



# **Clear Creek Watershed/Storage Study Wyoming Water Development Commission**

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**Sponsored by:**  
*Lake DeSmet Conservation District*  
&  
*Sheridan County Conservation District*

**Consultant:**  
**States West Water Resources Corporation - Cheyenne, Wyoming**

**Subconsultants:**  
**DOWL HKM – Sheridan, Wyoming**  
**Anderson Consulting Engineers – Fort Collins, Colorado**  
**RJH Consultants – Englewood, Colorado**  
**Western EcoSystems Technology, Inc. – Cheyenne, Wyoming**  
**Watts & Associates – Laramie, Wyoming**  
**Leonard Rice Engineers – Denver, Colorado**  
**Wyoming State Archeological Survey – Laramie, Wyoming**

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**May 24, 2011**

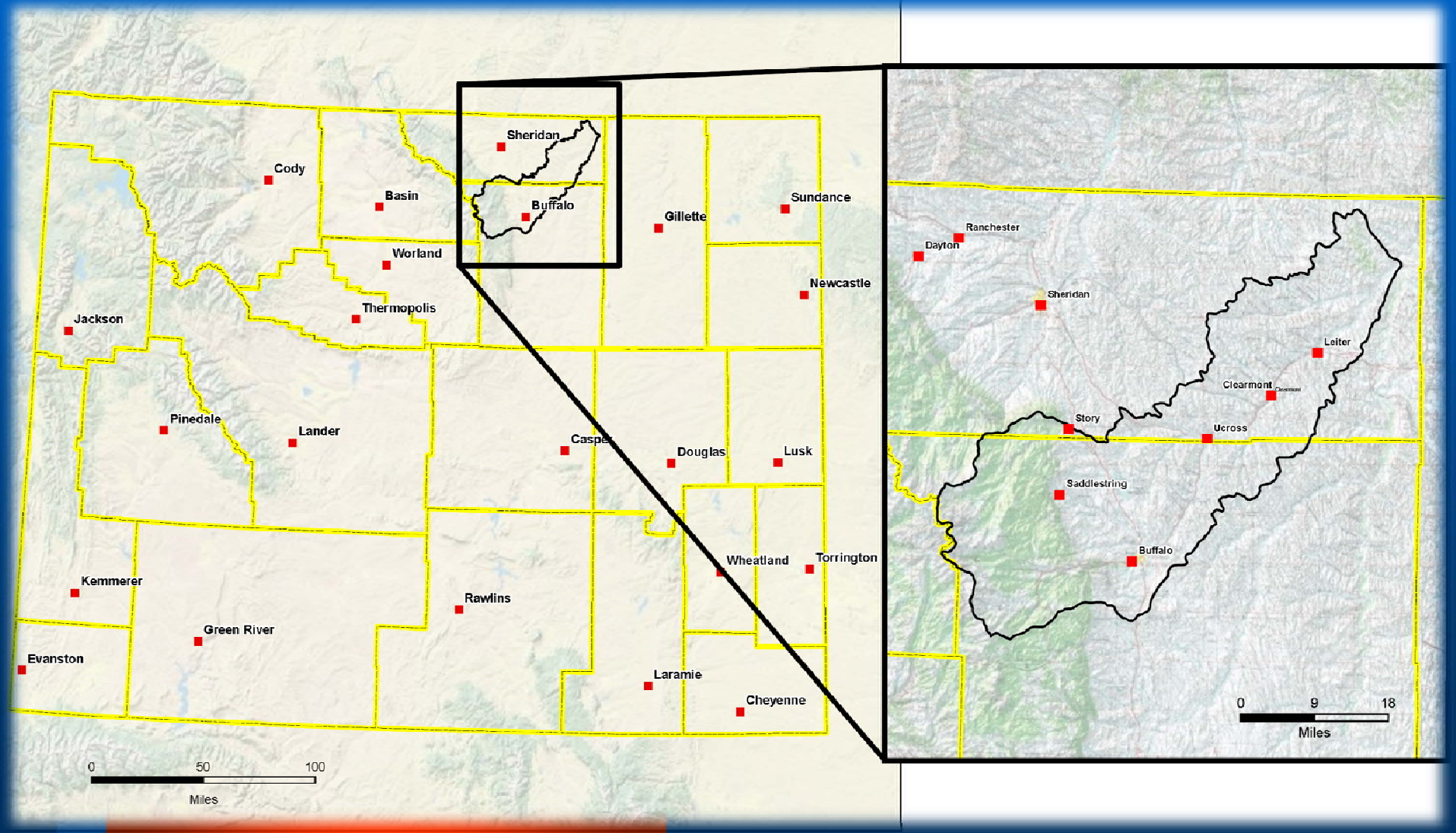


# Project Purpose

- **Inventory and describe the Clear Creek watershed**
- **Develop a GIS of compiled data**
- **Streamflow data collection**
- **Develop rehabilitation plans and projects for watershed infrastructure**
  - **Upland Water**
  - **Channel Stability**
  - **Irrigation Rehabilitation**
  - **Water Storage**



# Watershed Location



# Background

- **After initial interest from landowner and discussion about Conservation District sponsorship, various meetings were held by WWDO staff in 2007 and 2008 to inform the community and conservation districts of the WWDC's watershed study process and to get consent before proceeding with the study in summer of 2009.**

**Oct. 2007 – Buffalo Landowner Meeting**

**Nov. 2007 – Sheridan Landowner Meeting**

**May 2008 – Clearmont Landowner Meeting**

**July 2008 – Buffalo Landowner Meeting**

**July 2008 – Sheridan Landowner Meeting**

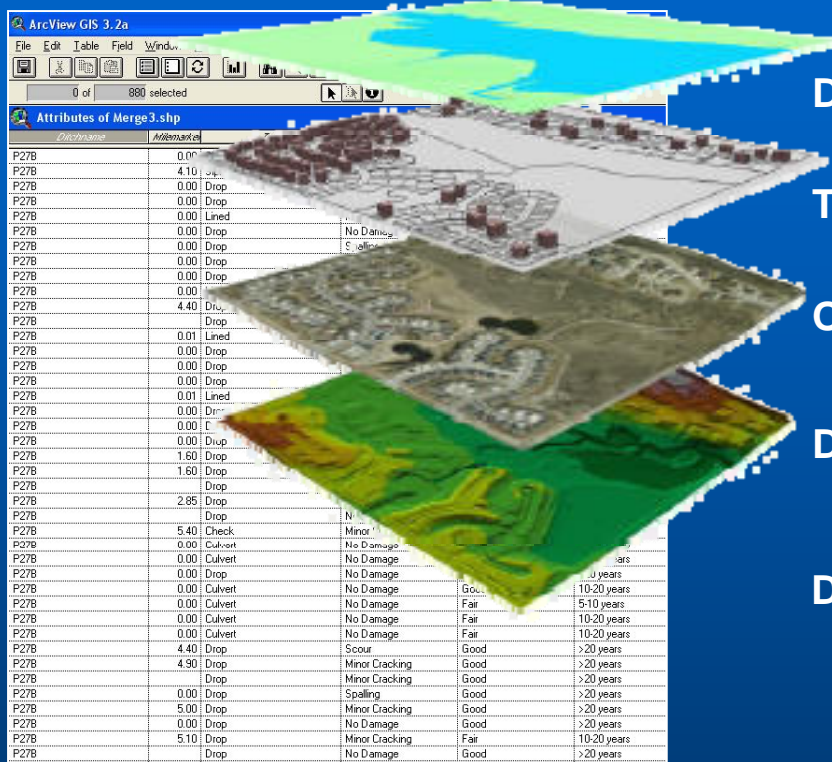
**Dec. 2008 – LCCD Board Meeting**

**Jan. 2009 – SCCD Board Meeting**





# GIS Development



Dataset Themes: Ownership, Hydrography, Soils, etc.

Topographic Mapping

Ortho Photography

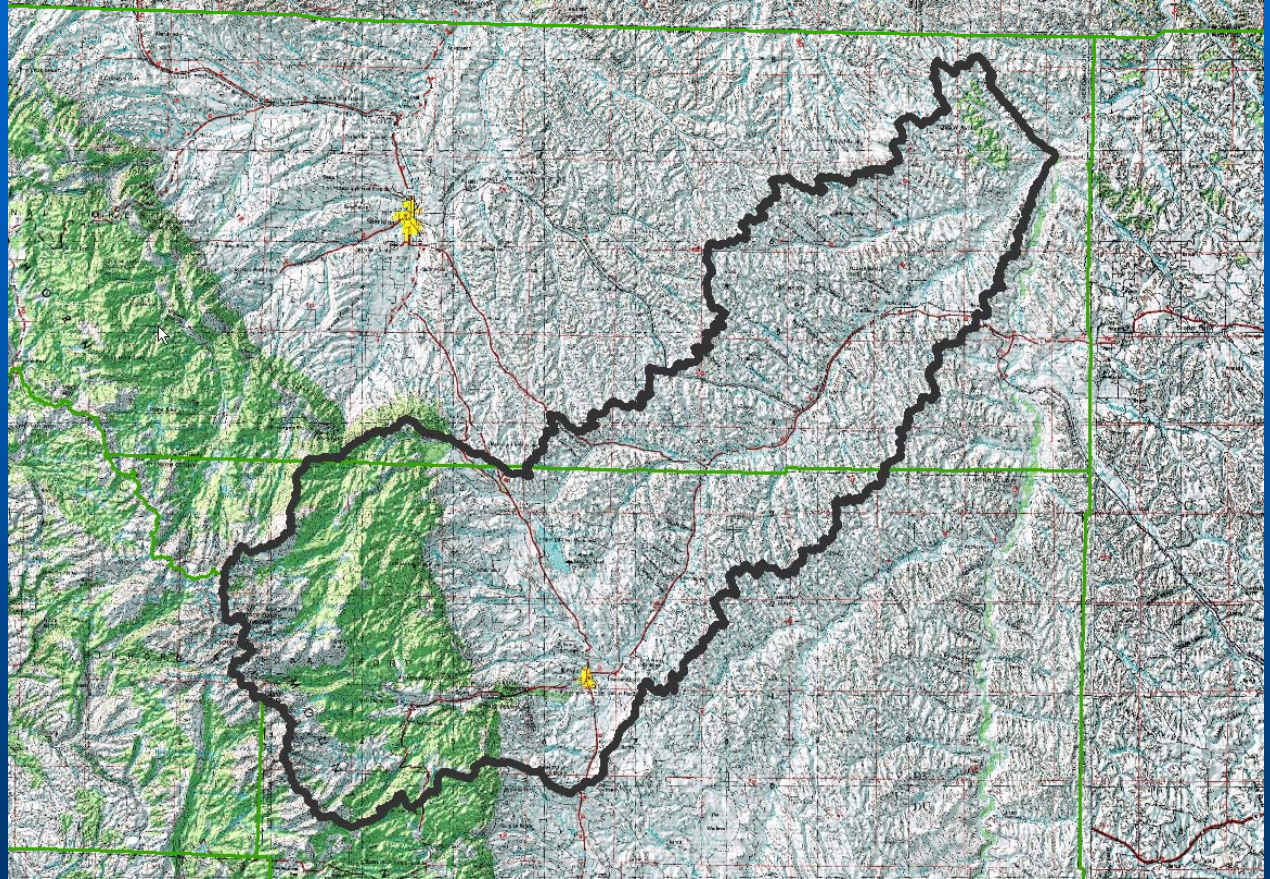
Digital Elevation Models: Base maps, Data Analysis

Databases and Attribute Tables

*Comprehensive “Clearinghouse” of Project Information*

# Data Collection: Geographic Information System Contents

- Backgrounds
  - Aerial Photos
  - Topographic Maps
- Climate
- Cultural / Historical
- Environmental
- Geology
- Geomorphology
- Hydrology
- Infrastructure
- Irrigation
- Mining
- Oil and Gas
- Ownership
- Political Boundaries
- Range Management
- Soils
- Watershed Management Plan Components



GIS Becomes a valuable tool for the future



# Geographic Information System

- **Hot Linked Information**
  - Reservoir site information
  - Climate data
  - Temporary stream gauge data
  - Irrigation structure and canal remediation info
  - Geomorphic photo points
  - Wetland assessment reports
  - Ecological site descriptions

# Watershed Inventory and Description

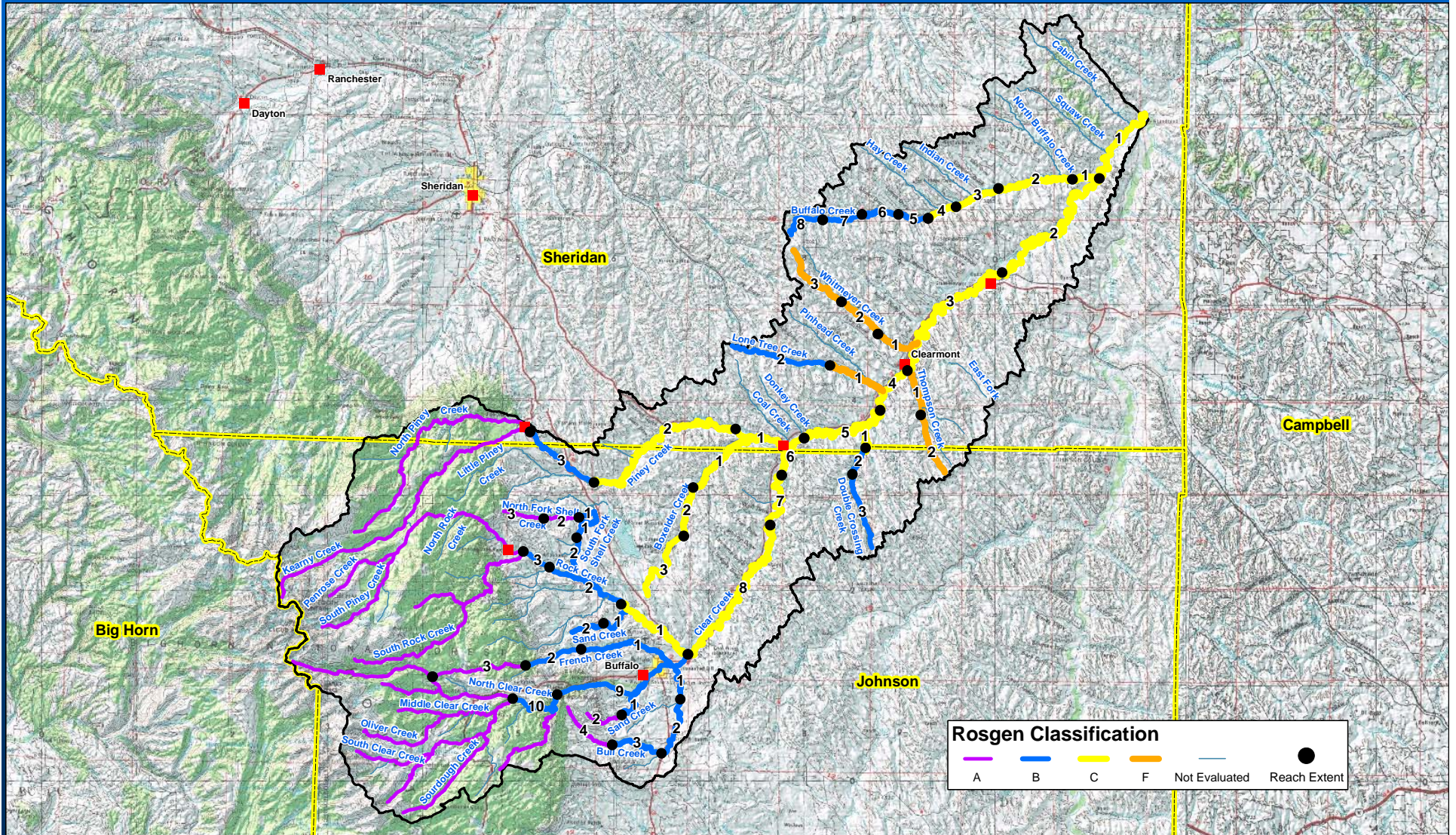
- Basin Geomorphology, topography, geography, population centers, land ownership
- Geology, soils, precipitation, climate
- Surface water availability and watershed hydrology
- Groundwater availability and aquifer characterization
- Plant communities / grazing resources
- Pipelines, roads, railroads, easements
- Mining
- Irrigation diversions and irrigated lands
- Existing water quality data and irrigation suitability
- Wetlands
- Wildlife habitat / fisheries







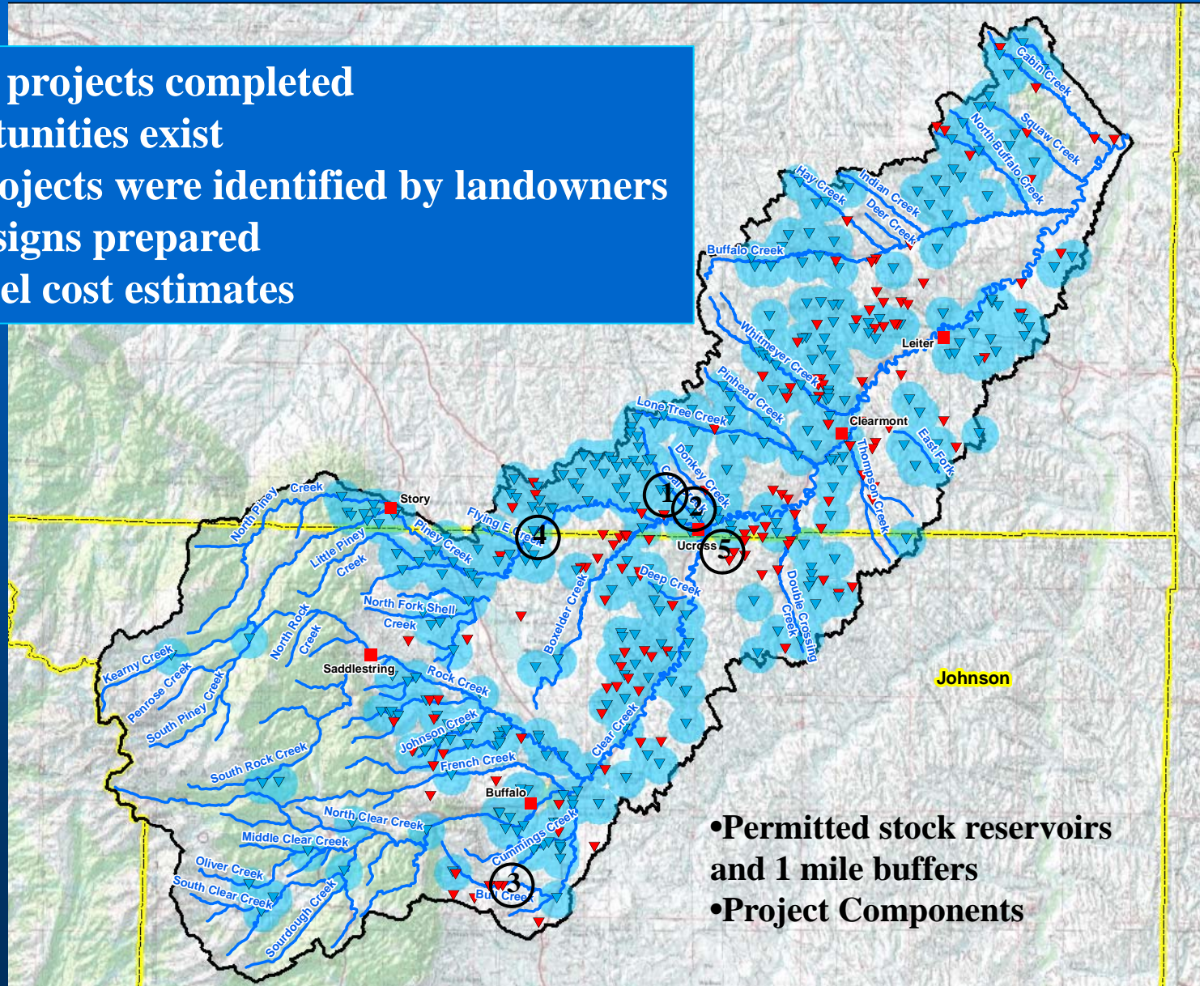
# Level I Geomorphic Characterization





# Upland Water Projects

- Various NRCS projects completed
- Further opportunities exist
- 5 individual projects were identified by landowners
- Conceptual designs prepared
- Conceptual level cost estimates

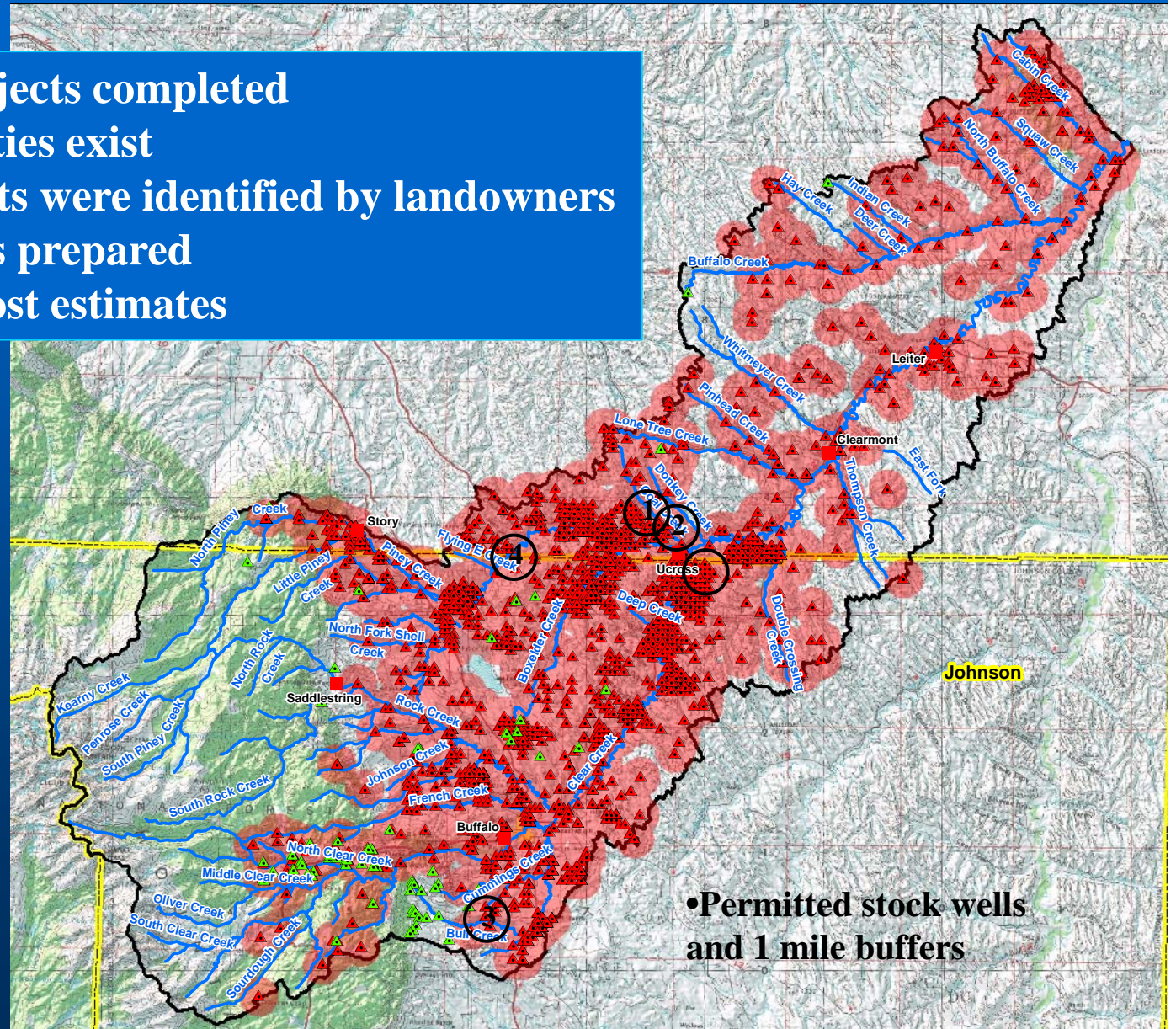


- Permitted stock reservoirs and 1 mile buffers
- Project Components



# Upland Water Projects

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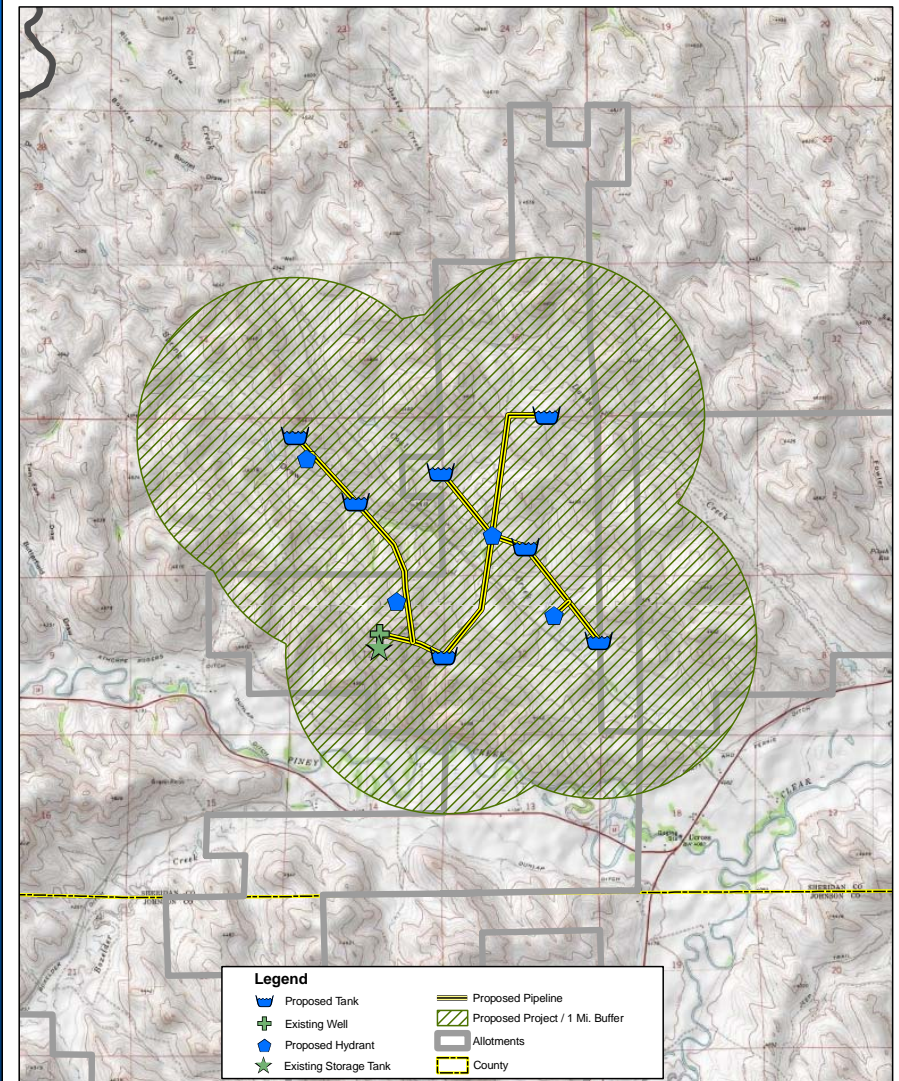
# Upland Projects

For these projects to go forward:

- Application to WWDC Small Water Projects by December 31
- Approval for funding
- Coordination with BLM if appropriate (Scheduling, NEPA compliance, etc)

## Watershed Plan Component: Upland Wildlife / Livestock Water Projects

Project Number	Project Name	Allotment Directly Benefitted	Pipeline (lineal feet)	Stock Tanks (number each)
Upland 1	Apache Ranch Phase I	Sahara Draw	36,375	7
Upland 2	Apache Ranch Phase II	Sahara Draw	33,000	5
Upland 3	Nelson	T.W.	4,500	1
Upland 4	Wilwauka Ranch	Private Lands	800	1
Upland 5	Vignaroli	State Lands	32,125	7
		<b>Total</b>	<b>20 miles</b>	<b>21</b>







# Purpose of Assessment

- To identify issues with water supply, conveyance loss and seepage
- Identify needed rehabilitation of irrigation infrastructure
- Make recommendations for upgrades and improvements
  - *Voluntary process\*\*\**
  - *Identified interested parties through public meetings, open-houses, and Conservation Districts*
  - *Interested parties were contacted, and visited to discuss issues*



# Sub-Basins – Visited Systems

- **Clear Creek**

- McKinney Ditch
- Six Mile Ditch
- Johnson-Holt Ditch
- Crown Ditch
- Carwile-Lobban Ditch
- Ladd Ditch
- Clear Creek Ditch
- Big Redman Ditch
- Hillery & Onslow Ditch
- LX Ditch
- Frank Hopkins Ditch
- Big Bonanza Ditch
- Pratt & Ferris #2 Ditch
- Pratt & Ferris #3 Ditch

# Sub-Basins – Visited Systems

- **French Creek**
  - Brown and Foster
- **Johnson Creek**
  - Johnson Ditch
  - Johnson #2
- **Rock Creek**
  - Fox Ditch
  - Hallie Ditch
  - Lake Desmet (M&M) Ditch
  - Last Chance Ditch
  - Prince Albert Ditch
  - Ono Ditch



# Sub-Basins – Visited Systems

- **Piney Creek**

- Rock Creek & South Piney Diversion
- Piney Divide Ditch
- Little Piney Ditch
- Leiter Ditch
- High Line Ditch
- Senff Ditch
- Sturdovant Ditch
- WJD Ditch
- Dunlap Ditch
- Pratt & Ferris #1

- **Boxelder Creek**

- Dave Belus
- Phil Wohlbrandt

# Condition Assessment Database

## Asset Priority Index (API) Rating

Rating	Function	Structure Types
50	Primary Diversion	Diversion Dams, Headworks
40	Conveyance	Siphon, Flume, Pump, Drop, Chute
30	Regulation / Fish Protection	Check, Wasteway, Fish Ladder, Fish Screen
20	Lateral Diversion / Flow Measurement	Headgate, Weir
10	Delivery	Turnout

## API Significance Rating

Rating	(cfs)	
	Minimum	Maximum
50	40	100
40	25	39
30	17	24
20	6	16
10	0	5

Structure database compiles site description and uses canal capacity, structure type to identify structure importance with respect to other structures in database. Establishes structure priority index

Database also compiles rehabilitation vs. replacement costs. This ratio is a component in the structure priority index

Local Name: Big Redman Diversion

HKM ID: BR-DD1	BLA ID:	Division: Clear Creek
Canal Name: Big Redman	Structure Type: Diversion Dam	
UTM Zone: 13	Coordinates: 368535.5, 4913300.3	Total # of Photos: 6

**Notes:** The Big Redman Ditch diverts from Clear Creek approximately 0.5 miles east of the Interstate 90 overpass off of US Highway 16 East. The ditch flows approximately 4.5 miles. It has a direct flow water right of 17.4 cfs which can serve approximately 1200 acres. The diversion structure is composed of large concrete wing walls and headwall with a large slide gate that controls flow through a 6' x 4' CMP arch pipe. The concrete footer below the pipe is broken which causes leakage and piping around the arch pipe and actually lead to a complete washout of the pipe. Sediment accumulation at the headgate is an issue. There is no slide gate that would allow for diverted water to return to the creek during non-irrigation times. The CMP pipe is showing corrosion and should be replaced. Rehabilitation costs reflect the installation of a 36" slide gate on the left headwall, and replacement and repair of the pipe and footer. Handrail should also be added to the headwall structure and downstream control wall. A rock vane diversion has been installed recently and is in good condition. However, replacement costs include a rock vane diversion. This is to represent the most complete replacement cost if the structure and diversion were to be completely demolished and replaced. Miscellaneous costs reflect a fish screen structure.



## Remediation Assessment

### Rehabilitation Costs

Item Description	Quantity	Units	Unit Cost	Total
Miscellaneous	66,000.0	\$	\$1.00	\$66,000.00
RCP 5' D	18.0	FT	\$384.21	\$6,915.73
Stream Control (Small)	1.0	Each	\$6,614.35	\$6,614.35
CIP Concrete	5.0	CY	\$1,102.40	\$5,512.00
36" Diameter Canal Gate	1.0	Each	\$5,159.23	\$5,159.23
RCP 36" D	40.0	FT	\$128.62	\$5,144.67
Trash Rack	150.0	SF	\$33.22	\$4,982.64
Handrail	60.0	FT	\$49.23	\$2,954.02
Concrete Demo. & Disposal	5.0	CY	\$203.83	\$1,019.15
<b>Total Field Cost:</b>				<b>\$104,301.79</b>
<b>Active Dewatering:</b> 7.5%				<b>\$7,822.63</b>
<b>Contingency:</b> 10%				<b>\$10,430.18</b>
<b>Subtotal:</b>				<b>\$122,554.60</b>
<b>Engineering:</b> 15%				<b>\$18,383.19</b>
<b>Mobilization:</b> 10%				<b>\$12,255.46</b>
<b>Total Rehabilitation Cost:</b>				<b>\$153,193.25</b>

### Replacement Costs

Item Description	Quantity	Units	Unit Cost	Total
Miscellaneous	66,000.0	\$	\$1.00	\$66,000.00
Rock Vane Diversion	1.0	Each	\$30,000.00	\$30,000.00
CIP Concrete	24.0	CY	\$1,102.40	\$26,457.60
5-ft x 5-ft Slide Gate	1.0	Each	\$8,589.90	\$8,589.90
Structural Fill	230.0	CY	\$35.58	\$8,183.03
RCP 5' D	18.0	FT	\$384.21	\$6,915.73
Stream Control (Small)	1.0	Each	\$6,614.35	\$6,614.35
36" Diameter Canal Gate	1.0	Each	\$5,159.23	\$5,159.23
RCP 36" D	40.0	FT	\$128.62	\$5,144.67
Structural Excavation	230.0	CY	\$22.28	\$5,123.66
Trash Rack	150.0	SF	\$33.22	\$4,982.64
Concrete Demo. & Disposal	24.0	CY	\$203.83	\$4,891.91
Handrail	60.0	FT	\$49.23	\$2,954.02
<b>Total Field Cost:</b>				<b>\$181,016.74</b>
<b>Active Dewatering:</b> 7.5%				<b>\$13,576.26</b>
<b>Contingency:</b> 10%				<b>\$18,101.67</b>
<b>Subtotal:</b>				<b>\$212,694.68</b>
<b>Engineering:</b> 15%				<b>\$31,904.20</b>
<b>Mobilization:</b> 10%				<b>\$21,269.47</b>
<b>Current Replacement Value (CRV):</b>				<b>\$265,868.35</b>

Facilities Condition Index (FCI):	0.58
Asset Priority Index (API):	80
Remediation Priority Index (RPI):	48

Deficiency	
Category:	CHSci
Rating:	Serious



# Condition Assessment Database

- **Canal Evaluation Form**
  - Component of database used to evaluate canal
  - Establishes cost estimates for canal remediation
  - Remediation includes:
    - Cleaning/reshaping
    - Seepage areas
    - Canal lining installation
    - Wasteway Headcutting
- Database identifies systems in worst condition, and create priority ranking for existing basin irrigation systems
- Would be most helpful tool for prioritizing projects for irrigation districts



# Conceptual Irrigation Improvements

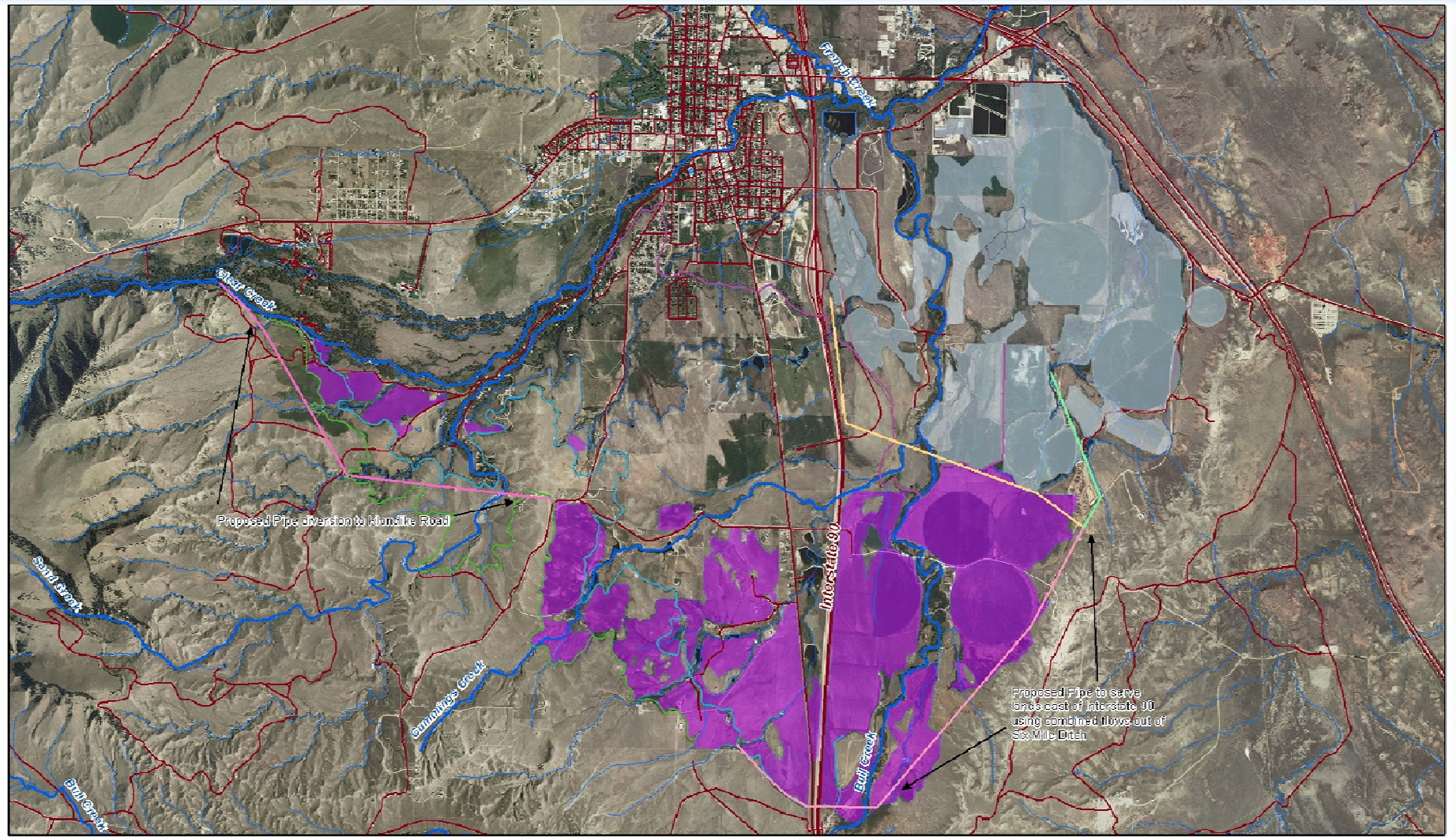
**Conceptual improvements are additional improvements to systems other than remediating current issues. These ideas include:**

- **Combining ditches to reduce losses**
- **Developing piped systems**
- **Incorporating irrigation improvements with proposed storage**



# Conceptual Irrigation Improvements

- **Johnson Holt/Six Mile/Clear Creek Ditches**
  - Johnson Holt/Six Mile parallel for entire length
  - Clear Creek Ditch serves ~2,100 acres east of I-90
  - Concern about Clear Creek Ditch pipe under High School
  - Pipe diversion to an enlarged Johnson Holt Ditch
  - Potentially serve lands east of I-90 by gravity feed



**Legend**

- |   |  |   |
|---|--|---|
| <ul style="list-style-type: none"> <li>— Fairling Ditch</li> <li>— Clear Creek Ditch</li> <li>— Johnson Holt Ditch</li> <li>— Six Mile Ditch</li> </ul> | <ul style="list-style-type: none"> <li>— Proposed Pipeline</li> <li>— 40 inch RCP</li> <li>— 30 inch PVC</li> <li>— 10 inch PVC</li> <li>— 12 inch PVC</li> <li>— Clear Creek Ditch Lands</li> </ul> | <ul style="list-style-type: none"> <li>■ Six Mile/Johnson Holt Lands</li> <li>— Six Miles</li> <li>— Roads</li> </ul> |
|---|--|---|

**Figure 5.5-1**  
**Clear Creek Irrigation Assessment**  
**Johnson Holt/Six Mile/Clear Creek**  
**Consolidation and Pipeline**



# Prioritized Rehabilitation Plan

- **5 Upland Water Projects**
- **5 Channel Stability Projects**
- **32 Ditch System Evaluated**
  - ***50 Irrigation Infrastructure Remediation Projects***
    - ***\$3,000,000+***
  - ***66 Canal Remediation Projects***
    - ***\$7,000,000+***
  - ***6 Conceptual Level Broad Scale Conservation Projects***
    - ***\$11,000,000+***



***\*Great tool for future planning and budgeting***

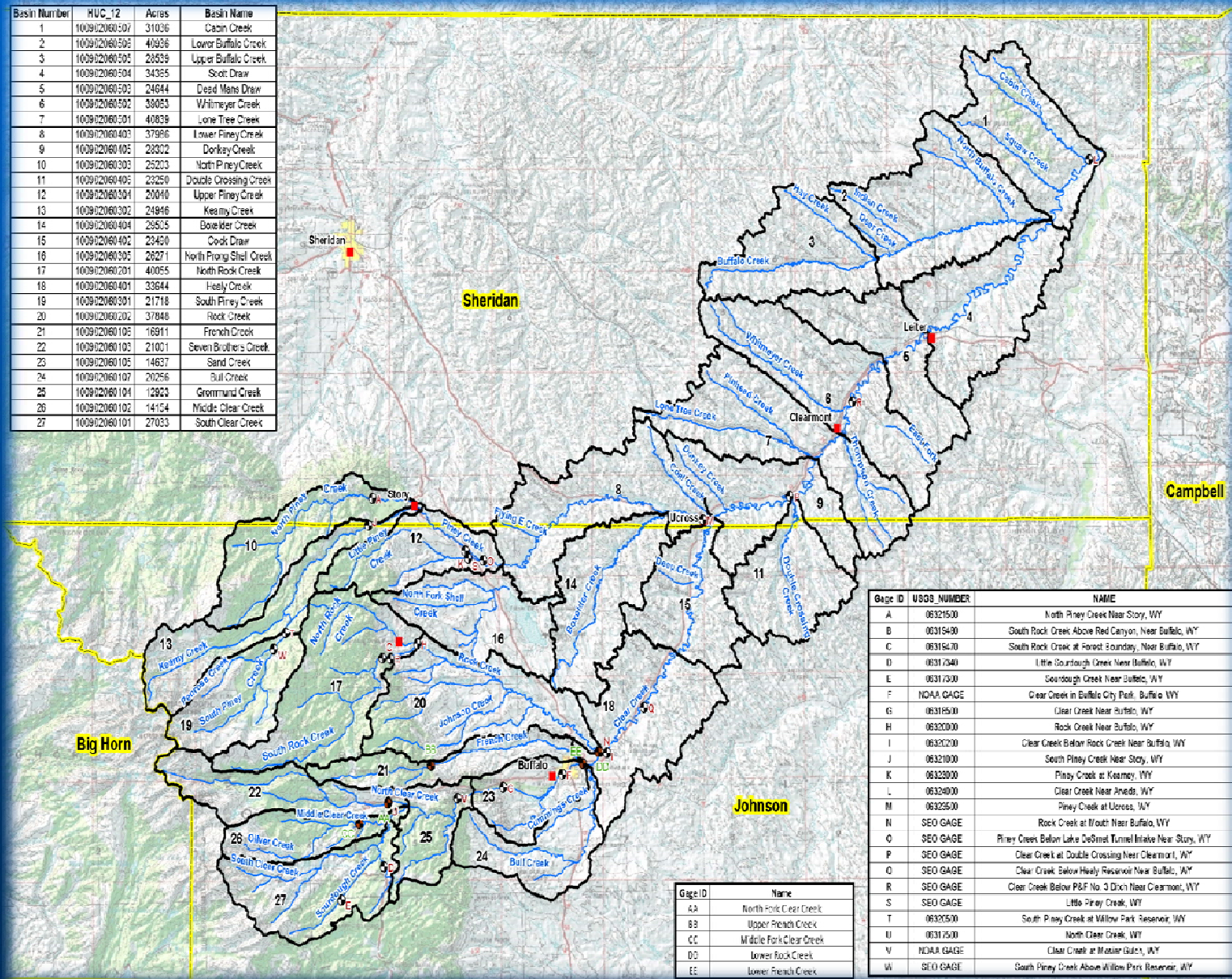
# Complete Assessment Report and Results

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- **Report will be on-line and on file at Conservation District offices for review**
- **GIS products, which link to assessment reports, will be accessible on-line and at Conservation District offices**



# Temporary Stream Gauging



# Water Storage Evaluation

- **Assess Purpose / Need**
  - Multi-Purpose Projects
  - Irrigation
  - Recreation
  - Stream Flows
  - Town of Buffalo
- **Quantify storage volume**
  - Watershed hydrology
  - Water availability
  - Stream Gauging





# Water Storage Evaluation

- **Sites identified based on:**
  - Previous studies
  - Input from landowners and sponsors
  - Areas of need
  - Topographically optimal locations
  - Availability of water
- **41 existing and potential new reservoir sites identified**

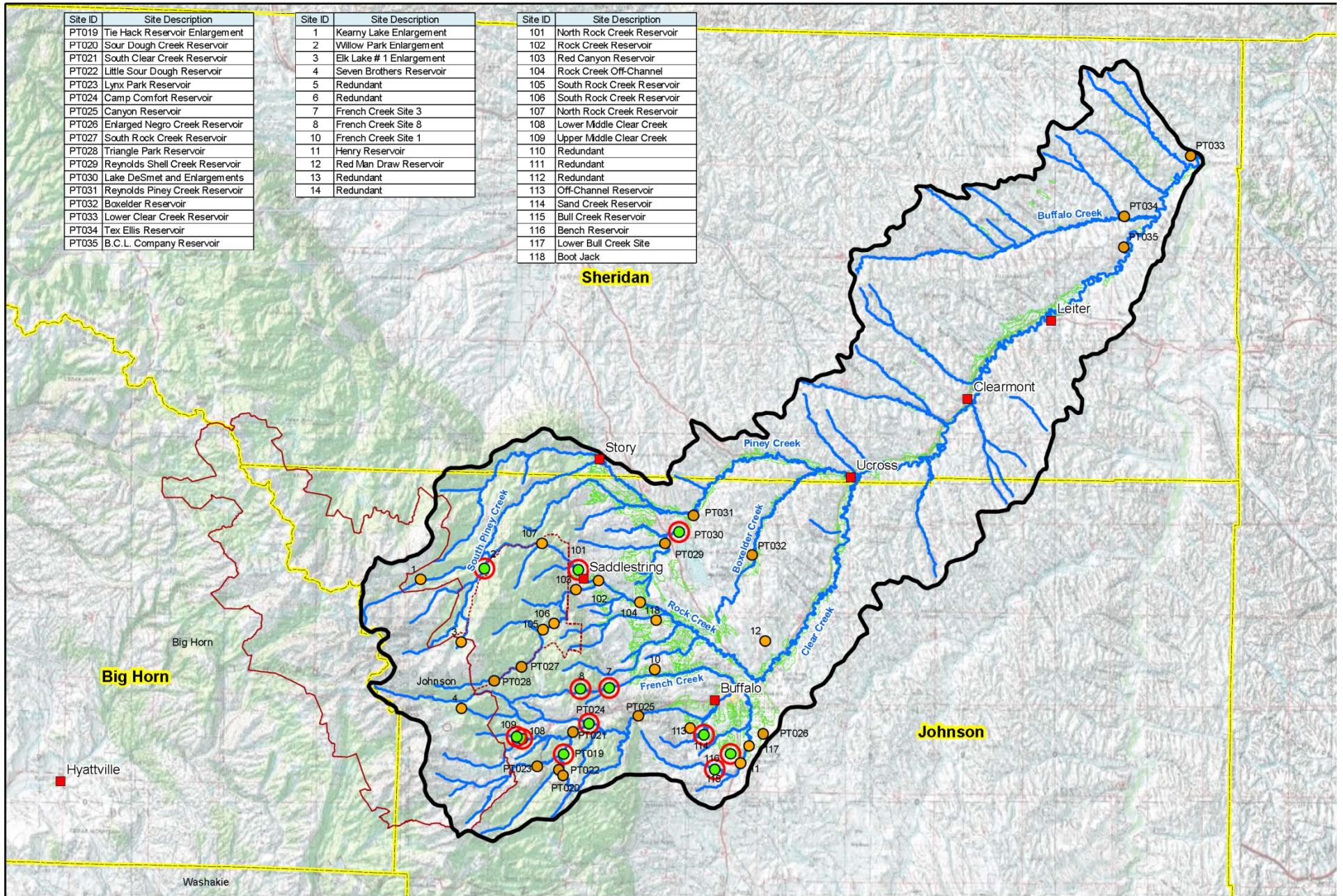


# Potential Storage Sites

Site ID	Site Description
PT019	Tie Hack Reservoir Enlargement
PT020	Sour Dough Creek Reservoir
PT021	South Clear Creek Reservoir
PT022	Little Sour Dough Reservoir
PT023	Lynx Park Reservoir
PT024	Camp Comfort Reservoir
PT025	Canyon Reservoir
PT026	Enlarged Negro Creek Reservoir
PT027	South Rock Creek Reservoir
PT028	Triangle Park Reservoir
PT029	Reynolds Shell Creek Reservoir
PT030	Lake DeSmet and Enlargements
PT031	Reynolds Piney Creek Reservoir
PT032	Boxelder Reservoir
PT033	Lower Clear Creek Reservoir
PT034	Tex Ellis Reservoir
PT035	B.C.L. Company Reservoir

Site ID	Site Description
1	Kearny Lake Enlargement
2	Willow Park Enlargement
3	Elk Lake # 1 Enlargement
4	Seven Brothers Reservoir
5	Redundant
6	Redundant
7	French Creek Site 3
8	French Creek Site 8
10	French Creek Site 1
11	Henry Reservoir
12	Red Man Draw Reservoir
13	Redundant
14	Redundant

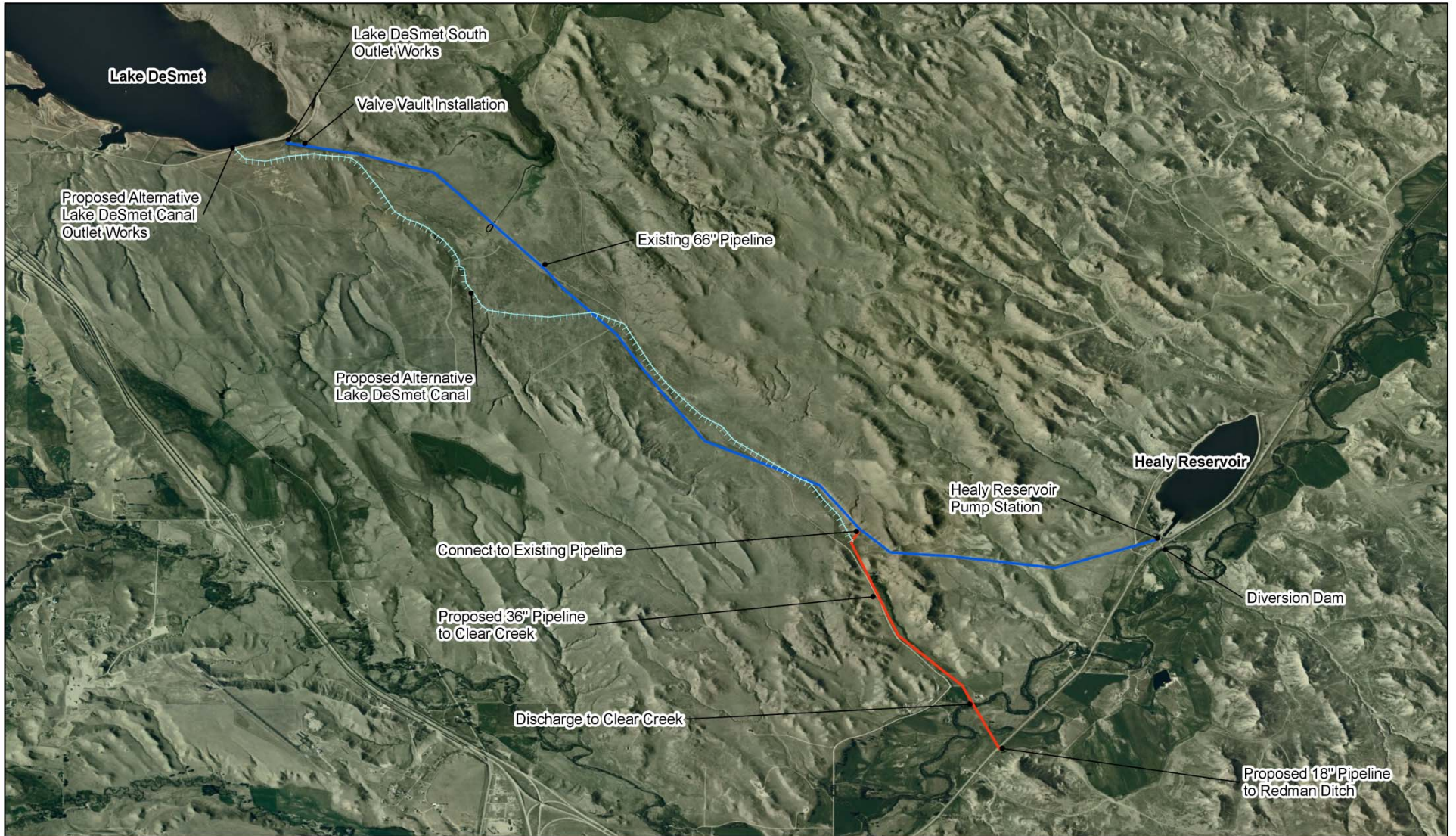
Site ID	Site Description
101	North Rock Creek Reservoir
102	Rock Creek Reservoir
103	Red Canyon Reservoir
104	Rock Creek Off-Channel
105	South Rock Creek Reservoir
106	South Rock Creek Reservoir
107	North Rock Creek Reservoir
108	Lower Middle Clear Creek
109	Upper Middle Clear Creek
110	Redundant
111	Redundant
112	Redundant
113	Off-Channel Reservoir
114	Sand Creek Reservoir
115	Bull Creek Reservoir
116	Bench Reservoir
117	Lower Bull Creek Site
118	Boot Jack





# Potential Storage Sites

- Lake DeSmet option



# Potential Storage Sites

## ● Sites Matrix

	Site PT019 - Tie Hack Reservoir Enlargement	Site PT024 - Camp Comfort Reservoir	Site PT030 - Lake DeSmet Reservoir Utilization Concept	Site 2 - Willow Park Reservoir Enlargement	Site 7 - French Creek Reservoir Site 3	Site 8 - French Creek Reservoir Site 8
Site Name	Site PT019 - Tie Hack Reservoir Enlargement	Site PT024 - Camp Comfort Reservoir	Site PT030 - Lake DeSmet Reservoir Utilization Concept	Site 2 - Willow Park Reservoir Enlargement	Site 7 - French Creek Reservoir Site 3	Site 8 - French Creek Reservoir Site 8
Lat/Long	44.2856, -106.9214	44.3165, -106.8883	44.4503, -106.7194	44.4656, -107.0346	44.3502, -106.8645	44.3484, -106.9015
GIS Identifier	PT019	PT024	PT030	2	7	8
Location	On Channel South Clear Creek	On Channel Clear Creek	Off Channel	On Channel South Piney Creek	On Channel French Creek	On Channel Cottonwood Creek
Indirect Supply Source	NA	NA	Piney Creek, Clear Creek, Rock Creek, Shell Creek	NA	North Clear Ck	North Clear Ck
Supply Mechanism	NA	NA	Existing canal, tunnel, and pump station	NA	Enlarge Four Lakes Diversion	Enlarge Four Lakes Diversion
Storage Capacity (AF)	1,400 AF enlargement	10,400 and 6,000	80,000	4,000 AF enlargement	5500, 3000	5500, 2500
Surface Area (acres)		90		275	84, 55	87, 64
Water Surface Elevation	7467	6880	Between 4615.5 and 4590	8631.5	6230, 6190	7100, 7070
Water Availability (AF/yr)	1,400			12,000	Water year 2010: ~2,000 AF	Water year 2010: ~2,000 AF
Irrigated Acres Supplied		All acreage under Clear Creek	Upper Clear Creek basin via exchange	All acreage under Rock and Piney Creek and non trib via exchange	French Ck, Johnson Ck	French Ck, Johnson Ck
Average Annual Shortages (AF)	Irri: 4000, Fish: 1500	Irri: 4000, Fish: 1500	4,000		2,500 to 3,000	2,500 to 3,000
Average Annual Yield (AF) Uses	1,400 Municipal				3350, 1950	3310, 1630
Other Benefits		Ag Irri., Municipal, Environmental, Recreation	Ag Irri., Environmental	Ag Irrigation	Ag Irri., Municipal, Environmental, Recreation	Ag Irri., Municipal, Environmental, Recreation
Dam Type	RCC	RCC	Earth embankment	Zoned embankment available on site	Earth embankment or RCC	Earth embankment or RCC
Borrow Material Availability	Process onsite bedrock materials for RCC	Process onsite bedrock materials for RCC	NA		Rock avail, fine grain unknown	Rock avail, fine grain unknown
Dam Height (ft)	20' upstream raise	220		15 raise	230, 190	230, 200
Crest Elevation (ft)	7472	6890		8640.5	6240, 6200	7110, 7080
Crest Length (ft)		1050		6000	1000, 880	800, 700
Crest Width (ft)	37	20		20	56, 48	56, 50
Embankment Volume (1000 CY)	50	320, 240 (RCC)			3500, 2200	2400, 900
Storage Efficiency (CY/AF)	36 (RCC)	31, 40 (RCC)			636, 733	436, 360
Design Flood	PMF	PMF		PMF	PMF	PMF
Relative Peak Flood Size	Moderate	Large		Moderate	14150 cfs	9500 cfs
Avg Precip (in)		27			20	20
Drainage Area (sq-mi)		98		34.0	11.9	6.2
Potential for Flood Control	Minimal	Moderate		Minimal	Moderate	Moderate
Reservoir Supply	South Clear Creek	Clear Creek	Piney Creek, Clear Creek, Rock Creek, Shell Creek	South Piney Creek	Enlarge Four Lakes diversion and pipe existing canal	Enlarge Four Lakes diversion and pipe existing canal
Outlet Works	new multi-level intake, extend conduit	400 cfs multi level intake, conduit and control valve	Existing 66" pipeline and new 36" pipeline to Clear Creek and 18" pipeline to Redman ditch		Multilevel intake	Multilevel intake
Spillways	new ogee crest, extend existing chute	integral to RCC dam			Excavate around left abutment	Excavate around left abutment
Geology	enlargement would be constrained by right abutment	granitic gneiss, white river formation above left abutment, wide joints identified in exposed rock, depth of suitable foundation unknown, fault in valley bottom may impact seepage control and foundation strength				Precambrian granite
Land Ownership	Forest Service	Forest Service	private	Forest Service	Forest Service	Forest Service
Irrigated Acreage Inundated (acre)	0	0	0	0	0	0
Inundated Infrastructure	-	cabins immediately up and downstream	-	none	none	French Creek cow camp (structure)
Cultural/Archaeological Impacts	unknown		unknown	unknown	Mining site, historic road	French Creek cow camp (structure)
NWI Wetlands Impacts (ac)	at upstream end	~4 ac wetland or possible fen		~26 ac wetlands, possible fen in areas	<0.5	<1.0
Riparian Impacts	minor woody riparian, large amount of upland forest	minor woody riparian, large amount of upland forest		very little woody riparian, large amount of upland forest	some willow riparian, large amount of upland forest	some willow riparian, large amount of upland forest
Core Sage Grouse Habitat	No	No	No	No	No	No
Species of Concern	may occur in area	may occur in area	may occur in area	may occur in area	occur in area	occur in area
Big Game Impacts - crucial	none	elk	none	elk	elk	elk
WFDQ Stream Class	Class 2AB	Class 2AB	Class 2AB	Class 2AB	Class 2AB	Class 2AB
WGFDD Stream Class	Yellow ribbon	Yellow ribbon (2.5 mi inundated)	-	Green ribbon	Green ribbon (0.7 mi inundated)	Green ribbon (1.0 mi inundated)
Access	Hwy 16	Hwy 16		4WD, limited public access	improve existing private road or improve existing Forest Service road	improve existing Forest Service road
Project Cost (\$)	\$12M	\$57M, \$45M	\$2.9M to \$4.1M		\$59.5M, \$44.2M	\$39.9M, \$21.9M
Cost/AF (\$/AF)	\$8.6k	\$5.5k, \$7.5k	\$0.036k to \$0.051k		\$10.8k, \$14.7k	\$7.3k, \$8.8k
Cost/AF Yield (\$/AF Yield)	\$8.6k	\$5.5k, \$7.5k	\$0.7k to \$1.0k		\$17.8k, \$22.7k	\$12.0k, \$13.4k
Cost/CY fill (\$/CY)		\$178, \$188	-		\$17, \$20	\$17, \$24



# Evaluation Matrix

Rank	Site	Size (AF)	Ability to Meet Needs	Land Ownership	Envir. Issues	Geotechnical Feasibility	Flood Control	Multi-Purpose Potential	Ability to Permit	Relative Cost	Total Score	Comments
	<b>Weight</b>		<b>40</b>	<b>20</b>	<b>30</b>	<b>20</b>	<b>20</b>	<b>40</b>	<b>40</b>	<b>20</b>		
1	Bull Creek Reservoir	9,170	8	10	8	6	4	8	10	8	1,840	Note 1
2	Sand Creek Reservoir	8,000	8	6	8	6	4	8	10	8	1,760	Note 1
3	Camp Comfort Reservoir	10,400	10	4	4	6	8	10	4	8	1,600	Note 1
4	Bench Reservoir	3,500	4	10	10	6	0	2	10	6	1,380	Note 1
4	French Creek Reservoir #3	5,500	8	4	6	6	4	10	4	2	1,380	Note 1
6	French Creek Reservoir #8	6,000	8	2	6	6	4	10	2	4	1,300	Note 1
7	North Rock Creek Reservoir	6,600	6	4	6	4	4	6	4	2	1,100	
8	Upper Middle Clear Creek Reservoir	5,000	6	2	4	6	4	6	2	2	960	Note 1
9	Lower Middle Clear Creek Reservoir	3,800	4	2	4	6	4	4	2	2	800	Note 1
10	Tie Hack Reservoir Enlargement	1,400	2	2	4	8	2	2	4	5	780	Note 1
11	Willow Park Enlargement	4,000									0	Fatal Flaw-Fen Wetlands

**Note 1** - The feasibility of new storage in the Clear Creek basin is dependant on the utilization of the M&M Ranch water rights from Clear Creek. If the water rights are fully utilized, insufficient water would be available for new storage projects.

# Funding Opportunities

- **WWDC**
  - Small Water Program
  - Dam and Reservoir Program
  - Conventional rehab project funding
    - Require District formation
- **NRCS**
  - EQIP
  - AWEP
  - CCPI
  - CIG
- **Wyo Wildlife and Natural Resource Trust Fund**
- **Wyo DEQ 319 Grant**





# Watershed Study Values

- **Inventory and description of the watershed**
- **GIS**
- **Rehabilitation plans and projects for watershed infrastructure**
  - **Upland Water**
  - **Channel Stability**
  - **Irrigation Rehabilitation**
  - **Water Storage**
- **Sponsor or other legal entity may choose to proceed with a WWDC feasibility study on certain identified projects**
- **Community is eligible for WWDC's Small Water Project Program**
- **Includes Ecological Site Descriptions so the document is longer lived and projects not yet identified can still be eligible for Small Water funding.**

# Added Watershed Study Values

- **The process can organize the community**
- **Amassing the information helps identify impacts and opportunities**
- **Provides a holistic view of the natural resources**
- **Provides a lot of information if a TMDL needs to be written...streamlines the process...projects cued up to address impairments**
- **Provides NRCS budget demand information and agency planning**
- **Involved communities with a plan tend to get more funding opportunities**
- **Identifies fatal flaws relative to storage and has the potential to streamline the NEPA process**



# Clear Creek Storage Level II

- Based on the results of the Level I Watershed Study and the support of the local community to further explore storage opportunities, LDCD passed a resolution to request a WWDC Level II Storage Feasibility Study
- LDCD Sponsored
- Funding was received from the Legislature and States West was chosen through the proposal and interview process to conduct the study



# Purpose of Study

- **Develop Purpose and Need**
- **Develop Hydrologic Model**
- **Identify Best Locations for Reservoirs**
- **Determine Technical Feasibility**
- **Emphasize Multiple Use Potential**
- **Determine Economic Feasibility**
- **Expand Project Involvement**
- **Recommend Top 3 Sites**

**\*Completion Winter 2012**





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Questions?