of Wyoming Highway 189. Application of the Department's Standard Recommendations for Development of Oil and Gas Resources in Crucial and Important Wildlife Habitats and development stipulations under the Governor's sage-grouse core habitats should be applied throughout areas that energy development is permitted. Additional analysis of existing habitats should be pursued to assess the need for treatment and/or improved livestock management. Efforts should begin in the Labarge Common allotment to treat mixed mountain shrub in transitional habitats following evaluation. Conservation easement opportunities should be pursued where possible.
- *Additional Information:*
  Major habitat types in this area include aspen, mixed conifer, mixed mountain shrub, willow and cottonwood riparian, wet meadow, and sagebrush-grassland habitats. Some isolated stands of curl-leaf mountain mahogany also occur in this area.

Green River, Blacks Fork and Hams Fork: Combined Crucial Area

- *Reason Selected:*
  Fontenelle Reservoir and the lower Green River support a regionally important recreational sport fishery. The lower river corridors provide important cottonwood/willow riparian habitat diversity within the high sagebrush desert ecosystem that is used by several terrestrial and aquatic wildlife species. The river corridors provide habitat for sensitive native non-game species. This area includes crucial winter range for Lincoln Moose and Carter Lease and Sublette Pronghorn Herd Units and severe winter relief habitats for West Green River Elk and Wyoming Range Mule Deer Herd Units. Since this polygon is primarily woody riparian, it represents critical big game migration corridors. It also includes areas designated as a greater sage-grouse core breeding area by the Governor's Sage-grouse Implementation Team (GSGIT). This area supports numerous SGCN identified in the CWCS report.
- *Primary Species or assemblages of species:*
  Roundtail chub, flannelmouth sucker, bluehead sucker, mountain sucker, rainbow trout, brown trout, kokanee, cutthroat trout, mountain whitefish, Great Basin spadefoot toad, northern leopard frog, moose, pronghorn, sage grouse, cottonwood-willow riparian obligate non-game species, sagebrush obligates, and other SGCN listed in the Wyoming Comprehensive Wildlife Conservation Strategy (CWCS).
- *Solutions or actions:*
  Advocate sound water management practices. Promote sound livestock grazing management practices and other land use activities that reduce excessive sediment yield. Work with landowners and conservation organizations to develop instream habitat projects for improving fish habitat. Promote full assessment and protection of habitats (especially riparian habitats and prairie dog

complexes). Conduct habitat treatments where appropriate to improve rangeland, riparian and stream channel condition. Attempt to minimize habitat impacts created by energy and industrial development activities. The Department and partners should pursue permanent withdrawals of energy development leases. Conservation easements or other habitat protection approaches should be pursued where possible. Construct experimental instream rock sill structures to improve.

- *Additional Information:*
  Along the Hams Fork River, the meandering channel has created many large, deep holes that provide fish cover. In some areas undercut banks associated with these deep holes provide additional cover. Some reaches of the river have been channelized and straightened due to the railroad, or in an effort to protect private lands. Agricultural water use has occurred extensively along the floodplain of the river throughout the drainage downstream of Viva Naughton Reservoir in suitable areas. Irrigation of native hay crops, in many instances, depletes river flows during late summer, thus diminishing habitat function for fish. River channel dewatering severs connectivity with lateral side channel habitats. Several diversion structures in the river may be barriers to fish passage and promotes habitat fragmentation.

2.3 Natural Environment

2.3.1 Vegetation and Landcover

2.3.1.1 Wyoming GAP Analysis

The GAP dataset is intended for use at a state or ecoregion level geographic area. For the purposes of this project however it is the most display friendly vegetative dataset available. The GAP dataset provides generalized distributions of the vegetative land cover located within the Phase I study area. For more information related to the GAP dataset please see the Basinwide volume of this report. Figure 2.3-1 displays the Wyoming Gap Analysis results for the Phase I study area.

2.3.1.2 NLCD

The National Land Cover Database (NLCD) is a Landsat-based, 30-meter resolution, land cover database for the nation. Details regarding this database are discussed in the Basinwide volume of this report.

In order to more accurately analyze the distribution of the NLCD dataset, the Phase I study area has been broken into two subregions based on their physiographic characteristics. The two subregions are the Upper Hams Fork and Lower Hams Fork. Table 2.3-1 presents the results of National Land Cover Database analysis for these subregions. The Upper Hams Fork Subregion is dominated by Evergreen Forest and Herbaceuous grasses along with a relatively high percentage of Shrub/Scrub as you move farther downstream in the subregion. The Lower Hams Fork Subregion is 75% Shrub/Scrub and the Herbaceous grasses drop off to 13% of the land cover within the subregion.

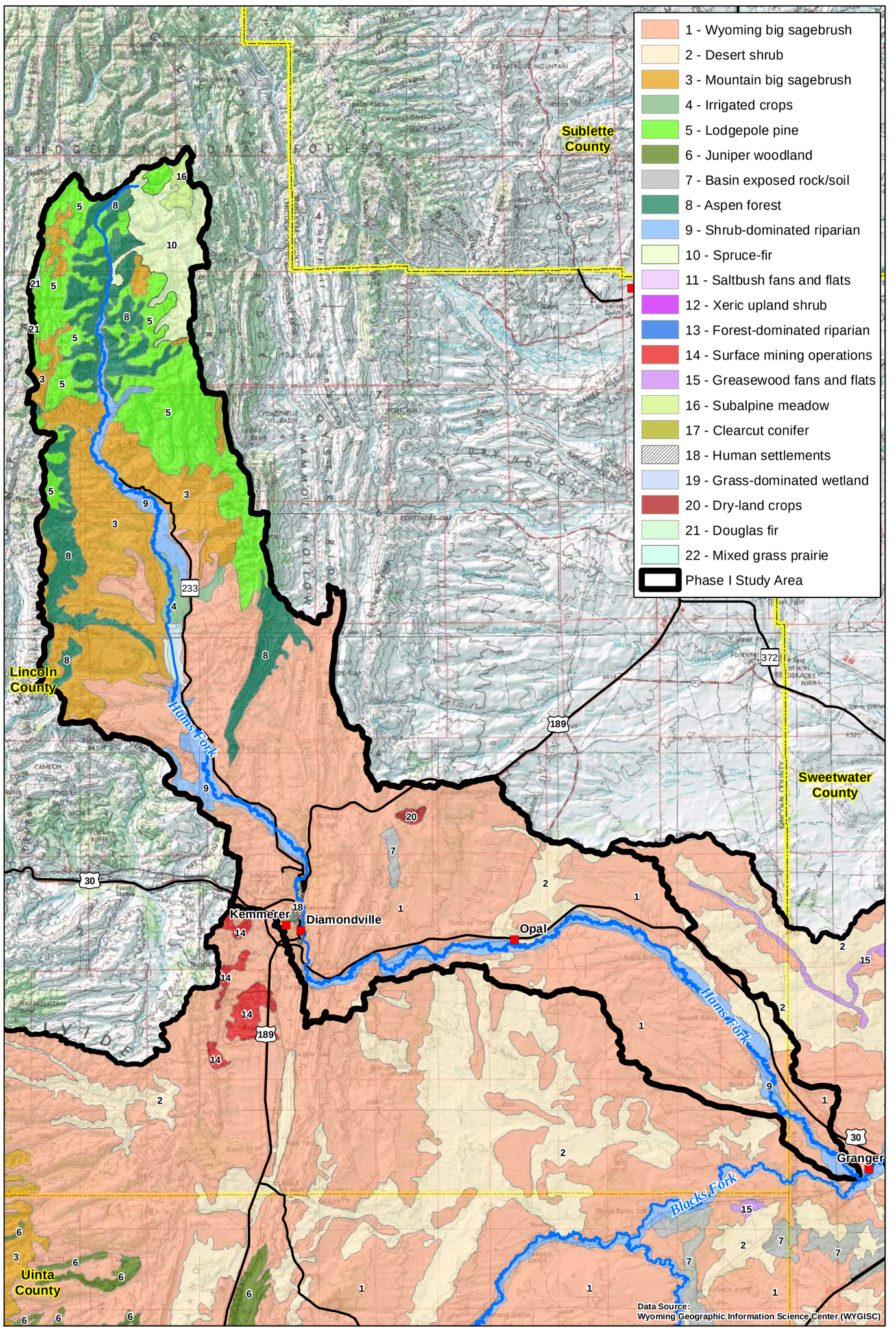


Figure 2.3-1 Blacks Fork Watershed Phase I: Wyoming GAP Analysis

Table 2.3-1 Tabulation of National Land Cover Database: Phase I Subregions.

Blacks Fork Watershed Phase I : Upper Hams Fork Subregion (NLCD)			
Classification	**Description**	**Acres**	**Percent of Subregion**
Evergreen Forest	Areas dominated by trees generally greater than 16 feet tall, and greater than 20% of total vegetation cover. More than 75% of the tree species maintain their leaves all year. Canopy is never without green foliage.	54,509	35.6%
Herbaceuous	Areas dominated by gramanoid or herbaceous vegetation, generally greater than 80% of total vegetation. These areas are not subject to intensive management such as tilling, but can be utilized for grazing.	41,354	27.0%
Shrub/Scrub	Areas dominated by shrubs; less than 16 feet tall with shrub canopy typically greater than 20% of total vegetation. This class includes true shrubs, young trees in an early successional stage or trees stunted from environmental conditions.	36,107	23.6%
Deciduous Forest	Areas dominated by trees generally greater than 16 feet tall, and greater than 20% of total vegetation cover. More than 75% of the tree species shed foliage simultaneously in response to seasonal change.	6,400	4.2%
Woody Wetlands	Areas where forest or shrubland vegetation accounts for greater than 20% of vegetative cover and the soil or substrate is periodically saturated with or covered with water.	4,421	2.9%
Emergent Herbaceuous Wetlands	Areas where perennial herbaceous vegetation accounts for greater than 80% of vegetative cover and the soil or substrate is periodically saturated with or covered with water.	4,267	2.8%
Mixed Forest	areas dominated by trees generally greater than 16 feet tall, and greater than 20% of total vegetation cover. Neither deciduous nor evergreen species are greater than 75% of total tree cover.	4,247	2.8%
Other	Areas with less than 1% of Subregion Area	1,967	1.3%
Total		153,271	100%
Blacks Fork Watershed Phase I : Lower Hams Fork Subregion (NLCD)			
Classification	**Description**	**Acres**	**Percent of Subregion**
Shrub/Scrub	Areas dominated by shrubs; less than 16 feet tall with shrub canopy typically greater than 20% of total vegetation. This class includes true shrubs, young trees in an early successional stage or trees stunted from environmental conditions.	183,995	75.3%
Herbaceuous	Areas dominated by gramanoid or herbaceous vegetation, generally greater than 80% of total vegetation. These areas are not subject to intensive management such as tilling, but can be utilized for grazing.	33,579	13.7%
Hay/Pasture	Areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle. Pasture/hay vegetation accounts for greater than 20% of total vegetation.	9,371	3.8%
Woody Wetlands	Areas where forest or shrubland vegetation accounts for greater than 20% of vegetative cover and the soil or substrate is periodically saturated with or covered with water.	5,002	2.0%
Deciduous Forest	Areas dominated by trees generally greater than 16 feet tall, and greater than 20% of total vegetation cover. More than 75% of the tree species shed foliage simultaneously in response to seasonal change.	2,887	1.2%
Developed, Open Space	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 commonly include large-lot single-family housing units, parks, golf courses, and vegetation planted in developed settings for recreation, erosion control, or aesthetic purposes.	2,435	1.0%
Other	Areas with less than 1% of Subregion Area	7,025	3.0%
Total		244,294	100%

2.3.1.3 LANDFIRE

In order to more accurately analyze the distribution of the LANDFIRE dataset, the Phase I study area has been broken into subregions based on their physiographic characteristics. The Phase I study area has

been broken in to two subregions: Upper Hams Fork and Lower Hams Fork. Existing vegetative type within each Phase I subregion was evaluated using data obtained through the LANDFIRE project (www.landfire.gov). For clarity, vegetation types making up less than 1% of each subregion were grouped together and tallied at the bottom of each table.

Upper Hams Fork Subregion

The LANDFIRE existing vegetation data indicate 18 different vegetation classifications make up 94% of the land area within the Upper Hams Fork Subregion. As is indicated in the data, the major sagebrush community (Mountain Big Sagebrush Shrubland Alliance) dominates coverage of the subregion totaling approximately 25% of the area. The table also presents valuable information pertaining to the vegetation types present to a much lesser extent. Table 2.3-2 summarizes the distribution of the vegetation communities within the Upper Hams Fork subregion.

Table 2.3-2 Tabulation of LANDFIRE Existing Vegetation Type Data: Phase I Upper Hams Fork Subregion.

Blacks Fork Watershed Phase I : Upper Hams Fork Subregion (LANDFIRE)			
Existing Vegetation Type	**Acres**	**Percent of Subregion**	**Cumulative Percent**
Mountain Big Sagebrush Shrubland Alliance	38253.86	24.923%	24.923%
Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland	24225.21	15.783%	40.707%
Rocky Mountain Subalpine-Montane Mesic Meadow	15963.70	10.401%	51.108%
Inter-Mountain Basins Aspen-Mixed Conifer Forest and Woodland	12930.91	8.425%	59.532%
Rocky Mountain Subalpine/Upper Montane Riparian Systems	7847.41	5.113%	64.645%
Rocky Mountain Aspen Forest and Woodland	7353.70	4.791%	69.436%
Northern Rocky Mountain Subalpine Woodland and Parkland	6513.05	4.243%	73.680%
Northern Rocky Mountain Lower Montane-Foothill-Valley Grassland	4449.22	2.899%	76.578%
Middle Rocky Mountain Montane Douglas-fir Forest and Woodland	4320.68	2.815%	79.393%
Inter-Mountain Basins Montane Sagebrush Steppe	3859.88	2.515%	81.908%
Rocky Mountain Subalpine Mesic-Wet Spruce-Fir Forest and Woodland	3823.18	2.491%	84.399%
Rocky Mountain Lodgepole Pine Forest	2990.76	1.949%	86.348%
Pasture and Hayland	2630.48	1.714%	88.062%
Rocky Mountain Montane Riparian Systems	2276.21	1.483%	89.545%
Xeric Montane Douglas-fir Forest	2108.08	1.373%	90.918%
Inter-Mountain Basins Big Sagebrush Shrubland	1707.32	1.112%	92.030%
Northern Rocky Mountain Subalpine Deciduous Shrubland	1626.59	1.060%	93.090%
Northern Rocky Mountain Subalpine-Upper Montane Grassland	1591.46	1.037%	94.127%
All other classes less than 1% each	10605.55	5.873%	100.00%

Lower Hams Fork Subregion

The LANDFIRE existing vegetation data indicate 13 different vegetation classifications make up approximately 92% of the land area within the Lower Hams Fork Subregion. As is clearly indicated in the data, the major sagebrush community (Inter-Mountain Basins Big Sagebrush Shrubland) dominates coverage of the subregion totaling approximately 42% of the area. Table 2.3-3 summarizes the distribution of the vegetation communities within the Lower Hams Fork subregion.

Table 2.3-3 Tabulation of LANDFIRE Existing Vegetation Type Data: Phase I Lower Hams Fork Subregion.

Blacks Fork Watershed Phase I : Lower Hams Fork Subregion (LANDFIRE)			
Existing Vegetation Type	**Acres**	**Percent of Subregion**	**Cumulative Percent**
Inter-Mountain Basins Big Sagebrush Shrubland	101605.82	41.548%	41.548%
Mountain Big Sagebrush Shrubland Alliance	53013.29	21.678%	63.225%
Inter-Mountain Basins Big Sagebrush Steppe	16568.84	6.775%	70.000%
Rocky Mountain Subalpine/Upper Montane Riparian Systems	10990.51	4.494%	74.495%
Inter-Mountain Basins Mat Saltbush Shrubland	8647.59	3.536%	78.031%
Pasture and Hayland	7734.21	3.163%	81.193%
Wyoming Basins Dwarf Sagebrush Shrubland and Steppe	6730.55	2.752%	83.945%
Inter-Mountain Basins Greasewood Flat	4036.90	1.651%	85.596%
Inter-Mountain Basins Semi-Desert Grassland	3988.20	1.631%	87.227%
Rocky Mountain Aspen Forest and Woodland	3041.47	1.244%	88.471%
Inter-Mountain Basins Sparsely Vegetated Systems	2908.48	1.189%	89.660%
Inter-Mountain Basins Montane Sagebrush Steppe	2718.55	1.112%	90.772%
Rocky Mountain Montane Riparian Systems	2584.45	1.057%	91.828%
All other classes less than 1% each	19983.70	8.172%	100.00%

2.3.1.4 WYNDD

The Wyoming Natural Diversity Database (WYNDD) lists several vegetation species within the Phase I study area. Table 2.3-4 presents the results of a database query conducted by the WYNDD for the Phase I study area broken down by subregion.

Table 2.3-4 Wyoming Natural Diversity Database: Flowering Plants by subregion.

Common Name	Scientific Name	Subregion		Listing Status	Tracked/ Watched
		Upper Hamms Fork	Lower Hamms Fork		
Flowering Plants					
Large-flower collomia	Collomia grandiflora	x			Tracked
Payson's milkvetch	Astragalus paysonii	x			Tracked
Slender-trumpet ipomopsis	Ipomopsis aggregata var. tenuituba	x			Tracked
Wasatch biscuitroot	Lomatium bicolor var. bicolor	x			Watched

2.3.1.5 Wetlands

Existing wetlands mapping data within each Phase I subregion was evaluated using data obtained through National Wetlands Inventory (NWI) created by the US Fish and Wildlife Service (USFWS) and the LANDFIRE project (www.landfire.gov).

Due to the relatively limited extent of NWI mapped wetlands in relation to the size of subregions, the data does not lend itself to mapping presentation at this scale. The results of the NWI analysis by subregion are presented in Table 2.3-5.

Table 2.3-5 Tabulation of NWI Wetlands by subregion.

Phase I NWI Inventory	
Subregion	**Total NWI Acres**
Lower Hams Fork	7976.57
Upper Hams Fork	10023.77
Total Acres	**18000.34**

Table 2.3-6 summarizes the distribution of the LANDFIRE wetland and riparian vegetation communities within each Phase I subregion (Rocky Mountain Subalpine/Upper Montane Riparian Systems, Rocky Mountain Montane Riparian Systems, Rocky Mountain Wetland-Herbaceous, Northern Rocky Mountain Conifer Swamp, Western Great Plains Floodplain Systems, Western Great Plains Depressional Wetland Systems, Introduced Riparian Vegetation). Figure 2.3-2 displays the LANDFIRE wetland classifications for the entire Phase I study area.

Table 2.3-6 Tabulation of LANDFIRE Wetlands Data: Phase I Subregions.

Blacks Fork Watershed Phase I : Upper Hams Fork Subregion (LANDFIRE Wetlands)			
Existing Vegetation Type	**Acres**	**Percent of Subregion**	**Cumulative Percent**
Rocky Mountain Subalpine/Upper Montane Riparian Systems	7847.41	5.113%	5.113%
Rocky Mountain Montane Riparian Systems	2276.21	1.483%	6.596%
Rocky Mountain Wetland-Herbaceous	791.50	0.516%	7.111%
Northern Rocky Mountain Conifer Swamp	669.19	0.436%	7.547%
Western Great Plains Floodplain Systems	595.79	0.388%	7.936%
Western Great Plains Depressional Wetland Systems	4.45	0.003%	7.939%
Introduced Riparian Vegetation	2.45	0.002%	7.940%
Blacks Fork Watershed Phase I : Lower Hams Fork Subregion (LANDFIRE Wetlands)			
Existing Vegetation Type	**Acres**	**Percent of Subregion**	**Cumulative Percent**
Rocky Mountain Subalpine/Upper Montane Riparian Systems	10990.51	4.494%	4.494%
Rocky Mountain Montane Riparian Systems	2584.45	1.057%	5.551%
Western Great Plains Floodplain Systems	1913.04	0.782%	6.333%
Rocky Mountain Wetland-Herbaceous	791.28	0.324%	6.657%
Western Great Plains Depressional Wetland Systems	130.77	0.053%	6.710%
Northern Rocky Mountain Conifer Swamp	83.84	0.034%	6.745%
Introduced Riparian Vegetation	1.33	0.001%	6.745%

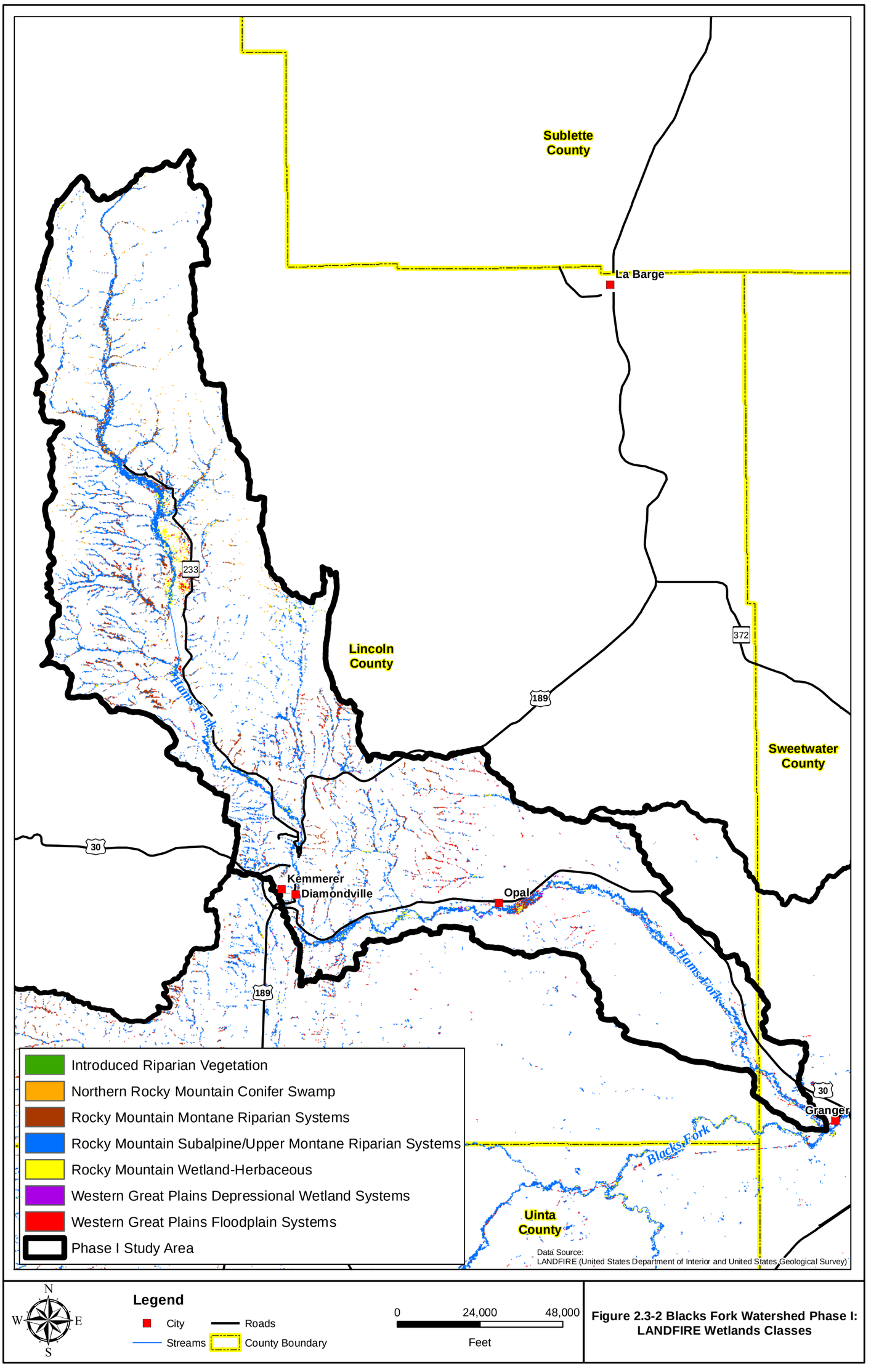


Figure 2.3-2 Blacks Fork Watershed Phase I: LANDFIRE Wetlands Classes

III. PHASE I WATERSHED MANAGEMENT AND REHABILITATION PLAN (HAMS FORK SUBREGION)

3.1 Overview

In this chapter, those individual project components of the Blacks Fork Watershed Management Plan which fall within the geographic boundaries of the Phase I investigation (Hams Fork Subregion) are presented. The reader is directed to the Basinwide Report volume for a discussion of the benefits associated with the various components of the watershed management plan. Likewise, the Basinwide Report volume tabulates summaries of this and the other two project investigative phases.

In the following paragraphs, individual projects are presented within the following categories:

- **Irrigation System Conservation and Rehabilitation.** The inventory and evaluation of the existing infrastructure was completed and improvements identified for the rehabilitation of existing structures and the potential conservation of existing irrigation diversions.
- **Livestock/Wildlife Upland Watering Opportunities**. Based upon an evaluation of existing water sources and the condition of upland grazing resources, potential upland water source development projects were identified.
- **Grazing Management Opportunities**. Based upon a review of the pertinent ESDs and the ambient vegetation and soil conditions, grazing management strategies are presented.
- **Surface Water Storage Opportunities**. Results of previous investigations pertaining to development of water storage opportunities within the watershed are incorporated.
- **Stream Channel Condition and Stability**. Stream channels within the watershed were characterized with respect to their condition and stability. Impaired channels were identified for further evaluation and alternative improvements developed.

In the remainder of this chapter, the conceptual plans developed within each watershed component are described and evaluated with respect to providing benefits to improving the existing water supply through conservation. For the purposes of tracking individual components of the watershed management plan, each component was designated a unique project or "improvement" number. The prefixes used for each improvement describe the category of the watershed management plan it falls under. The prefixes are as follows:

- Project Components "I": Irrigation system rehabilitation components (Section 3.2)
- Project Components "L/W": Livestock/wildlife upland watering opportunities (Section 3.3)
- Project Components "G": Grazing management opportunities (Section 3.4)
- Project Components "S": Surface water storage opportunities (Section 3.5)
- Project Components "C": Stream channel stability components (Section 3.6)

Project Components Identifiers are also provided which provide a means of tracking projects sponsored by individual landowners/stakeholders within the study area.

3.2 Irrigation System Rehabilitation Projects (Watershed Plan Components "I")

As presented in the Basinwide Report volume, the irrigation system inventory effort associated with this project consisted of evaluation of structures and ditch conditions at the request of interested landowners and stakeholders. No ditch systems were inventoried in their entirety. Instead, and at the request of those individuals who came forward with requests to participate in the study, individual irrigation system components were inventoried. The recommendations included herein are not all-inclusive; there will be additional irrigation structures located throughout the watershed in need of rehabilitation or replacement. By virtue of their location within the geographic boundaries of this study, those potential projects involving those structures would still be considered eligible for application funding through the WWDC Small Water Project Program (SWPP).

The improvements that comprise this component of the watershed management plan include:

- Rehabilitation/replacement of existing structures
- Mitigation of seepage losses
- Enhanced delivery of water
- Reduction in annual operation and maintenance costs
- Improvement in ditch management and efficiency through water measurement
- Economic practicality
- Physical feasibility

In this Phase I Hams Fork volume of the Blacks Fork River Watershed Study, narratives of the individual projects are presented along with conceptual cost estimates. The projects identified in this phase of the investigation and their respective component identifiers in the watershed management plan are summarized in Table 3.2-1. Figure 3.2-1 displays their general location.

Table 3.2-1 Watershed Plan Component: Irrigation Rehabilitation Projects (I).

Watershed Management Plan Component	Project ID	Project Name	Diversion	Headgate	Measurement Device	Siphon	Splitter Box
Phase I							
I-001	Sears 001	Christman #1 Ditch Rehabilitation	1			1	
I-002	Schulthess 001	Davison Ditch Diversion Structure	1				
I-003	Schulthess 002	Davison Ditch Lined Segment					
I-004	Weston 001	Philbrick and Johnson Ditch Rehabilitation	1		1		1

3.2.1 I-001: Christman #1 Ditch Rehabilitation (Project ID: Sears – 001)

The Christman #1 and Christman #2 Ditches are both diverted from the Hams Fork River in Section 21, Township 21 North, Range 113 West on deeded property.

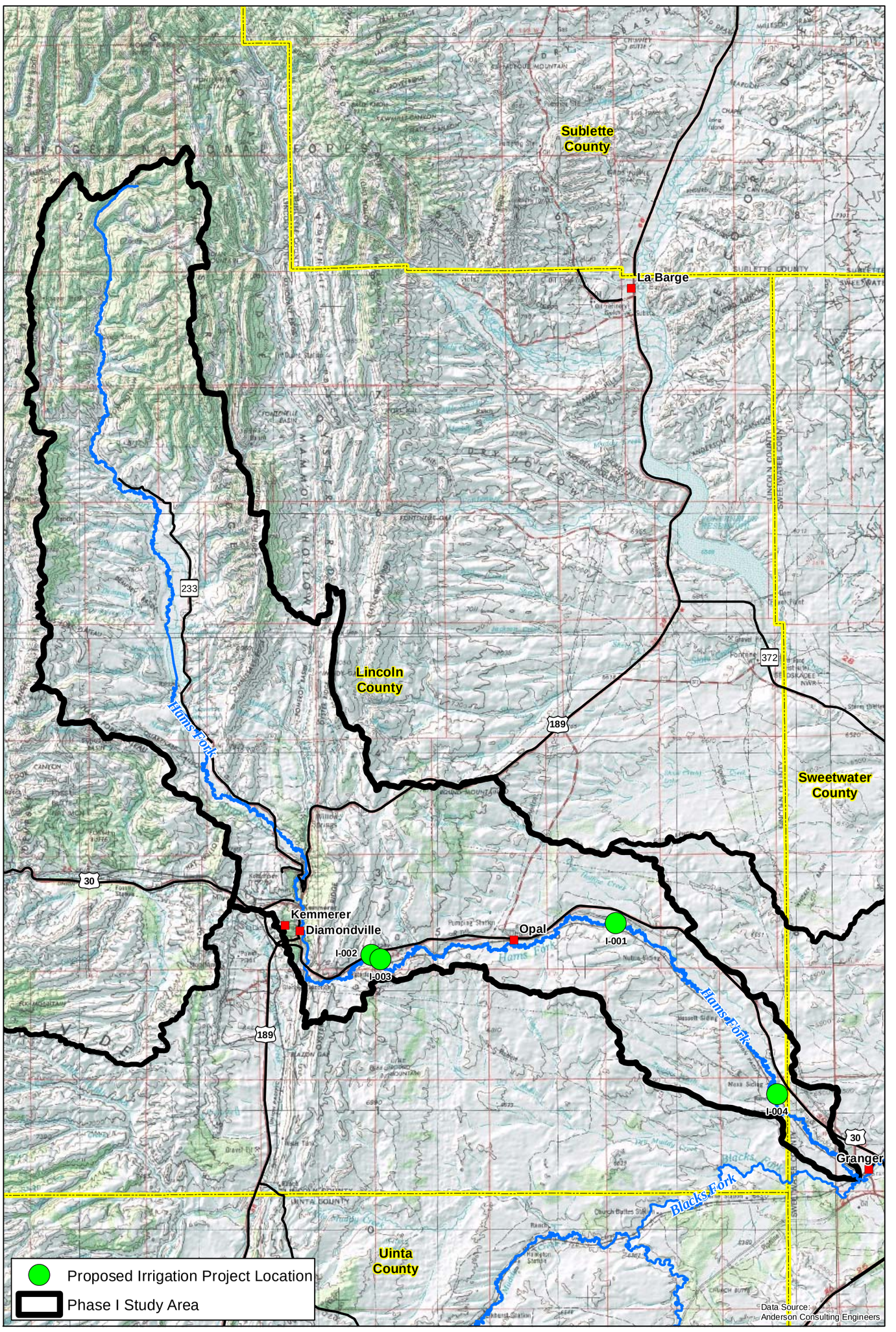


Figure 3.2-1 Blacks Fork Watershed Phase I: Proposed Irrigation Project Locations

The existing diversion facility is reported functional; however, frequent and annual maintenance is required to facilitated diversion of water during low flow periods. The structure consists of concrete rubble spanning the river. Downstream of the structure, there is significant bank erosion on the left bank (Figure 3.2-2).

Figure 3.2-2 Christman #1 and Christman #2 diversion facility, Hams Fork River.

The Christman #2 Ditch, which is diverted from the right (south) bank, is reportedly in fair condition and no significant maintenance needs or requirements were discussed. However, the Christman #1 ditch, which diverts on the left bank (north), has been obliterated in several locations due to lateral migration of the Hams Fork River.

At this time, the land owner would like to restore usage of the Christman #1 Ditch. Evaluation of the historic alignment of the Christman #1 Ditch indicates that reconstruction of the ditch in its previous configuration would be cost-prohibitive due to altered alignment of the Hams Fork. As indicated in Figure 3.2-3, the Hams Fork impinges in several locations on the adjoining hillside. At these locations, either flumes or suspended pipelines would likely be required if the ditch were rebuilt in its historic alignment.

Based upon discussions with the landowner, it is our understanding that use of the water is a higher priority near the downstream portions of the original ditch. Under this alternative, the point of diversion for the Christman #1 Ditch would be changed to allow its water to be diverted and conveyed within the Christman #2 ditch. At a point where topography permits, Christman #1 water would be diverted from the Christman #2 and conveyed to the north side of the Hams Fork by way of a proposed ditch and siphon crossing of the river, see Figure 3.2-3.

In conjunction with the change in point of diversion, the diversion structure would be rehabilitated. Conceptually, sheet pile would be driven into the Hams Fork channel bottom in a configuration facilitating diversion at low flows yet passing high flows safely. The right bank of the Hams Fork

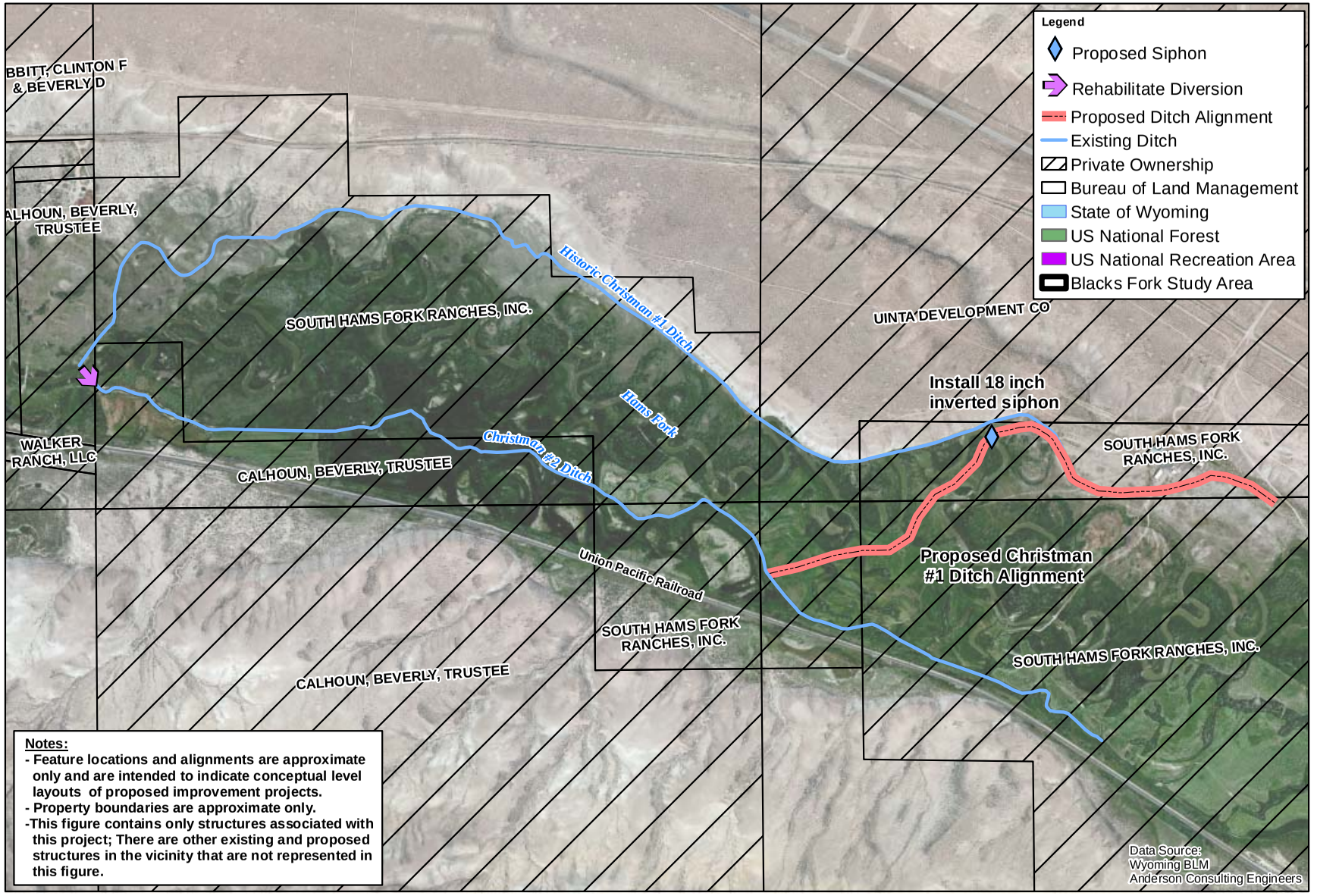


Figure 3.2-3 Conceptual Design I-001: Christman #1 Ditch Rehabilitation (Sears 001)

downstream would be stabilized with rock riprap. Note that implementation of this alternative would require coordination with the Wyoming State Engineers Office (WSEO) in order to secure permit facilitating the change in the point of diversion.

3.2.2 I-002: Davison Ditch Diversion Structure (Project ID: Schulthess 001)

This diversion structure serves the Davison Ditch headgate on the Hams Fork River in Section 33, Township 21 North, Range 115 West. The Davison Ditch diverts water under Permit Number P224.0E with a priority date of July 8, 1895.

At the request of the ditch owner, the Davison Ditch headgate and diversion were inventoried. The following observations pertaining to the diversion were noted:

- The diversion structure consist of concrete rubble and boulders placed in the Hams Fork channel.
- The ditch headgate appears to be in good condition and is not in obvious need of repair or replacement.
- The site visit took place during a period of relatively *high flows in the Hams Fork. At that time, the right bank* of the river was overtopping between the diversion structure and the railroad tracks as indicated in Figure 3.2-4.
- Bank erosion and bed scour was occurring downstream of the diversion structure where flows which had overtopped the banks were returning to the channel.

Remediation of problems associated with this structure would entail primarily stabilization of steam banks upstream of the structure to prevent its eventual bypass. If left unprotected, the Hams Fork will likely eventually cut a new channel between the diversion structure and the railroad crossing. In this event, railroad infrastructure could potentially be threatened. Several means of stabilizing the bank exist including "soft" measures such as bioengineered alternatives such as planting riparian vegetation. However, at this location and given the severity of potential consequences associated with eventual channel cutoff, a "hard" approach is recommended. In this respect, placement of large boulders, sheet pile, or concrete.

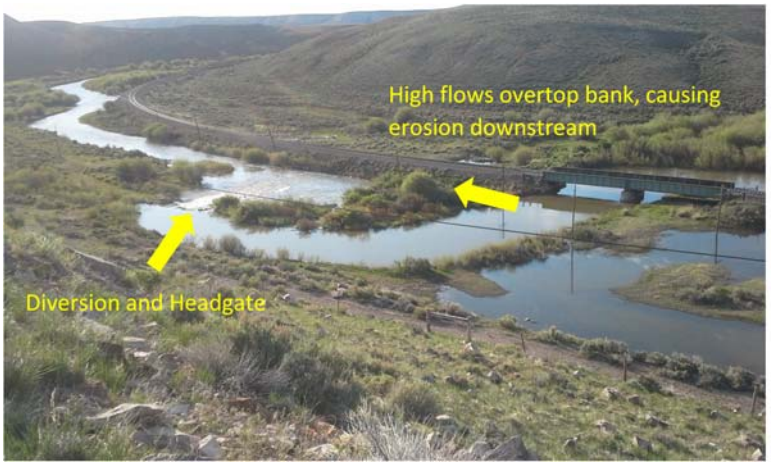


Figure 3.2-4 Davison Ditch Diversion Structure on the Hams Fork River.

At this location, the solution deemed most feasible would be construction of a driven sheet pile wall along the right bank of the Hams Fork and extending it across the channel to form a diversion dam.

Design of the structure would require consideration of passage of Hams Fork high flows while facilitating diversion of water for irrigation during low flow periods. Figure 3.2-5 displays the conceptual layout of this project.

Note that the project would involve lands owned and managed by the Union Pacific Land Resources Corporation, consequently coordination and permitting for construction would be required through their land management group.

Permitting through the US Army Corps of Engineers should be minimal as the project should fall within categorical exclusions of the 404 permitting process and requirements.

3.2.3 I-003: Davison Ditch Lined Segment (Project ID: Schulthess 002)

This diversion structure serves the Davison Ditch headgate on the Hams Fork River in Section 33, Township 21 North, Range 115 West. From that point, the ditch runs roughly parallel to the Hams Fork for approximately 2.5 miles where pastures and hay fields are ultimately irrigated. Figure 3.2-6 displays the general layout of the ditch.

Approximately 2.800 feet downstream of the diversion structure, the Hams Fork impinges upon the hillslope on the left bank (northern). The ditch here is visibly seeping and the integrity of the ditch could ultimately be threatened by continued seepage weakening the underlying materials.

Under this alternative, approximately 1,150 linear feet of the ditch would be lined using any of several lining methods. At this location and given the potential for damage due to livestock and wildlife, a buried bentonitic geotextile liner may be recommended given its propensity to 'self-heal'.

3.2.4 I-004: Philbrick and Johnson Ditch Rehabilitation (Project ID: Weston 001)

The Philbrick and Johnson Ditch serves two users along the Hams Fork. The diversion is located in Section 4, Township 19 North, Range 112 West. The ditch diverts water under several permits including enlargements; the senior of which is Permit No. T2832 with a priority date of 12/31/1887. Enlargements occurred in 1901 and 1963 according to records of the Wyoming State Engineers Office.

The ditch currently serves two private parties and irrigates lands within the floodplain of the Hams Fork. According to manager of the ditch system, equitable delivery of water to both of the landowners has been problematic due to measurement and conveyance issues. The desired solution would be to split the ditch at a location where each land owner would manage individually measured flows. Figure 3.2-7 displays the proposed changes associated with this project alternative. In addition to splitting the conveyance ditch, rehabilitation of the existing diversion structure and the measurement device would be recommended. As indicated in the figure, the following components would be employed:

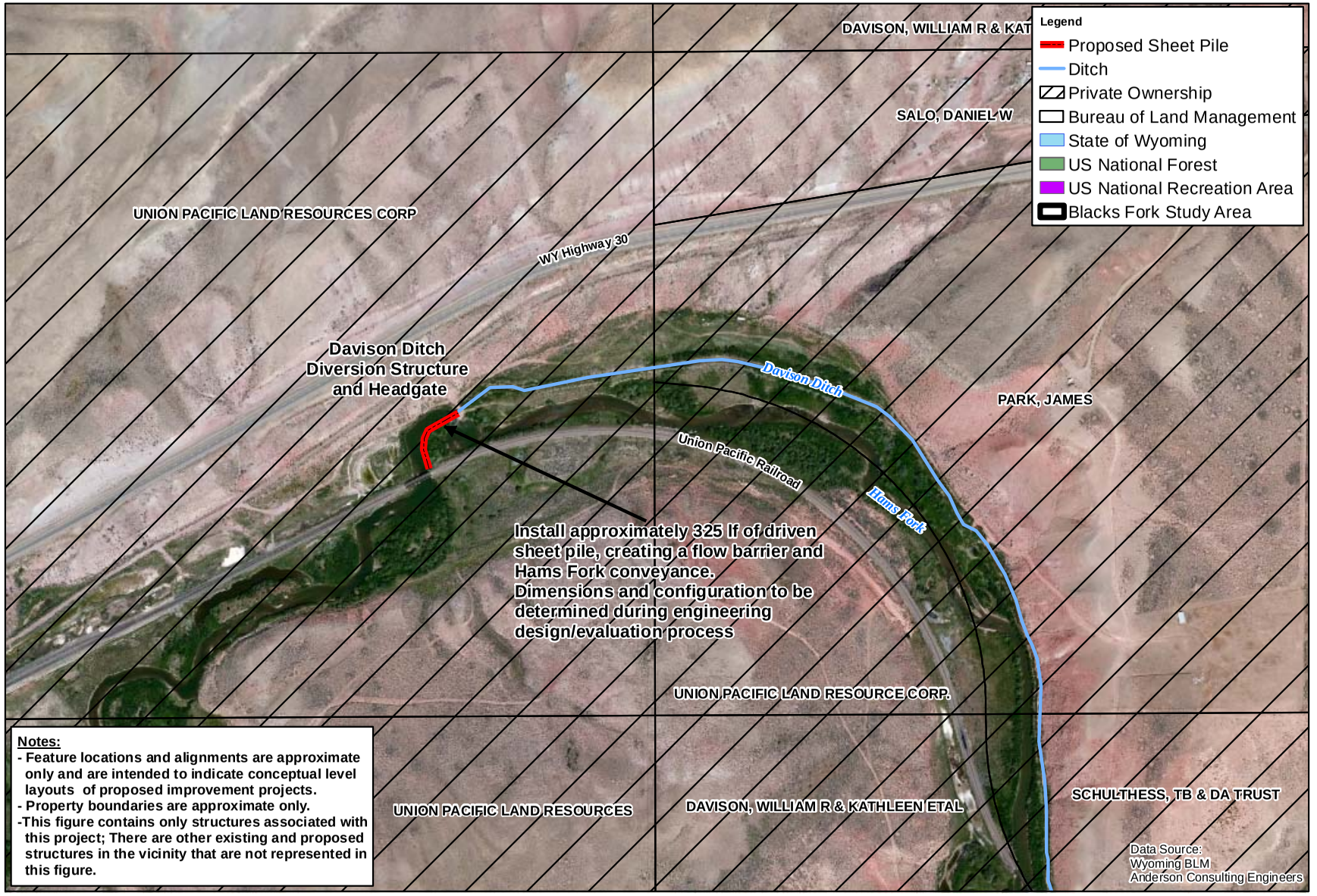


Figure 3.2-5 Conceptual Design I-002: Davison Ditch Diversion Structure (Schulthess 001)

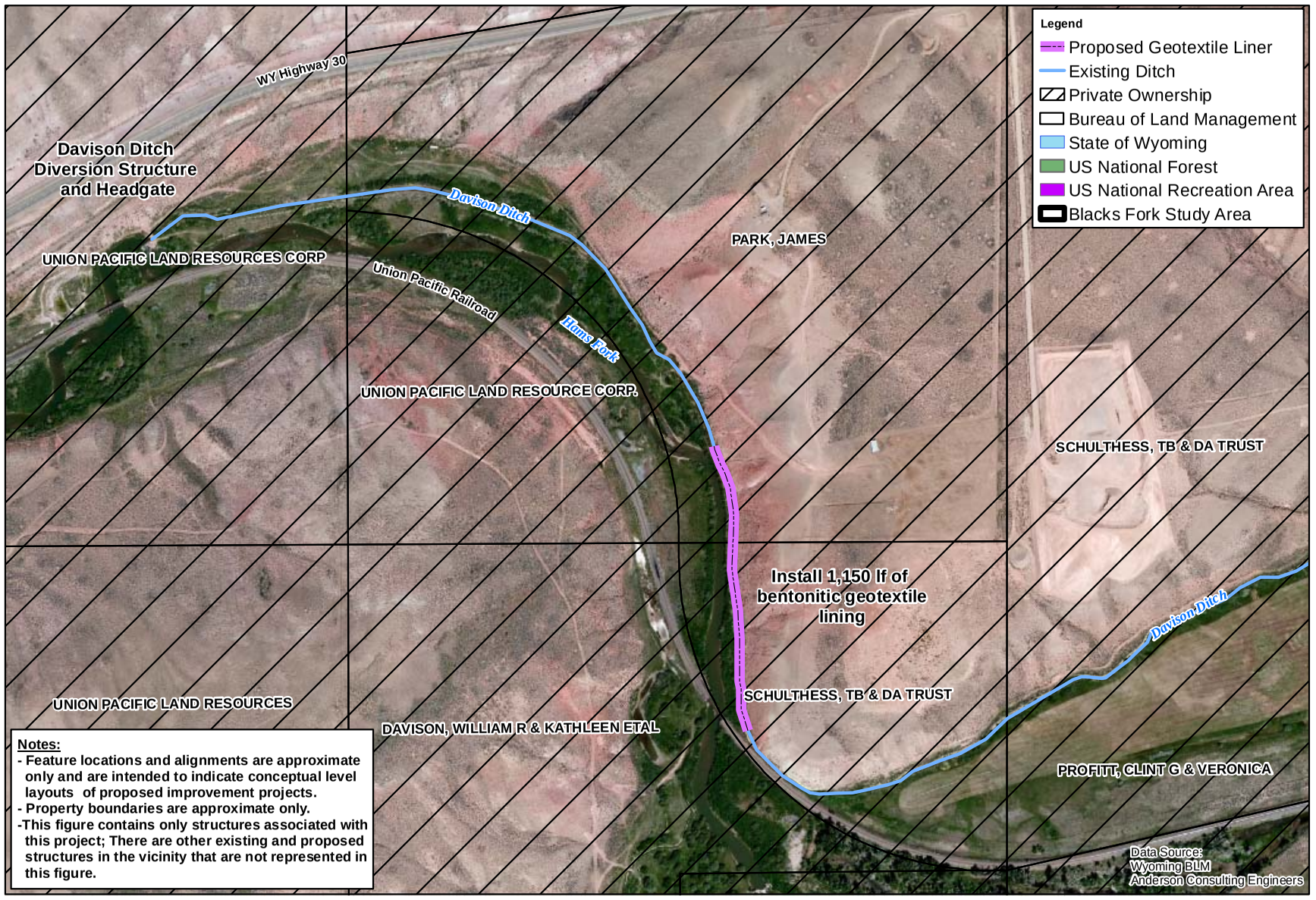


Figure 3.2-6 Conceptual Design I-003: Davison Ditch Lined Segment (Schulthess 002)

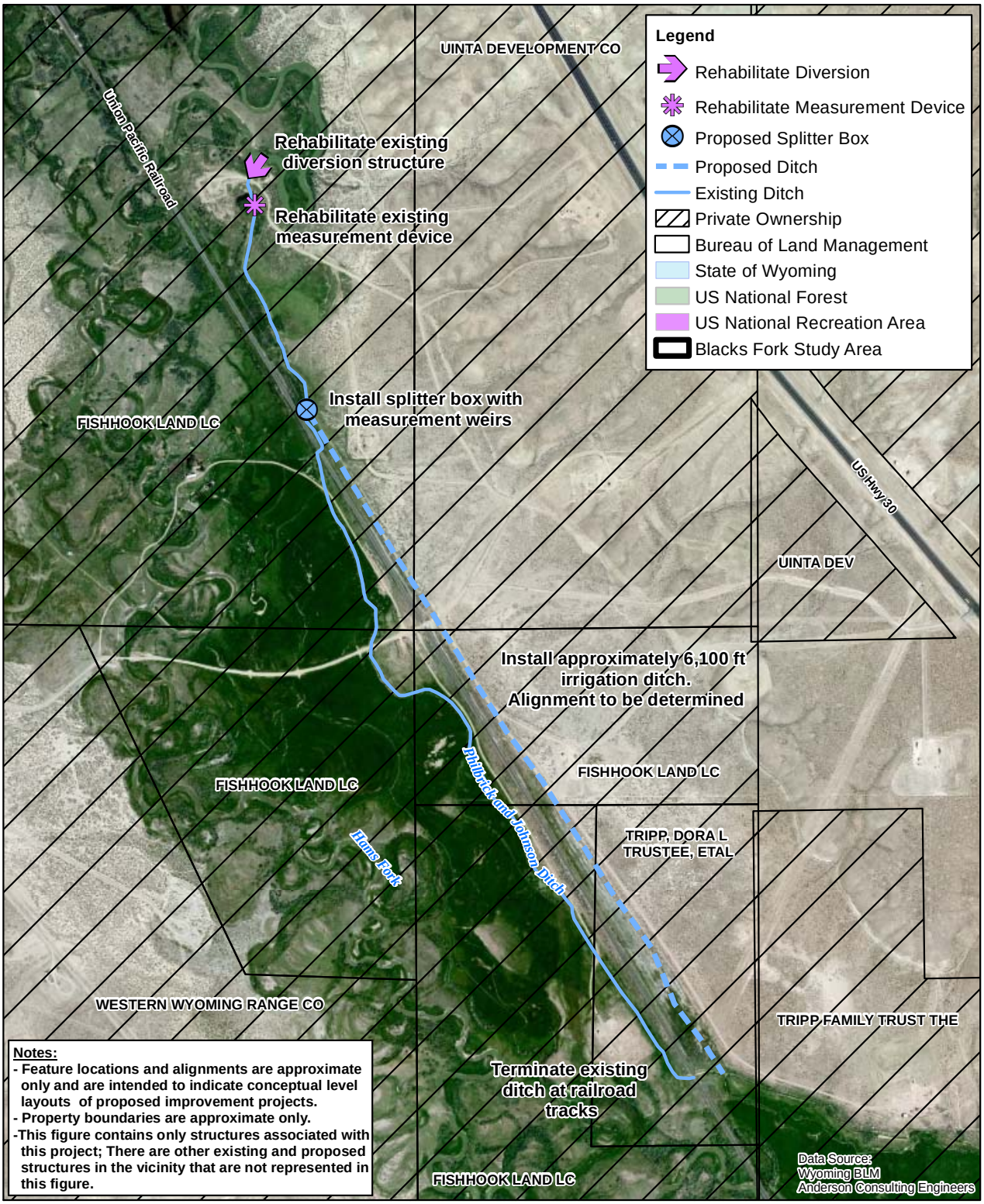


Figure 3.2-7 Conceptual Design I-004: Philbrick and Johnson Ditch Rehabilitation (Weston 001)

- The flow opening in the diversion structure on the Hams Fork is reportedly too wide to facilitate diversion of flows at low-flow periods in the river. Reduction of the opening would result in a higher water surface elevation at low flows while still allowing high flows to pass. Driven sheet pile on each side of the existing opening would likely be the most cost effective solution. Figure 3.2-8 displays the existing diversion structure.
- The existing measurement device appears to have been recently installed at too high an elevation which results in backwater extending to the diversion structure making diversion at low flows difficult. Figure 3.2-9 displays a photo of the device at its current location. A more suitable site or optimal installation elevation would be determined for the structure and it would be reinstalled.
- In order to mitigate management issues, a splitter box would be installed as indicated in Figure 3.2-7. The box could be fitted with rectangular weirs to facilitate measurement of flows delivered to each ditch, or the box could be constructed to deliver the appropriate proportion to each user.
- Finally, approximately 6,100 linear feet of earthen ditch would be constructed as shown in Figure 3.2-7 to convey flows to the downstream user.

Figure 3.2-8 Existing Philbrick and Johnson Ditch Diversion.

Figure 3.2-9 Philbrick and Johnson Measurement Device.

3.3 Upland Wildlife/Livestock Watering Sources (Watershed Management Plan Component L/W)

As presented in the Basinwide volume of this report, water sources deemed "viable" were mapped within the project GIS. Based upon the premise that existing water sources are capable of providing water to livestock within a one mile radius, buffers were drawn around the mapped sources (Figure 3.3-1). Note that this figure does not show buffers about perennial / intermittent streams nor springs. When viewing this figure, it should be kept in mind that stock reservoirs represent ephemeral sources of water; the majority of them rely upon rainfall runoff for their water supply. Also, although all wells with stock use as a permitted use are shown, not all may in actuality be equipped to provide livestock / wildlife water.

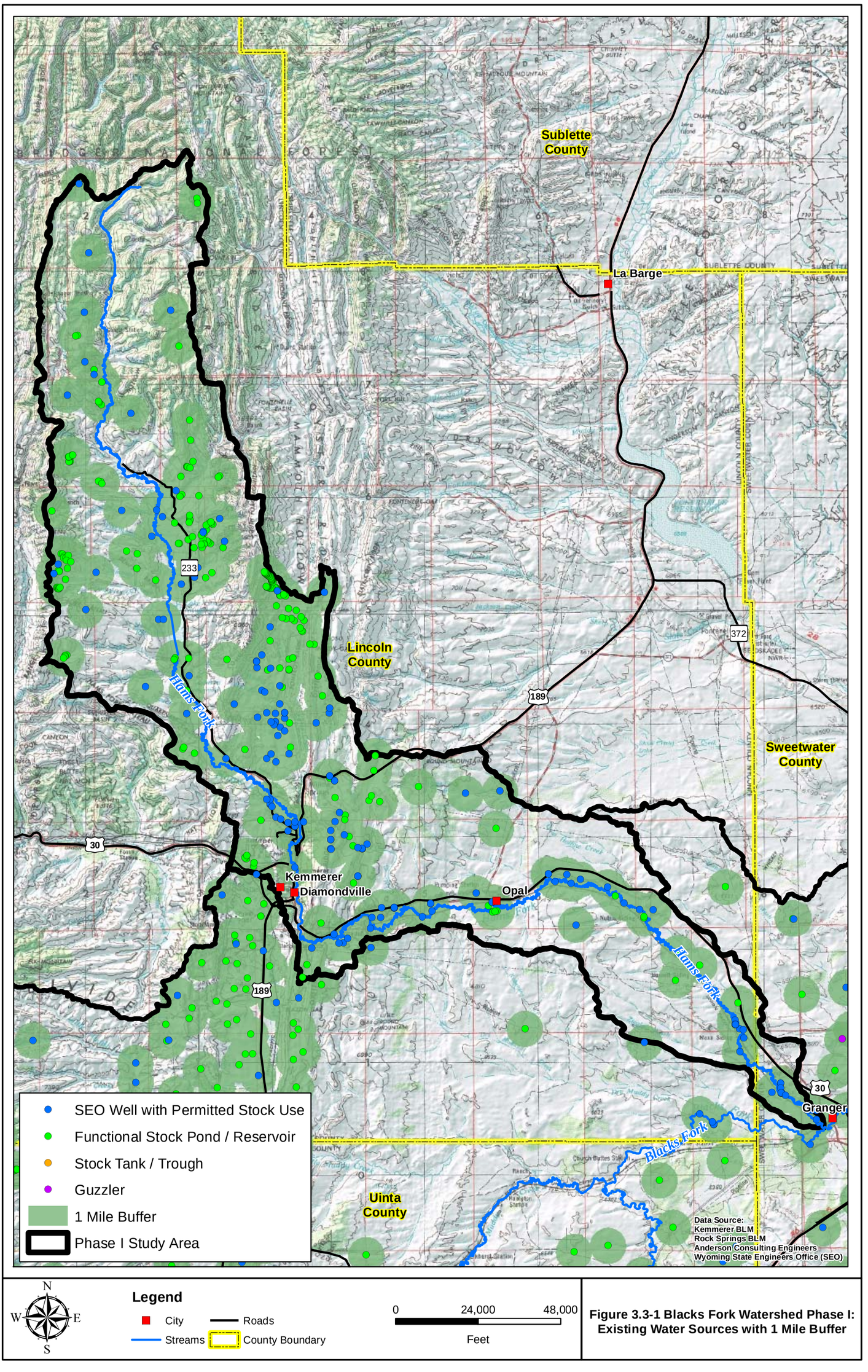


Figure 3.3-1 Blacks Fork Watershed Phase I: Existing Water Sources with 1 Mile Buffer

A list of interested land owners and allotment permittees was generated based upon input obtained at project meetings. Individual meetings were scheduled and completed to gain their input on the water needs of their respective geographical areas of interest. Based upon the results of these interviews and the information presented above pertaining to existing water supplies and areas in need of upland water development, conceptual water development projects were identified. The general objective of this effort was to create a means of providing reliable sources of livestock / wildlife drinking water in water-short portions of the watershed as well as alternative water supplies to riparian corridors.

In this Phase I Hams Fork volume of the Blacks Fork River Watershed Study, the Livestock/Wildlife water supply projects lying within the boundaries of the investigative phase are presented. The projects identified in this phase of the investigation and their respective component identifiers in the watershed management plan are summarized in Table 3.3-1. The following information is presented for each of the livestock/wildlife (L/W) watershed plan components:

1. Narrative description of the project including the individual components, land ownership, location and benefit. This information is presented in the following paragraphs.
2. Conceptual Drawings showing the overall layout and design of the project.

Figure 3.3-2 displays the general location of all livestock/wildlife water opportunity projects.

It must be kept in mind that designs presented in this report are conceptual only. The indicated alignments of pipelines and placement of livestock / wildlife watering facilities are general and intended to represent the concept behind the alternatives if implemented, detailed design would be required. It must also be kept in mind that maintenance of proposed projects is imperative to their success.

Table 3.3-1. Watershed Plan Component: Livestock/Wildlife Supply Projects (L/W).

Watershed Management Plan Component	Project ID	Project Name	Spring Development	Pipeline	Stock Tank	Storage Tank	Well Construction / Rehabilitation	Solar Pump / Generator	Stock Reservoir Rehabilitation	Stock Reservoir Construction	Guzzler Construction
Phase I											
L/W-001	Circle B 001	Cow Camp Springs	1	100	1						
L/W-002	Circle B 002	Mounded Springs	1	470	1						
L/W-003	Circle B 003	Mayfield Cabin Spring	1	100	1						
L/W-004	Circle B 004	Waterhouse Canyon	1	150	1						
L/W-005	Circle B 005	Cattail Spring	1	200	1						
L/W-006	Haslem 001	Cow Hollow Stock Pond								1	
L/W-007	Haslem 002	Craven Creek Stock Pond								1	
L/W-008	Haslem 003	Nutria Ditch Pipeline Project		5,250	1			1			
L/W-009	Hoffman 001	Beaver Dam Creek Well Project		200	1		1	1			
L/W-010	Hoffman 002	Corral Creek Well Project		200	1		1	1			
L/W-011	Hoffman 003	Fenn Creek Stock Reservoir								1	
L/W-012	Hoffman 004	Robert Fox Stock Reservoir Rehabilitation							1		
L/W-013	Julian 001	State Section Pipeline Project		2,000	1						
L/W-014	Julian 002	MAU #2 Well Modification			1			1			
L/W-015	Julian 003	Oyster Ridge Pipeline Project	1	1,300	1	1					
L/W-016	Lamborn 001	Lamborn Pipeline Project No. 1		3,400	2		1	1			
L/W-017	Walker 001	Walker Pipeline Project No. 1		10,650	2		1	1			
L/W-018	Walker 002	Walker Well Replacement Project No. 1			1		1	1	1		
L/W-043	UDC-001	Joe #1							1		
L/W-044	UDC-002	Joe #2							1		
L/W-052	UDC-010	Highway Pit							1		

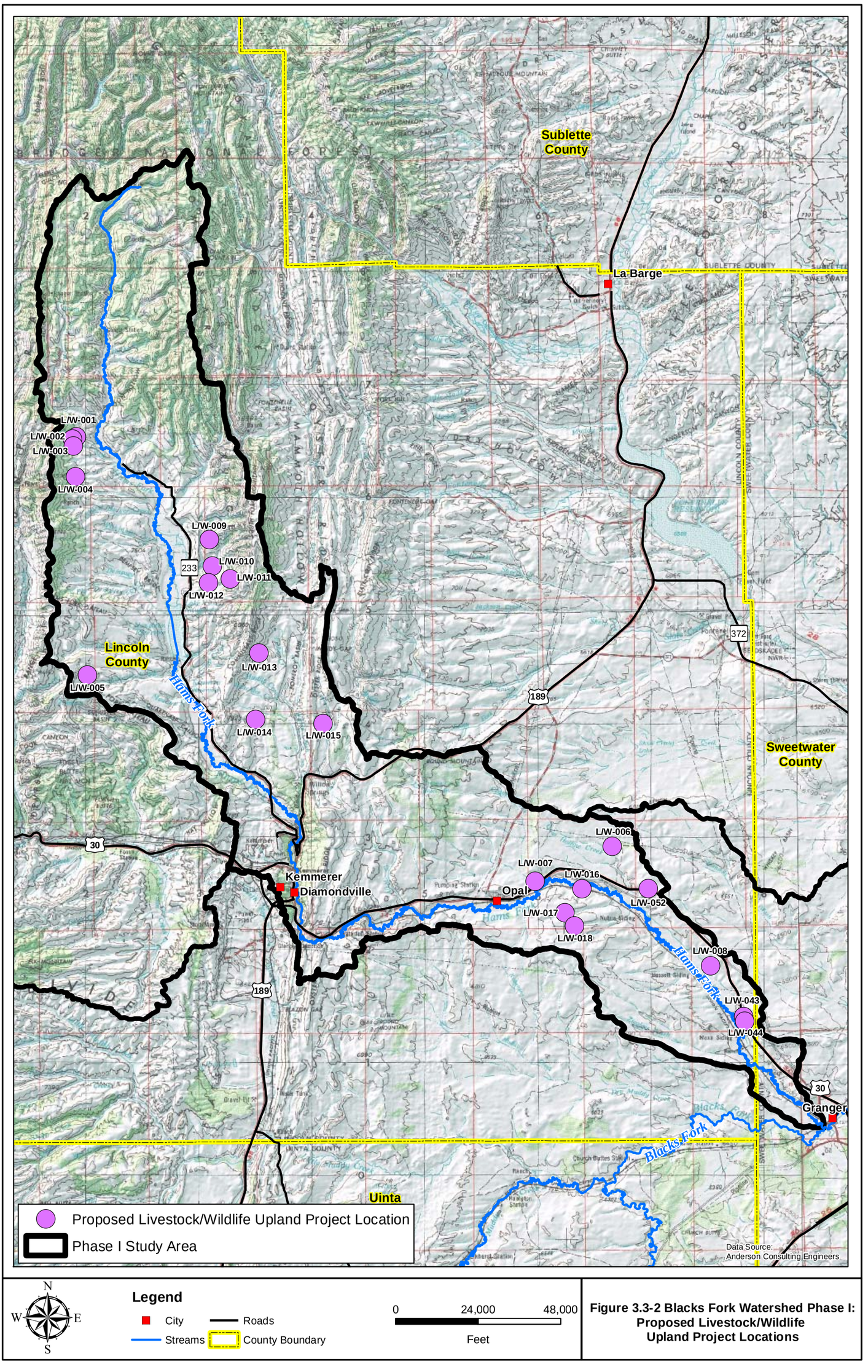


Figure 3.3-2 Blacks Fork Watershed Phase I: Proposed Livestock/Wildlife Upland Project Locations

3.3.1 L/W-001 through L/W-005 Circle B Ranch Projects (Project ID: Circle B 001 to 005)

The Circle B Ranch consists of numerous parcels within the north western portion of the project study area and within the Hams Fork subwatershed area. Ranch owners have completed applications for funding of range improvement projects through the Wyoming Landscape Conservation Initiative (WLCI). Five of these projects lie within the project study area and are incorporated in the current study. The projects included in this study all consist of development of existing springs.

Each of the proposed projects would include the following components:

- An existing spring would be developed. A valve would be included for management of pipeline flows.
- From the spring, water would drain by gravity downslope to a 1,200 gallon stock tank.
- Buried 1 ½ inch HDPE low-pressure pipeline would be required.
- Requisite valves and fittings would be incorporated to facilitate management of flows and water levels.
- Wildlife egress ramps would be installed in the proposed stock tank.
- The spring vicinity would be fenced to prevent spring development damage from livestock and wildlife.

Table 3.3-2 summarizes the components associated with each of the proposed Circle B Ranch projects.

Table 3.3-2 Component Summary of Circle B Ranch Proposed Projects.

Watershed Management Plan Component	Spring Name	Ranch	Lattitude	Longitude	Spring Development	Stock Tank	Pipeline (lf)	Fencing (lf)
L/W-001	Cow Camp Springs	Mayfield	42.14149	-110.768	1	1	100	1,020
L/W-002	Mounded Spring	Mayfield	42.14017	-110.773	1	1	470	1,700
L/W-003	Mayfield Cabin Spring	Mayfield	42.13483	-110.772	1	1	100	1,220
L/W-004	Waterhouse Canyon	Mayfield	42.11041	-110.769	1	1	150	1,350
L/W-005	Cattail Spring	Fish Creek	41.95172	-110.758	1	1	200	1,460

Figures 3.3-3 to 3.3-7 depict the conceptual design for each project. Note that each proposed project as delineated would involve only deeded property.

3.3.2 L/W-006: Cow Hollow Stock Pond (Project ID: Haslem 001)

This alternative would involve construction of a new stock pond in an area lacking viable year round sources of water. The proposed reservoir would be located in the center of section 11, Township 21 North, Range 113 West. The proposed stock reservoir would be sited on a tributary to Cow Hollow Creek. Figure 3.3-8 displays the general location of this project. Note that the proposed project as conceptualized would involve only privately owned deeded properties.

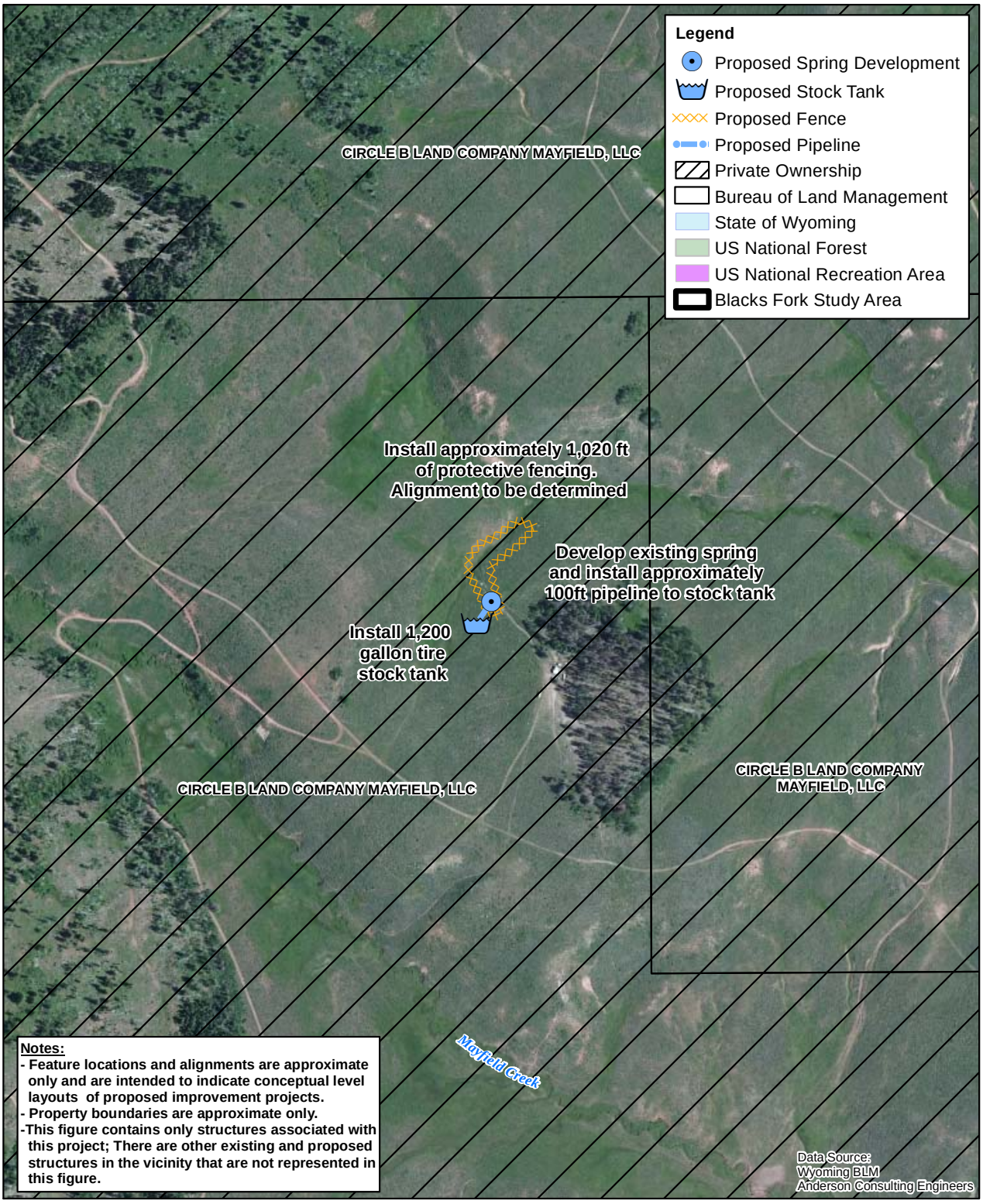


Figure 3.3-3 Conceptual Design L/W-001: Cow Camp Springs (Circle B 001)

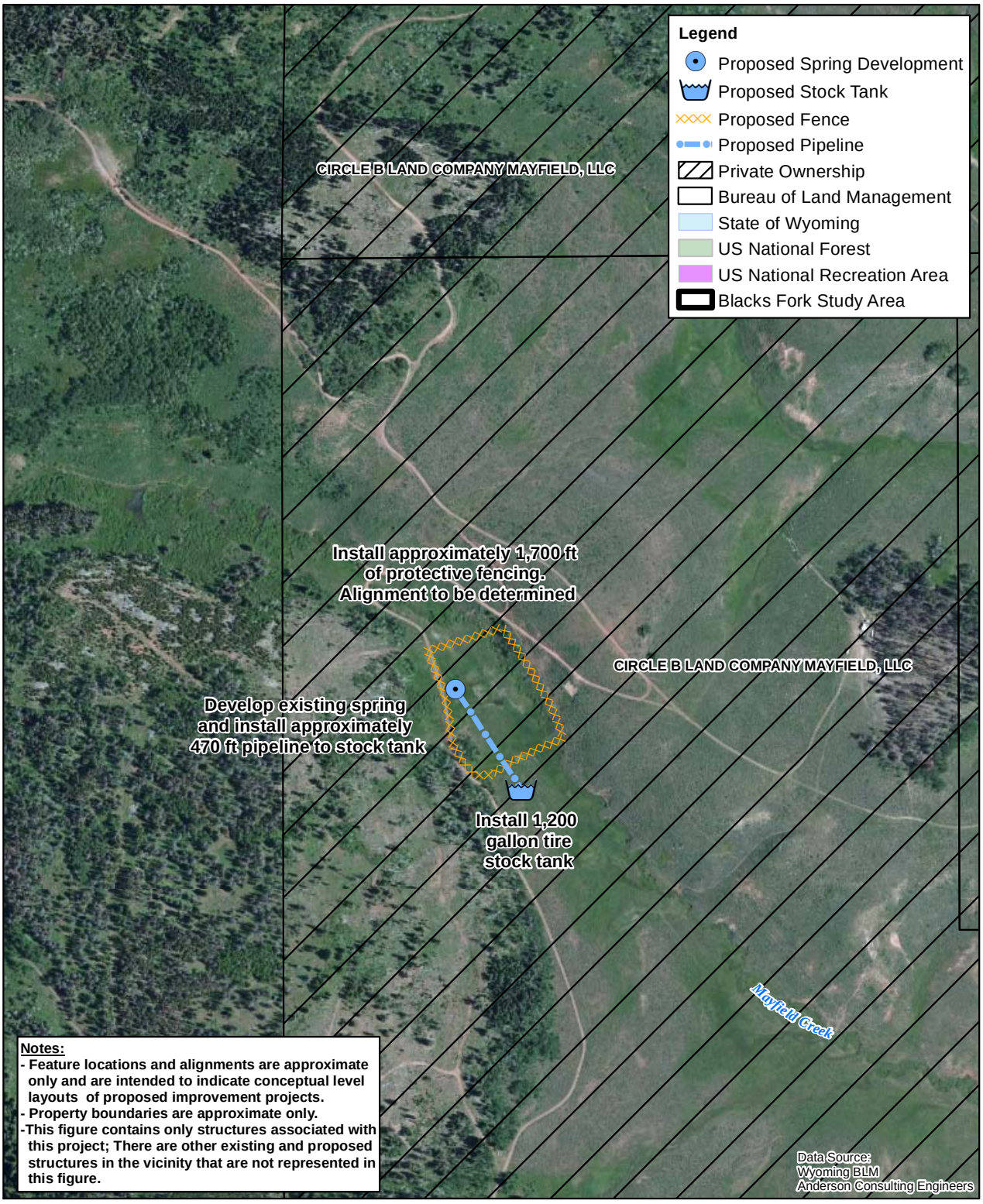


Figure 3.3-4 Conceptual Design L/W-002: Mounded Spring (Circle B 002)

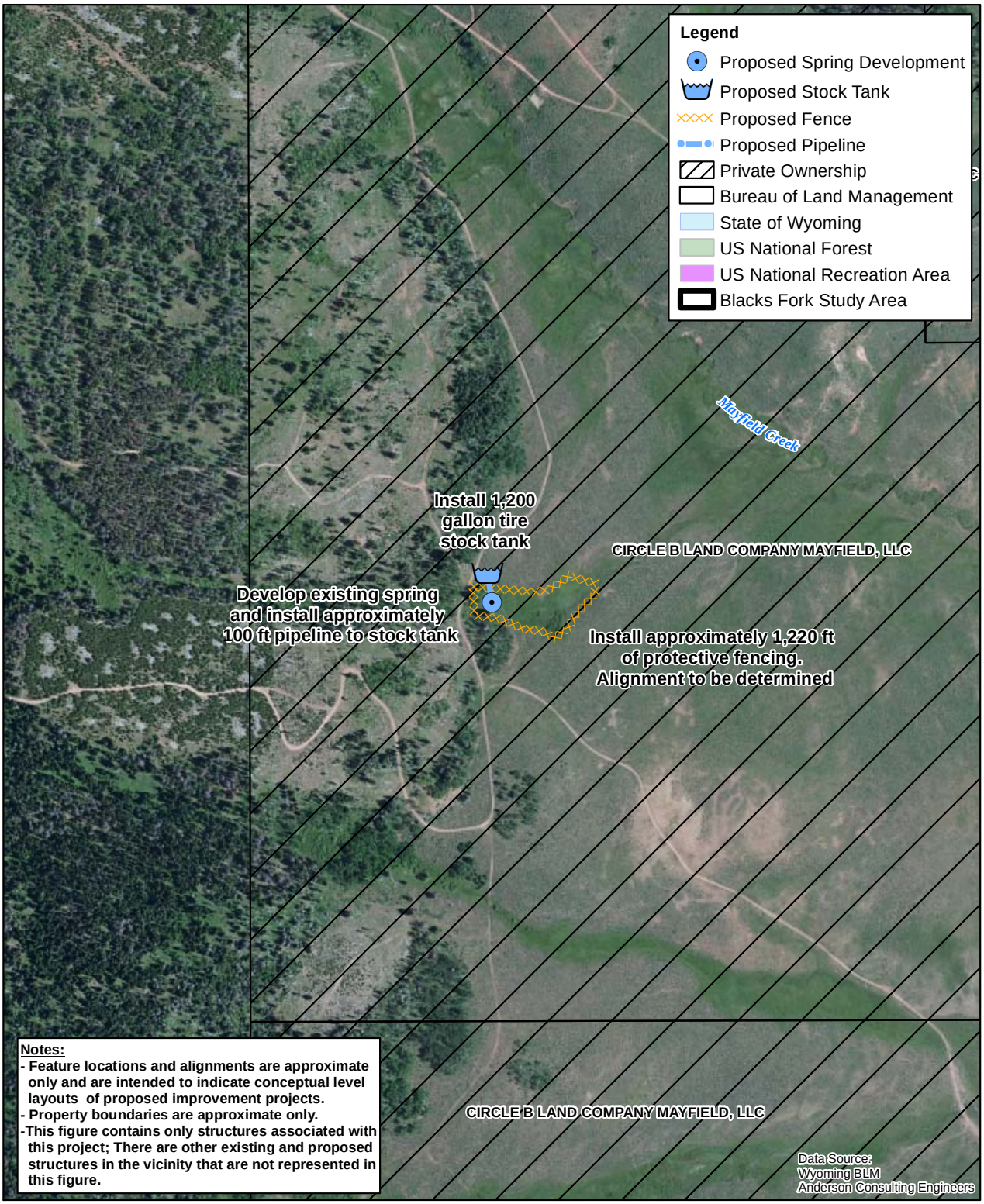


Figure 3.3-5 Conceptual Design L/W-003: Mayfield Cabin Spring (Circle B 003)

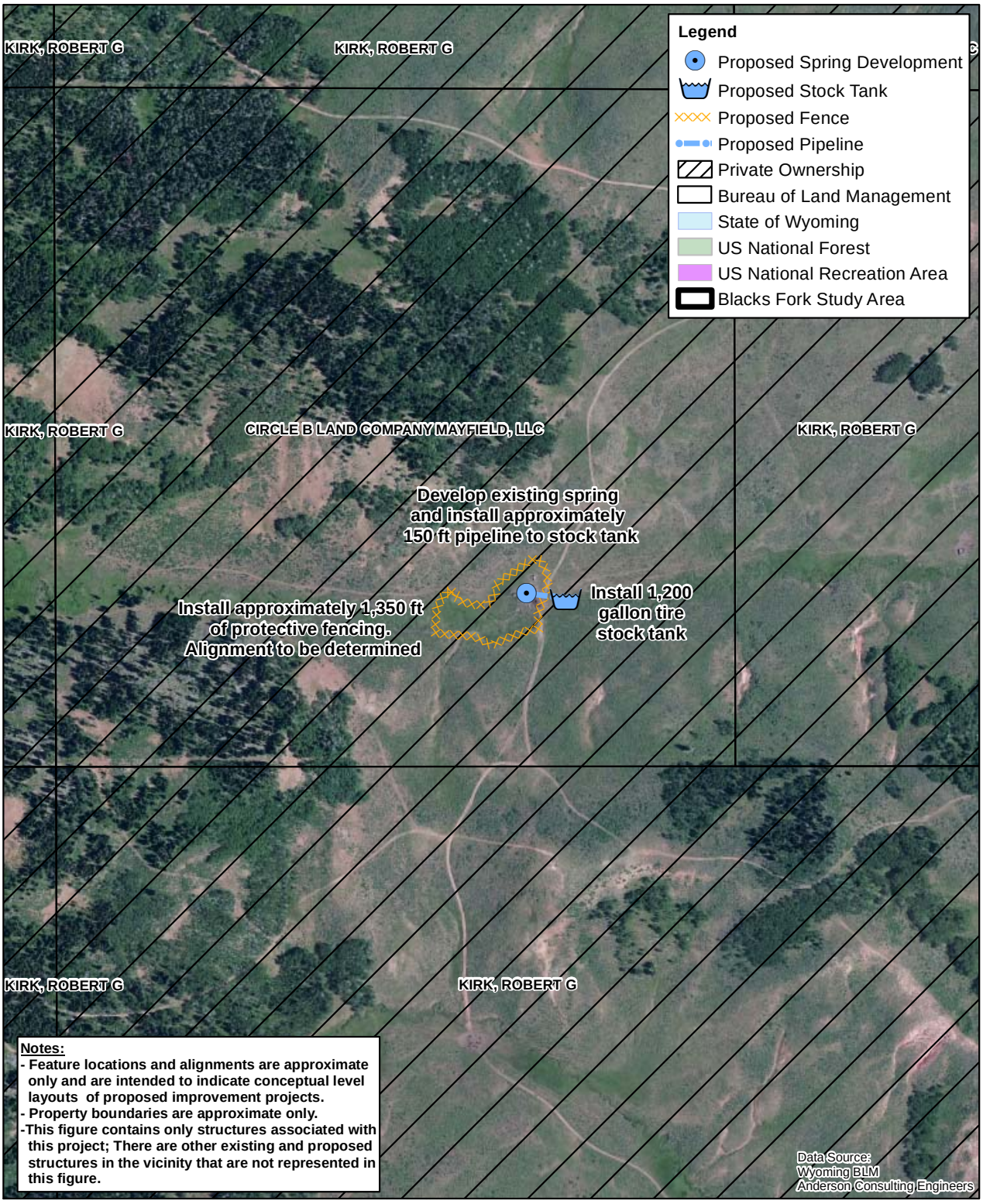


Figure 3.3-6 Conceptual Design L/W-004: Waterhouse Canyon (Circle B 004)

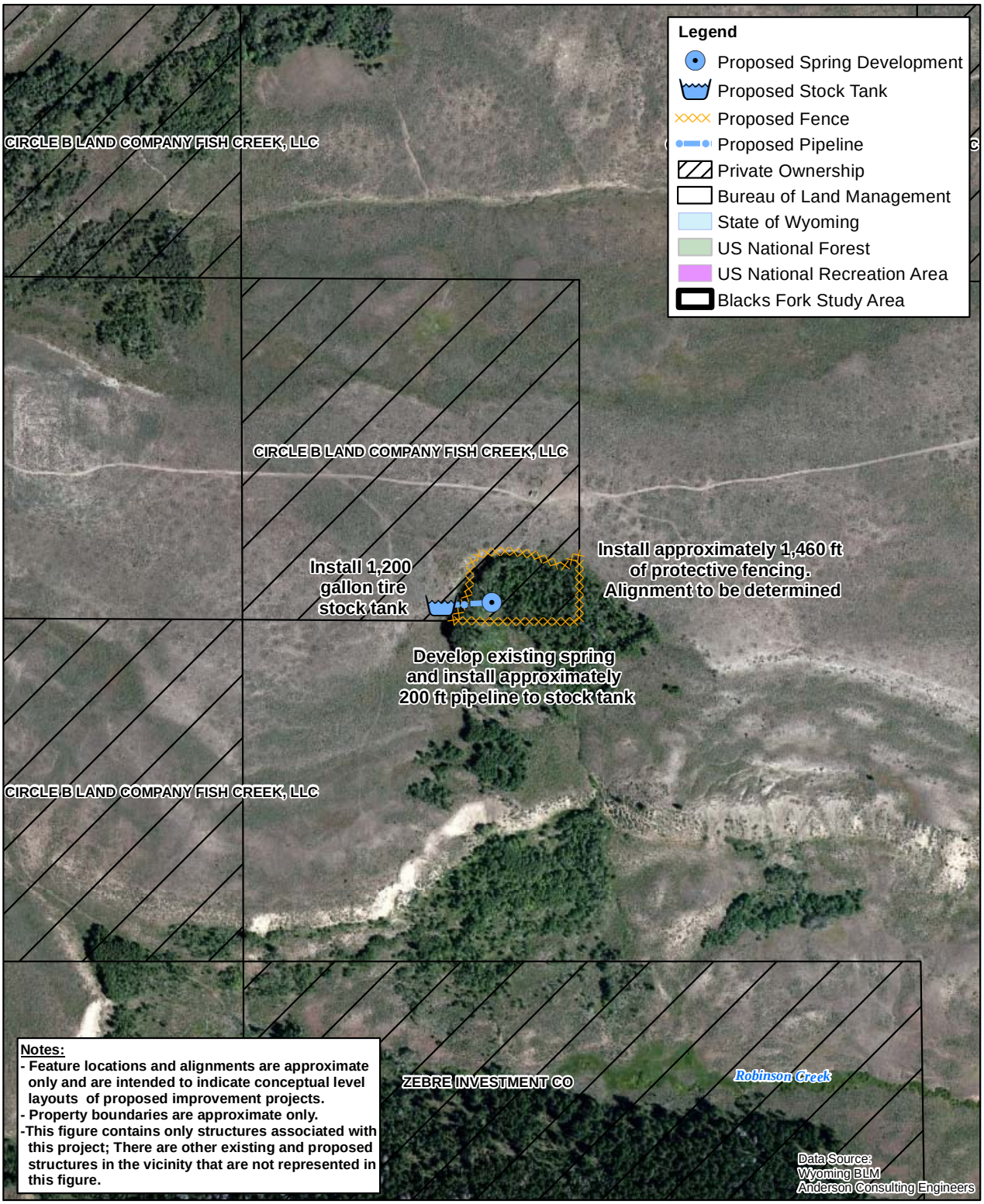


Figure 3.3-7 Conceptual Design L/W-005: Cattail Spring (Circle B 005)

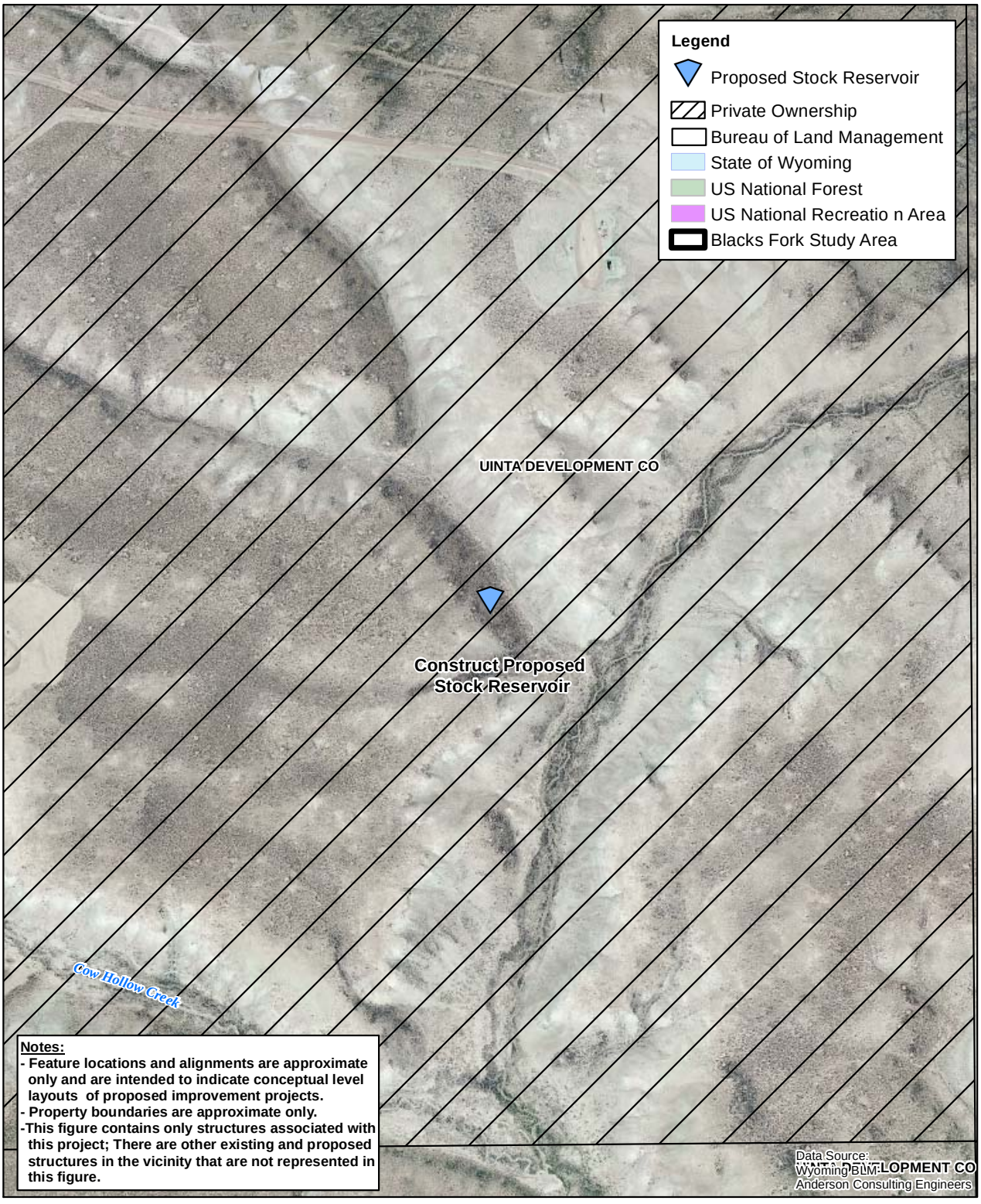


Figure 3.3-8 Conceptual Design L/W-006: Cow Hollow Stock Pond (Haslem 001)

3.3.3 L/W-007: Craven Creek Stock Pond (Project ID: Haslem 002)

This alternative would involve construction of a new stock pond in an area lacking viable year round sources of water. The proposed reservoir would be located in the northwest quarter of Section 19, Township 21 North, Range 113 West. The proposed stock reservoir would be sited on Craven Creek. Figure 3.3-9 displays the general location of this project. Note that the proposed project as conceptualized would involve only privately owned deeded properties.

3.3.4 L/W-008: Nutria Ditch Pipeline Project (Project ID: Haslem 003)

This alternative would involve the utilization of waters conveyed in the Nutria Ditch in Section 17, Township 20 North, Range 112 West. The alternative would provide a source of water to an area where reliable sources are absent. Figure 3.3-10 displays the conceptual design of the project.
Under this alternative, the following components would be employed:

- A solar platform consisting of solar panels, solar powered pump, batteries, and all requisite regulators, connections and housings would be installed near the tail end of the Nutria Ditch.
- From the ditch, water would be pumped easterly and upslope to a 1,200 gallon capacity stock tank.
- Approximately 5,250 linear feet of buried 1 ½ inch HDPE low pressure pipeline would be required.
- Requisite valves and fittings would be incorporated to facilitate management of flows and water levels.
- Wildlife egress ramps would be installed in the proposed stock tanks.

Note that the proposed project as delineated would involve only privately owned deeded property.

3.3.5 L/W-009: Beaver Dam Creek Well Project (Project ID: Hoffman 001)

This project involves drilling a new well (250 feet in depth), installing a solar pump, and stock tank. The project is located in the Section 18, Township 24 North, Range 116 West and is entirely on deeded property. The project lies within the Beaver Creek subwatershed. The alternative would supply water to a portion of the watershed lacking adequate alternative livestock and wildlife upland water sources. Figure 3.3-11 displays the conceptual design of the project.

Under this alternative, the following components would be employed:

- A new well would be constructed. Based upon information pertaining to existing wells in the immediate vicinity, the depth of the proposed well would likely be on the order of 250 feet deep.
- The proposed well would be equipped with a solar pump facility.

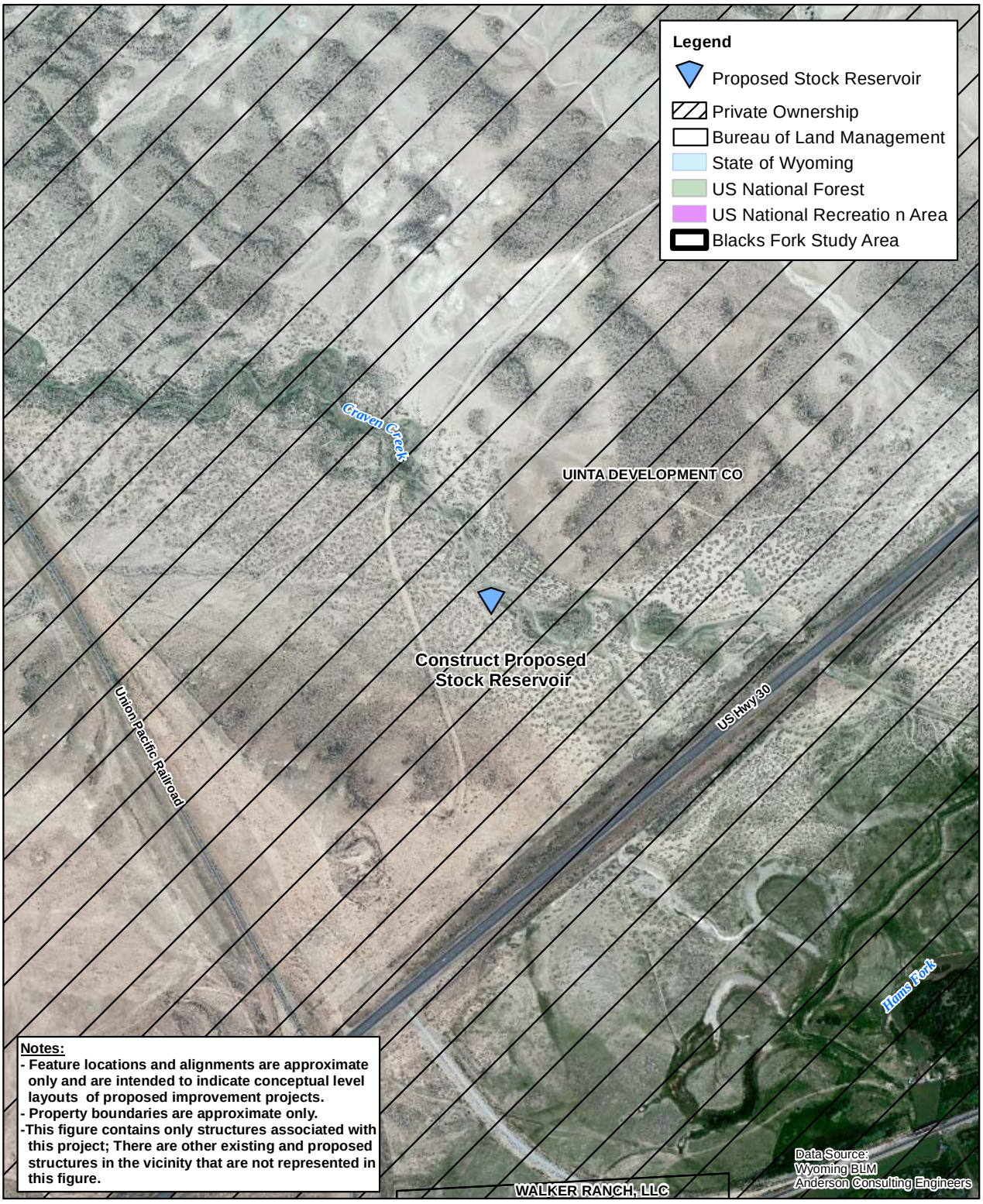


Figure 3.3-9 Conceptual Design L/W-007: Craven Creek Stock Pond (Haslem 002)

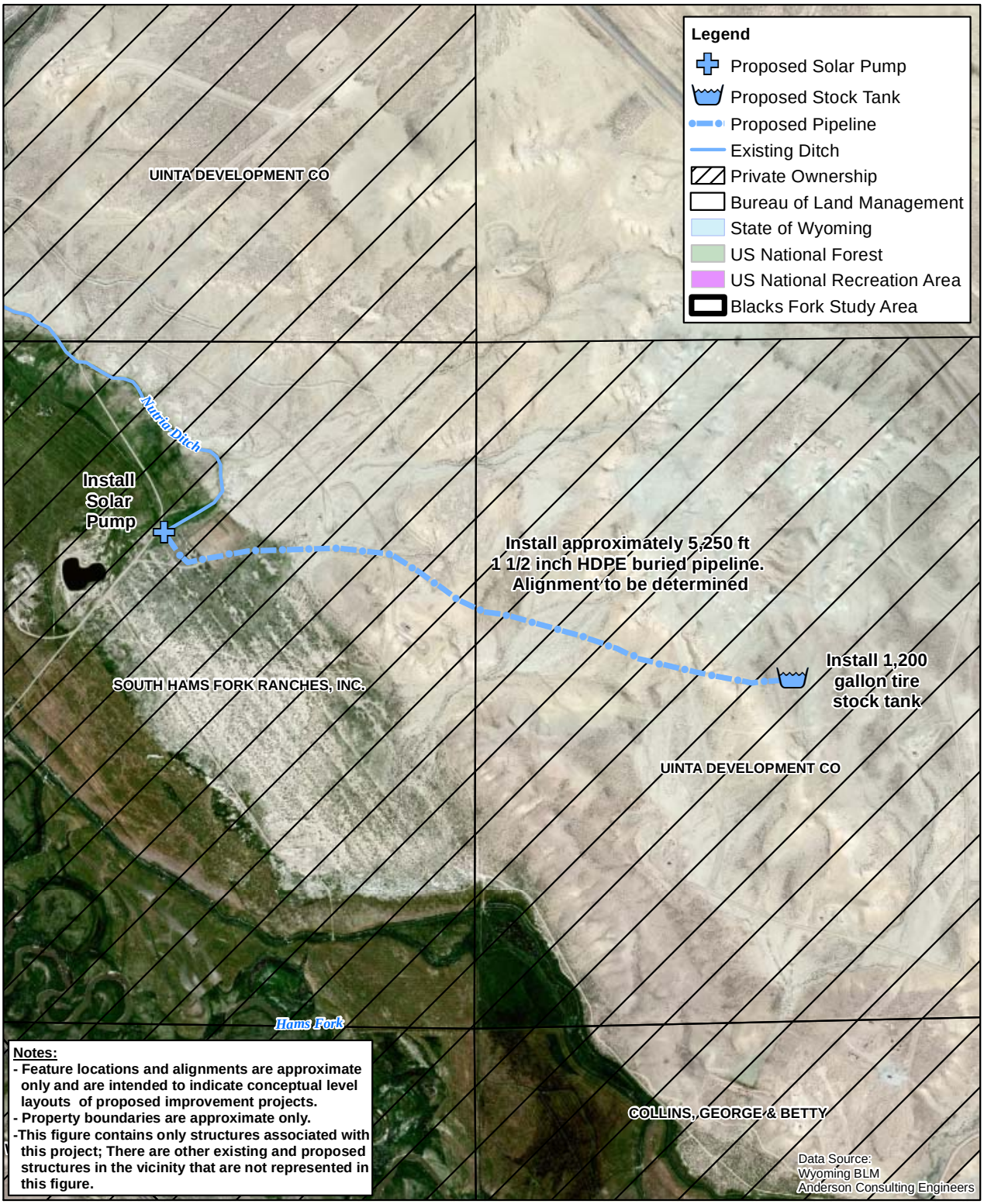


Figure 3.3-10 Conceptual Design L/W-008: Nutria Ditch Pipeline Project (Haslem 003)

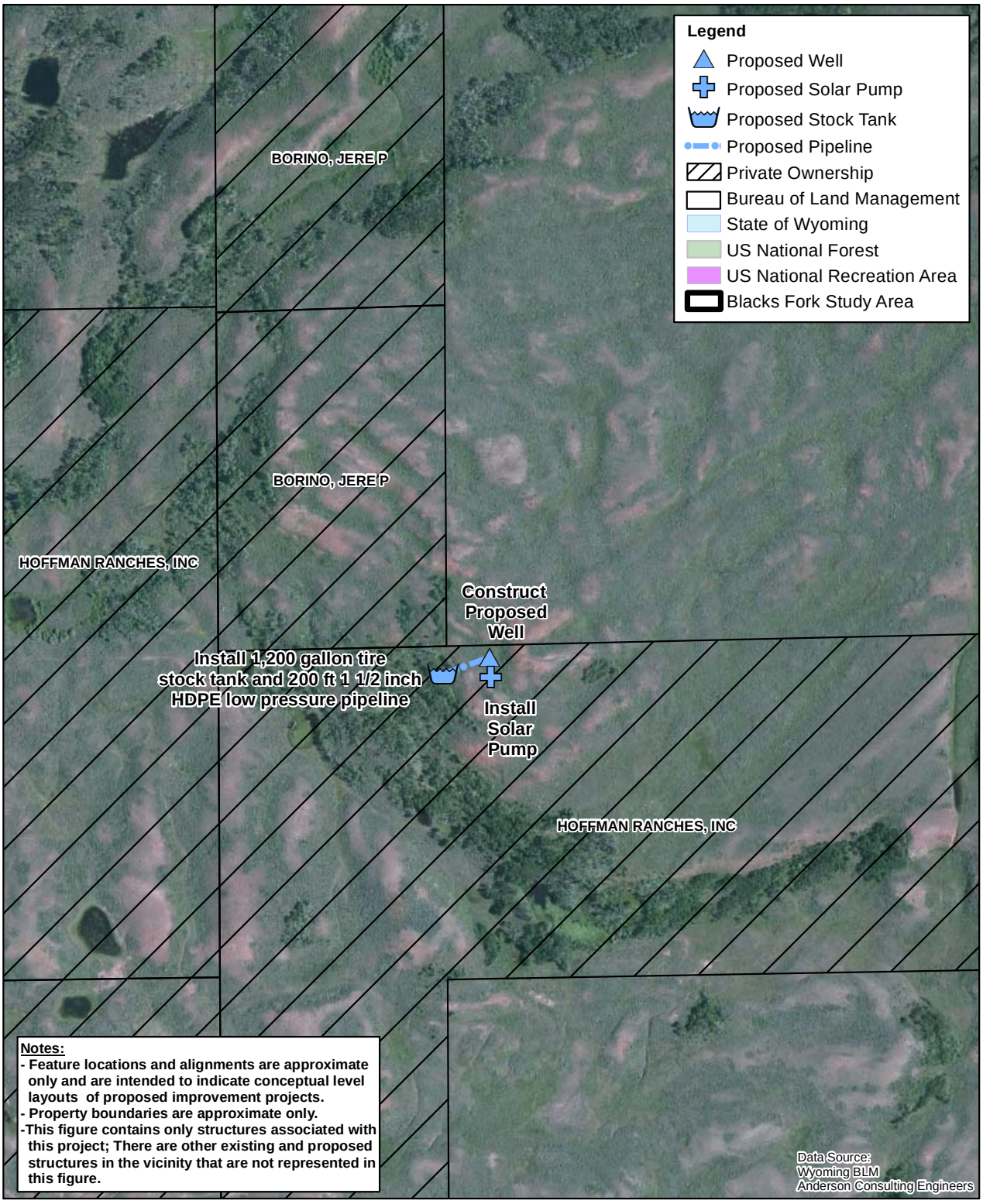


Figure 3.3-11 Conceptual Design L/W-009: Beaver Dam Creek Well Project (Hoffman 001)

- Approximately 200 linear feet of buried 1 ½ inch HDPE low-pressure pipeline would be routed west to a 1,200 gallon stock tank.
- Requisite valves and fittings would be incorporated to facilitate management of flows and water levels.
- Wildlife egress ramps would be installed in the proposed stock tank.

Note that the proposed project as delineated would involve only deeded lands.

3.3.6 L/W-010: Corral Creek Well Project (Project ID: Hoffman 002)

This project would involve the construction of a well in the vicinity of an existing spring. According to the landowner, a spring and associated wetted area supporting wetland vegetation formed following drilling activities associated with seismic exploration. The site is located in the Corral Creek subwatershed (Section 19, Township 24 North, Range 116 West). The well would be equipped with a solar pump and a 1,200 gallon stock tank. This project would provide a reliable source of water which would be an alternative to riparian sources. Figure 3.3-12 displays the conceptual design of the project.

Under this alternative, the following components would be employed:

- A new well would be constructed in the vicinity of the existing spring. Based upon information pertaining to existing wells in the immediate vicinity, the depth of the proposed well would be on the order of 250 feet deep.
- The proposed well would be equipped with a solar pump facility.
- Approximately 200 linear feet of buried 1 ½ inch HDPE low-pressure pipeline would be routed west to a 1,200 gallon stock tank.
- Requisite valves and fittings would be incorporated to facilitate management of flows and water levels.
- Wildlife egress ramps would be installed in the proposed stock tank.

Note that the proposed project as delineated would involve only deeded lands.

3.3.7 L/W-011: Fenn Creek Stock Reservoir (Project ID: Hoffman 003)

This project would involve the construction of a new stock reservoir in Section 19, Township 24 North, Range 116 West. The project would provide a reliable source of water for livestock and wildlife in area where the nearest alternative would be over one mile away. Figure 3.3-13 displays the general location of the proposed project.

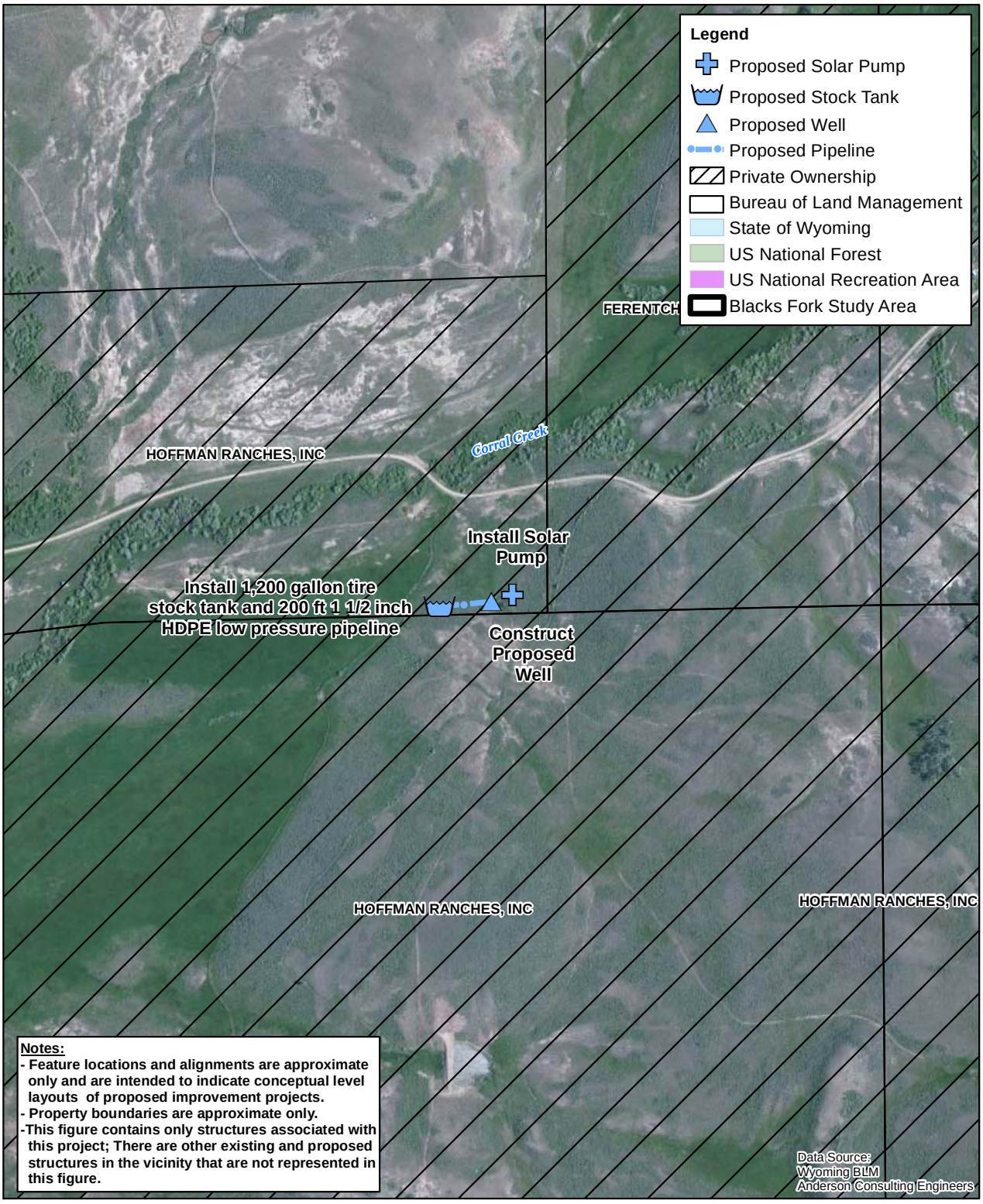


Figure 3.3-12 Conceptual Design L/W-010: Corral Creek Well Project (Hoffman 002)

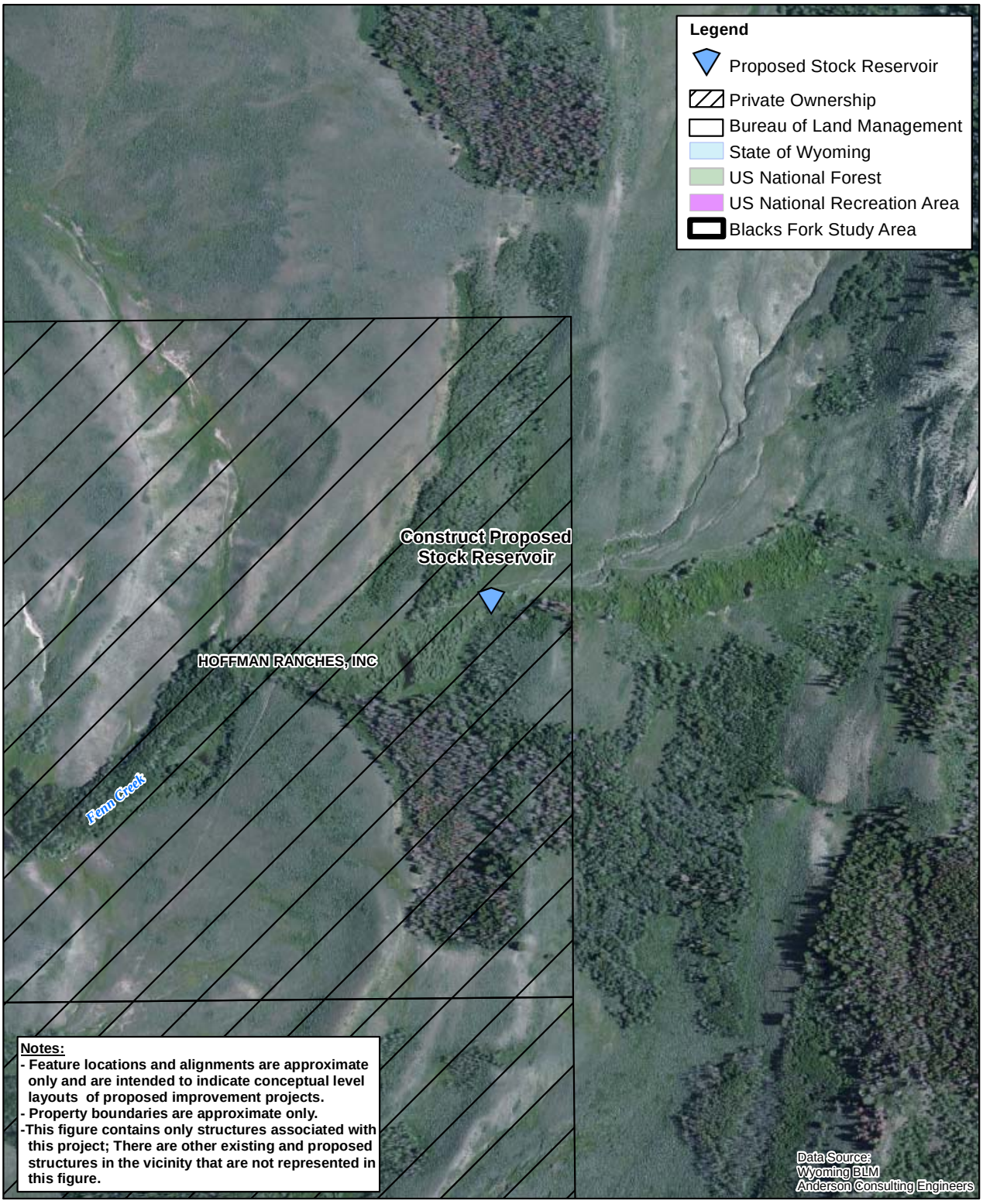


Figure 3.3-13 Conceptual Design L/W-011: Fenn Creek Stock Reservoir (Hoffman 003)

Under this alternative, the following components would be employed:

- An earthen embankment would be constructed on Fenn Creek.
- The stock reservoir would be equipped with an adequate outlet (ex. Agri-Drain) to manage releases.

Note that the proposed project as delineated would involve only deeded lands.

3.3.8 L/W-012: Robert Fox Stock Reservoir Rehabilitation (Project ID: Hoffman 004)

This project would involve the reconstruction / repair of the Robert Fox Stock Reservoir (Permit No. P19737.0S) which breached in the Spring of 2014. The reservoir has a permitted capacity of 1.63 acre-feet. As indicated in Figure 3.3-14, the reservoir over-topped during spring runoff, resulting in failure of the embankment. The reservoir is located in Section 30, Township 24 North, Range 116 West on Fenn Creek as indicated in Figure 3.3-15.

Figure 3.3-14 Reservoir Embankment Failure.

Under this alternative, the following components would be utilized:

- A suitable outlet structure would be installed to control water surface elevations and reservoir releases (ex. AgriDrain outlet as displayed in Figure 3.3-16.
- The existing spillway would be armored with rock riprap to protect it in the event of overtopping
- The existing embankment would be repaired.

Note that the proposed project as delineated would involve only federally owned lands managed by the Bureau of Land Management.

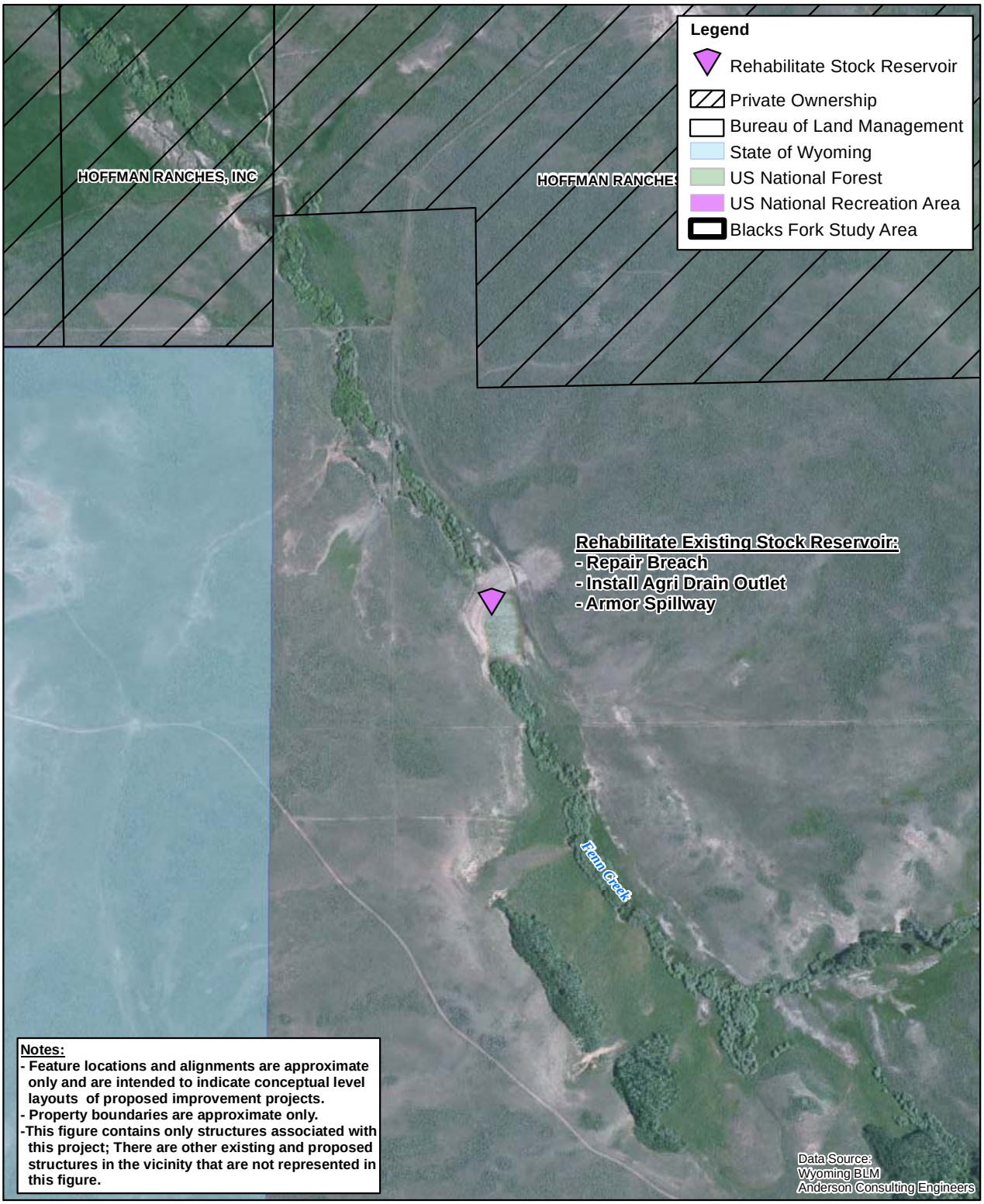


Figure 3.3-15 Conceptual Design L/W-012: Robert Fox Stock Reservoir Rehabilitation (Hoffman 004)

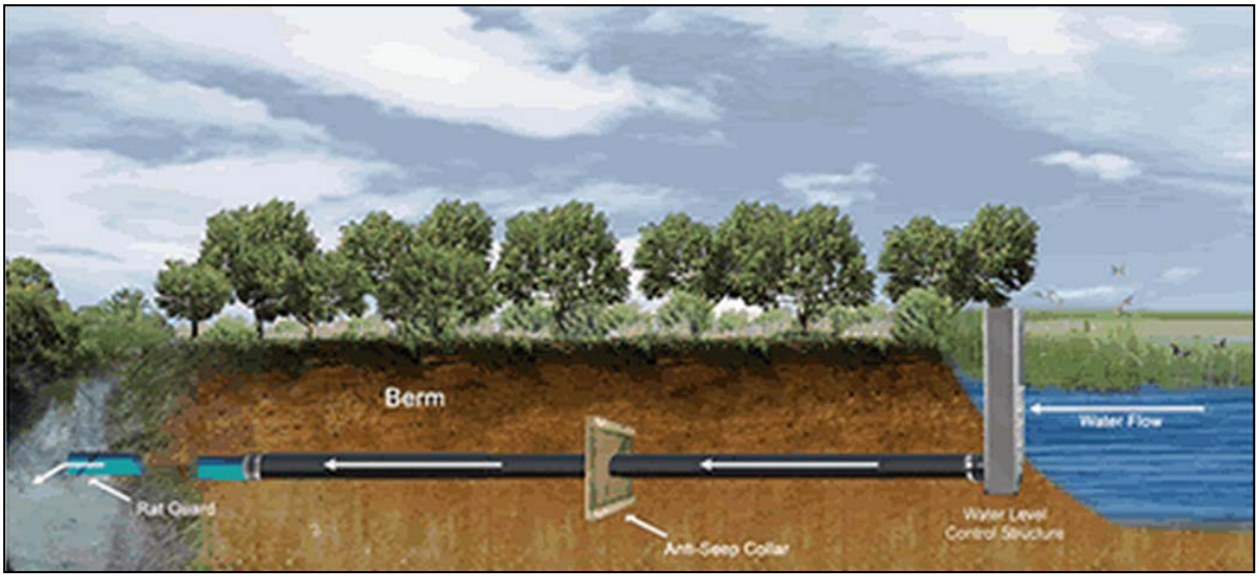


Figure 3.3-16 Typical Agridrain Inlet Water Level Control Structure.

3.3.9 L/W-013: State Section Pipeline Project (Project ID: Julian 001)

This alternative would involve utilizing a previously developed spring in the Willow Creek subwatershed located in Section 15, Township 23, Range 116. The alternative would supply water to a portion of the watershed lacking adequate alternative livestock and wildlife upland water sources. Figure 3.3-17 displays the conceptual design of the project.

Under this alternative, the following components would be employed:

- A previously developed spring would be utilized as a source of water. Currently, the spring facility includes a livestock watering facility. A valve would be included for management of pipeline flows.
- From the spring, water would drain by gravity easterly to an additional livestock watering facility. The watering facility would be designed to enable sheep to utilize it.
- Approximately 2,000 linear feet of buried 1 ½ inch HDPE low-pressure pipeline would be required.
- Requisite valves and fittings would be incorporated to facilitate management of flows and water levels.
- Wildlife egress ramps would be installed in the proposed stock tank.
- The spring vicinity would be fenced to prevent spring development damage from livestock and wildlife.

Note that the proposed project as delineated would be constructed entirely on lands owned by the State of Wyoming.

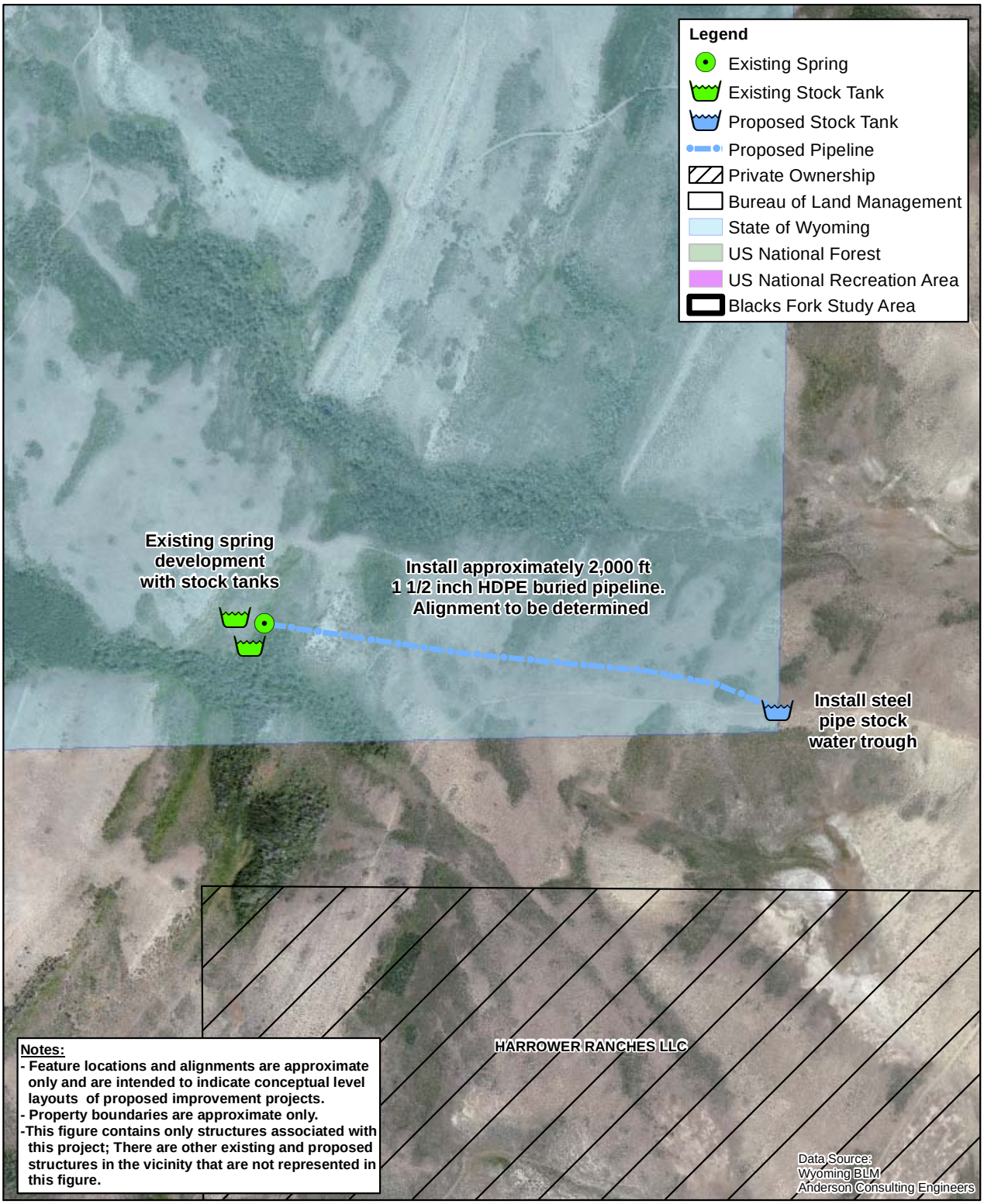


Figure 3.3-17 Conceptual Design L/W-013 State Section Pipeline Project (Julian 001)

3.3.10 L/W-014: MAU #2 Well Modification (Project ID: Julian 002)

This alternative would involve the modification of facilities associated with an existing well located within the Willow Creek subwatershed (Section 3, Township 23N, Range 116W). Under this alternative, the well would be equipped with a solar pump. The alternative would supply water to a portion of the watershed lacking adequate alternative livestock and wildlife upland water sources. Figure 3.3-18 displays the location of the project.

Under this alternative, the following components would be employed:

- The existing well would be equipped with a solar platform consisting of solar panels, solar powered pump, batteries, and all requisite regulators, connections and housings.
- A 1,200 gallon stock tank would be installed at the well.
- Requisite valves and fittings would be incorporated to facilitate management of flows and water levels.
- Wildlife egress ramps would be installed in the proposed stock tank.

Note that the proposed project as delineated would be constructed entirely on lands owned by the State of Wyoming.

3.3.11 L/W-015: Oyster Ridge Pipeline Project (Project ID: Julian 003)

This alternative would involve the development of an existing spring adjacent to East Branch Willow Creek and located on deeded property. This alternative would provide a source of water which would be an alternative to riparian sources. Figure 3.3-19 displays the conceptual design of the project.

Under this alternative, the following components would be employed:

- An existing spring would be developed in Section 6, Township 22 North, Range 115 West. A valve would be included for management of pipeline flows.
- The buried 1 ½ inch HDPE low-pressure pipeline (approx. 1,300 feet) would be routed southeasterly from the spring to a stock tank located upslope and away from the riparian corridor.
- A stock watering facility and 5,000 gallon storage tank would be constructed at the pipe's end which would facilitate watering of sheep.
- Requisite valves and fittings would be incorporated to facilitate management of flows and water levels.
- Wildlife egress ramps would be installed in the proposed watering facility.
- The spring vicinity would be fenced to prevent spring development damage from livestock and wildlife.

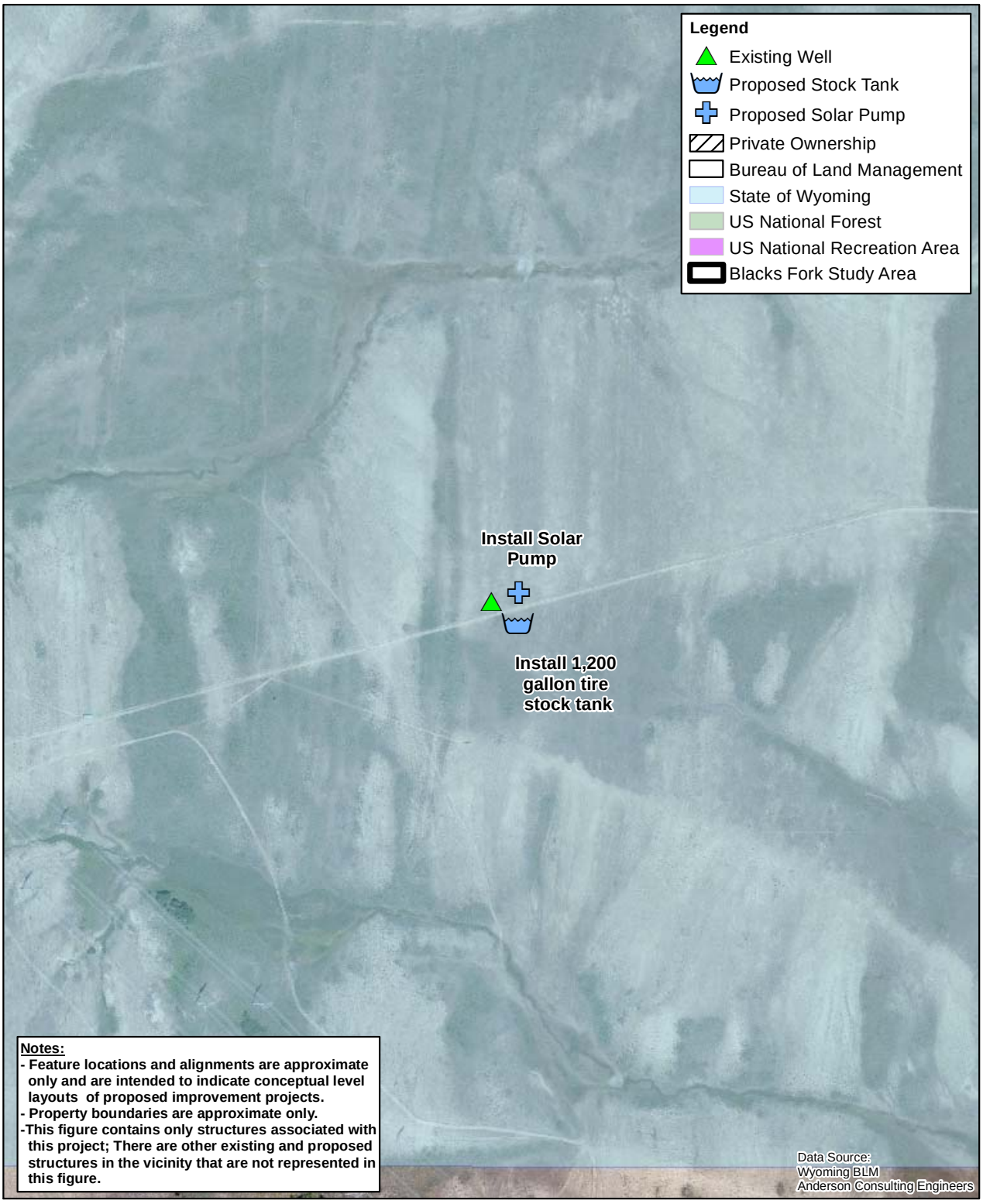


Figure 3.3-18 Conceptual Design L/W-014: MAU #2 Well Modification (Julian 002)

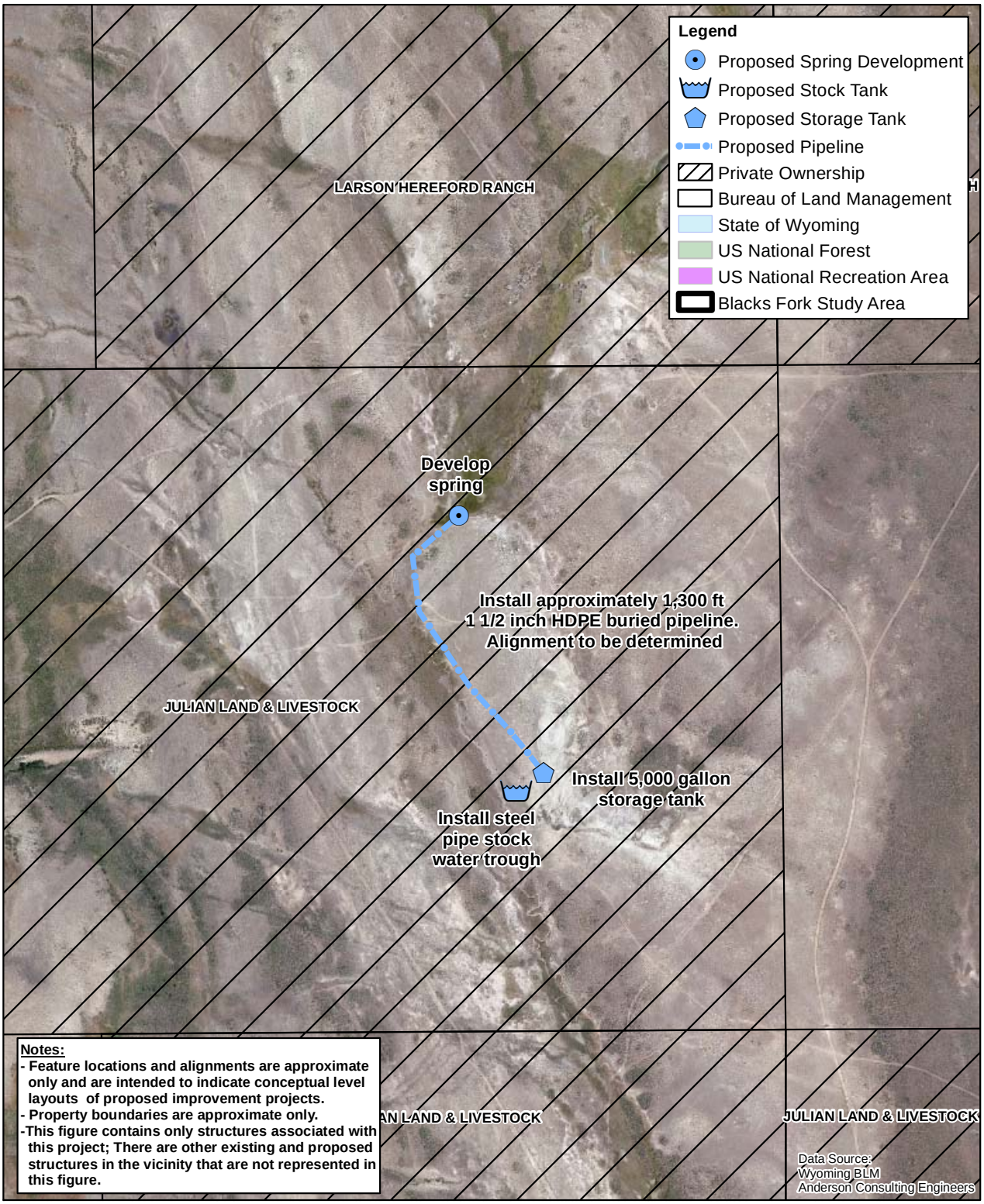


Figure 3.3-19 Conceptual Design L/W-015: Oyster Ridge Pipeline Project (Julian 003)

Note that the proposed project as delineated would be constructed entirely on privately owned deeded properties.

3.3.12 L/W-016: Lamborn Pipeline Project No. 1 (Project ID: Lamborn 001)

This alternative would involve the construction of a shallow well within the Lower Hams Fork watershed (Sections 21 and 22, Township 21 North, Range 113 West). The well would be equipped with a solar pump, pipeline, and two 1,200 gallon stock tanks. The alternative would supply water to two landowners in a portion of the watershed lacking adequate alternative livestock and wildlife upland water sources. Figure 3.3-20 displays the conceptual design of the project.

Under this alternative, the following components would be employed:

- A new well would be constructed. Based upon information pertaining to existing wells in the immediate vicinity, the depth of the proposed well would be approximately 50 feet deep.
- A solar platform consisting of solar panels, solar powered pump, batteries, and all requisite regulators, connections and housings would be installed
- Approximately 1,250 linear feet of buried 1 ½ inch HDPE low-pressure pipeline would be routed south to a 1,200 gallon stock tank. Placement of the pipeline would require utilization of an existing crossing (culvert) under the Union Pacific railroad tracks.
- From the first tank, an additional 2,150 feet of 1 ½ inch HDPE low-pressure pipeline would be routed westerly to the adjacent land owner's property where a second 1,200 gallon stock tank would be installed.
- Requisite valves and fittings would be incorporated to facilitate management of flows and water levels.
- Wildlife egress ramps would be installed in the proposed stock tank.

Note that the project as delineated would involve only private lands.

3.3.13 L/W-017: Walker Pipeline Project No. 1 (Project ID: Walker 001)

This project involves drilling a new well, installing a solar pump, and routing a pipeline approximately 10,650 feet to two new stock tanks. The project is located in the Section 28, 29,32, 33, Township 21 North, Range 113 West. The alternative would supply water to a portion of the watershed lacking adequate alternative livestock and wildlife upland water sources. Figure 3.3-21 displays the conceptual design of the project.

Under this alternative, the following components would be employed:

- A new well would be drilled.

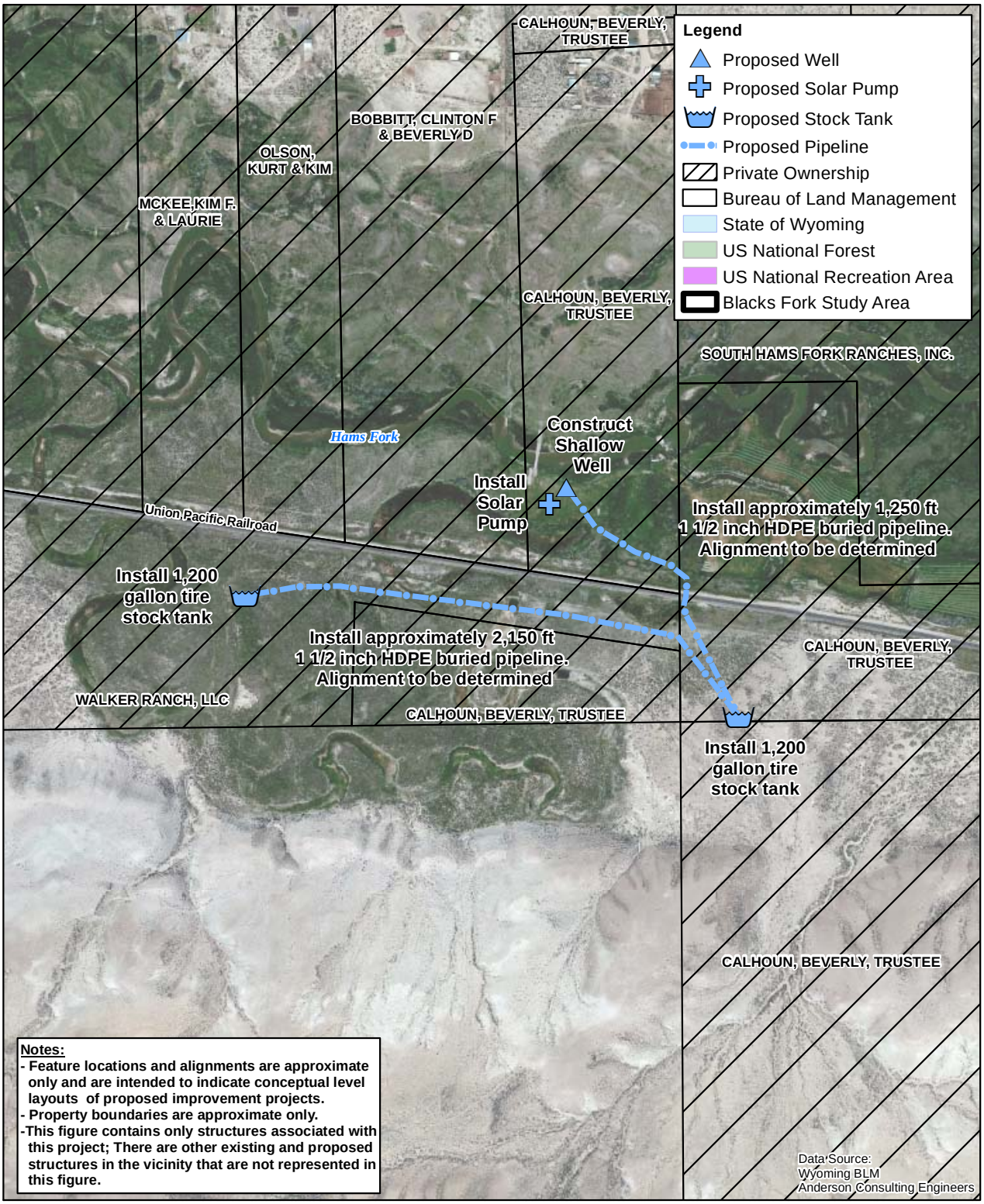


Figure 3.3-20 Conceptual Design L/W-016: Lamborn Pipeline Project No. 1 (Lamborn 001)

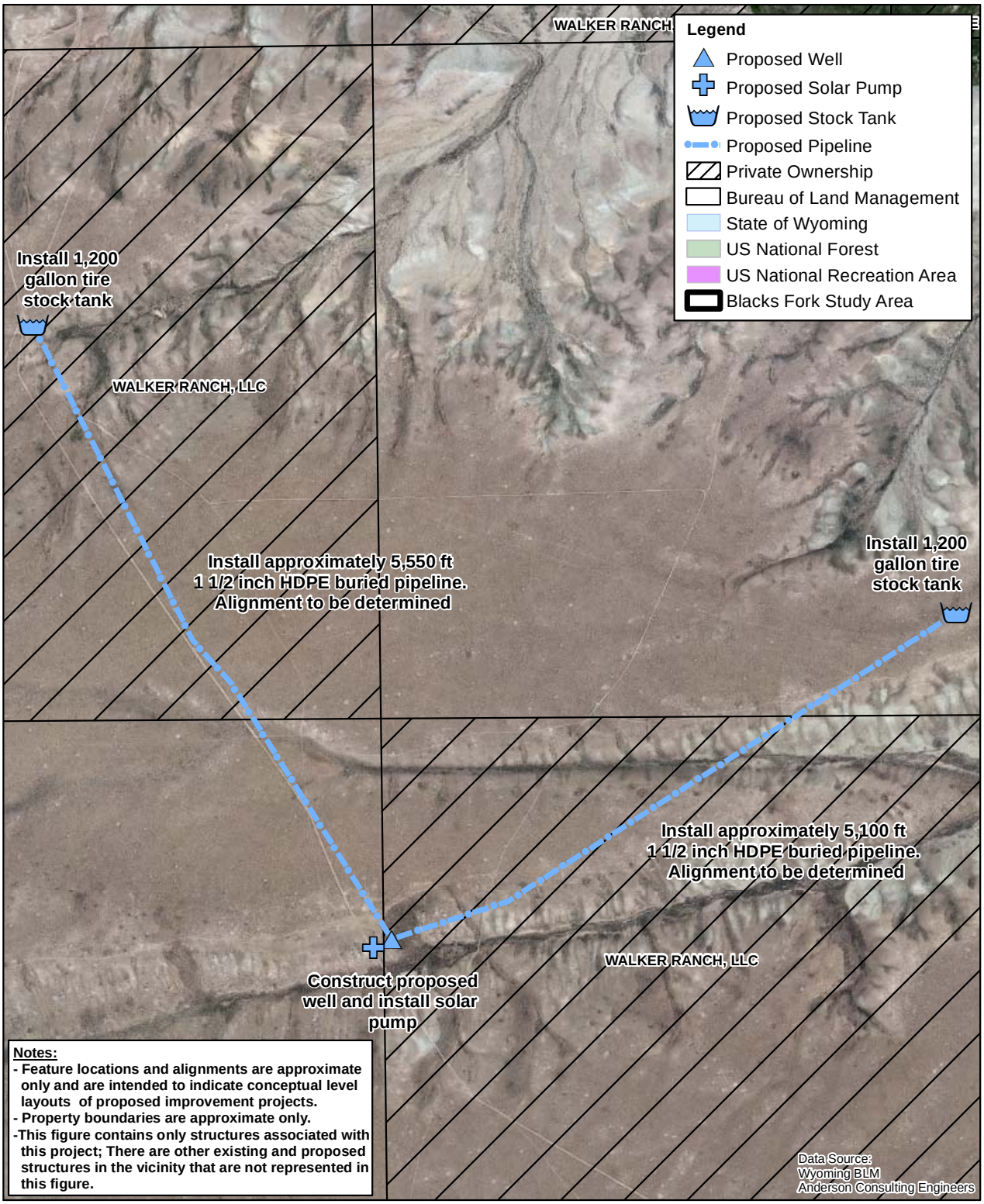


Figure 3.3-21 Conceptual Design L/W-017: Walker Pipeline Project No. 1 (Walker 001)

- Based upon review of available information from the WSEO, it appears that a well in this vicinity would be required to be drilled to a depth of approximately 100 to 200 feet deep to penetrate a viable water source.
- The proposed well would be equipped with a solar pump facility.
- A buried 1 ½ inch HDPE low-pressure pipeline (approx. 5,550 feet) would be routed northwesterly from the well to a proposed stock tank
- An additional 1 ½ inch buried HDPE low-pressure pipeline (approximately 5,100 feet would be routed northeasterly to a second proposed stock tank.
- Requisite valves and fittings would be incorporated to facilitate management of flows and water levels.
- Wildlife egress ramps would be installed in the proposed stock tanks.

Note that the proposed project as delineated would involve coordination with BLM because both pipelines cross federally owned lands managed by the BLM.

3.3.14 L/W-018: Walker Well Replacement Project No. 1 (Project ID: Walker 002)

This project involves replacement of an existing well, installing a solar pump, installing a stock tank, and routing stock tank overflow to an existing stock reservoir. The project is located in the Section 33, Township 21 North, Range 113 West. The alternative would supply water to a portion of the watershed lacking adequate alternative livestock and wildlife upland water sources. Figure 3.3-22 displays the conceptual design of the project. According to the landowner, the existing well produces low levels of water and its yield needs to be increased. The most practical solution at this location appears to be construction of a new well in the vicinity of the old well.

Under this alternative, the following components would be employed:

- A new well would be drilled and a 1,200 gallon stock tank would be installed.
- Based upon review of available information from the WSEO, it appears that a well in this vicinity would be required to be drilled to a depth of approximately 100 to 200 feet deep to penetrate a viable water source.
- The proposed well would be equipped with a solar pump facility.
- The existing stock reservoir reportedly does not retain water; consequently lining the pond with bentonite is recommended in order to reduce seepage losses.
- Requisite valves and fittings would be incorporated to facilitate management of flows and water levels.
- Wildlife egress ramps would be installed in the proposed stock tank.

Note that the proposed project as delineated would involve only privately owned lands.

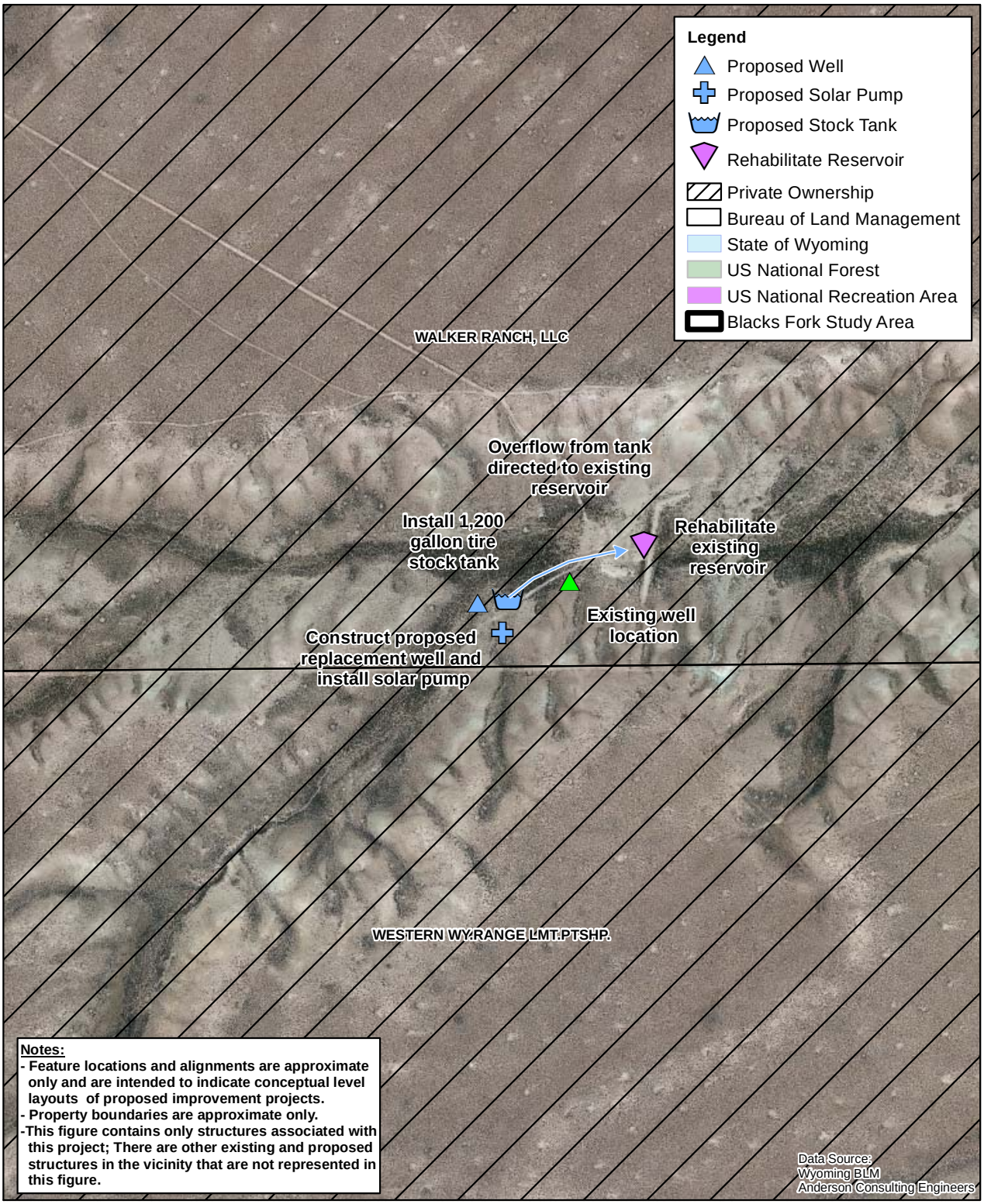


Figure 3.3-22 Conceptual Design L/W-018: Walker Well Replacement Project No. 1 (Walker 002)

3.3.15 L/W-43, L/W-44, and L/W 52: UDC Projects (Project IDs UDC-001, UDC-002, and UDC-010)

Three projects identified by the Uinta Development Company (UDC) are located within the boundaries of the Phase I investigation. Table 3.3-3 tabulates the various construction components associated with these three projects. *As presented in the Basinwide Report, conceptual designs and narratives of UDC projects were not prepared in this Level I investigation*.

Table 3.3-3 UDC Project Construction Components.

Project Name	UDC Waypoint	Priority	Develop Source	Fence Source - 850'	Diversion Repair	Supply Ditch-Earthwork	Supply Ditch-Rock	Excavate Pond/Pit (Sediment Removal)	Line Pond/Pit (Bentonite)	Install Principal Outlet (Agri-Drain)	Repair Embankment-Earthwork	Repair Emergency Spillway-Earthwork	Repair Emergency Spillway-Rock	Install Buried Pipe - 300'	Install Stock Tank	Latitude (dd.ddd)	Longitude (dd.ddd)	QQ	Section	Town	Range	Pasture
Watershed Component L/W-043 (UDC-001)	8	High				x	x	x	x			x				41.6759	-110.06	NENE	33	T 20 N	R 112 W	SEVEN MILE
Watershed Component L/W-044 (UDC-002)	9	Low								x	x	x				41.6722	-110.059	NENE	33	T 20 N	R 112 W	SEVEN MILE
Watershed Component L/W-052 (UDC-010)	21	Low						x	x	x	x	x				41.7789	-110.16	SWSW	19	T 21 N	R 112 W	SEVEN MILE

3.4 Grazing Management Opportunities (Watershed Management Plan Component G)

3.4.1 State and Transition Models

The concepts and descriptions of Ecological Sites are covered in the Blacks Fork Watershed Basinwide Volume. Please refer to that volume for more information. The ESD for a given ecological site contains a wealth of information pertaining to the site and its community. Within each ESD is a State and Transition model.

Based upon the mapping which is available for the Phase I study area (see Figure 2.2-7 in Appendix 2A), there are several ecological sites which are predominant. These ecological sites are:

- Loamy (Ly) 7-9" Green River and Great Divide Basins
- Loamy (Ly) 10-14" Foothills and Basins West
- Shallow Loamy (SwLy) 7-9" Green River and Great Divide Basins

It is important to note that other ecological sites will be encountered and that the list above is provided as an initial point for prescription of grazing practices. Prior to prescription of a grazing management plan, local site-specific conditions must be considered and the appropriate ESD determined.

Loamy (Ly) 7-9" Green River and Great Divide Basins

The interpretive plant community for this site is the Historic Climax Plant Community. This state evolved with grazing by large herbivores and is well suited for grazing by domestic livestock. Potential vegetation

is estimated at 75% grasses or grass-like plants, 10% forbs, and 15% woody plants. The major grasses include thickspike wheatgrass, needleandthread, Indian ricegrass, bluebunch wheatgrass, prairie junegrass, and bottlebrush squirreltail. Other grasses occurring in the state may include Sandberg and Canby bluegrass, threadleaf and needleleaf sedge, and plains reedgrass. Wyoming big sagebrush is the dominant woody plant. Other woody species may include green rabbitbrush, bud sagebrush, shadscale, spiny hopsage, and winterfat.

A typical plant composition for this state consists of thickspike wheatgrass 10-30%, needleandthread 10-20%, Indian ricegrass 10-20%, up to 10% prairie junegrass, up to 10% bottlebrush squirreltail, up to 10% bluebunch wheatgrass, other grasses and grass-like plants 5-15%, perennial forbs 5-15%, Wyoming big sagebrush 5-15%, and 5-15% other woody species. The overstory of sagebrush and understory of grass and forbs provide a diverse plant community that will support domestic livestock and wildlife such as mule deer and antelope. Ground cover, by ocular estimate, varies from 20-35%.

The total annual production (air-dry weight) of this state is about 500 lbs./acre, but it can range from about 300 lbs./acre in unfavorable years to about 700 lbs./acre in above average years.

This plant community is extremely stable and well adapted to the Cool Central Desertic Basins and Plateaus climatic conditions. The diversity in plant species allows for high drought tolerance. This is a sustainable plant community (site/soil stability, watershed function, and biologic integrity).

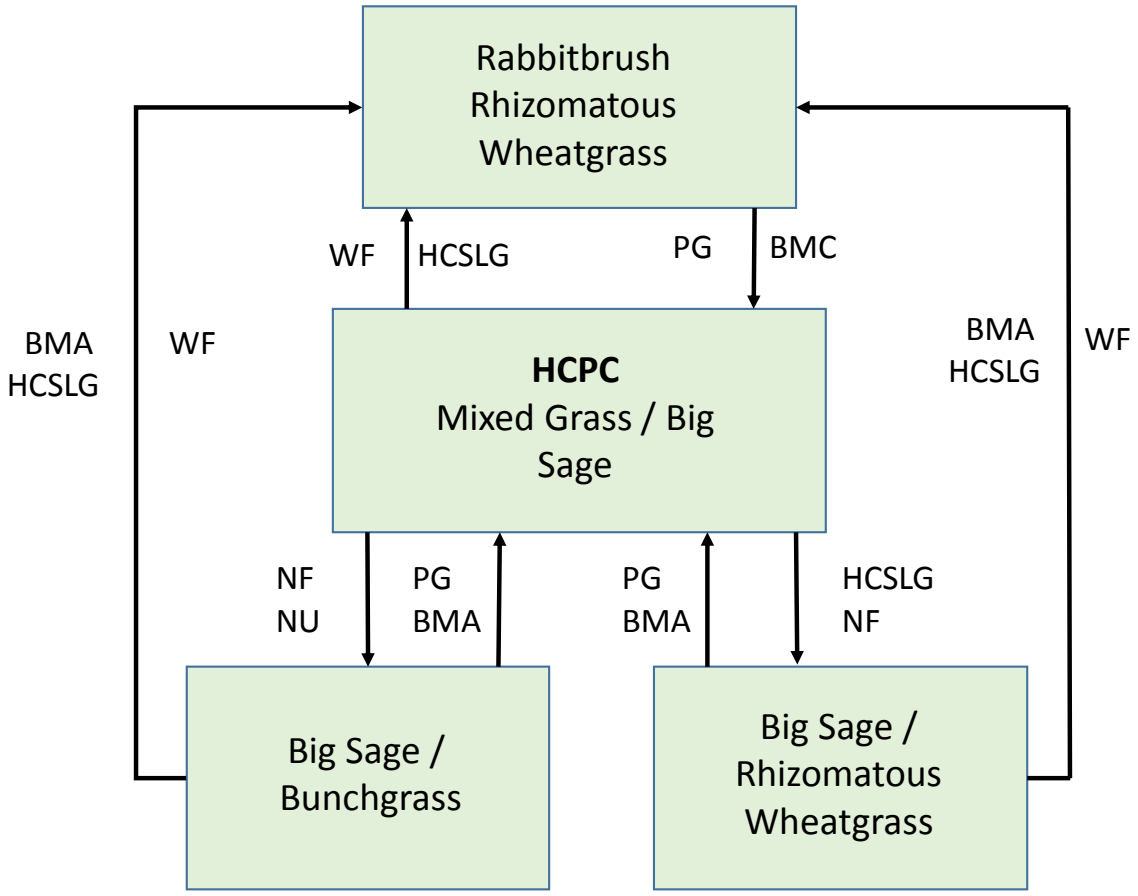
Transitions or pathways leading to other plant communities are as follows:

- *Nonuse and No Fire will convert this plant community to the Big Sagebrush/Bunchgrass State.*
- *Heavy Continuous Season-long Grazing and No Fire will convert this plant community to the Big Sagebrush/Rhizomatous Wheatgrass State.*
- *Wildfire with Heavy Continuous Season-long Grazing will convert this plant community to the Douglas Rabbitbrush/Rhizomatous Wheatgrass State.*

Figure 3.4-1 displays the state and transition model for this site.

Loamy (Ly) 10-14" Foothills and Basins West

The interpretive plant community for this site is the Historic Climax Plant Community. This state evolved with grazing by large herbivores and is well suited for grazing by domestic livestock. Potential vegetation is estimated at 75% grasses or grass-like plants, 10% forbs, and 15% woody plants. The major grasses include rhizomatous wheatgrass, bluebunch wheatgrass, Letterman needlegrass, Canby bluegrass, and needleandthread. Other grasses may include Indian ricegrass, prairie junegrass, and bottlebrush squirreltail, Sandberg and mutton bluegrass, threadleaf and needleleaf sedge, and plains reedgrass. Wyoming big sagebrush is the dominant woody plant. Other woody species may include green rabbitbrush and winterfat.



BMA – Brush Management (All Methods)	NF – No Fire
BMC – Brush Management (Chemical)	NS – Natural Succession
BMF – Brush Management (Fire)	NWC – Noxious Weed Control
BMM – Brush Management (Mechanical)	NWI – Noxious Weed Invasion
CSP – Chemical Seedbed Preparation	NU - Nonuse
DR - Drainage	P&C – Plow & Crop (including hay)
CSG – Continuous Spring Grazing	PG – Prescribed Grazing
HB – Heavy Browse	RPT – Replant Trees
HCSLG – Heavy Continuous Season – Long Grazing	RS – Re-Seed
HI – Heavy Inundation	SGD – Severe Ground Disturbance
LPG – Long Term Prescribed Grazing	SHC – Severe Hoof Compaction
MT – Mechanical Treatment (chiseling, ripping, pitting)	WD – Wildlife Damage (Beaver)
	WF - Wildfire

Figure 3.4-1 State and Transition Model: Loamy (Ly) 7-9" Green River and Great Divide Basins.

A typical plant composition for this state consists of rhizomatous wheatgrass 10-30%, bluebunch wheatgrass 5-15%, Letterman needlegrass 5-15%, needleandthread 5-10%, Canby bluegrass 5-10%, other grasses and grass-like plants 10-20%, perennial forbs 5-15%, Wyoming big sagebrush 10-20%, and 5-10% other woody species. The overstory of sagebrush and understory of grass and forbs provide a diverse plant community that will support domestic livestock and wildlife such as mule deer and antelope. Ground cover, by ocular estimate, varies from 40-50%.

The total annual production (air-dry weight) of this state is about 1100 lbs./acre, but it can range from about 700 lbs./acre in unfavorable years to about 1500 lbs./acre in above average years.

This plant community is extremely stable and well adapted to the Cool Central Desertic Basins and Plateaus climatic conditions. The diversity in plant species allows for high drought tolerance. This is a sustainable plant community (site/soil stability, watershed function, and biologic integrity).

Transitions or pathways leading to other plant communities are as follows:

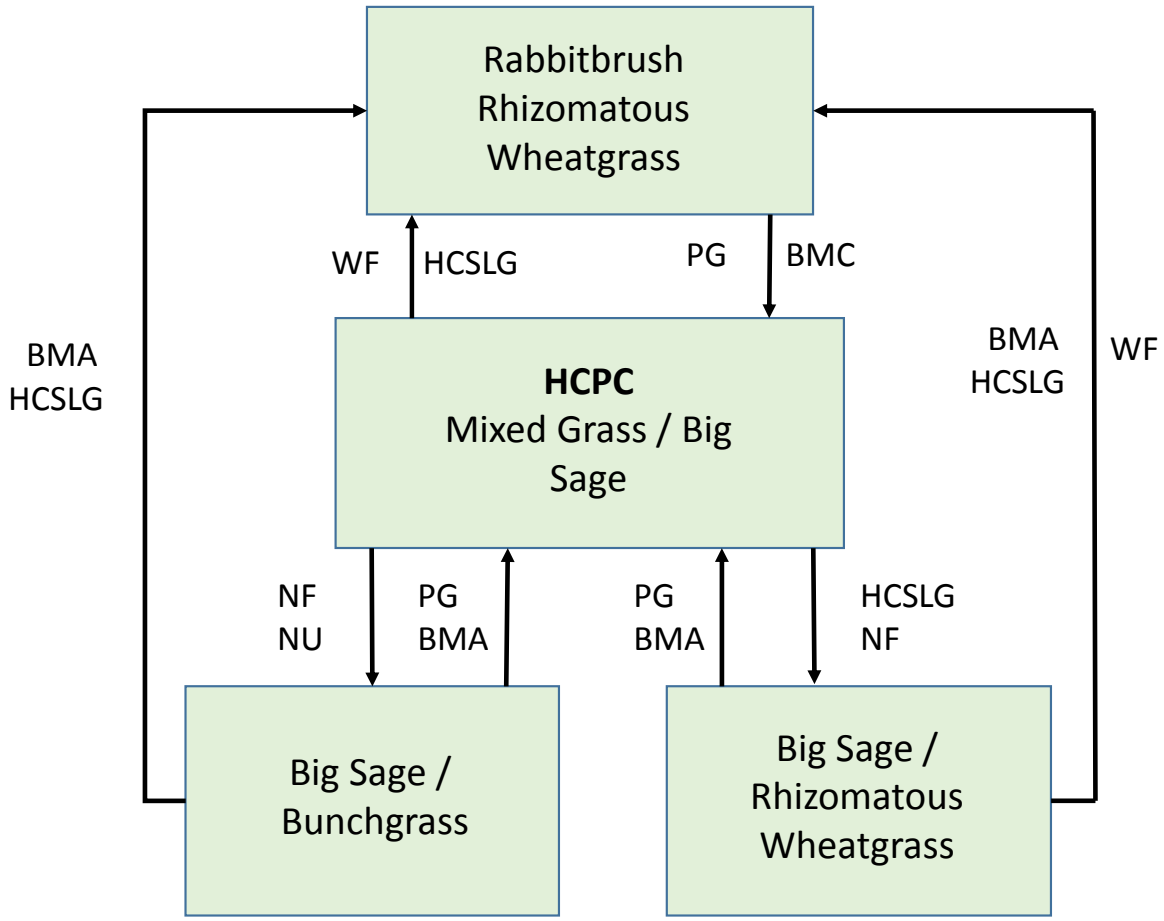
- *Nonuse and No Fire will convert this plant community to the Big Sagebrush/Bunchgrass State.*
- *Heavy Continuous Season-long Grazing and No Fire will convert this plant community to the Big Sagebrush/Rhizomatous Wheatgrass State.*
- *Wildfire with Heavy Continuous Season-long Grazing will convert this plant community to the Rabbitbrush/Rhizomatous Wheatgrass State.*

Figure 3.4-2 displays the state and transition model for this site.

Shallow Loamy (SwLy) 7-9" Green River and Great Divide Basins

The interpretive plant community for this site is the Historic Climax Plant Community. Potential vegetation is about 70% grasses or grass-like plants, 10% forbs, and 20% woody plants. The major grasses include bluebunch wheatgrass, needleandthread, Indian ricegrass, and thickspike wheatgrass. Other grasses include Letterman needlegrass, Sandberg bluegrass, prairie junegrass, bottlebrush squirreltail, Salina wildrye, and needleleaf sedge. Winterfat is the major woody plant. Other woody plants include black, low, and big sagebrush, and green rabbitbrush.

A typical plant composition for this state consists of bluebunch wheatgrass 20-40%, needleandthread 10-20%, Indian ricegrass 10-20%, thickspike wheatgrass 10-20%, other grasses and grass-like plants 5-15%, perennial forbs 5-15%, winterfat 1-10%, and 5-15% other woody species. Ground cover, by ocular estimate, varies from 10-30%. The total annual production (air-dry weight) of this state is about 350 pounds per acre, but it can range from about 200 lbs./acre in unfavorable years to about 450 lbs./acre in above average years. The state is extremely stable and well adapted to the Cool Central Desertic Basins and Plateaus climatic conditions. The diversity in plant species allows for high drought resistance. This is a sustainable plant community (site/soil stability, watershed function, and biologic integrity).



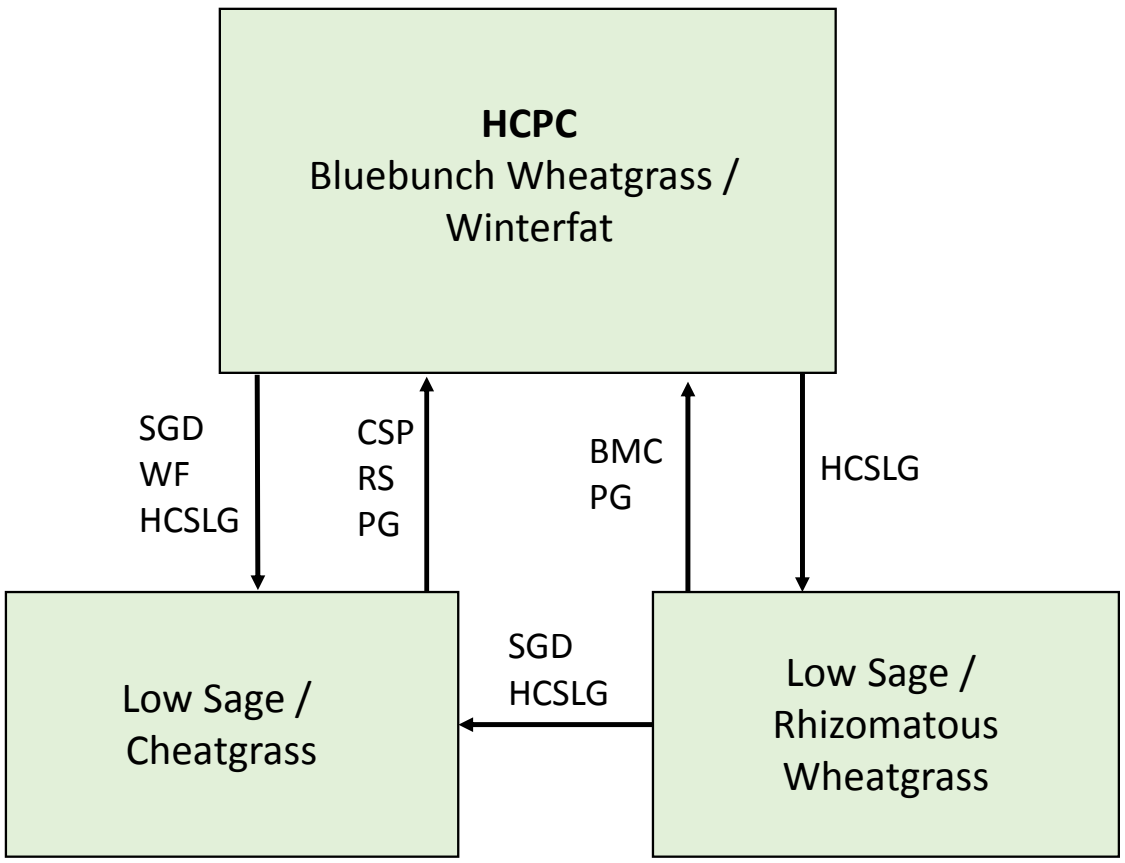
BMA – Brush Management (All Methods)	NF – No Fire
BMC – Brush Management (Chemical)	NS – Natural Succession
BMF – Brush Management (Fire)	NWC – Noxious Weed Control
BMM – Brush Management (Mechanical)	NWI – Noxious Weed Invasion
CSP – Chemical Seedbed Preparation	NU - Nonuse
DR - Drainage	P&C – Plow & Crop (including hay)
CSG – Continuous Spring Grazing	PG – Prescribed Grazing
HB – Heavy Browse	RPT – Replant Trees
HCSLG – Heavy Continuous Season – Long Grazing	RS – Re-Seed
HI – Heavy Inundation	SGD – Severe Ground Disturbance
LPG – Long Term Prescribed Grazing	SHC – Severe Hoof Compaction
MT – Mechanical Treatment (chiseling, ripping, pitting)	WD – Wildlife Damage (Beaver)
	WF - Wildfire

Figure 3.4-2 State and Transition Model: Loamy (Ly) 10-14" Foothills and Basins West.

Transitions or pathways leading to other plant communities are as follows:

- *Wildfire or Severe Ground Disturbance followed by Heavy Continuous Season-long Grazing will convert this plant community to the Low Sagebrush/Cheatgrass State.*
- *Heavy Continuous Season-long Grazing will convert this plant community to the Low Sagebrush/Rhizomatous Wheatgrass State.*

Figure 3.4-3 displays the state and transition model for this site.



BMA – Brush Management (All Methods)	NF – No Fire
BMC – Brush Management (Chemical)	NS – Natural Succession
BMF – Brush Management (Fire)	NWC – Noxious Weed Control
BMM – Brush Management (Mechanical)	NWI – Noxious Weed Invasion
CSP – Chemical Seedbed Preparation	NU - Nonuse
DR - Drainage	P&C – Plow & Crop (including hay)
CSG – Continuous Spring Grazing	PG – Prescribed Grazing
HB – Heavy Browse	RPT – Replant Trees
HCSLG – Heavy Continuous Season – Long Grazing	RS – Re-Seed
HI – Heavy Inundation	SGD – Severe Ground Disturbance
LPG – Long Term Prescribed Grazing	SHC – Severe Hoof Compaction
MT – Mechanical Treatment (chiseling, ripping, pitting)	WD – Wildlife Damage (Beaver)
	WF - Wildfire

Figure 3.4-3 State and Transition Model: Shallow Loamy (SwLy) 7-9" Green River and Great Divide Basins.

3.5 Water Storage Opportunities

Three potential reservoir storage projects were identified within this phase of the Blacks Fork Watershed investigation. Two involve construction or modification of large facilities. The third consists

of rehabilitation of an existing small reservoir. Table 3.5-1 tabulates the projects and pertinent information. Figure 3.5-1 shows their location.

Table 3.5-1 Phase I Water Storage Opportunities.

Watershed Plan Component	Study Area Phase	Project Name	Action	Source	Storage	
					Existing	New Construction/ Enlarged
Large Reservoirs						
S-001	1	Viva Naughton Reservoir	Enlargement	Hams Fork	69,645	+5,000
S-004	1	Dempsey Basin Reservoir	New Construction	Dempsey Gulch	N/A	+24,180
Small Reservoirs						
S-009	1	Davis Reservoir	Rehabilitation	Lake Creek	98.9	N/A

3.5.1 S-001 Viva Naughton Reservoir Enlargement

Viva Naughton Reservoir (Figure 3.5-2) and its potential enlargement has been the subject of study for many years. The following extract from the WWDC's Legislative Report describes the need and history of project development:

"The evaluation of existing agricultural uses has shown a need for additional storage on the Hams Fork River. Additional storage could provide a much needed source of late season water to all uses below the dam, including the Hams Fork Water Users Association, and downstream municipalities

2001 investigations completed for the Green River Groundwater Recharge and Alternate Storage Study indicated enlarging Viva Naughton Reservoir was one of the more efficient water development projects in the state. The existing reservoir is owned and operated by PacifiCorp, who has expressed an interest in the further investigation of the potential enlargement of Viva Naughton. The reservoir has an existing capacity of 45,465 acre-feet. PacifiCorp has water right filings for an additional 36,430 acre-feet of storage.

During the 2002 Budget Session, the water users in the Hams Fork Valley requested and received funding for a Level II Storage Feasibility Study to investigate potential options for additional water supplies on the Hams Fork. Three options, Viva Naughton enlargement, Dempsey Basin dam and Willow Creek dam, were identified with conceptual level cost estimates all in the same range. The Level II study concluded that shortages did exist within the Hams Fork Basin and that any of the three options could ease shortages if constructed.

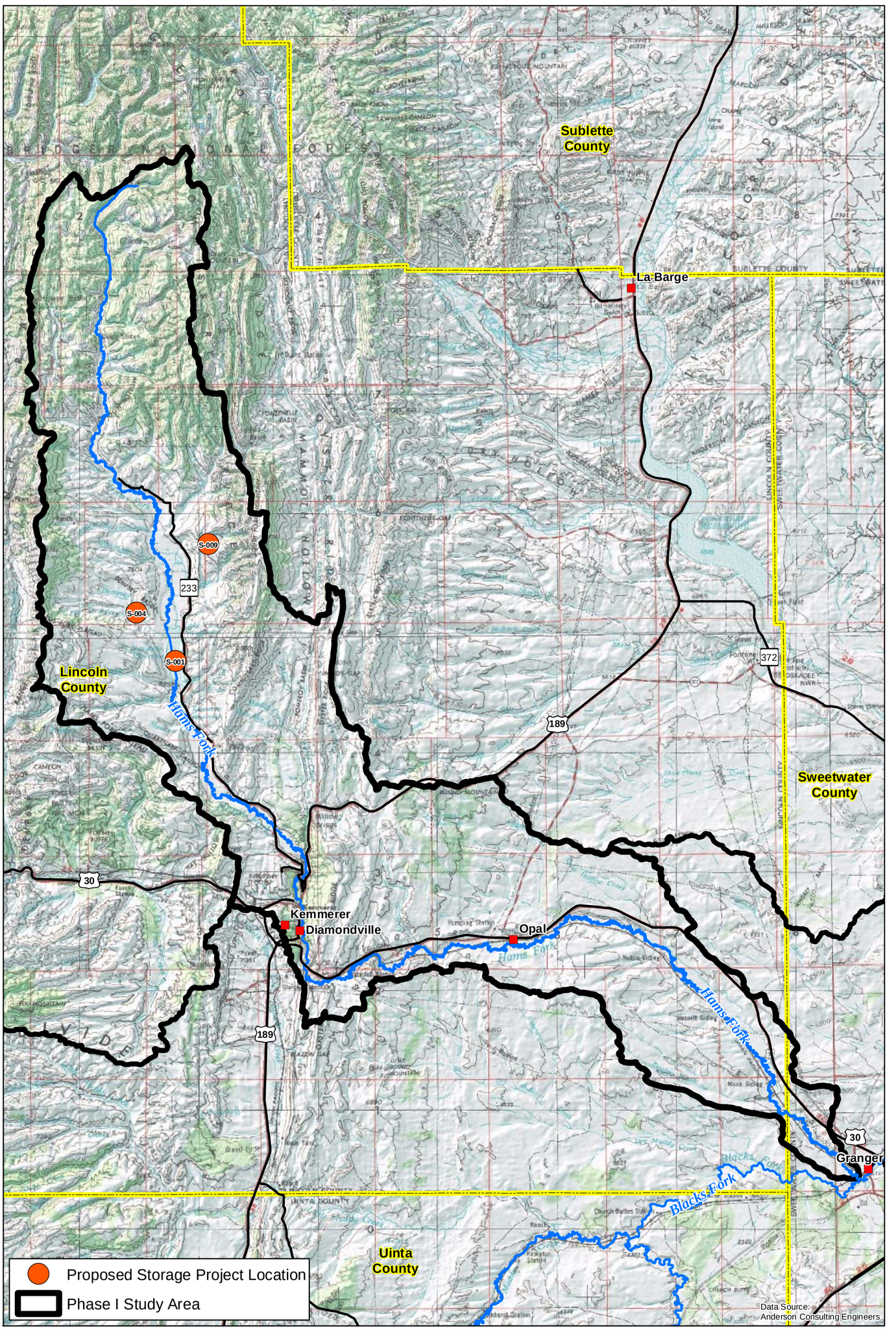


Figure 3.5-1 Blacks Fork Watershed Phase I: Proposed Storage Project Locations

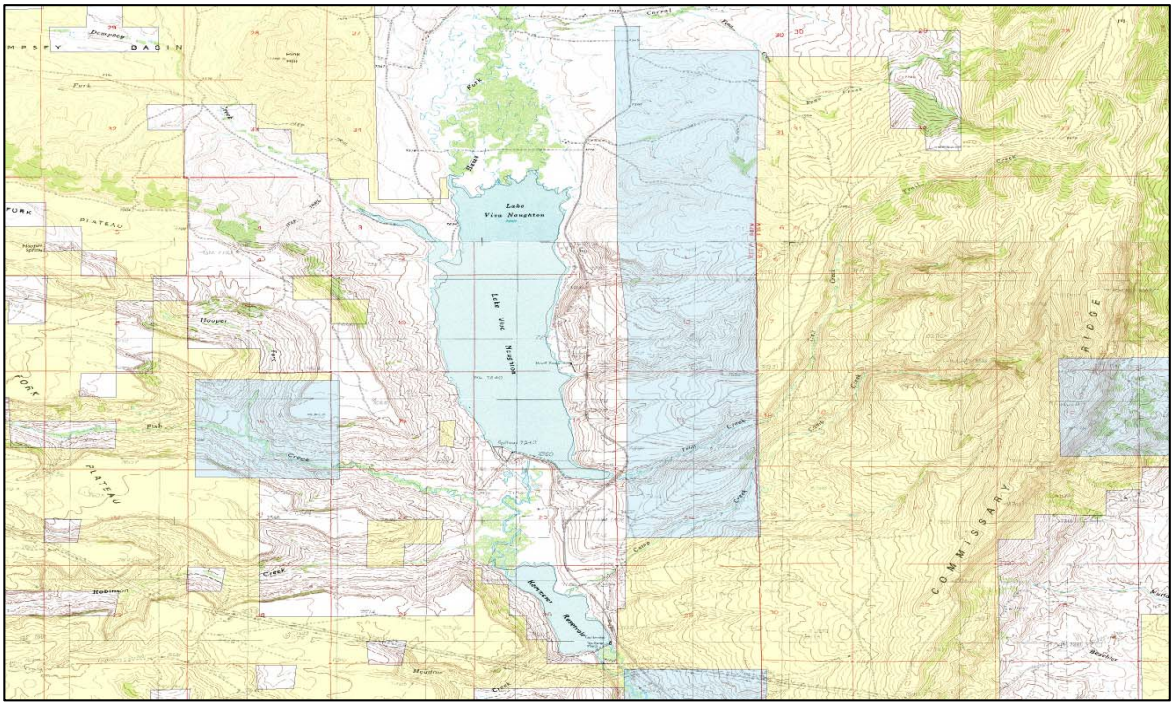


Figure 3.5-2 Viva Naughton Reservoir Location Map.

In 2005, an appropriation was authorized during the General Session to complete a Level II, Phase II Storage Feasibility Study to obtain required geotechnical and wetland information to further refine storage feasibility. Before the geotechnical drilling could start, a Temporary Use Permit from BLM was required. The Dempsey – Hockaday Cutoff of the Oregon Trail runs through the Dempsey Basin Reservoir site. This trail is considered pristine in places within the basin. As a result, it took longer than expected to acquire the Temporary Use Permit to explore Dempsey Basin, later renamed Lower Dempsey Basin. During this time, wetlands classifications, archeological investigations, refined hydrologic needs analyses, and surveying work were completed. After the above items were finished, an interim report summarizing the results and outlining an approach to the geotechnical drilling work was completed.

In 2007, supplemental funding was authorized during the General Session to complete the Level II, Phase II Storage Feasibility Study and the Temporary Use Permit for the project was issued by the United States Department of the Interior Bureau of Land Management. Geotechnical drilling at Lower Dempsey Basin and Viva Naughton was completed and the results analyzed. During that time, an alternative storage site upstream of the Lower Dempsey Basin site was identified (Upper Dempsey Basin) that could potentially have been more favorable in the aspect of land ownership, NEPA, SHPO, and embankment quantities.

Additional funding was authorized from the Dam and Reservoir Program during the 2009 General Session to continue the Level II, Phase II study. The additional funds were to allow further exploration and drilling of the Upper Dempsey Basin site. The work was completed in 2009 and the data has been analyzed. The Upper Dempsey Basin site does appear geotechnically feasible. However, during the time

of the Level II, Phase II study, the Wyoming Governor's Office has issued several executive orders (EO) addressing the Greater Sage-Grouse in Wyoming. The latest EO 2011-5 includes a method for use in determining compliance with the EO for new projects, referred to as the Density and Disturbance Calculation Tool (DDCT). The DDCT is used to determine if the proposed new disturbance, combined with existing and permitted disturbances in the area, are below 5% of the DDCT area and result in an average of <1 disruptive activity (defined as oil and gas wells and mines) per 640 acres within the area affected by the project. Based on the results of the DDCT analysis performed for the Level II, Phase II Study, neither the Upper or Lower Dempsey Basin sites would be in compliance with the Governor's EO because total surface disturbance (9.29% for upper; 10.53% for lower) is substantially greater than 5%. Even without the new disturbance, the area of existing disturbance in the DDCT analysis area (7.76% for upper; 8.61% for lower) is already substantially above the 5% threshold. Further analysis is needed to determine if existing impacts include unsuitable Sage Grouse habitat, which could lower percentages or if mitigation is an option.

In the meantime, another alternative has been discussed which would entail enlarging the existing Viva Naughton Reservoir by raising the spillway. This would be a much smaller scale enlargement (5,000 acre-feet), but if temporary inundation can be proven not to adversely impact wetlands and/or habitat, it may be a feasible option. In 2012, the WWDO presented the data on the alternatives to PacifiCorp. The WWDO proposed to develop PacifiCorp's water right permits, for the benefit of water users in the basin, with either a nominal raise of Viva Naughton Reservoir or by pursuing the Upper Dempsey Basin alternative. PacifiCorp responded that they were willing to engage in further discussions with the WWDC on the development of a mutually agreeable arrangement that may facilitate the nominal Viva Naughton Reservoir enlargement alternative. During the 2014 Budget Session, the WWDC requested additional Level II, Phase II funding to further investigate a nominal raise of Viva Naughton Reservoir. The work is underway and will include reservoir modeling and operation, flood hydrology and routing, environmental analysis, more thorough geotechnical investigations, preliminary design and survey."

3.5.2 S-004 Dempsey Basin Reservoir

One of the alternatives recommended during the 2007 Level II, Phase 2 investigation of Viva Naughton Reservoir Enlargement (Gannet Flemming, 2007) was the construction of one of two new reservoirs:

- Dempsey Basin Reservoir
- Willow Creek Reservoir

The Willow Creek site was ultimately removed from further considerations due to the presence of a large underground coal mine (Gomer Mine). However, the Dempsey Basin site remains as a potential alternative to enlargement of Viva Naughton.

Various options involving Dempsey Basin sites have been discussed. According to the WWDC's Legislative Report discussed above, the Dempsey Basin sites have become lower in priority due to several potential constraints, including sage grouse habitat.

For perspective, the following extract from the 2004 Level II investigation (ECI, 2004) is included to describe the general conceptual plan should the Dempsey Basin projects ever move forward:

"The proposed Dempsey Creek Reservoir Dam would be an earth dam located at the west inlet of the Viva Naughton Reservoir. The dam was designed to be 83 feet high with a crest elevation of 7,337 feet with a storage capacity of 40,000 acre-feet. It would have a normal high water elevation of 7,332 feet. It would include a spillway and an outlet works to control irrigation discharges. The dam would be an off-stream reservoir that would need a supply canal due to its small drainage area and limited runoff. A 6-mile canal with a discharge capacity of 750 cfs along with diversion and gated control inlet structures were designed to meet this need. The supply canal would convey water from Hams Fork to the reservoir during the spring and summer months." Figure 3.5-3 displays the conceptual layout of the proposed reservoir.

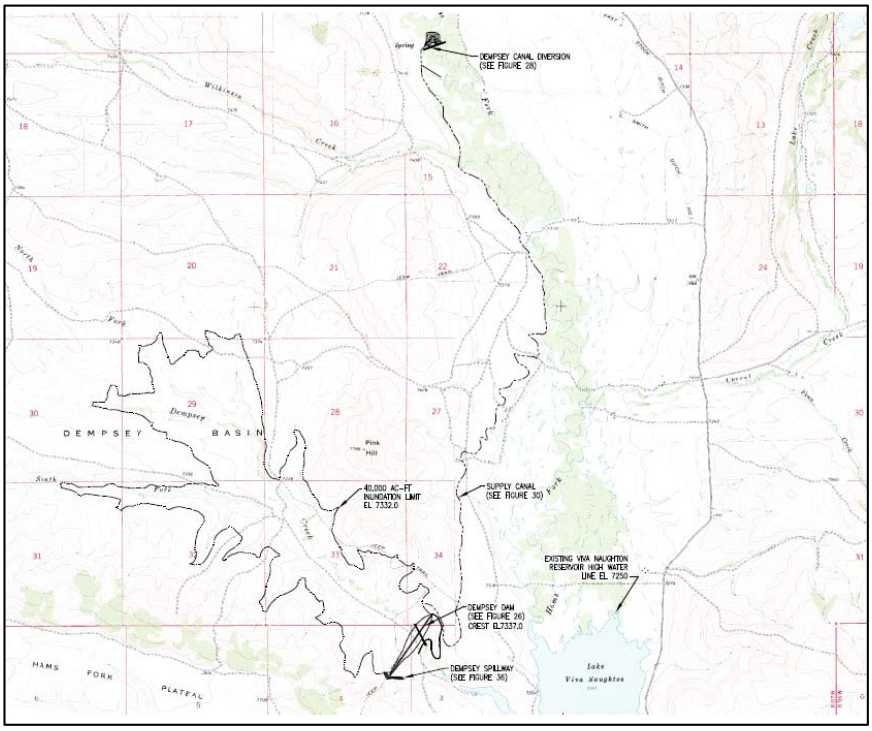


Figure 3.5-3 Dempsey Basin Reservoir (Proposed) Project Location Map.

3.5.3 S-009 Davis Reservoir Rehabilitation

The Davis No. 2 Reservoir is a small reservoir located in Section 7, Township 24 North, Range 116 West storing water from Lake Creek (tributary to Corral Creek which is tributary to the Hams Fork River). According to records of the WSEO, the reservoir was enlarged in 1954 resulting in a total capacity of 189.4. The reservoir is an off-channel reservoir filled by the Davis Supply Ditch. Irrigated lands are located downstream within the Hams Fork floodplain are served by the McTigue Ditch. Permitted uses are irrigation and stock water. The reservoir and the supply ditch are located entirely on privately owned deeded property. Figure 3.5-4 displays the conceptual layout for Davis No. 2 reservoir.

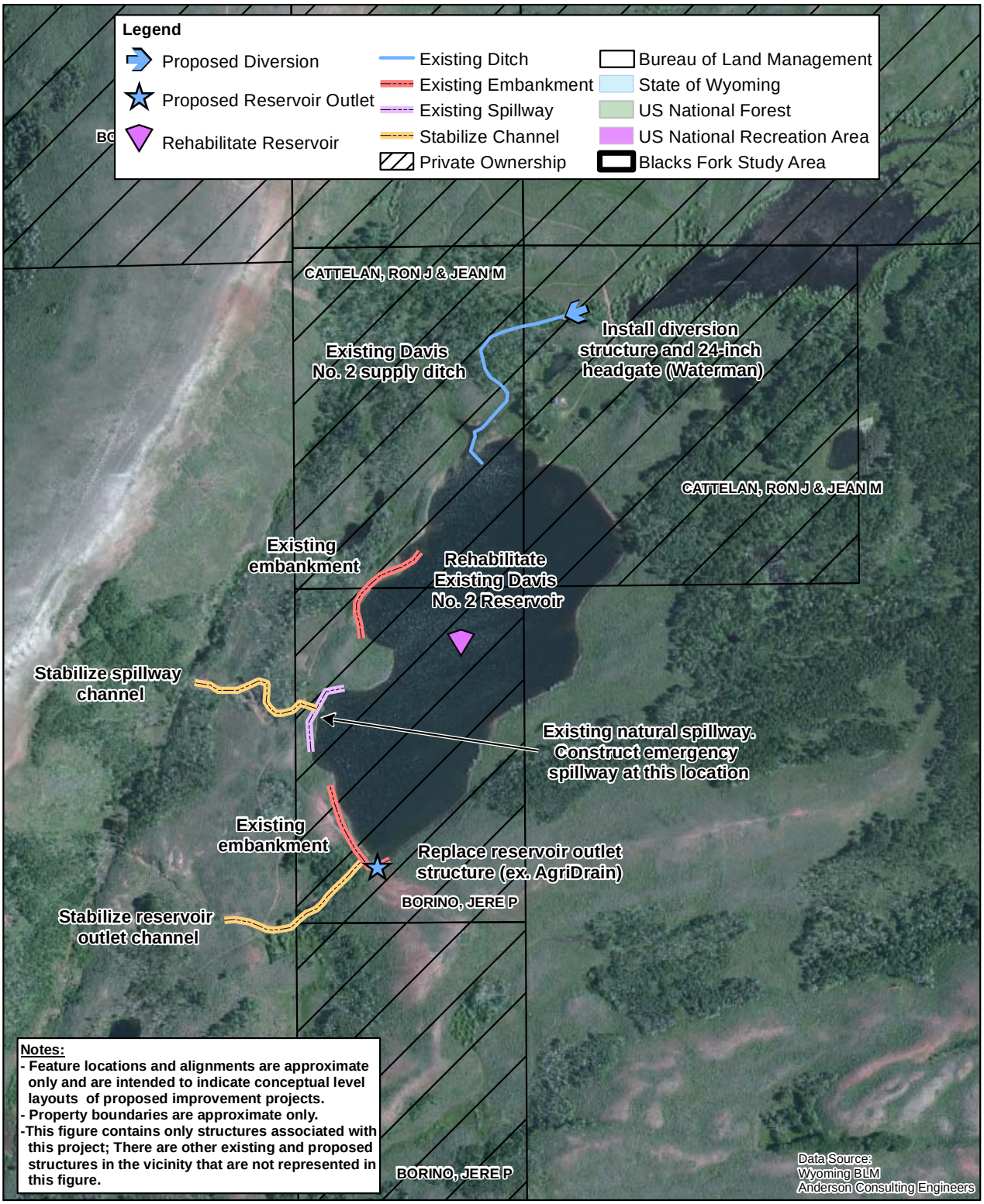


Figure 3.5-4 Conceptual Design S-009: Davis Reservoir Rehabilitation (Carollo 001)

At the request of the land owner, the reservoir and its facilities were inventoried in conjunction with this project. However, based upon a preliminary review of the facility, the following design components and observations are noted:

- The reservoir embankment would be of such a height (> 20 ft) that adherence to Wyoming Dam Safety Requirements would be necessary
- The outlet of the reservoir is reportedly non-functional; it was reported that it can only be closed when the reservoir is dry. Figure 3.5-5 displays the gate control. Figure 3.5-6 displays the outlet.
- The channel returning water from the reservoir to Lake Creek (downstream of the outlet) is severely incising.
- There is a significant amount of channel incision in the channel conveying water from the natural spillway back to Lake Creek (Figure 3.5-7)
- The Davis Supply Ditch diversion on Lake Creek consists of boards and tarpaulins; there is no controllable headgate structure.

According to the land owner, the reservoir currently stores a sufficient amount of water to irrigate his lands for approximately one month. In normal or wet years, this is adequate. However, during dry years, supplies fall short and enlargement of the reservoir would be desirable. Bases upon preliminary measurements, raising the existing embankment five feet would increase the reservoir storage capacity by approximately 120 to 125 acre-feet.

Enlargement of the reservoir would require engineering and design efforts beyond the scope of this Level I investigation. Rehabilitation and enlargement of the Davis No. 2 Reservoir would include the following efforts:

- Completion of this project would require permitting through the Wyoming State Engineers Office. Because the height of the dam would exceed 20 feet, compliance with State Dam Safety requirements would be necessary.
- Approximately 10,000 to 12,000 cubic yards of suitable fill material would be required to construct the elevated embankment.
- The existing outlet would be replaced in order to provide an operable outlet of suitable design. An AgriDrain outlet or similar would be the most cost effective replacement outlet.
- The channel downstream of the outlet would require stabilization to discontinue channel incision and bank destabilization.
- Currently, the reservoir spills via a natural overflow without a designed emergency spillway. Raising the embankment elevation would require design of an emergency spillway at the location of the existing natural spill.
- The channel downstream of the natural spillway would require stabilization to discontinue channel incision and bank destabilization.
- A headgate structure with a slide gate of adequate size would be required at the diversion on Lake Creek.

Figure 3.5-5 Davis No. 2 Reservoir outlet control.

Figure 3.5-6 Davis No. 2 Reservoir outlet.

Figure 3.5-7 Davis No. 2 Reservoir outlet channel incision.

IV. COST ESTIMATES

4.1 Phase I Conceptual Cost Estimates

Conceptual-level costs have been developed for each of the alternative potential projects identified and described in Chapter 3. The basis for these costs are described in the following subsections for each of the overall project categories. Cost estimates presented represent 2015 dollars.

Discussion of methods and sources used to generate these costs are presented in Chapter 7 of the Basinwide volume of this report.

The following tables reiterate the conceptual cost estimates presented in the Basinwide volume for convenience herein:

Table 4.1-1: Irrigation System Components
Table 4.1-2: Livestock/Wildlife (L/W) Components
Table 4.1-3: Livestock/Wildlife (L/W) Components (UDC)
Table 4.1-4: Storage Opportunities

Table 4.1-1 Conceptual Cost Estimates: Phase I Irrigation System Components.

Watershed Plan Component	Study Area Phase	Proect Name	Construction Subtotal	Engineering (10%)	Constuction and Engineering Subtotal	Contingency (15%)	Total Construction Cost	Final Plans and Specs	Additional	Permitting / Legal Fees / Access and Rights of Way	Total Project Cost
I-001	Phase I	Sears 001	$156,300	$15,630	$171,930	$25,790	$197,720	$2,500	$0	$2,000	**$202,220**
I-002	Phase I	Schulthess 001	$135,000	$13,500	$148,500	$22,275	$170,775	$2,500	$0	$500	**$173,775**
I-003	Phase I	Schulthess 002	$67,600	$6,760	$74,360	$11,154	$85,514	$2,500	$0	$500	**$88,514**
I-004	Phase I	Weston 001	$41,000	$4,100	$45,100	$6,765	$51,865	$2,500	$0	$500	**$54,865**

Table 4.1-2 Conceptual Cost Estimates: Phase I Livestock / Wildlife (L/W) Components.

Project Phase		Phase I	Phase I	Phase I	Phase I	Phase I	Phase I	Phase I	Phase I	Phase I	Phase I
		Watershed Component	Watershed Component	Watershed Component	Watershed Component	Watershed Component	Watershed Component	Watershed Component	Watershed Component	Watershed Component	Watershed Component
		L/W-001	L/W-002	L/W-003	L/W-004	L/W-005	L/W-006	L/W-007	L/W-008	L/W-009	L/W-010
Project Number:		Circle B 001	Circle B 002	Circle B 003	Circle B 004	Circle B 005	Haslem 001	Haslem 002	Haslem 003	Hoffman 001	Hoffman 002
Description:		Spring Development / Pipeline / Stock Tank Construction	Spring Development / Pipeline / Stock Tank Construction	Spring Development / Pipeline / Stock Tank Construction	Spring Development / Pipeline / Stock Tank Construction	Spring Development / Pipeline / Stock Tank Construction	Stock Pond Construction	Stock Pond Construction	Pipeline / Stock Tank Construction	Well / Stock Tank Construction	Well / Stock Tank Construction
Project Name:		Cow Camp Springs	Mounded Spring	Mayfield Cabin Spring	Waterhouse Canyon	Cattail Spring	Cow Hollow Stock Pond	Craven Creek Stock Pond	Nutria Ditch Pipeline Project	Beaver Dam Creek Well Project	Corral Creek Well Project
Water Source:		Existing Spring	Existing Spring	Existing Spring	Existing Spring	Existing Spring	Proposed Reservoir	Proposed Reservoir	Existing Ditch	Proposed Well	Proposed Well
Mobilization		$3,000	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000
Well Construction / Spring Development	Source:	Existing Spring	Existing Spring	Existing Spring	Existing Spring	Existing Spring	NA	NA	NA	Proposed Well	Proposed Well
	Units (each)	1	1	1	1	1				1	1
	Depth Each	NA	NA	NA	NA	NA				250	250
	Unit Cost ($/LF wells or $/EA springs	$3,600	$3,600	$3,600	$3,600	$3,600				$100	$100
	Well Screen (LF each well)	NA	NA	NA	NA	NA				NA	NA
	Well Screen ($/LF)	NA	NA	NA	NA	NA				NA	NA
	Component Subtotal	$3,600	$3,600	$3,600	$3,600	$3,600				$25,000	$25,000
Stock Pond / Guzzler Construction / Rehabilitation	Units (each)	NA	NA	NA	NA	NA	1	1	NA	NA	NA
	Earthwork (Stock Pond)						$11,200	$11,200			
	Agri-Drain Installation (Stock Pond)						$4,800	$4,800			
	Rock Stabilization (Stock Pond)						NA	NA			
	Bentonite Lining (Stock Pond)						$10,000	$10,000			
	Guzzler Installation (Materials and Labor)						NA	NA			
	Pond/ Guzzler Component Subtotal						$26,000	$26,000			
Pump	Units (EA)	NA	NA	NA	NA	NA	NA	NA	1	1	1
	Type								Solar Pump	Solar Pump	Solar Pump
	Unit Cost (EA)								$8,500	$8,500	$8,500
	Component Subtotal								$8,500	$8,500	$8,500
Pipeline	**Low Pressure 1 1/2 in Pipe Diameter:**	1.5	1.5	1.5	1.5	1.5	NA	NA	1.5	1.5	1.5
	Units (LF)	100	470	100	150	200			5,250	200	200
	Unit Cost (EA)	$3.34	$3.34	$3.34	$3.34	$3.34			$3.34	$3.34	$3.34
	Component Subtotal	$334	$1,570	$334	$501	$668			$17,535	$668	$668
	Other Pipe	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Units (LF)										
	Unit Cost (EA)										
	Component Subtotal										
Additional Storage Tanks	Units (EA)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Size (gal)										
	Unit Cost ($/gal)										
	Component Subtotal										
Livestock / Wildlife Water Tanks	Units (EA)	1	1	1	1	1	NA	NA	1	1	1
	Size (gal)	1,200	1,200	1,200	1,200	1,200			1,200	1,200	1,200
	Unit Cost	$3,000	$3,000	$3,000	$3,000	$3,000			$3,000	$3,000	$3,000
	Component	$3,000	$3,000	$3,000	$3,000	$3,000			$3,000	$3,000	$3,000
Miscellaneous	Item	Fencing	Fencing	Fencing	Fencing	Fencing	NA	NA	NA	NA	NA
	Units (Each)	1,020	1,700	1,220	1,350	1,460					
	Unit Cost ($/ea)	$5.00	$5.00	$5.00	$5.00	$5.00					
	Component Subtotal	$5,100.00	$8,500.00	$6,100.00	$6,750.00	$7,300.00					
Construction Subtotal		$15,034	$19,670	$16,034	$16,851	$17,568	$29,000	$29,000	$32,035	$40,168	$40,168
Engineering (10%)		$1,503	$1,967	$1,603	$1,685	$1,757	$2,900	$2,900	$3,204	$4,017	$4,017
Constuction and Engineering Subtotal		$16,537	$21,637	$17,637	$18,536	$19,325	$31,900	$31,900	$35,239	$44,185	$44,185
Contingency (15%)		$2,481	$3,246	$2,646	$2,780	$2,899	$4,785	$4,785	$5,286	$6,628	$6,628
Total Construction Cost		$19,018	$24,882	$20,283	$21,317	$22,224	$36,685	$36,685	$40,524	$50,813	$50,813
Final Plans and Specs		$300	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,500	$1,000	$1,000
Additional		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Permitting / Legal Fees / Access and Rights of Way		$0	$500	$500	$500	$500	$500	$500	$500	$500	$500
Total Project Cost		**$19,318**	**$26,382**	**$21,783**	**$22,817**	**$23,724**	**$38,185**	**$38,185**	**$42,524**	**$52,313**	**$52,313**

Table 4.1-2 Conceptual Cost Estimates: Phase I Livestock / Wildlife (L/W) Components (continued).

Project Phase		Phase I	Phase I	Phase I	Phase I	Phase I	Phase I	Phase I	Phase I
		Watershed Component	Watershed Component	Watershed Component	Watershed Component	Watershed Component	Watershed Component	Watershed Component	Watershed Component
		L/W-011	L/W-012	L/W-013	L/W-014	L/W-015	L/W-016	L/W-017	L/W-018
Project Number:		Hoffman 003	Hoffman 004	Julian 001	Julian 002	Julian 003	Lamborn 001	Walker 001	Walker 002
Description:		Stock Pond Construction	Stock Pond Rehabilitation	Pipeline / Stock Tank Construction	Solar Pump / Stock Tank Construction	Spring Development / Pipeline / Storage and Stock Tank Construction	Well / Pipeline and Stock Tank Construction	Well / Pipeline and Stock Tank Construction	Well / Stock Tank Construction and Reservoir Rehabilitation
Project Name:		Fenn Creek Stock Reservoir	Hoffman 004	State Section Pipeline Project	MAU #2 Well Modification	Oyster Ridge Pipeline Project	Lamborn Pipeline Project No. 1	Walker Pipeline Project No.1	Walker Well Replacement Project No. 1
Water Source:		Proposed Reservoir	Rehabilitate Reservoir	Existing Spring	Existing Well	Existing Spring	Proposed Well	Proposed Well	Proposed Well
Mobilization		$3,000	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000
Well Construction / Spring Development	Source:	NA	NA	NA	NA	Existing Spring	Proposed Well	Proposed Well	Proposed Well
	Units (each)					1	1	1	1
	Depth Each					NA	50	200	200
	Unit Cost ($/LF wells or $/EA springs					$3,600	$100	$100	$100
	Well Screen (LF each well)					NA	NA	NA	NA
	Well Screen ($/LF)					NA	NA	NA	NA
	Component Subtotal					$3,600	$5,000	$20,000	$20,000
Stock Pond / Guzzler Construction / Rehabilitation	Units (each)	1	1	NA	NA	NA	NA	NA	1
	Earthwork (Stock Pond)	$11,200	$10,000						NA
	Agri-Drain Installation (Stock Pond)	$4,800	$4,800						NA
	Rock Stabilization (Stock Pond)	NA	NA						NA
	Bentonite Lining (Stock Pond)	$10,000							10000
	Guzzler Installation (Materials and Labor)	NA	NA						NA
	Pond/ Guzzler Component Subtotal	$26,000	$14,800						$10,000
Pump	Units (EA)	NA	NA	NA	1	NA	1	1	1
	Type				Solar Pump		Solar Pump	Solar Pump	Solar Pump
	Unit Cost (EA)				$8,500		$8,500	$8,500	$8,500
	Component Subtotal				$8,500		$8,500	$8,500	$8,500
Pipeline	**Low Pressure 1 1/2 in Pipe Diameter:**	NA	NA	1.5	NA	1.5	1.5	1.5	NA
	Units (LF)			2,000		1,300	3,400	10,650	
	Unit Cost (EA)			$3.34		$3.34	$3.34	$3.34	
	Component Subtotal			$6,680		$4,342	$11,356	$35,571	
	Other Pipe	NA	NA	NA	NA	NA	NA	NA	NA
	Units (LF)								
	Unit Cost (EA)								
	Component Subtotal								
Additional Storage Tanks	Units (EA)	NA	NA	NA	NA	1	NA	NA	NA
	Size (gal)					5000			
	Unit Cost ($/gal)					$1			
	Component Subtotal					$5,000			
Livestock / Wildlife Water Tanks	Units (EA)	NA	NA	1	1	1	2	2	1
	Size (gal)			1,200	1,200	1,200	1,200	1,200	1,200
	Unit Cost			$3,000	$3,000	$3,000	$3,000	$3,000	$3,000
	Component			$3,000	$3,000	$3,000	$6,000	$6,000	$3,000
Miscellaneous	Item	NA	NA	Fencing	NA	Fencing	NA	NA	NA
	Units (Each)			850		850			
	Unit Cost ($/ea)			$5.00		$5.00			
	Component Subtotal			$4,250.00		$4,250.00			
Construction Subtotal		$29,000	$17,800	$16,930	$14,500	$23,192	$33,856	$73,071	$44,500
Engineering (10%)		$2,900	$1,780	$1,693	$1,450	$2,319	$3,386	$7,307	$4,450
Constuction and Engineering Subtotal		$31,900	$19,580	$18,623	$15,950	$25,511	$37,242	$80,378	$48,950
Contingency (15%)		$4,785	$2,937	$2,793	$2,393	$3,827	$5,586	$12,057	$7,343
Total Construction Cost		$36,685	$22,517	$21,416	$18,343	$29,338	$42,828	$92,435	$56,293
Final Plans and Specs		$1,000	$1,500	$1,500	$1,500	$1,500	$1,000	$1,500	$1,500
Additional		$0	$0	$0	$0	$0	$0	$0	$0
Permitting / Legal Fees / Access and Rights of Way		$500	$1,000	$500	$1,000	$1,000	$500	$2,000	$500
Total Project Cost		**$38,185**	**$25,017**	**$23,416**	**$20,843**	**$31,838**	**$44,328**	**$95,935**	**$58,293**

Table 4.1-3 Conceptual Cost Estimates: Phase I Livestock / Wildlife (L/W) Components (UDC).

Project ID	Project Name	UDC Inventory Waypoint	Estimated Project Cost	Construction Subtotal	Engineering (10%)	Constuction and Engineering Subtotal	Contingency (15%)	Total Construction Cost	Final Plans and Specs	Additional	Permitting / Legal Fees / Access and Rights of Way	Total Project Cost
Watershed Component L/W-043 (UDC-001)	Joe #1	8	$26,000	$26,000	$2,600	$28,600	$4,290	$32,890	$1,500	$0	$500	**$34,890**
Watershed Component L/W-044 (UDC-002)	Joe #2	9	$26,000	$26,000	$2,600	$28,600	$4,290	$32,890	$500	$0	$500	**$33,890**
Watershed Component L/W-052 (UDC-010)	Highway Pit	21	$26,000	$26,000	$2,600	$28,600	$4,290	$32,890	$1,500	$0	$500	**$34,890**

Table 4.1-4 Conceptual Cost Estimates:Storage Opportunities.

Watershed Plan Component	Priority	Study Area Phase	Project name	Action	Conceptual Project Cost
Large Reservoirs					
S-001	1	I	Viva Naughton Reservoir	Enlargement	$5.5M
S-004	3	I	Lower/Upper Dempsey Gulch	New Construction	$55.5M
Small Reservoirs					
S-009		I	Davis Reservoir	Rehabilitation	$100,000

APPENDIX 2A

ALLOTMENT LISTING

BLM Grazing Allotments

Field Office Name	Allotment Number	Allotment Name	Public AUMs	Private AUMs	State AUMs	Acres	ACE_ID
Kemmerer	21052	AIRPORT	231	116		6097.74	2
Kemmerer	11106	BASIN	8			314.05	10
Kemmerer	21042	BEAVER CREEK	2206	176	380	10309.39	11
Kemmerer	11306	CARTER LEASE	13184	16699	945	238798.19	21
Kemmerer	11109	COLLETTI	134	210	9	1602.44	26
Kemmerer	21043	COMMISSARY	511	7	113	5686.33	27
Kemmerer	11301	COW HOLLOW	687	425	66	18058.58	29
Kemmerer	11304	COYOTE SPRINGS	168	154	27	8186.07	31
Kemmerer	1458	CUMBERLAND FLATS	1561	1872	90	43318.70	34
Kemmerer	21038	DEMPSEY BASIN	2030	909	86	15226.91	36
Kemmerer	21041	EAST FORK	100			1026.53	41
Kemmerer	11053	EAST WILLOW CREEK	210	70		3765.14	42
Kemmerer	1460	ELKOL	304			11885.05	43
Kemmerer	21039	FISH CREEK	3037	1660	123	18840.75	44
Kemmerer	11302	GRANGER LEASE	13865	15172	727	470679.64	49
Kemmerer	21044	GRANNY PEAK	229	188		3149.75	50
Kemmerer	11326	H.F. ALLOT.	36			551.29	52
Kemmerer	11305	HASSETT	116	172		4695.68	57
Kemmerer	21032	HOODOO	450	21	97	3495.32	62
Kemmerer	11045	LAKE CREEK	142	46		3599.16	68
Kemmerer	1105	MAMMOTH HOLLOW	725	574	425	17273.29	76
Kemmerer	21036	MAYFIELD	126	1982	296	5214.03	77
Kemmerer	11321	NELSON SECTION	20	80		1019.21	89
Kemmerer	11056	NORTH MOYER	82	18		681.50	92
Kemmerer	11323	NUTRIA ALLOT.	20	80		1153.52	93
Kemmerer	11322	OPAL	232			4989.88	95
Kemmerer	11058	OYSTER RIDGE	16			636.69	96
Kemmerer	11030	PINE CREEK	312		75	4080.92	97
Kemmerer	11040	POLE CREEK	780	787	204	6837.55	98
Kemmerer	11107	POMEROY BASIN	2182	1819	859	27670.84	99
Kemmerer	21048	QUAKENASP CANYON	556			8999.39	101
Kemmerer	11110	QUEALY PEAK	91	151		3080.54	103
Kemmerer	11325	ROBERSON CREEK	130	201	41	5728.33	106
Kemmerer	21035	ROCK CREEK	9096	1064	1793	81808.33	107
Kemmerer	21050	SAWMILL	240	74		1995.04	114
Kemmerer	11113	SLATE CREEK	11082	1527	615	258077.92	116
Kemmerer	21034	SLIDE ROCK	119	204	92	3400.31	117
Kemmerer	11054	SOUTH MOYER	5	81		745.68	122
Kemmerer	21031	SUBLETTE CANYON	454			2582.63	124
Kemmerer	21033	TOM GOURE	545	913		6064.36	129
Kemmerer	21046	TRAIL CREEK	1146		128	7654.10	132
Kemmerer	11051	WEST WILLOW CREEK	159	98		1318.90	140
Kemmerer	21049	WESTPHAL CREEK	218	15		1155.72	142
Kemmerer	21037	WILKINSON CREEK	530	1224		8290.89	143
Kemmerer	N/L	ZNOT LEASED	0			668.52	146

Bridger Teton National Forest RMUs

UNIT_NO	UNIT_NAME	UNIT_TYPE	ACE_ID	Acres
1001	ASPEN SPRINGS	1	156	5,739
1022	BASIN CREEK	1	159	4,861
1005	DEVILS HOLE	1	163	19,668
1007	ELK CREEK	1	158	12,369
1009	GREEN KNOLL	1	162	12,069
1027	HAMS FORK	1	155	3,028
1010	INDIAN CREEK	1	161	10,531
1030	POISON HOLLOW	1	154	3,735
1016	POLE CREEK	1	153	6,219
1019	SAMS ALLEN CR	1	160	18,862
1024	SOUTH FONTENELLE	1	157	15,473
1006	SPRUCE CREEK	1	152	6,113

APPENDIX 2B

STOCK RESERVOIR EVALUATION

ACE ID	Name	Source	Condition	Water Source	Notes	Lattitude	Longitude	Phase	HUC 12 Name	Allotment	Land Owner	T	R	S
1	Devils Hole Lakes	ACE Mapscan	Wet	Yes		42.33	-110.64	Phase I	Hams Fork-East Fork Hams Fork	Devils Hole	USFS	27N	116W	17
2	Devils Hole Lakes	ACE Mapscan	Wet	Yes		42.33	-110.64	Phase I	Hams Fork-East Fork Hams Fork	Devils Hole	USFS	27N	116W	17
3	Unknown	ACE Mapscan	Wet	Yes		42.22	-110.77	Phase I	West Fork Hams Fork	Basin Creek	USFS	26N	117W	19
4	Unknown	ACE Mapscan	Wet	Yes		42.22	-110.77	Phase I	West Fork Hams Fork	Basin Creek	USFS	26N	117W	19
5	Unknown	ACE Mapscan	Wet	Yes		42.21	-110.66	Phase I	Hams Fork-East Fork Hams Fork	Elk Creek	USFS	26N	116W	30
6	Unknown	ACE Mapscan	Wet	Yes		42.20	-110.75	Phase I	Hams Fork-East Fork Hams Fork	Aspen Springs	USFS	26N	117W	32
7	Unknown	ACE Mapscan	Wet	Yes		42.19	-110.74	Phase I	Hams Fork-East Fork Hams Fork	Hams Fork	USFS	25N	117W	4
8	Unknown	ACE Mapscan	Wet	Yes		42.17	-110.74	Phase I	Hams Fork-East Fork Hams Fork	Aspen Springs	USFS	25N	117W	9
9	Unknown	ACE Mapscan	Wet	Yes		42.17	-110.74	Phase I	Hams Fork-East Fork Hams Fork	Aspen Springs	USFS	25N	117W	9
10	Unknown	ACE Mapscan	Wet	Yes		42.17	-110.74	Phase I	Hams Fork-East Fork Hams Fork	Hams Fork	USFS	25N	117W	9
11	Unknown	ACE Mapscan	Wet	Yes		42.16	-110.65	Phase I	Beaver Creek	Pole Creek	USFS	25N	116W	17
12	Unknown	ACE Mapscan	Wet	Yes		42.14	-110.65	Phase I	Beaver Creek	Beaver Creek	BLM	25N	116W	20
13	Unknown	ACE Mapscan	Wet	Yes		42.13	-110.77	Phase I	Hams Fork-West Beaver Creek	Mayfield	Private	25N	117W	29
14	Unknown	ACE Mapscan	Wet	Yes		42.13	-110.77	Phase I	Hams Fork-West Beaver Creek	Mayfield	Private	25N	117W	29
15	Unknown	ACE Mapscan	Wet	Yes		42.13	-110.77	Phase I	Hams Fork-West Beaver Creek	Mayfield	Private	25N	117W	29
16	Unknown	ACE Mapscan	Wet	Yes		42.13	-110.78	Phase I	Hams Fork-West Beaver Creek	Mayfield	BLM	25N	117W	30
17	Unknown	ACE Mapscan	Wet	Yes		42.13	-110.78	Phase I	Hams Fork-West Beaver Creek	Mayfield	BLM	25N	117W	30
18	Unknown	ACE Mapscan	Wet	Yes		42.13	-110.78	Phase I	Hams Fork-West Beaver Creek	Mayfield	BLM	25N	117W	30
19	Unknown	ACE Mapscan	Wet	Yes		42.12	-110.77	Phase I	Hams Fork-West Beaver Creek	Wilkinson Creek	Private	25N	117W	29
20	Unknown	ACE Mapscan	Wet	Yes		42.12	-110.78	Phase I	Hams Fork-West Beaver Creek	Wilkinson Creek	Private	25N	117W	30
21	Unknown	ACE Mapscan	Wet	Yes		42.12	-110.78	Phase I	Hams Fork-West Beaver Creek	Wilkinson Creek	Private	25N	117W	30
22	Unknown	ACE Mapscan	Wet	Yes		42.12	-110.64	Phase I	Beaver Creek	Beaver Creek	BLM	25N	116W	29
23	Unknown	ACE Mapscan	Wet	Yes		42.12	-110.65	Phase I	Beaver Creek	Beaver Creek	BLM	25N	116W	29
24	Unknown	ACE Mapscan	Wet	Yes		42.12	-110.65	Phase I	Beaver Creek	Beaver Creek	BLM	25N	116W	29
25	Unknown	ACE Mapscan	Wet	Yes		42.12	-110.65	Phase I	Beaver Creek	Beaver Creek	BLM	25N	116W	29
26	Unknown	ACE Mapscan	Wet	Yes		42.12	-110.65	Phase I	Beaver Creek	Beaver Creek	BLM	25N	116W	29
27	Unknown	ACE Mapscan	Wet	Yes		42.11	-110.61	Phase I	Beaver Creek	Beaver Creek	BLM	25N	116W	34
28	Unknown	ACE Mapscan	Wet	Yes		42.11	-110.66	Phase I	Hams Fork-West Beaver Creek	Beaver Creek	Private	25N	116W	32
29	Unknown	ACE Mapscan	Wet	Yes		42.11	-110.62	Phase I	Beaver Creek	Beaver Creek	BLM	25N	116W	34
30	Unknown	ACE Mapscan	Wet	Yes		42.11	-110.74	Phase I	Hams Fork-West Beaver Creek	No Allotment	Private	25N	117W	33
31	Unknown	ACE Mapscan	Wet	Yes		42.11	-110.74	Phase I	Hams Fork-West Beaver Creek	No Allotment	Private	25N	117W	33
32	Unknown	ACE Mapscan	Wet	Yes		42.11	-110.74	Phase I	Hams Fork-West Beaver Creek	No Allotment	Private	25N	117W	33
33	Unknown	ACE Mapscan	Wet	Yes	WET IN TWO YEARS OF PHOTOGRAPHY	42.10	-110.66	Phase I	Beaver Creek	Beaver Creek	Private	24N	117W	2
34	Unknown	ACE Mapscan	Wet	Yes		42.09	-110.64	Phase I	Beaver Creek	Beaver Creek	State of Wyoming	24N	117W	1
35	Unknown	ACE Mapscan	Wet	Yes	WET IN TWO YEARS OF PHOTOGRAPHY	42.09	-110.66	Phase I	Beaver Creek	Beaver Creek	Private	24N	117W	2
36	Unknown	ACE Mapscan	Wet	Yes		42.08	-110.79	Phase I	Hams Fork-West Beaver Creek	Wilkinson Creek	BLM	24N	118W	3
37	Unknown	ACE Mapscan	Wet	Yes	WET IN TWO YEARS OF PHOTOGRAPHY	42.08	-110.65	Phase I	Hams Fork-Dempsey Creek	No Allotment	Private	24N	117W	12
38	Unknown	ACE Mapscan	Wet	Yes	WET IN TWO YEARS OF PHOTOGRAPHY	42.08	-110.65	Phase I	Hams Fork-Dempsey Creek	No Allotment	Private	24N	117W	12
39	Unknown	ACE Mapscan	Wet	Yes	WET IN TWO YEARS OF PHOTOGRAPHY	42.08	-110.65	Phase I	Hams Fork-Dempsey Creek	No Allotment	Private	24N	117W	12
40	Unknown	ACE Mapscan	Wet	Yes		42.07	-110.62	Phase I	Hams Fork-Dempsey Creek	Lake Creek	Private	24N	116W	7
41	Unknown	ACE Mapscan	Wet	Yes	WET IN TWO YEARS OF PHOTOGRAPHY	42.07	-110.65	Phase I	Hams Fork-Dempsey Creek	No Allotment	Private	24N	117W	12
42	Unknown	ACE Mapscan	Wet	Yes		42.07	-110.66	Phase I	Hams Fork-Dempsey Creek	No Allotment	Private	24N	117W	11
43	Unknown	ACE Mapscan	Wet	Yes	WET IN TWO YEARS OF PHOTOGRAPHY	42.07	-110.63	Phase I	Hams Fork-Dempsey Creek	Lake Creek	Private	24N	116W	7
44	Unknown	ACE Mapscan	Wet	Yes	WET IN TWO YEARS OF PHOTOGRAPHY	42.07	-110.62	Phase I	Hams Fork-Dempsey Creek	Lake Creek	Private	24N	116W	7
45	Unknown	ACE Mapscan	Wet	Yes	WET IN TWO YEARS OF PHOTOGRAPHY	42.07	-110.62	Phase I	Hams Fork-Dempsey Creek	Lake Creek	Private	24N	116W	7
46	Unknown	ACE Mapscan	Wet	Yes	WET IN TWO YEARS OF PHOTOGRAPHY	42.07	-110.63	Phase I	Hams Fork-Dempsey Creek	Lake Creek	Private	24N	116W	7
47	Unknown	ACE Mapscan	Wet	Yes		42.07	-110.63	Phase I	Hams Fork-Dempsey Creek	Lake Creek	Private	24N	116W	7
48	Unknown	ACE Mapscan	Wet	Yes		42.07	-110.63	Phase I	Hams Fork-Dempsey Creek	Lake Creek	BLM	24N	117W	13
49	Unknown	ACE Mapscan	Wet	Yes		42.07	-110.63	Phase I	Hams Fork-Dempsey Creek	Lake Creek	BLM	24N	117W	13
50	Unknown	ACE Mapscan	Wet	Yes		42.06	-110.63	Phase I	Hams Fork-Dempsey Creek	Lake Creek	BLM	24N	117W	13
51	Unknown	ACE Mapscan	Wet	Yes		42.06	-110.64	Phase I	Hams Fork-Dempsey Creek	Lake Creek	Private	24N	117W	13
52	Unknown	ACE Mapscan	Wet	Yes		42.06	-110.64	Phase I	Hams Fork-Dempsey Creek	No Allotment	Private	24N	117W	13
53	Unknown	ACE Mapscan	Wet	Yes		42.06	-110.63	Phase I	Hams Fork-Dempsey Creek	No Allotment	Private	24N	117W	13
54	Unknown	ACE Mapscan	Wet	Yes		42.06	-110.65	Phase I	Hams Fork-Dempsey Creek	No Allotment	Private	24N	117W	13
55	Unknown	ACE Mapscan	Wet	Yes		42.06	-110.63	Phase I	Hams Fork-Dempsey Creek	Lake Creek	Private	24N	116W	18
56	Unknown	ACE Mapscan	Wet	Yes		42.06	-110.63	Phase I	Hams Fork-Dempsey Creek	Lake Creek	Private	24N	116W	18
57	Unknown	ACE Mapscan	Wet	Yes		42.06	-110.66	Phase I	Hams Fork-Dempsey Creek	No Allotment	Private	24N	117W	14
58	Unknown	ACE Mapscan	Wet	Yes		42.06	-110.66	Phase I	Hams Fork-Dempsey Creek	No Allotment	Private	24N	117W	14
59	Unknown	ACE Mapscan	Wet	Yes		42.06	-110.63	Phase I	Hams Fork-Dempsey Creek	Lake Creek	Private	24N	116W	18
60	Unknown	ACE Mapscan	Wet	Yes		42.06	-110.63	Phase I	Hams Fork-Dempsey Creek	No Allotment	Private	24N	117W	13
61	Unknown	ACE Mapscan	Wet	Yes		42.06	-110.63	Phase I	Hams Fork-Dempsey Creek	No Allotment	Private	24N	117W	13
62	Unknown	ACE Mapscan	Wet	Yes		42.06	-110.63	Phase I	Hams Fork-Dempsey Creek	No Allotment	Private	24N	117W	13
63	Unknown	ACE Mapscan	Wet	Yes		42.05	-110.63	Phase I	Hams Fork-Dempsey Creek	No Allotment	Private	24N	117W	13
64	Unknown	ACE Mapscan	Wet	Yes		42.05	-110.64	Phase I	Hams Fork-Dempsey Creek	No Allotment	Private	24N	117W	13
65	Unknown	ACE Mapscan	Wet	Yes		42.05	-110.61	Phase I	Hams Fork-Dempsey Creek	Granny Peak	Private	24N	116W	17
66	Unknown	ACE Mapscan	Wet	Yes		42.05	-110.78	Phase I	Hams Fork-Dempsey Creek	Dempsey Basin	BLM	24N	118W	23
67	Unknown	ACE Mapscan	Wet	Yes		42.05	-110.70	Phase I	Hams Fork-Dempsey Creek	Dempsey Basin	BLM	24N	117W	21
68	Unknown	ACE Mapscan	Wet	Yes	WET IN TWO YEARS OF PHOTOGRAPHY	42.05	-110.78	Phase I	Hams Fork-Dempsey Creek	Dempsey Basin	BLM	24N	118W	23
69	Unknown	ACE Mapscan	Wet	Yes		42.05	-110.78	Phase I	Hams Fork-Dempsey Creek	Dempsey Basin	BLM	24N	118W	23
70	Unknown	ACE Mapscan	Wet	Yes		42.05	-110.78	Phase I	Hams Fork-Dempsey Creek	Dempsey Basin	BLM	24N	118W	23
71	Unknown	ACE Mapscan	Wet	Yes		42.05	-110.78	Phase I	Hams Fork-Dempsey Creek	Dempsey Basin	BLM	24N	118W	23
72	Unknown	ACE Mapscan	Wet	Yes		42.05	-110.78	Phase I	Hams Fork-Dempsey Creek	Dempsey Basin	BLM	24N	118W	23
73	Unknown	ACE Mapscan	Wet	Yes		42.04	-110.78	Phase I	Hams Fork-Dempsey Creek	Dempsey Basin	BLM	24N	118W	23
74	Unknown	ACE Mapscan	Wet	Yes		42.04	-110.77	Phase I	Hams Fork-Dempsey Creek	Dempsey Basin	BLM	24N	118W	23
75	Unknown	ACE Mapscan	Wet	Yes		42.04	-110.64	Phase I	Hams Fork-Dempsey Creek	No Allotment	Private	24N	117W	24

ACE ID	Name	Source	Condition	Water Source	Notes	Lattitude	Longitude	Phase	HUC 12 Name	Allotment	Land Owner	T	R	S
76	Unknown	ACE Mapscan	Wet	Yes		42.04	-110.78	Phase I	Hams Fork-Dempsey Creek	Dempsey Basin	BLM	24N	118W	26
77	Unknown	ACE Mapscan	Wet	Yes		42.04	-110.79	Phase I	Hams Fork-Dempsey Creek	Dempsey Basin	Private	24N	118W	26
78	Unknown	ACE Mapscan	Wet	Yes		42.04	-110.79	Phase I	Hams Fork-Dempsey Creek	Dempsey Basin	Private	24N	118W	26
79	Unknown	ACE Mapscan	Wet	Yes		42.03	-110.79	Phase I	Hams Fork-Dempsey Creek	Dempsey Basin	BLM	24N	118W	26
80	Unknown	ACE Mapscan	Wet	Yes		42.03	-110.57	Phase I	Willow Creek-East Branch Willow Creek	Mammoth Hollow	Private	24N	116W	27
81	Unknown	ACE Mapscan	Dry	No	BREACHED	42.03	-110.79	Phase I	Hams Fork-Dempsey Creek	Dempsey Basin	Private	24N	118W	27
82	Unknown	ACE Mapscan	Wet	Yes		42.03	-110.62	Phase I	Hams Fork-Dempsey Creek	Lake Creek	Private	24N	116W	30
83	Unknown	ACE Mapscan	Wet	Yes		42.03	-110.57	Phase I	Willow Creek-East Branch Willow Creek	Mammoth Hollow	Private	24N	116W	27
84	Unknown	ACE Mapscan	Wet	Yes		42.03	-110.57	Phase I	Willow Creek-East Branch Willow Creek	Mammoth Hollow	Private	24N	116W	27
85	Unknown	ACE Mapscan	Wet	Yes		42.03	-110.57	Phase I	Willow Creek-East Branch Willow Creek	Mammoth Hollow	Private	24N	116W	27
86	Unknown	ACE Mapscan	Wet	Yes		42.03	-110.57	Phase I	Willow Creek-East Branch Willow Creek	Mammoth Hollow	Private	24N	116W	27
87	Unknown	ACE Mapscan	Wet	Yes		42.03	-110.57	Phase I	Willow Creek-East Branch Willow Creek	Mammoth Hollow	Private	24N	116W	27
88	Unknown	ACE Mapscan	Wet	Yes		42.03	-110.57	Phase I	Willow Creek-East Branch Willow Creek	Mammoth Hollow	Private	24N	116W	27
89	Unknown	ACE Mapscan	Wet	Yes		42.03	-110.56	Phase I	Willow Creek-East Branch Willow Creek	Mammoth Hollow	Private	24N	116W	27
90	Unknown	ACE Mapscan	Wet	Yes		42.03	-110.56	Phase I	Willow Creek-East Branch Willow Creek	Mammoth Hollow	Private	24N	116W	27
91	Unknown	ACE Mapscan	Wet	Yes		42.03	-110.56	Phase I	Willow Creek-East Branch Willow Creek	Mammoth Hollow	Private	24N	116W	27
92	Unknown	ACE Mapscan	Wet	Yes		42.03	-110.56	Phase I	Willow Creek-East Branch Willow Creek	Mammoth Hollow	Private	24N	116W	27
93	Unknown	ACE Mapscan	Wet	Yes		42.03	-110.56	Phase I	Willow Creek-East Branch Willow Creek	Mammoth Hollow	Private	24N	116W	27
94	Unknown	ACE Mapscan	Wet	Yes		42.03	-110.56	Phase I	Willow Creek-East Branch Willow Creek	Mammoth Hollow	Private	24N	116W	27
95	Unknown	ACE Mapscan	Wet	Yes		42.03	-110.63	Phase I	Hams Fork-Dempsey Creek	No Allotment	Private	24N	117W	25
96	Unknown	ACE Mapscan	Wet	Yes		42.03	-110.56	Phase I	Willow Creek-East Branch Willow Creek	Mammoth Hollow	Private	24N	116W	27
97	Unknown	ACE Mapscan	Wet	Yes		42.03	-110.78	Phase I	Hams Fork-Dempsey Creek	Dempsey Basin	Private	24N	118W	26
98	Unknown	ACE Mapscan	Wet	Yes		42.03	-110.56	Phase I	Willow Creek-East Branch Willow Creek	Mammoth Hollow	Private	24N	116W	27
99	Unknown	ACE Mapscan	Wet	Yes		42.03	-110.56	Phase I	Willow Creek-East Branch Willow Creek	Mammoth Hollow	Private	24N	116W	27
100	Unknown	ACE Mapscan	Wet	Yes		42.03	-110.68	Phase I	Hams Fork-Dempsey Creek	Dempsey Basin	BLM	24N	117W	27
101	Unknown	ACE Mapscan	Wet	Yes		42.03	-110.56	Phase I	Willow Creek-East Branch Willow Creek	Mammoth Hollow	Private	24N	116W	27
102	Unknown	ACE Mapscan	Wet	Yes		42.03	-110.56	Phase I	Willow Creek-East Branch Willow Creek	Mammoth Hollow	Private	24N	116W	27
103	Unknown	ACE Mapscan	Wet	Yes		42.03	-110.56	Phase I	Willow Creek-East Branch Willow Creek	Mammoth Hollow	Private	24N	116W	27
104	Unknown	ACE Mapscan	Wet	Yes		42.03	-110.56	Phase I	Willow Creek-East Branch Willow Creek	Mammoth Hollow	Private	24N	116W	27
105	Unknown	ACE Mapscan	Wet	Yes		42.03	-110.56	Phase I	Willow Creek-East Branch Willow Creek	Mammoth Hollow	Private	24N	116W	26
106	Unknown	ACE Mapscan	Dry	No	BREACHED	42.02	-110.78	Phase I	Hams Fork-Dempsey Creek	Dempsey Basin	Private	24N	118W	35
107	Unknown	ACE Mapscan	Wet	Yes		42.02	-110.57	Phase I	Willow Creek-East Branch Willow Creek	Mammoth Hollow	State of Wyoming	24N	116W	34
108	Unknown	ACE Mapscan	Wet	Yes		42.02	-110.79	Phase I	Hams Fork-Dempsey Creek	Dempsey Basin	Private	24N	118W	35
109	Unknown	ACE Mapscan	Wet	Yes		42.02	-110.79	Phase I	Hams Fork-Dempsey Creek	Dempsey Basin	Private	24N	118W	35
110	Unknown	ACE Mapscan	Wet	Yes		42.02	-110.79	Phase I	Hams Fork-Dempsey Creek	Dempsey Basin	Private	24N	118W	35
111	Unknown	ACE Mapscan	Wet	Yes		42.02	-110.57	Phase I	Willow Creek-East Branch Willow Creek	Mammoth Hollow	State of Wyoming	24N	116W	34
112	Unknown	ACE Mapscan	Wet	Yes		42.02	-110.56	Phase I	Willow Creek-East Branch Willow Creek	Mammoth Hollow	State of Wyoming	24N	116W	34
113	Unknown	ACE Mapscan	Wet	Yes		42.02	-110.79	Phase I	Hams Fork-Dempsey Creek	Dempsey Basin	Private	24N	118W	35
114	Unknown	ACE Mapscan	Wet	Yes		42.02	-110.56	Phase I	Willow Creek-East Branch Willow Creek	Mammoth Hollow	Private	24N	116W	35
115	Unknown	ACE Mapscan	Wet	Yes		42.02	-110.56	Phase I	Willow Creek-East Branch Willow Creek	Mammoth Hollow	State of Wyoming	24N	116W	34
116	Unknown	ACE Mapscan	Wet	Yes		42.02	-110.79	Phase I	Hams Fork-Dempsey Creek	Dempsey Basin	Private	24N	118W	35
117	Unknown	ACE Mapscan	Wet	Yes		42.02	-110.56	Phase I	Willow Creek-East Branch Willow Creek	Mammoth Hollow	Private	24N	116W	35
118	Unknown	ACE Mapscan	Wet	Yes		42.02	-110.56	Phase I	Willow Creek-East Branch Willow Creek	Mammoth Hollow	State of Wyoming	24N	116W	34
119	Unknown	ACE Mapscan	Wet	Yes		42.02	-110.56	Phase I	Willow Creek-East Branch Willow Creek	Mammoth Hollow	Private	24N	116W	35
120	Unknown	ACE Mapscan	Wet	Yes		42.02	-110.56	Phase I	Willow Creek-East Branch Willow Creek	Mammoth Hollow	Private	24N	116W	35
121	Unknown	ACE Mapscan	Wet	Yes		42.02	-110.79	Phase I	Hams Fork-Dempsey Creek	Dempsey Basin	Private	24N	118W	35
122	Unknown	ACE Mapscan	Wet	Yes		42.02	-110.56	Phase I	Willow Creek-East Branch Willow Creek	Mammoth Hollow	Private	24N	116W	35
123	Unknown	ACE Mapscan	Wet	Yes		42.02	-110.79	Phase I	Hams Fork-Dempsey Creek	Dempsey Basin	Private	24N	118W	35
124	Unknown	ACE Mapscan	Wet	Yes		42.02	-110.56	Phase I	Willow Creek-East Branch Willow Creek	Mammoth Hollow	State of Wyoming	24N	116W	34
125	Unknown	ACE Mapscan	Wet	Yes		42.02	-110.56	Phase I	Willow Creek-East Branch Willow Creek	Mammoth Hollow	State of Wyoming	24N	116W	34
126	Unknown	ACE Mapscan	Wet	Yes		42.02	-110.56	Phase I	Willow Creek-East Branch Willow Creek	Mammoth Hollow	State of Wyoming	24N	116W	34
127	Unknown	ACE Mapscan	Wet	Yes		42.02	-110.55	Phase I	Willow Creek-East Branch Willow Creek	Mammoth Hollow	Private	24N	116W	35
128	Unknown	ACE Mapscan	Wet	Yes		42.02	-110.55	Phase I	Willow Creek-East Branch Willow Creek	Mammoth Hollow	Private	24N	116W	35
129	Unknown	ACE Mapscan	Dry	No	BREACHED	42.02	-110.78	Phase I	Hams Fork-Dempsey Creek	Dempsey Basin	Private	24N	118W	35
130	Unknown	ACE Mapscan	Wet	Yes		42.02	-110.55	Phase I	Willow Creek-East Branch Willow Creek	Mammoth Hollow	Private	24N	116W	35
131	Unknown	ACE Mapscan	Wet	Yes		42.01	-110.55	Phase I	Willow Creek-East Branch Willow Creek	Mammoth Hollow	Private	24N	116W	35
132	Unknown	ACE Mapscan	Wet	Yes		42.01	-110.55	Phase I	Willow Creek-East Branch Willow Creek	Mammoth Hollow	Private	24N	116W	35
133	Unknown	ACE Mapscan	Wet	Yes		42.01	-110.55	Phase I	Willow Creek-East Branch Willow Creek	Mammoth Hollow	Private	24N	116W	35
134	Unknown	ACE Mapscan	Wet	Yes		42.01	-110.56	Phase I	Willow Creek-East Branch Willow Creek	No Allotment	BLM	23N	116W	2
135	Unknown	ACE Mapscan	Wet	Yes		42.00	-110.54	Phase I	Willow Creek-East Branch Willow Creek	No Allotment	BLM	23N	116W	2
136	Unknown	ACE Mapscan	Wet	Yes		42.00	-110.53	Phase I	Willow Creek-East Branch Willow Creek	No Allotment	Private	23N	116W	1
137	Unknown	ACE Mapscan	Wet	Yes		42.00	-110.53	Phase I	Willow Creek-East Branch Willow Creek	No Allotment	BLM	23N	116W	1
138	Unknown	ACE Mapscan	Wet	Yes		42.00	-110.55	Phase I	Willow Creek-East Branch Willow Creek	No Allotment	BLM	23N	116W	2
139	Unknown	ACE Mapscan	Wet	Yes		42.00	-110.54	Phase I	Willow Creek-East Branch Willow Creek	No Allotment	BLM	23N	116W	1
140	Unknown	ACE Mapscan	Wet	Yes		42.00	-110.54	Phase I	Willow Creek-East Branch Willow Creek	No Allotment	BLM	23N	116W	2
141	Unknown	ACE Mapscan	Wet	Yes		41.99	-110.53	Phase I	Willow Creek-East Branch Willow Creek	No Allotment	BLM	23N	116W	12
142	Unknown	ACE Mapscan	Wet	Yes		41.99	-110.54	Phase I	Willow Creek-East Branch Willow Creek	No Allotment	BLM	23N	116W	12
143	Unknown	ACE Mapscan	Dry	Potential		41.99	-110.53	Phase I	Willow Creek-East Branch Willow Creek	No Allotment	BLM	23N	116W	12
144	Unknown	ACE Mapscan	Wet	Yes		41.99	-110.53	Phase I	Willow Creek-East Branch Willow Creek	No Allotment	BLM	23N	116W	12
145	Unknown	ACE Mapscan	Wet	Yes		41.99	-110.53	Phase I	Willow Creek-East Branch Willow Creek	No Allotment	BLM	23N	116W	12
146	Unknown	ACE Mapscan	Wet	Yes		41.99	-110.53	Phase I	Willow Creek-East Branch Willow Creek	No Allotment	BLM	23N	116W	12
147	Unknown	ACE Mapscan	Wet	Yes		41.98	-110.56	Phase I	Willow Creek-East Branch Willow Creek	Pomeroy Basin	Private	23N	116W	15
148	Unknown	ACE Mapscan	Wet	Yes		41.98	-110.52	Phase I	Willow Creek-East Branch Willow Creek	Pomeroy Basin	BLM	23N	115W	18
149	Unknown	ACE Mapscan	Wet	Yes		41.98	-110.51	Phase I	Willow Creek-East Branch Willow Creek	Pomeroy Basin	BLM	23N	115W	18
150	Unknown	ACE Mapscan	Wet	Yes		41.97	-110.78	Phase I	Hams Fork-Fish Creek	Fish Creek	Private	23N	118W	14

ACE ID	Name	Source	Condition	Water Source	Notes	Lattitude	Longitude	Phase	HUC 12 Name	Allotment	Land Owner	T	R	S
151	Unknown	ACE Mapscan	Wet	Yes		41.97	-110.78	Phase I	Hams Fork-Fish Creek	Fish Creek	Private	23N	118W	14
152	Unknown	ACE Mapscan	Wet	Yes		41.97	-110.78	Phase I	Hams Fork-Fish Creek	Fish Creek	Private	23N	118W	14
153	Unknown	ACE Mapscan	Wet	Yes		41.97	-110.78	Phase I	Hams Fork-Fish Creek	Fish Creek	BLM	23N	118W	23
154	Unknown	ACE Mapscan	Wet	Yes		41.97	-110.66	Phase I	Hams Fork-Fish Creek	No Allotment	Private	23N	117W	23
155	Unknown	ACE Mapscan	Wet	Yes		41.97	-110.54	Phase I	Willow Creek-East Branch Willow Creek	Pomeroy Basin	Private	23N	116W	24
156	Lake Viva Naughten	ACE Mapscan	Wet	Yes		41.96	-110.65	Phase I	Hams Fork-Dempsey Creek	No Allotment	Private	23N	117W	23
157	Unknown	ACE Mapscan	Wet	Yes		41.96	-110.66	Phase I	Hams Fork-Fish Creek	No Allotment	Private	23N	117W	23
158	Unknown	ACE Mapscan	Wet	Yes		41.96	-110.61	Phase I	Hams Fork-Fish Creek	Trail Creek	BLM	23N	116W	20
159	Unknown	ACE Mapscan	Wet	Yes		41.96	-110.54	Phase I	Willow Creek-East Branch Willow Creek	Pomeroy Basin	Private	23N	116W	23
160	Unknown	ACE Mapscan	Dry	Potential		41.96	-110.58	Phase I	Willow Creek-East Branch Willow Creek	Pomeroy Basin	BLM	23N	116W	21
161	Unknown	ACE Mapscan	Dry	Potential		41.96	-110.63	Phase I	Hams Fork-Fish Creek	Trail Creek	BLM	23N	116W	19
162	Unknown	ACE Mapscan	Dry	Potential		41.96	-110.57	Phase I	Willow Creek-East Branch Willow Creek	Pomeroy Basin	Private	23N	116W	22
163	Unknown	ACE Mapscan	Wet	Yes		41.96	-110.55	Phase I	Willow Creek-East Branch Willow Creek	Pomeroy Basin	Private	23N	116W	23
164	Unknown	ACE Mapscan	Wet	Yes		41.96	-110.54	Phase I	Willow Creek-East Branch Willow Creek	Pomeroy Basin	Private	23N	116W	23
165	Unknown	ACE Mapscan	Wet	Yes		41.96	-110.56	Phase I	Willow Creek-East Branch Willow Creek	Pomeroy Basin	Private	23N	116W	22
166	Unknown	ACE Mapscan	Wet	Yes		41.96	-110.54	Phase I	Willow Creek-East Branch Willow Creek	Oyster Ridge	Private	23N	116W	23
167	Unknown	ACE Mapscan	Dry	Potential		41.95	-110.68	Phase I	Hams Fork-Fish Creek	Fish Creek	BLM	23N	117W	22
168	Unknown	ACE Mapscan	Wet	Yes		41.95	-110.51	Phase I	Willow Creek-East Branch Willow Creek	Pomeroy Basin	BLM	23N	115W	30
169	Unknown	ACE Mapscan	Wet	Yes		41.94	-110.55	Phase I	Willow Creek-East Branch Willow Creek	Basin	Private	23N	116W	26
170	Kemmerer Reservoir	ACE Mapscan	Wet	Yes		41.94	-110.65	Phase I	Hams Fork-Fish Creek	No Allotment	Private	23N	117W	26
171	Coletti Reservoir 2	ACE Mapscan	Wet	Yes		41.93	-110.51	Phase I	Willow Creek-East Branch Willow Creek	Colletti	BLM	23N	115W	31
172	Unknown	ACE Mapscan	Dry	No	BREACHED	41.93	-110.50	Phase I	Willow Creek-East Branch Willow Creek	Colletti	BLM	23N	115W	31
173	Unknown	ACE Mapscan	Dry	No	BREACHED	41.92	-110.50	Phase I	Willow Creek-East Branch Willow Creek	Colletti	Private	22N	115W	6
174	Unknown	ACE Mapscan	Wet	Yes		41.91	-110.54	Phase I	Willow Creek-East Branch Willow Creek	Pomeroy Basin	Private	22N	116W	2
175	Unknown	ACE Mapscan	Dry	No	BREACHED	41.91	-110.51	Phase I	Willow Creek-East Branch Willow Creek	Pomeroy Basin	Private	22N	115W	6
176	Unknown	ACE Mapscan	Dry	Potential		41.90	-110.59	Phase I	Willow Creek-East Branch Willow Creek	Sawmill	BLM	22N	116W	9
177	Unknown	ACE Mapscan	Wet	Yes		41.89	-110.65	Phase I	Hams Fork-Fish Creek	Quakenasp Canyon	Private	22N	117W	11
178	Unknown	ACE Mapscan	Wet	Yes		41.89	-110.54	Phase I	Willow Creek-East Branch Willow Creek	Pomeroy Basin	Private	22N	116W	14
179	Unknown	ACE Mapscan	Wet	Yes		41.89	-110.66	Phase I	Hams Fork-Fish Creek	Quakenasp Canyon	Private	22N	117W	14
180	Unknown	ACE Mapscan	Wet	Yes		41.89	-110.59	Phase I	Hams Fork-Fish Creek	Sawmill	BLM	22N	116W	16
181	Unknown	ACE Mapscan	Wet	Yes		41.89	-110.64	Phase I	Hams Fork-Fish Creek	Quakenasp Canyon	BLM	22N	117W	13
182	Unknown	ACE Mapscan	Dry	No	SEDIMENT	41.89	-110.49	Phase I	Willow Creek-East Branch Willow Creek	Pomeroy Basin	BLM	22N	115W	17
183	Unknown	ACE Mapscan	Dry	No	SEDIMENT	41.89	-110.59	Phase I	Hams Fork-Fish Creek	Sawmill	BLM	22N	116W	16
184	Unknown	ACE Mapscan	Dry	Potential		41.89	-110.55	Phase I	Willow Creek-East Branch Willow Creek	Pomeroy Basin	Private	22N	116W	14
185	Unknown	ACE Mapscan	Dry	No	BREACHED	41.88	-110.50	Phase I	Willow Creek-East Branch Willow Creek	Pomeroy Basin	BLM	22N	115W	17
186	Unknown	ACE Mapscan	Dry	Potential		41.88	-110.58	Phase I	Hams Fork-Fish Creek	Sawmill	State of Wyoming	22N	116W	15
187	Unknown	ACE Mapscan	Dry	Potential		41.88	-110.58	Phase I	Hams Fork-Fish Creek	Sawmill	BLM	22N	116W	22
188	Unknown	ACE Mapscan	Dry	Potential		41.87	-110.57	Phase I	Hams Fork-Fish Creek	Sawmill	BLM	22N	116W	22
189	Unknown	ACE Mapscan	Wet	Yes		41.87	-110.50	Phase I	Willow Creek-East Branch Willow Creek	East Willow Creek	Private	22N	115W	20
190	Unknown	ACE Mapscan	Dry	Potential		41.86	-110.50	Phase I	Willow Creek-East Branch Willow Creek	East Willow Creek	BLM	22N	115W	29
191	Craven Creek Reservoir (Franklin Res)	ACE Mapscan	Wet	Yes		41.86	-110.40	Phase I	Craven Creek	Slate Creek	Private	22N	114W	30
192	Unknown	ACE Mapscan	Dry	Potential		41.86	-110.51	Phase I	Willow Creek-East Branch Willow Creek	East Willow Creek	Private	22N	115W	30
193	Unknown	ACE Mapscan	Wet	Yes		41.85	-110.45	Phase I	Alkali Creek-Hams Fork	Slate Creek	BLM	22N	115W	27
194	Unknown	ACE Mapscan	Wet	Yes		41.85	-110.49	Phase I	Willow Creek-East Branch Willow Creek	East Willow Creek	BLM	22N	115W	29
195	Unknown	ACE Mapscan	Dry	No	SEDIMENT	41.85	-110.58	Phase I	Hams Fork-Fish Creek	No Allotment	Private	22N	116W	27
196	Unknown	ACE Mapscan	Dry	No	BREACHED	41.85	-110.58	Phase I	Hams Fork-Fish Creek	Airport	BLM	22N	116W	33
197	Unknown	ACE Mapscan	Dry	No	BREACHED	41.85	-110.30	Phase I	Craven Creek	Slate Creek	State of Wyoming	22N	114W	36
198	Unknown	ACE Mapscan	Dry	Potential		41.84	-110.32	Phase I	Craven Creek	Slate Creek	BLM	22N	114W	35
199	Unknown	ACE Mapscan	Wet	Yes		41.84	-110.48	Phase I	Alkali Creek-Hams Fork	Quealy Peak	Private	21N	115W	5
200	Unknown	ACE Mapscan	Wet	Yes		41.84	-110.57	Phase I	Hams Fork-Fish Creek	Airport	BLM	21N	116W	3
201	Unknown	ACE Mapscan	Dry	No	BREACHED	41.83	-110.45	Phase I	Alkali Creek-Hams Fork	Slate Creek	Private	21N	115W	3
202	Unknown	ACE Mapscan	Dry	No	BREACHED	41.83	-110.58	Phase I	Hams Fork-Oakley Draw	Airport	BLM	21N	116W	4
203	Unknown	ACE Mapscan	Dry	Potential		41.82	-110.45	Phase I	Alkali Creek-Hams Fork	Slate Creek	Private	21N	115W	3
204	Unknown	ACE Mapscan	Dry	Potential		41.82	-110.58	Phase I	Hams Fork-Oakley Draw	Airport	BLM	21N	116W	3
205	Unknown	ACE Mapscan	Dry	Potential		41.82	-110.46	Phase I	Alkali Creek-Hams Fork	Quealy Peak	Private	21N	115W	3
206	Unknown	ACE Mapscan	Dry	No	SEDIMENT	41.82	-110.51	Phase I	Hams Fork-Oakley Draw	Slate Creek	BLM	21N	115W	6
207	Unknown	ACE Mapscan	Dry	Potential		41.82	-110.34	Phase I	Craven Creek	Slate Creek	Private	21N	114W	3
208	Unknown	ACE Mapscan	Dry	No	SEDIMENT	41.82	-110.45	Phase I	Alkali Creek-Hams Fork	Slate Creek	Private	21N	115W	3
209	Unknown	ACE Mapscan	Dry	No	BREACHED	41.82	-110.58	Phase I	Hams Fork-Oakley Draw	Airport	Private	21N	116W	9
210	Unknown	ACE Mapscan	Dry	Potential		41.82	-110.59	Phase I	Hams Fork-Oakley Draw	North Moyer	BLM	21N	116W	9
211	Unknown	ACE Mapscan	Wet	Yes		41.81	-110.47	Phase I	Alkali Creek-Hams Fork	Quealy Peak	Private	21N	115W	9
212	Unknown	ACE Mapscan	Dry	No	BREACHED	41.81	-110.57	Phase I	Hams Fork-Oakley Draw	Airport	Private	21N	116W	10
213	Unknown	ACE Mapscan	Dry	Potential		41.81	-110.33	Phase I	Craven Creek	Slate Creek	Private	21N	114W	11
214	Unknown	ACE Mapscan	Wet	Yes		41.81	-110.59	Phase I	Hams Fork-Oakley Draw	North Moyer	Private	21N	116W	9
215	Unknown	ACE Mapscan	Dry	No	BREACHED	41.81	-110.59	Phase I	Hams Fork-Oakley Draw	South Moyer	Private	21N	116W	16
216	Unknown	ACE Mapscan	Wet	Yes		41.81	-110.59	Phase I	Hams Fork-Oakley Draw	South Moyer	Private	21N	116W	16
217	Unknown	ACE Mapscan	Wet	Yes		41.80	-110.59	Phase I	Hams Fork-Oakley Draw	South Moyer	Private	21N	116W	16
218	Unknown	ACE Mapscan	Dry	No	BREACHED	41.80	-110.57	Phase I	Hams Fork-Oakley Draw	Airport	Private	21N	116W	15
219	Unknown	ACE Mapscan	Dry	No	SEDIMENT	41.80	-110.52	Phase I	Hams Fork-Oakley Draw	Slate Creek	Private	21N	116W	13
220	Unknown	ACE Mapscan	Wet	Yes		41.80	-110.58	Phase I	Hams Fork-Oakley Draw	South Moyer	Private	21N	116W	16
221	Unknown	ACE Mapscan	Wet	Yes		41.80	-110.58	Phase I	Hams Fork-Oakley Draw	South Moyer	Private	21N	116W	16
222	Unknown	ACE Mapscan	Dry	Potential		41.80	-110.59	Phase I	Hams Fork-Oakley Draw	South Moyer	Private	21N	116W	16
223	Unknown	ACE Mapscan	Dry	Potential		41.80	-110.59	Phase I	Hams Fork-Oakley Draw	South Moyer	Private	21N	116W	16
224	Unknown	ACE Mapscan	Dry	Potential		41.79	-110.31	Phase I	Craven Creek	Slate Creek	Private	21N	114W	23
225	Unknown	ACE Mapscan	Dry	Potential		41.79	-110.47	Phase I	Alkali Creek-Hams Fork	Slate Creek	Private	21N	115W	21

ACE ID	Name	Source	Condition	Water Source	Notes	Lattitude	Longitude	Phase	HUC 12 Name	Allotment	Land Owner	T	R	S
226	Unknown	ACE Mapscan	Dry	No	SEDIMENT	41.79	-110.36	Phase I	Craven Creek	Slate Creek	Private	21N	114W	21
227	Unknown	ACE Mapscan	Dry	No	BREACHED	41.79	-110.31	Phase I	Craven Creek	Slate Creek	Private	21N	114W	23
228	Unknown	ACE Mapscan	Wet	Yes		41.79	-110.47	Phase I	Alkali Creek-Hams Fork	Slate Creek	Private	21N	115W	21
229	Unknown	ACE Mapscan	Dry	Potential		41.78	-110.32	Phase I	Craven Creek	Slate Creek	Private	21N	114W	23
230	Unknown	ACE Mapscan	Dry	Potential		41.78	-110.48	Phase I	Hams Fork-Oakley Draw	Slate Creek	Private	21N	115W	21
232	Unknown	ACE Mapscan	Dry	No	SEDIMENT	41.77	-110.38	Phase I	Hams Fork-Oakley Draw	Slate Creek	Private	21N	114W	29
233	Unknown	ACE Mapscan	Wet	Yes		41.77	-110.20	Phase I	Hams Fork-Cow Hollow Creek	Cow Hollow	Private	21N	113W	26
234	Unknown	ACE Mapscan	Dry	Potential		41.77	-110.35	Phase I	Hams Fork-Oakley Draw	Slate Creek	BLM	21N	114W	28
235	Unknown	ACE Mapscan	Dry	Potential		41.77	-110.26	Phase I	Hams Fork-Cow Hollow Creek	Opal	Private	21N	113W	29
238	Unknown	ACE Mapscan	Dry	Potential		41.77	-110.50	Phase I	Hams Fork-Oakley Draw	Slate Creek	BLM	21N	115W	30
239	Unknown	ACE Mapscan	Dry	Potential		41.77	-110.48	Phase I	Hams Fork-Oakley Draw	Slate Creek	Private	21N	115W	29
241	Unknown	ACE Mapscan	Dry	Potential		41.77	-110.55	Phase I	Hams Fork-Oakley Draw	No Allotment	Private	21N	116W	26
242	Unknown	ACE Mapscan	Wet	Yes		41.77	-110.33	Phase I	Hams Fork-Oakley Draw	No Allotment	Private	21N	114W	27
243	Unknown	ACE Mapscan	Wet	Yes		41.76	-110.32	Phase I	Hams Fork-Oakley Draw	No Allotment	Private	21N	114W	35
244	Unknown	ACE Mapscan	Wet	Yes		41.76	-110.32	Phase I	Hams Fork-Oakley Draw	No Allotment	Private	21N	114W	35
245	Unknown	ACE Mapscan	Wet	Yes		41.76	-110.33	Phase I	Hams Fork-Oakley Draw	No Allotment	Private	21N	114W	35
246	Unknown	ACE Mapscan	Wet	Yes		41.76	-110.33	Phase I	Hams Fork-Oakley Draw	No Allotment	Private	21N	114W	35
247	Unknown	ACE Mapscan	Dry	Potential		41.76	-110.50	Phase I	Hams Fork-Oakley Draw	Slate Creek	Private	21N	115W	31
248	Unknown	ACE Mapscan	Dry	No	SEDIMENT	41.76	-110.37	Phase I	Hams Fork-Oakley Draw	Roberson Creek	BLM	21N	114W	32
250	Unknown	ACE Mapscan	Wet	Yes		41.76	-110.17	Phase I	Hams Fork-Cow Hollow Creek	Cow Hollow	Private	21N	112W	31
251	Unknown	ACE Mapscan	Dry	No	BREACHED	41.76	-110.36	Phase I	Hams Fork-Oakley Draw	Roberson Creek	Private	21N	114W	33
252	Unknown	ACE Mapscan	Wet	Yes		41.76	-110.17	Phase I	Hams Fork-Cow Hollow Creek	Cow Hollow	Private	21N	112W	31
254	Unknown	ACE Mapscan	Wet	Yes		41.75	-110.51	Phase I	Hams Fork-Oakley Draw	Slate Creek	Private	21N	115W	31
255	Unknown	ACE Mapscan	Dry	No	SEDIMENT	41.75	-110.24	Phase I	Hams Fork-Cow Hollow Creek	Opal	Private	21N	113W	33
266	Unknown	ACE Mapscan	Dry	Potential		41.73	-110.50	Phase I	Hams Fork-Oakley Draw	Cumberland Flats	Private	20N	116W	11
268	Unknown	ACE Mapscan	Dry	No	BREACHED	41.73	-110.49	Phase I	Hams Fork-Oakley Draw	Carter Lease	Private	20N	116W	11
271	Unknown	ACE Mapscan	Dry	Potential		41.73	-110.53	Phase I	Hams Fork-Oakley Draw	Cumberland Flats	Private	20N	116W	9
273	Unknown	ACE Mapscan	Dry	Potential		41.73	-110.52	Phase I	Hams Fork-Oakley Draw	Cumberland Flats	BLM	20N	116W	10
274	Unknown	ACE Mapscan	Wet	Yes		41.73	-110.13	Phase I	Hams Fork-Cow Hollow Creek	No Allotment	Private	20N	113W	12
276	Unknown	ACE Mapscan	Dry	Potential		41.73	-110.51	Phase I	Hams Fork-Oakley Draw	Cumberland Flats	BLM	20N	116W	10
279	Unknown	ACE Mapscan	Dry	Potential		41.72	-110.53	Phase I	Hams Fork-Oakley Draw	Cumberland Flats	State of Wyoming	20N	116W	16
281	Unknown	ACE Mapscan	Dry	No	BREACHED	41.72	-110.52	Phase I	Hams Fork-Oakley Draw	Cumberland Flats	Private	20N	116W	15
282	Unknown	ACE Mapscan	Wet	Yes		41.72	-110.52	Phase I	Hams Fork-Oakley Draw	Cumberland Flats	State of Wyoming	20N	116W	16
283	Unknown	ACE Mapscan	Dry	Potential		41.72	-110.50	Phase I	Hams Fork-Oakley Draw	Cumberland Flats	Private	20N	116W	15
285	Unknown	ACE Mapscan	Dry	Potential		41.72	-110.51	Phase I	Hams Fork-Oakley Draw	Cumberland Flats	Private	20N	116W	15
288	Unknown	ACE Mapscan	Wet	Yes		41.72	-110.11	Phase I	Hams Fork-Cow Hollow Creek	No Allotment	Private	20N	112W	18
290	Unknown	ACE Mapscan	Dry	Potential		41.71	-110.52	Phase I	Hams Fork-Oakley Draw	Cumberland Flats	State of Wyoming	20N	116W	16
291	Unknown	ACE Mapscan	Wet	Yes		41.71	-110.53	Phase I	Hams Fork-Oakley Draw	Cumberland Flats	State of Wyoming	20N	116W	16
305	Unknown	ACE Mapscan	Wet	Yes		41.69	-110.07	Phase I	Hams Fork-Zieglers Wash	No Allotment	Private	20N	112W	28
306	Unknown	ACE Mapscan	Dry	Potential		41.69	-110.06	Phase I	Hams Fork-Zieglers Wash	Granger Lease	Private	20N	112W	28
316	Unknown	ACE Mapscan	Dry	No	SEDIMENT	41.68	-110.19	Phase I	Hams Fork-Zieglers Wash	Carter Lease	Private	20N	113W	33
1594	Unknown	Kemmerer BLM	Wet	Yes	RIPS DATABASE	42.05	-110.71	Phase I	Hams Fork-Dempsey Creek	Dempsey Basin	BLM	24N	117W	20
1595	Unknown	Kemmerer BLM	Wet	Yes	RIPS DATABASE	42.04	-110.70	Phase I	Hams Fork-Dempsey Creek	Dempsey Basin	BLM	24N	117W	28
1596	Unknown	Kemmerer BLM	Dry	No	Listed as "Blown Out" by BLM, no water present, hummocks, trampled	42.00	-110.50	Phase I	Willow Creek-East Branch Willow Creek	Slate Creek	BLM	23N	115W	6
1597	Unknown	Kemmerer BLM	Dry	Potential	RIPS DATABASE	41.97	-110.60	Phase I	Hams Fork-Fish Creek	Trail Creek	BLM	23N	116W	20
1598	Unknown	Kemmerer BLM	Wet	Yes	WET IN TWO YEARS OF PHOTOGRAPHY, RIPS DATABASE	41.89	-110.45	Phase I	Alkali Creek-Hams Fork	Slate Creek	BLM	22N	115W	15
1599	Unknown	Kemmerer BLM	Dry	Yes	RIPS DATABASE	41.87	-110.45	Phase I	Alkali Creek-Hams Fork	Slate Creek	BLM	22N	115W	22
1600	Unknown	Kemmerer BLM	N/A	No	NO VISIBLE RESERVOIR, RIPS DATABASE	41.86	-110.46	Phase I	Alkali Creek-Hams Fork	Slate Creek	BLM	22N	115W	27
1601	Unknown	Kemmerer BLM	Dry	Potential	RIPS DATABASE	41.85	-110.45	Phase I	Alkali Creek-Hams Fork	Slate Creek	BLM	22N	115W	27
1602	Unknown	Kemmerer BLM	Wet	Yes	RIPS DATABASE	41.85	-110.46	Phase I	Alkali Creek-Hams Fork	Slate Creek	BLM	22N	115W	27
1603	Unknown	Kemmerer BLM	N/A	No	NO VISIBLE RESERVOIR, RIPS DATABASE	41.85	-110.49	Phase I	Willow Creek-East Branch Willow Creek	East Willow Creek	BLM	22N	115W	32
1604	Unknown	Kemmerer BLM	Wet	Yes	WET IN TWO YEARS OF PHOTOGRAPHY	41.85	-110.45	Phase I	Alkali Creek-Hams Fork	Slate Creek	BLM	22N	115W	34
1605	Unknown	Kemmerer BLM	Dry	Potential	RIPS DATABASE	41.85	-110.44	Phase I	Alkali Creek-Hams Fork	Slate Creek	BLM	22N	115W	35
1606	Unknown	Kemmerer BLM	Dry	Potential	RIPS DATABASE	41.84	-110.44	Phase I	Alkali Creek-Hams Fork	Slate Creek	BLM	22N	115W	35
1607	Unknown	Kemmerer BLM	Dry	Potential	RIPS DATABASE	41.84	-110.35	Phase I	Craven Creek	Slate Creek	BLM	22N	114W	33
1608	Unknown	Kemmerer BLM	Dry	Potential	RIPS DATABASE	41.84	-110.43	Phase I	Craven Creek	Slate Creek	BLM	22N	115W	35
1609	Unknown	Kemmerer BLM	Wet	Yes	WET IN TWO YEARS PHOTOGRAPHY, RIPS DATABASE	41.84	-110.48	Phase I	Alkali Creek-Hams Fork	Quealy Peak	Private	22N	115W	32
1610	Unknown	Kemmerer BLM	Dry	Potential	RIPS DATABASE	41.84	-110.56	Phase I	Hams Fork-Fish Creek	Airport	BLM	22N	116W	34
1611	Unknown	Kemmerer BLM	Dry	No	SEDIMENT	41.84	-110.42	Phase I	Craven Creek	Slate Creek	BLM	22N	115W	36
1612	Unknown	Kemmerer BLM	Dry	Potential	RIPS DATABASE	41.84	-110.31	Phase I	Craven Creek	Slate Creek	BLM	22N	114W	35
1613	Unknown	Kemmerer BLM	Dry	No	BREACHED, RIPS DATABASE	41.84	-110.44	Phase I	Alkali Creek-Hams Fork	Slate Creek	BLM	22N	115W	35
1614	Unknown	Kemmerer BLM	Dry	Potential	RIPS DATABASE	41.83	-110.36	Phase I	Craven Creek	Slate Creek	BLM	21N	114W	4
1615	Unknown	Kemmerer BLM	Dry	Potential	RIPS DATABASE	41.83	-110.43	Phase I	Alkali Creek-Hams Fork	Slate Creek	BLM	21N	115W	2
1616	Unknown	Kemmerer BLM	Dry	No	BREACHED, RIPS DATABASE	41.83	-110.34	Phase I	Craven Creek	Slate Creek	BLM	21N	114W	3
1617	Unknown	Kemmerer BLM	Dry	No	BREACHED, RIPS DATABASE	41.83	-110.44	Phase I	Alkali Creek-Hams Fork	Slate Creek	BLM	21N	115W	2
1618	Unknown	Kemmerer BLM	Dry	No	SEDIMENT, RIPS DATABASE	41.83	-110.46	Phase I	Alkali Creek-Hams Fork	Quealy Peak	Private	21N	115W	3
1619	Unknown	Kemmerer BLM	Dry	Potential	RIPS DATABASE	41.83	-110.33	Phase I	Craven Creek	Slate Creek	BLM	21N	114W	3
1620	Unknown	Kemmerer BLM	Wet	Yes	WET IN TWO YEARS PHOTOGRAPHY, RIPS DATABASE	41.83	-110.32	Phase I	Craven Creek	Slate Creek	BLM	21N	114W	2
1621	Unknown	Kemmerer BLM	Dry	Potential	RIPS DATABASE	41.83	-110.31	Phase I	Craven Creek	Slate Creek	BLM	21N	114W	2
1622	Unknown	Kemmerer BLM	Dry	No	SEDIMENT, RIPS DATABASE	41.83	-110.43	Phase I	Alkali Creek-Hams Fork	Slate Creek	BLM	21N	115W	2
1623	Unknown	Kemmerer BLM	Dry	Potential	RIPS DATABASE	41.82	-110.44	Phase I	Alkali Creek-Hams Fork	Slate Creek	BLM	21N	115W	2
1624	Unknown	Kemmerer BLM	Dry	Potential	RIPS DATABASE	41.82	-110.35	Phase I	Craven Creek	Slate Creek	BLM	21N	114W	4
1625	Unknown	Kemmerer BLM	Wet	Yes	RIPS DATABASE	41.82	-110.48	Phase I	Alkali Creek-Hams Fork	Quealy Peak	BLM	21N	115W	4
1626	Unknown	Kemmerer BLM	Dry	Potential	RIPS DATABASE	41.82	-110.30	Phase I	Craven Creek	Slate Creek	Private	21N	114W	1
1627	Unknown	Kemmerer BLM	Dry	Potential	RIPS DATABASE	41.82	-110.33	Phase I	Craven Creek	Slate Creek	BLM	21N	114W	10

ACE ID	Name	Source	Condition	Water Source	Notes	Lattitude	Longitude	Phase	HUC 12 Name	Allotment	Land Owner	T	R	S
1628	Unknown	Kemmerer BLM	Dry	Potential	RIPS DATABASE	41.81	-110.30	Phase I	Craven Creek	Slate Creek	BLM	21N	114W	12
1629	Unknown	Kemmerer BLM	Dry	Potential	RIPS DATABASE	41.81	-110.34	Phase I	Craven Creek	Slate Creek	BLM	21N	114W	10
1630	Unknown	Kemmerer BLM	Dry	Potential	RIPS DATABASE	41.80	-110.32	Phase I	Craven Creek	Slate Creek	BLM	21N	114W	14
1631	Unknown	Kemmerer BLM	Dry	Potential	RIPS DATABASE	41.79	-110.49	Phase I	Hams Fork-Oakley Draw	Slate Creek	Private	21N	115W	17
1632	Unknown	Kemmerer BLM	Dry	Potential	RIPS DATABASE (TWO RIPS NO. 940055, 945016)	41.79	-110.49	Phase I	Hams Fork-Oakley Draw	Slate Creek	BLM	21N	115W	20
1633	Unknown	Kemmerer BLM	Dry	Potential	RIPS DATABASE	41.79	-110.50	Phase I	Hams Fork-Oakley Draw	Slate Creek	BLM	21N	115W	20
1634	Unknown	Kemmerer BLM	Dry	No	BREACHED, RIPS DATABASE	41.78	-110.30	Phase I	Craven Creek	Slate Creek	BLM	21N	114W	24
1635	Unknown	Kemmerer BLM	Dry	Potential	RIPS DATABASE	41.78	-110.29	Phase I	Craven Creek	Slate Creek	BLM	21N	114W	24
1636	Unknown	Kemmerer BLM	Dry	Potential	RIPS DATABASE	41.78	-110.50	Phase I	Hams Fork-Oakley Draw	Slate Creek	BLM	21N	115W	20
1637	Unknown	Kemmerer BLM	Dry	No	BREACHED, SEDIMENT, RIPS DATABASE	41.78	-110.44	Phase I	Alkali Creek-Hams Fork	Slate Creek	BLM	21N	115W	26
1638	Unknown	Kemmerer BLM	Dry	No	SEDIMENT, RIPS DATABASE	41.77	-110.36	Phase I	Hams Fork-Oakley Draw	Slate Creek	BLM	21N	114W	28
1639	Unknown	Kemmerer BLM	Dry	Potential	RIPS DATABASE	41.77	-110.47	Phase I	Hams Fork-Oakley Draw	Slate Creek	BLM	21N	115W	28
1640	Unknown	Kemmerer BLM	Dry	Potential	RIPS DATABASE	41.77	-110.43	Phase I	Alkali Creek-Hams Fork	Slate Creek	Private	21N	115W	26
1641	Unknown	Kemmerer BLM	Dry	No	BREACHED, RIPS DATABASE	41.77	-110.47	Phase I	Hams Fork-Oakley Draw	Slate Creek	BLM	21N	115W	28
1642	Unknown	Kemmerer BLM	Dry	Potential	RIPS DATABASE	41.77	-110.50	Phase I	Hams Fork-Oakley Draw	Slate Creek	BLM	21N	115W	30
1643	Unknown	Kemmerer BLM	Dry	Potential	RIPS DATABASE	41.76	-110.48	Phase I	Hams Fork-Oakley Draw	Slate Creek	BLM	21N	115W	32
1644	Unknown	Kemmerer BLM	Dry	Potential	RIPS DATABASE	41.74	-110.17	Phase I	Hams Fork-Cow Hollow Creek	Hassett	Private	20N	113W	10
1651	Unknown	Kemmerer BLM	Wet	Yes	RIPS DATABASE	41.71	-110.13	Phase I	Hams Fork-Cow Hollow Creek	Hassett	BLM	20N	113W	24
2015	HIGHWAY PIT	UDCo	Dry	No	BREACHED, See UDCo pdf Summary	41.78	-110.16	Phase I	Hams Fork-Cow Hollow Creek	Granger Lease	Private	21N	112W	19
2022	JOE # 1	UDCo	Dry	Potential	See UDCo pdf Summary	41.68	-110.06	Phase I	Hams Fork-Zieglers Wash	Granger Lease	Private	20N	112W	33
2023	JOE #3	UDCo	Dry	No	BREACHED, See UDCo pdf Summary	41.67	-110.06	Phase I	Hams Fork-Zieglers Wash	Granger Lease	Private	20N	112W	33
2024	JOE #2	UDCo	Dry	No	See UDCo pdf Summary	41.67	-110.06	Phase I	Hams Fork-Zieglers Wash	Granger Lease	Private	20N	112W	33

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