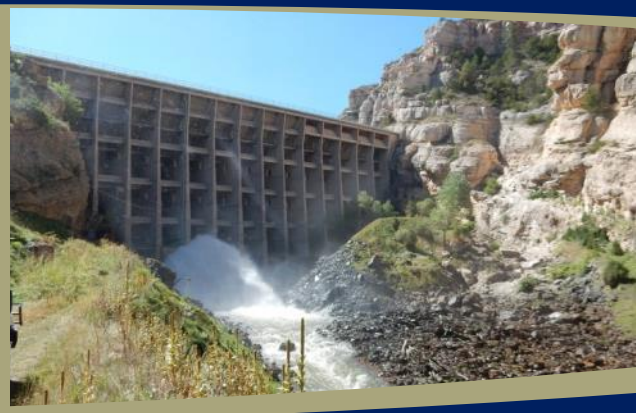




Middle North Platte – Glendo Watershed Level 1 Study

June 2016

RESPEC

Anderson Consulting Engineers, Inc.
Civil • Water Resources • Environmental

What is a Watershed Study?

- A **COMPREHENSIVE EVALUATION**, analysis and description of the land and water resources within a watershed
- **GATHERS DATA** on hydrology, geology, geomorphology, geography, soils, vegetation, water conveyance infrastructure, and stream systems
- PROVIDES A **MANAGEMENT AND REHABILITATION PLAN** outlining specific projects and identifies funding opportunities that will help improve watershed function

Who is Involved in a Watershed Study?

Converse County Conservation District

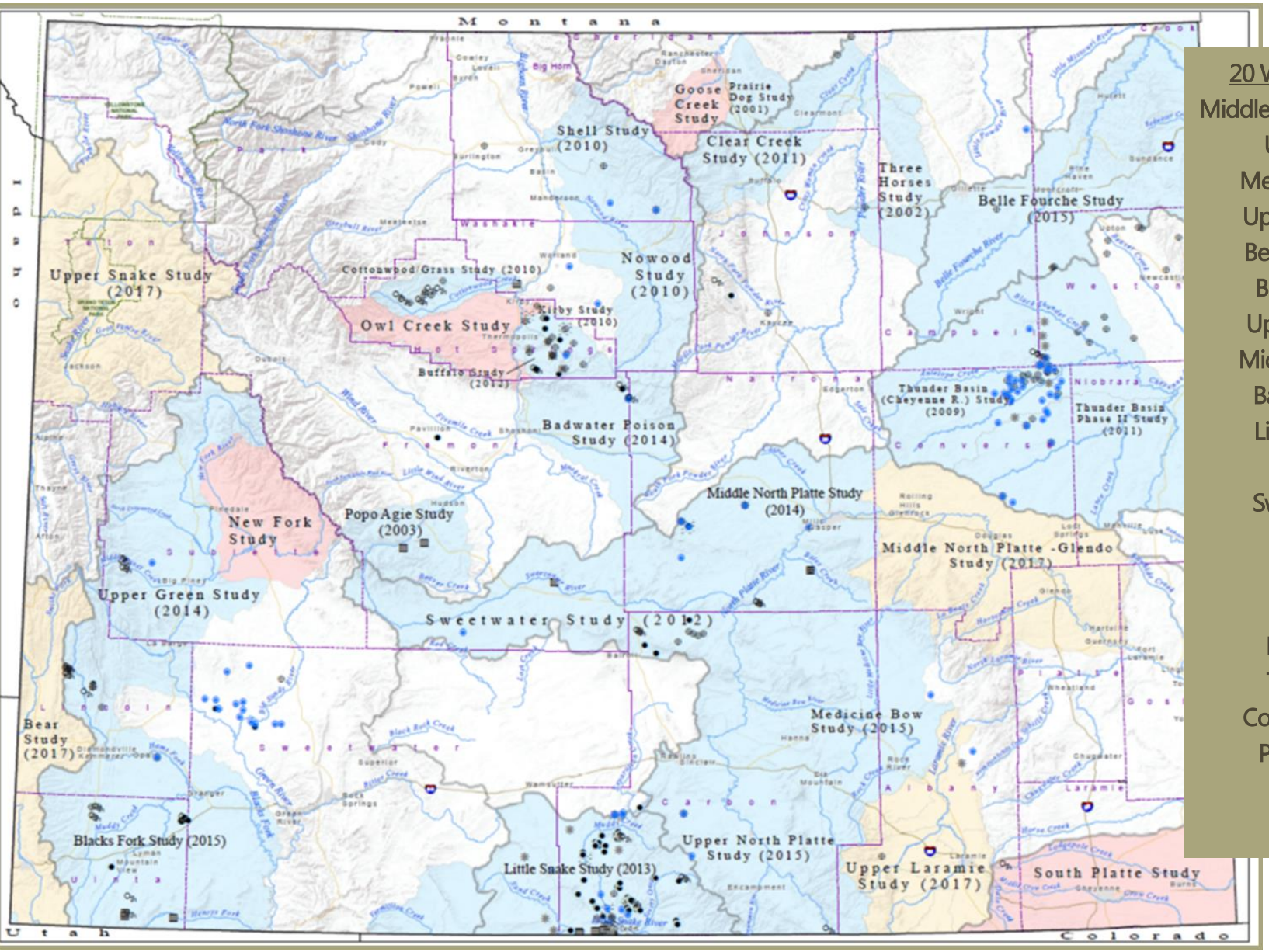
conserving natural resources

for our future

- Land Owners
- Residents
- Land Managers
- Local Study Sponsors
  - Converse County Conservation District
- Neighboring Districts
  - Laramie Rivers, Platte County, Niobrara, Natrona County, Lingle-Ft. Laramie
- Study Sponsor
  - Wyoming Water Development Commission (WWDC)
- Project Consultants
  - RESPEC Consulting
  - Anderson Consulting Engineers
  - JR Barnes Consulting

SCHEDULE: June 2015 through September 2016

WWDC Watershed Studies

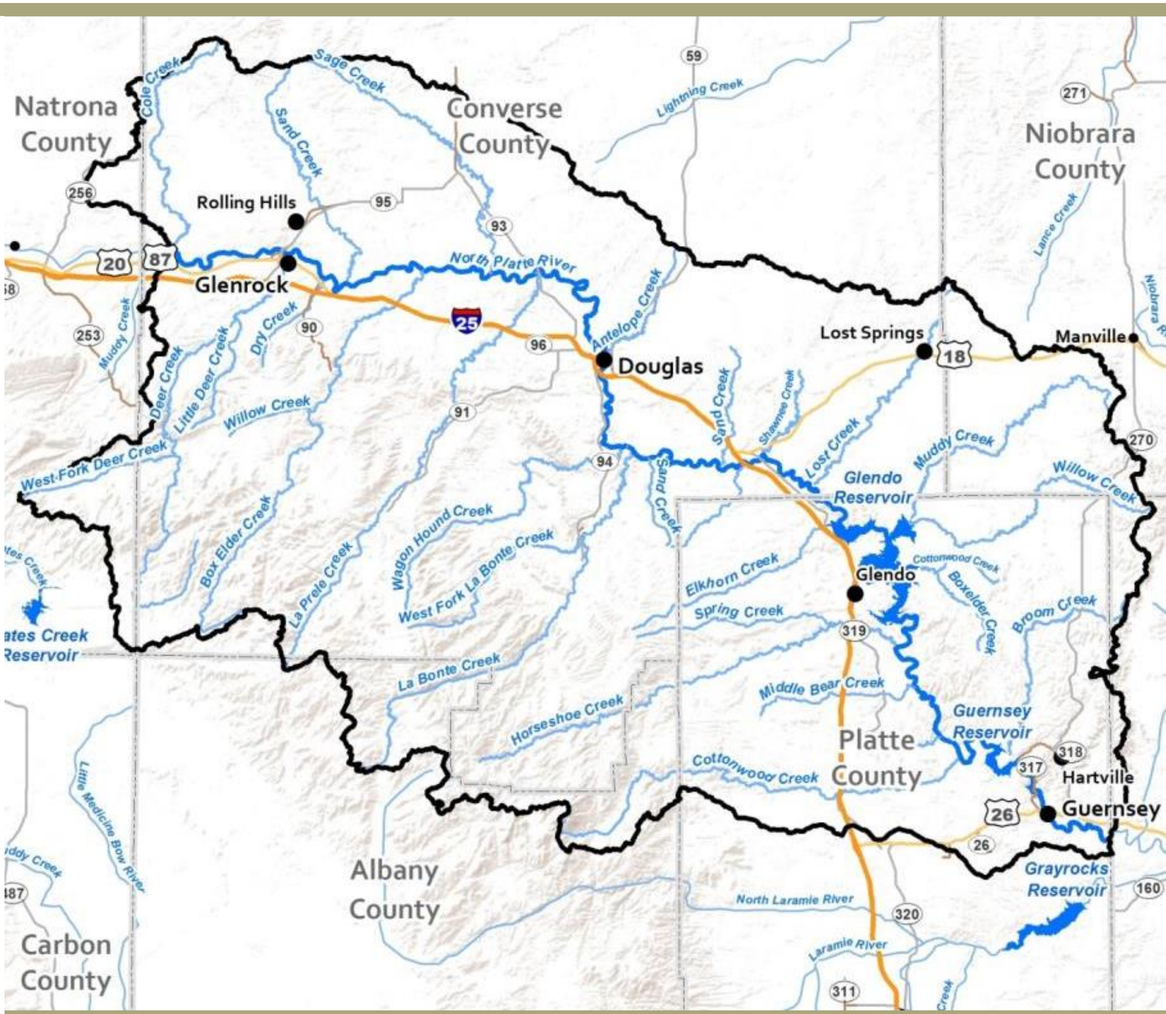


20 Watershed Studies

- Middle North Platte Glendo
- Upper Laramie
- Medicine Bow River
- Upper North Platte
- Belle Fourche River
- Blacks Fork River
- Upper Green River
- Middle North Platte
- Badwater/Poison
- Little Snake River
- Buffalo Creek
- Sweetwater River
- Kirby Creek
- Shell Creek
- Clear Creek
- Nowood River
- Thunder Basin
- Cottonwood/Grass
- Popo Agie River
- Three Horses
- Prairie Dog

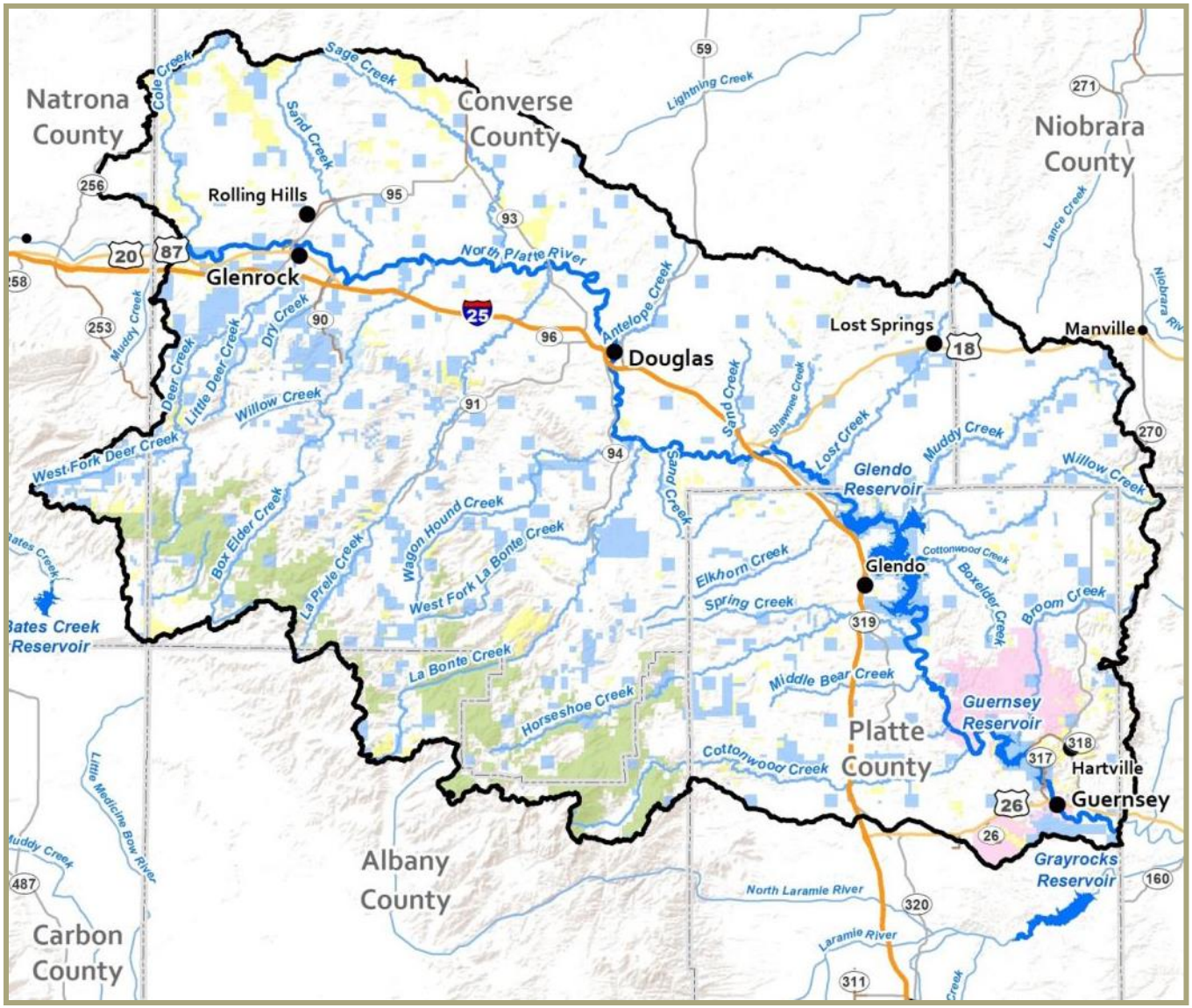
Middle North Platte – Glendo Watershed Level I Study Area

- 3,275 sq. miles or 2,095,807 Acres
  - 2.6% is Irrigated
  - Glenrock, Douglas, Glendo, Guernsey, Hartville, Lost Springs, and Rolling Hills
  - 75% is Private Land
- 6 Conservation Districts
  - Converse County (63%)
  - Platte County (24%)
  - Niobrara & Laramie Rivers (5%)
  - Natrona County (2%)
  - Lingle-Ft. Laramie (1%)
- North Platte River and Tributaries
  - 143 River Miles
  - >1,140 Miles of Perennial tributaries
  - Glendo Reservoir, Guernsey Reservoir, and LaPrele Reservoir



Watershed Description and Inventory

-Land Use and Management



- Grazing Lands
- Irrigated Lands
- Energy Production
- Recreation

Scoping and Project Meetings

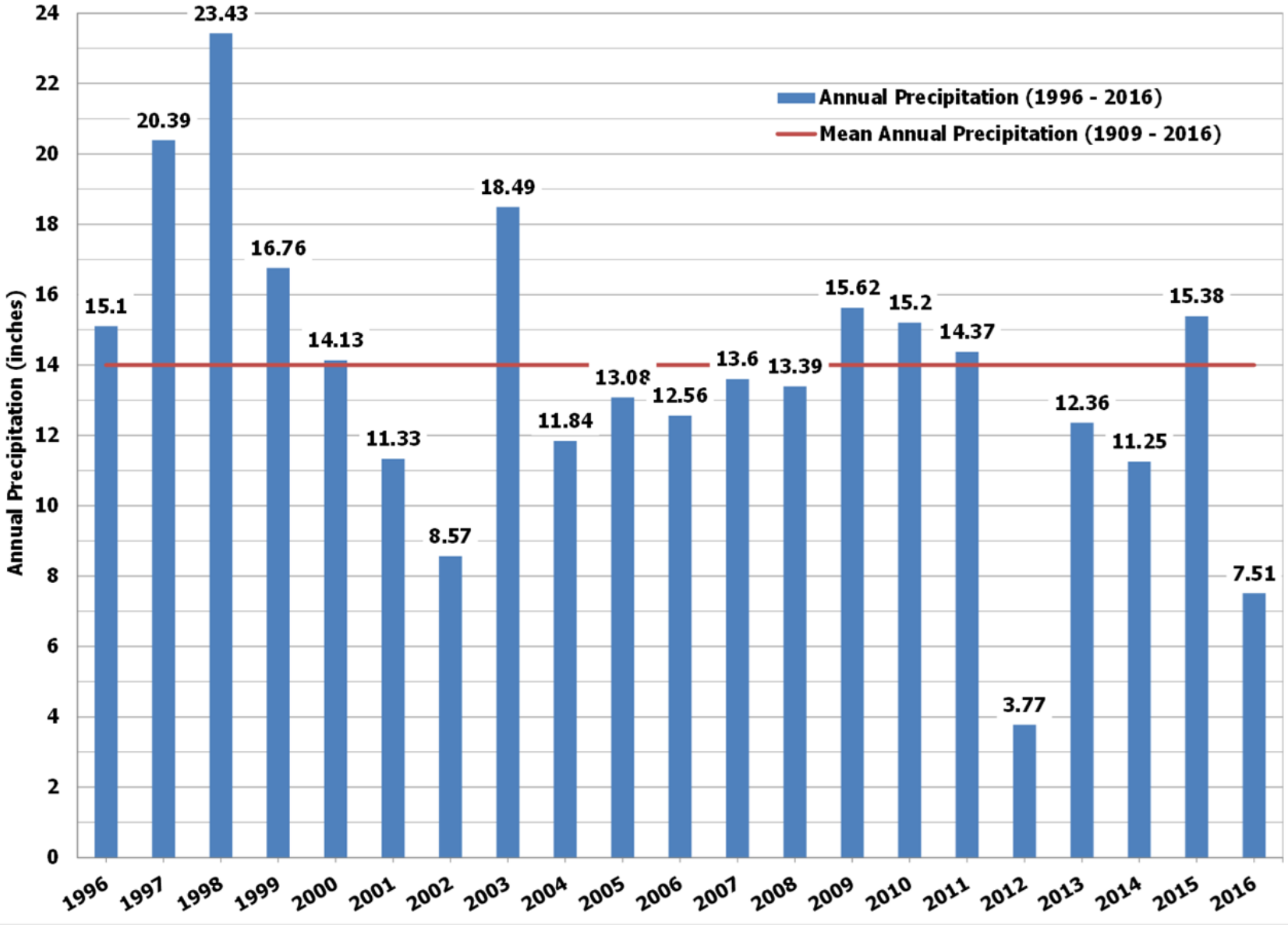
- Scoping Meetings held in Douglas and Glendo
- Landowner Open Houses held in Douglas, Wheatland, and Lusk

Landowner Permission, Trespassing to Collect Data Law, Farmbill Section 1619, and Credible Data

- Voluntary Participation
  - Participation is voluntarily in the watershed study
  - Only go on property when invited by landowners
- Senate File 12 (W.S. 6-3-414)
  - Trespassing to unlawfully collect resource data
  - GPS units with 2014 landowner parcel data card and signed landowner/lessee permission forms
- Farmbill Section 1619
  - Section 1619 of the 2008 Farm Bill prohibits disclosure of certain information by the USDA
  - NRCS Authorization of Release of Information signed by landowner/lessee

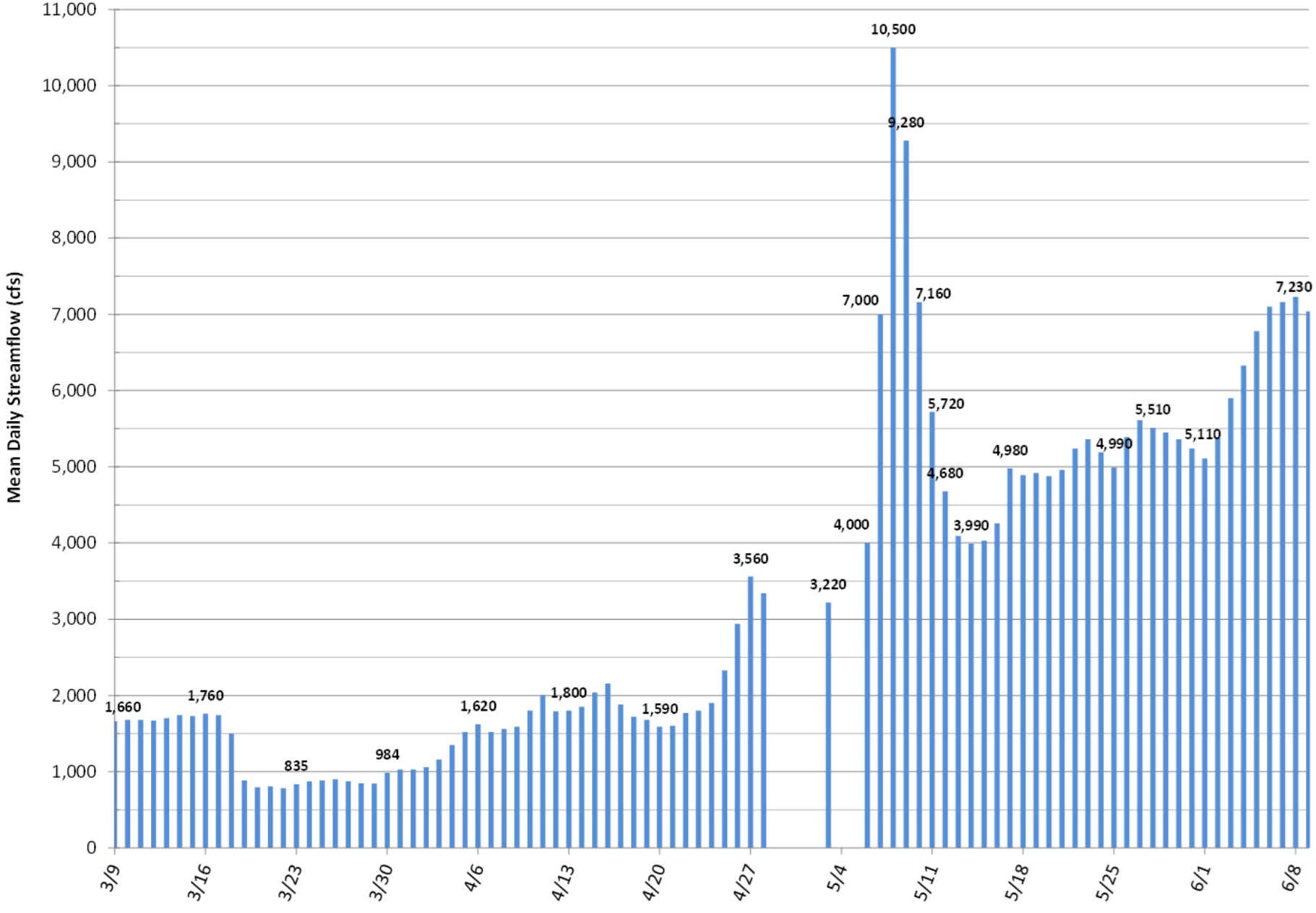
Work with WWDO, local sponsors, and landowners to adhere to applicable state and federal privacy and public records laws.

Watershed Description and Inventory
-1996 thru May 2016 precipitation at Douglas WY



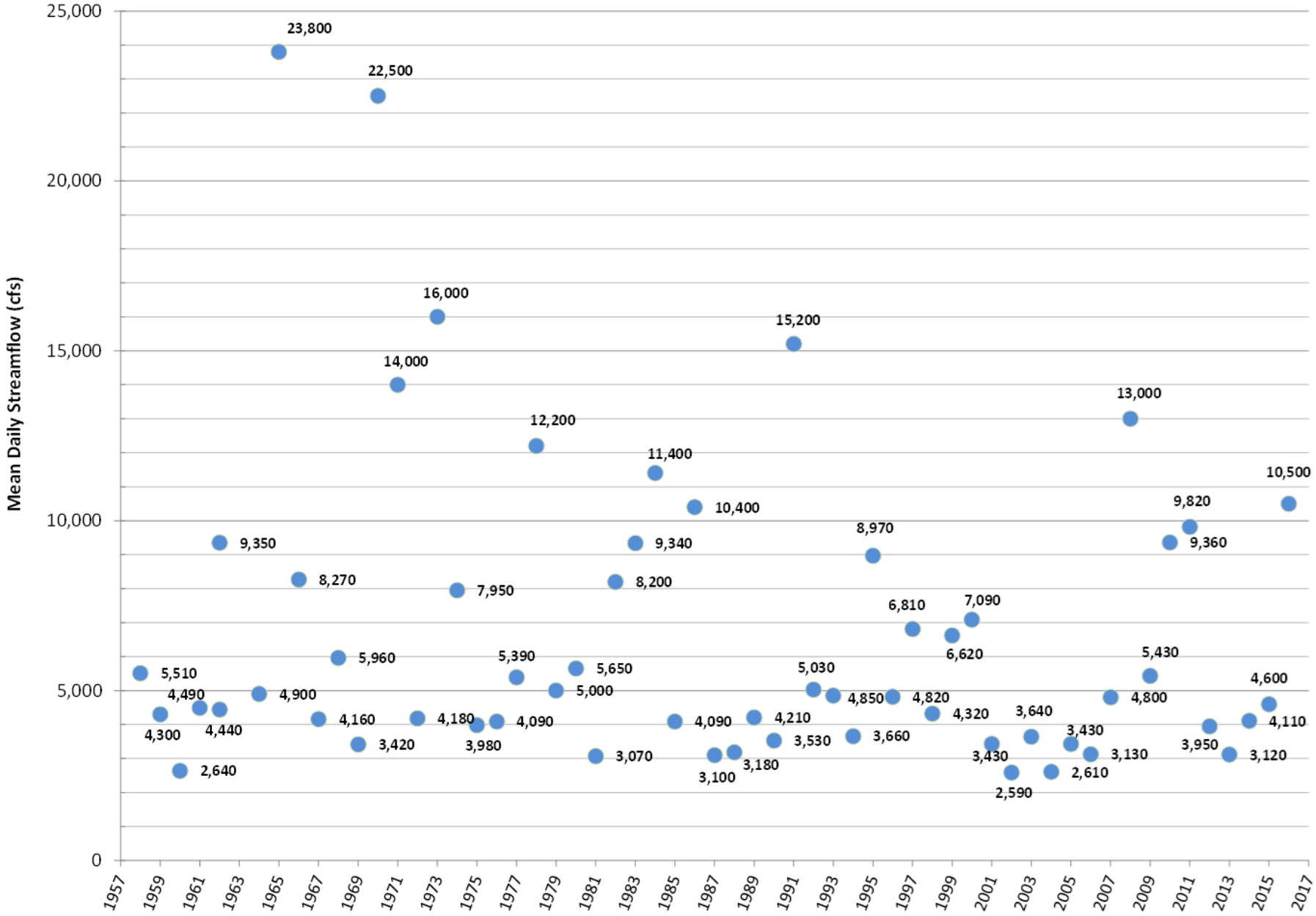
Watershed Description and Inventory

-Discharge on North Platte River at Orin Junction (USGS 06652000 3/2016 to 6/2016)



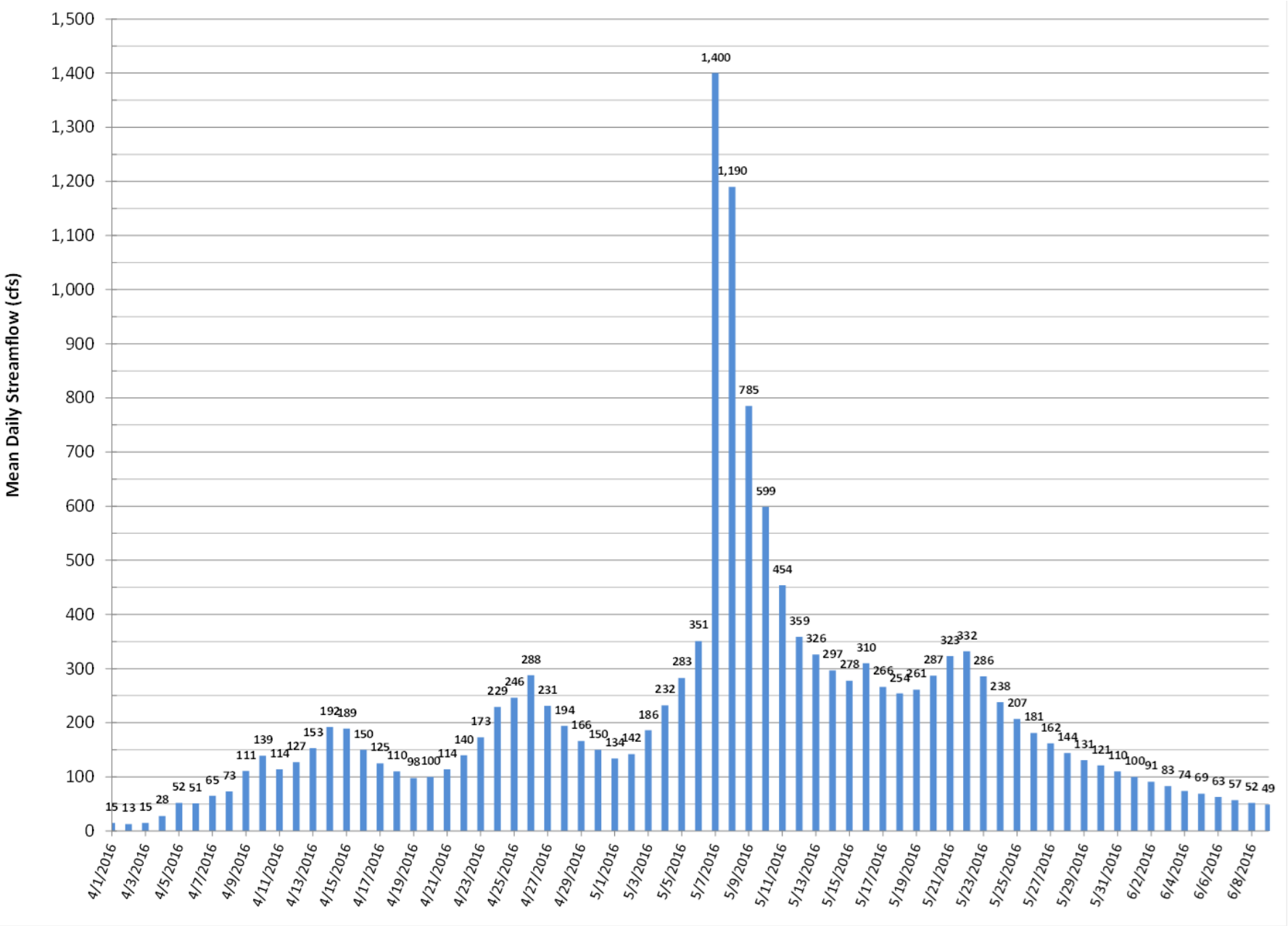
Watershed Description and Inventory

-Peak Flows on North Platte River at Orin Junction (USGS 06652000 1958 to 2016)



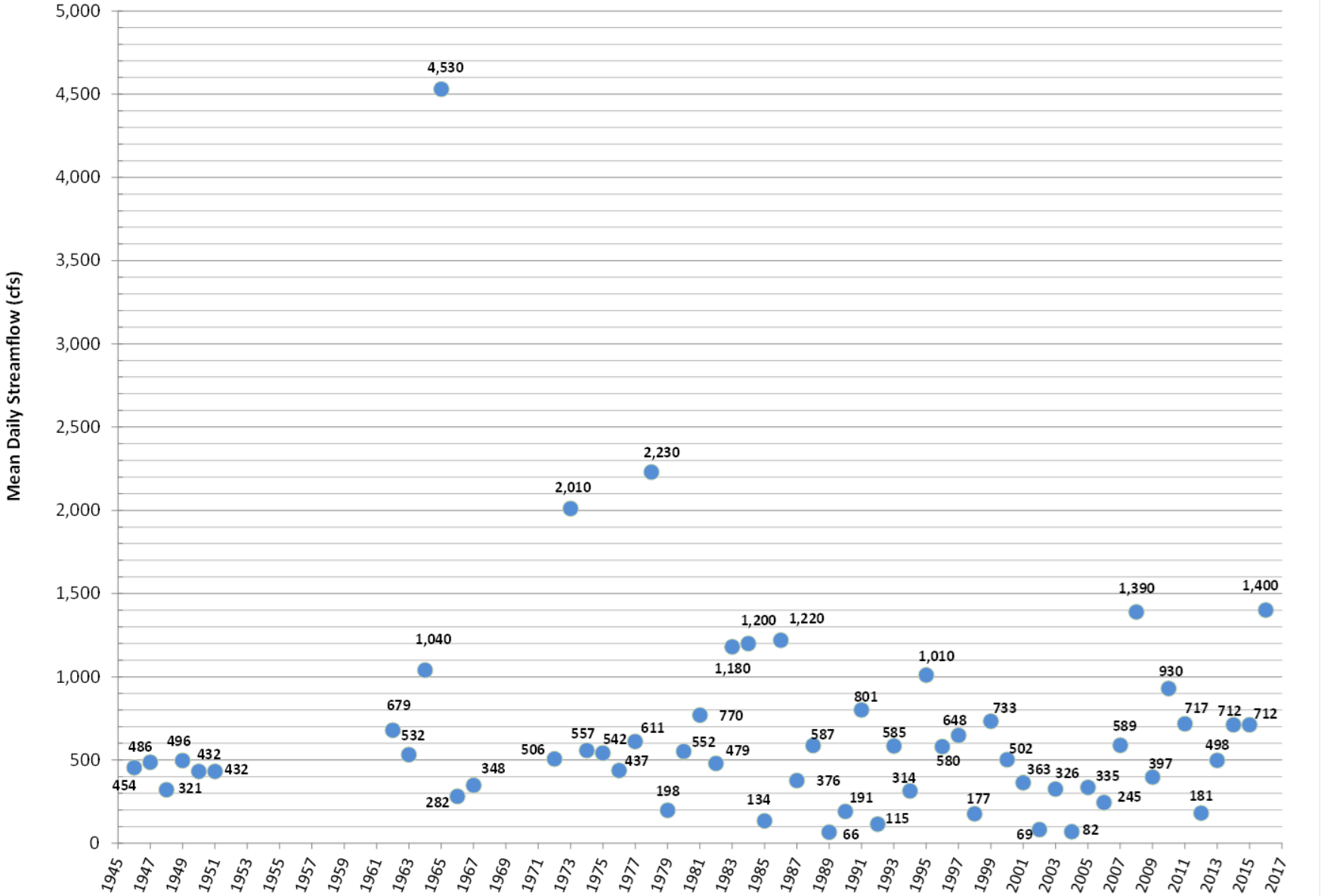
Watershed Description and Inventory

-Discharge on Boxelder Creek (USGS 06647500 4/2016 to 6/2016)

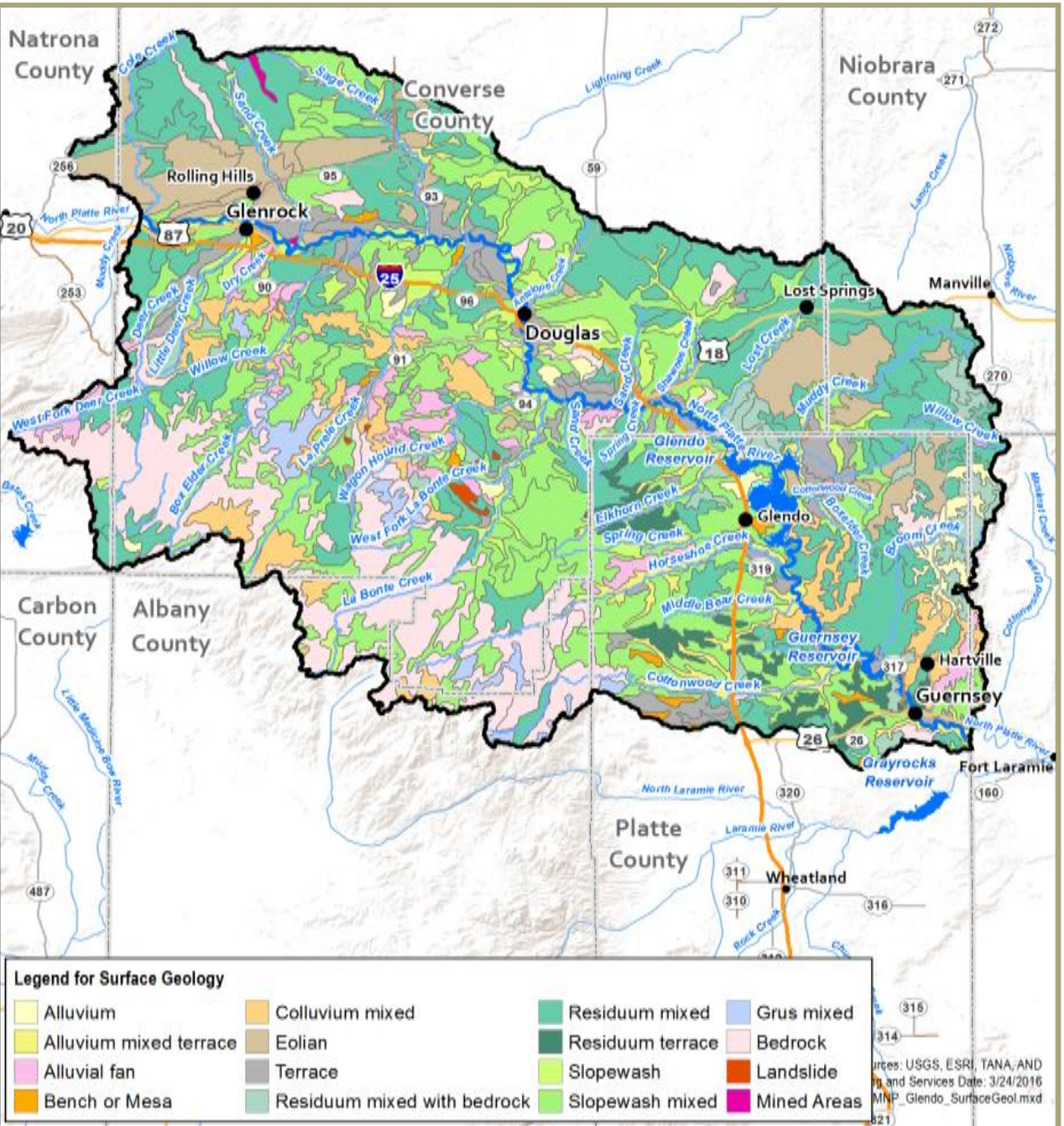


Watershed Description and Inventory

-Peak Flows on Boxelder Creek (USGS 06647500 1946 to 2016)

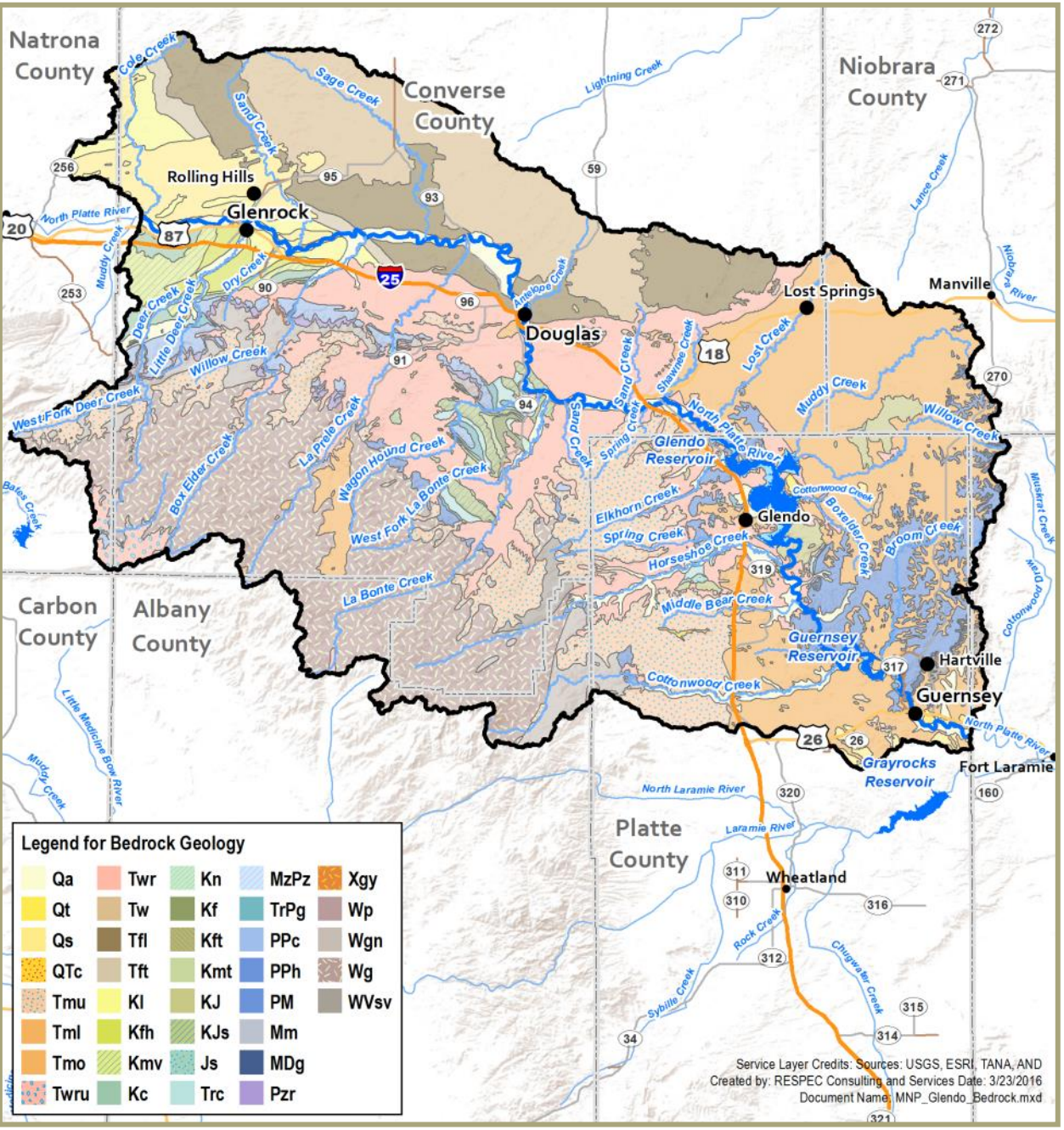


Surface Geology



- Northern end of the Laramie Range, the Hartville Uplift, and a small portion of the southern Powder River Basin
- Complex structural history with Laramide-age faulting and folding, resulting in formations with steep dips as well as thick Cenozoic sedimentary units
- Predominant surficial geologic units within the watershed are residuum mixed, slopewash, and bare bedrock

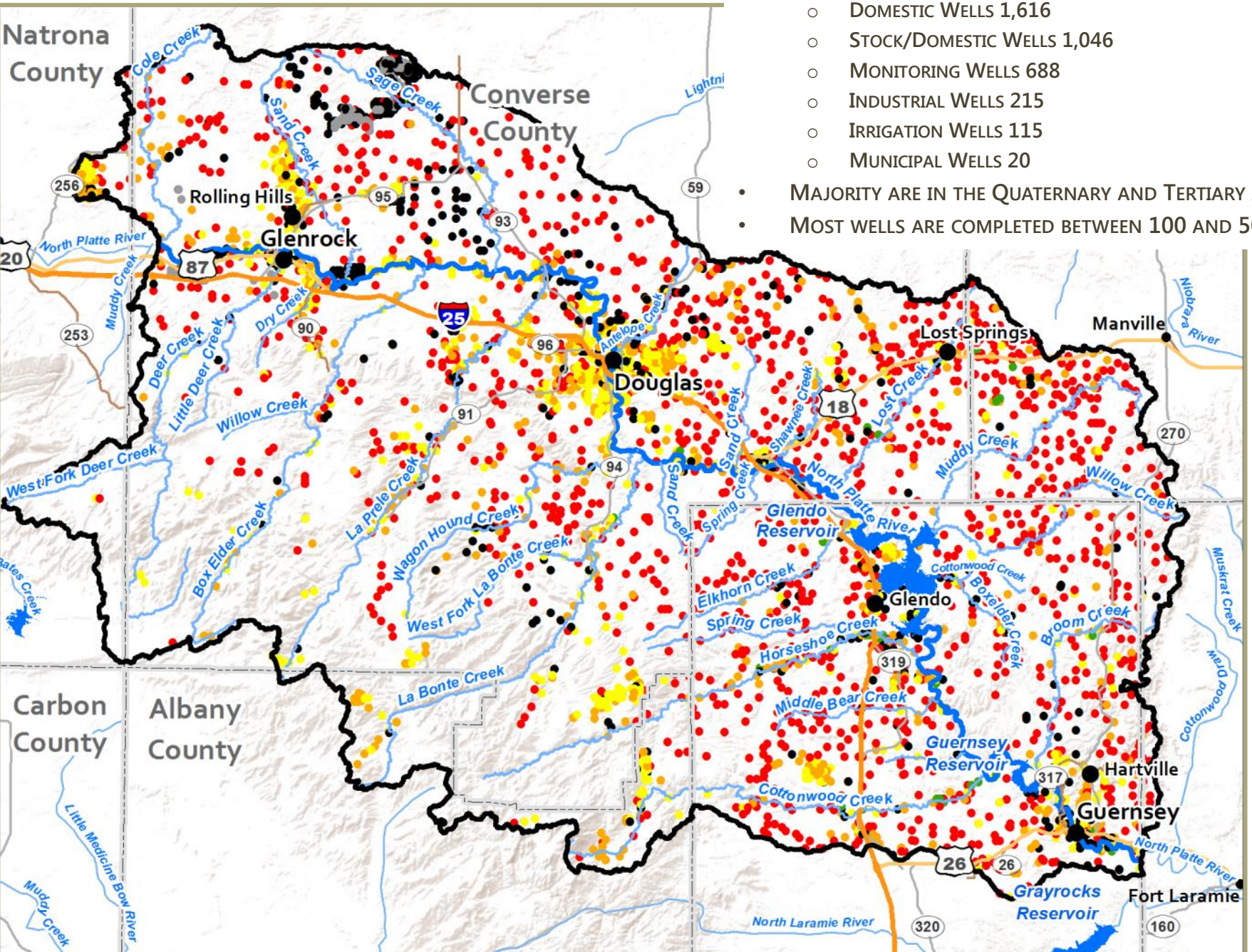
Bedrock Geology



- Tertiary sedimentary units and Precambrian rock Quaternary and Tertiary deposits cover over 65% of the watershed
- Tertiary formations include the White River, Fort Union, and Wasatch. Precambrian rocks cover about 20% of the watershed
- Precambrian rocks include the Laramie Granite, older metamorphic rocks, and numerous intrusive pegmatite veins.
- Paleozoic and Cretaceous rocks outcrop primarily within the southern half of the watershed.
- East of Glendo, the Hartville Uplift has resulted in erosion of much of the White River Formation and exposed the underlying sandstone and carbonates of the Hartville Formation.

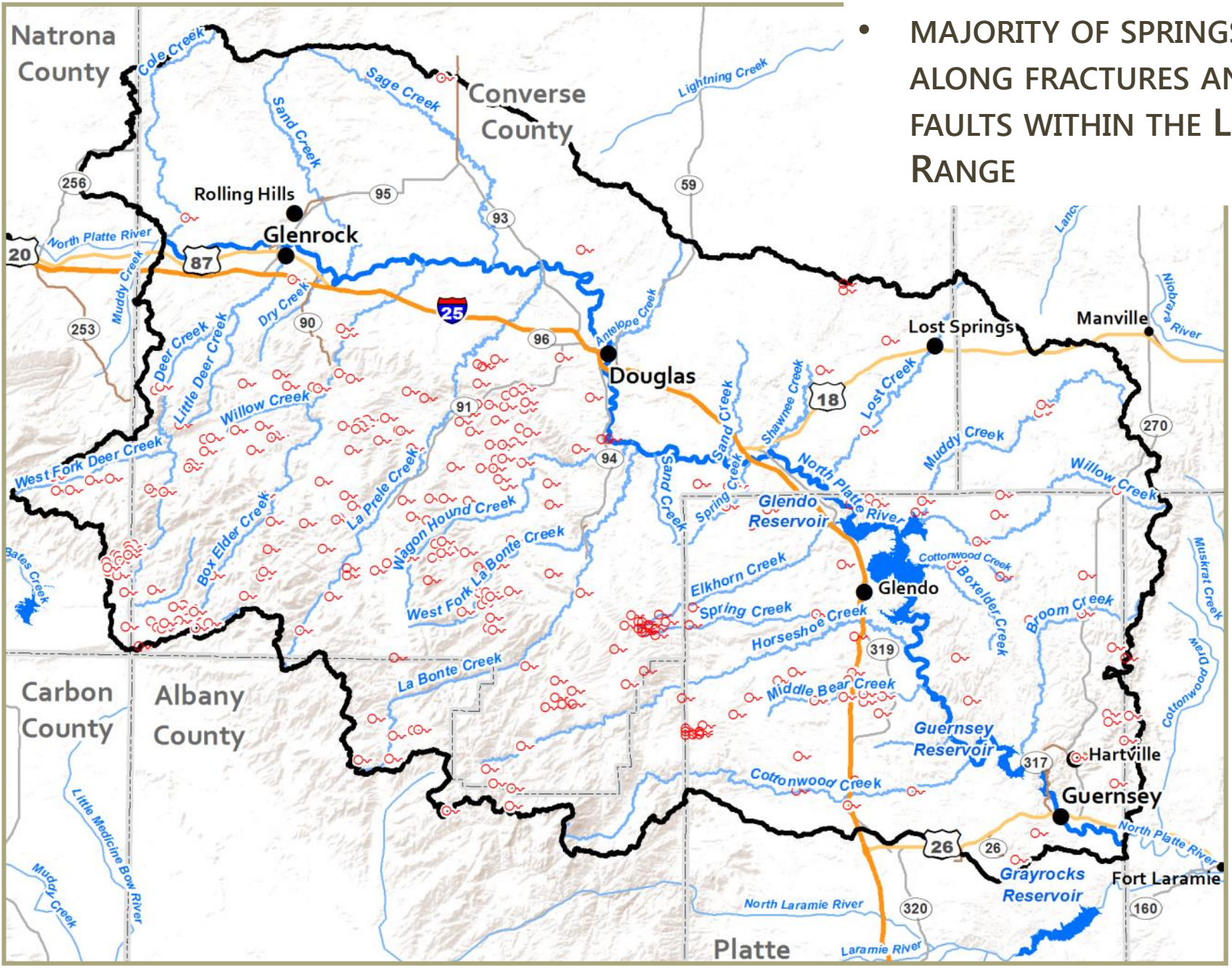
Water Wells

- 5,900 SEO permitted wells
  - Stock Wells 1,645
  - Domestic Wells 1,616
  - Stock/Domestic Wells 1,046
  - Monitoring Wells 688
  - Industrial Wells 215
  - Irrigation Wells 115
  - Municipal Wells 20
- Majority are in the Quaternary and Tertiary aquifers
- Most wells are completed between 100 and 500 ft deep

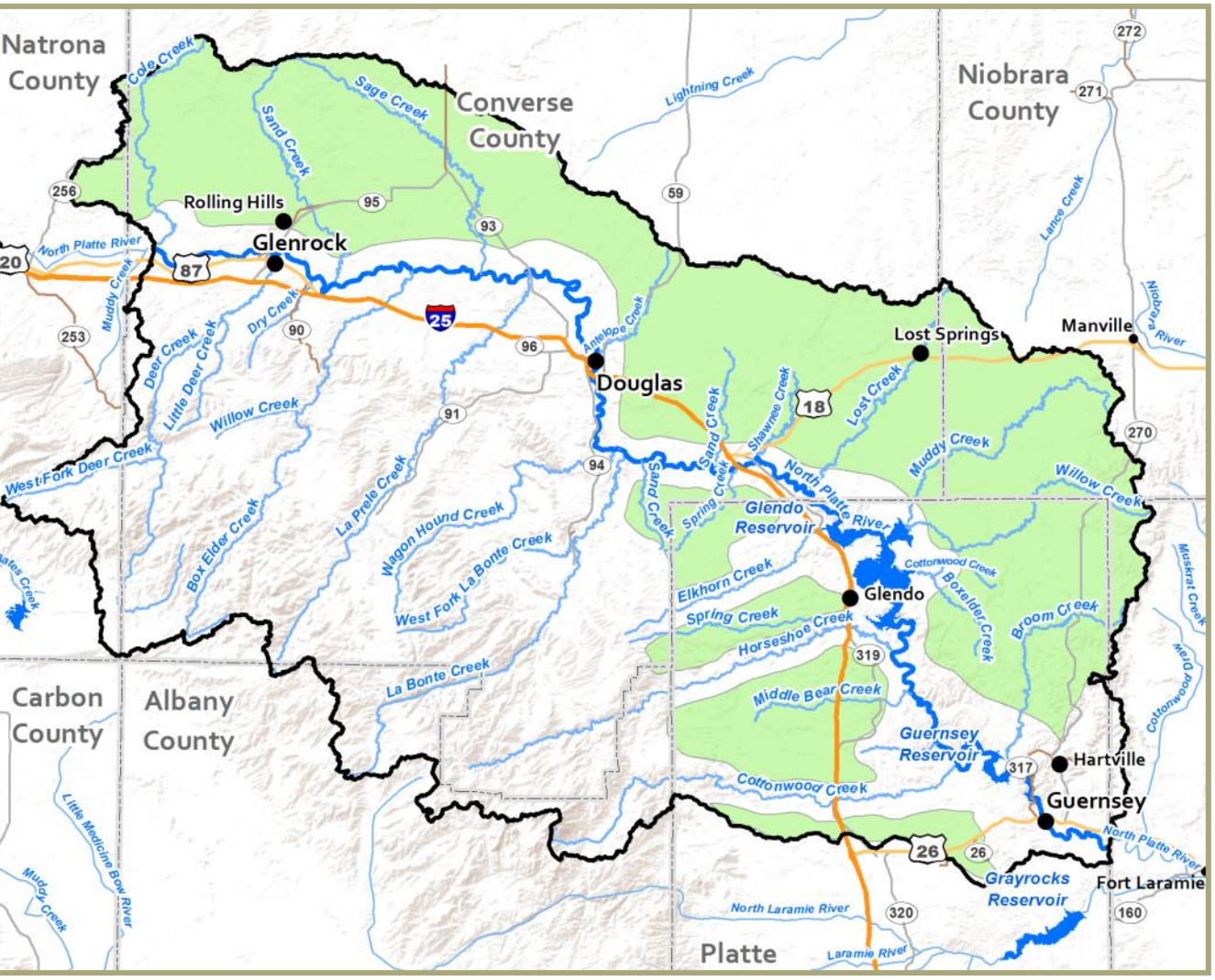


Springs

- 300 Springs
- Majority of springs occur along fractures and faults within the Laramie Range

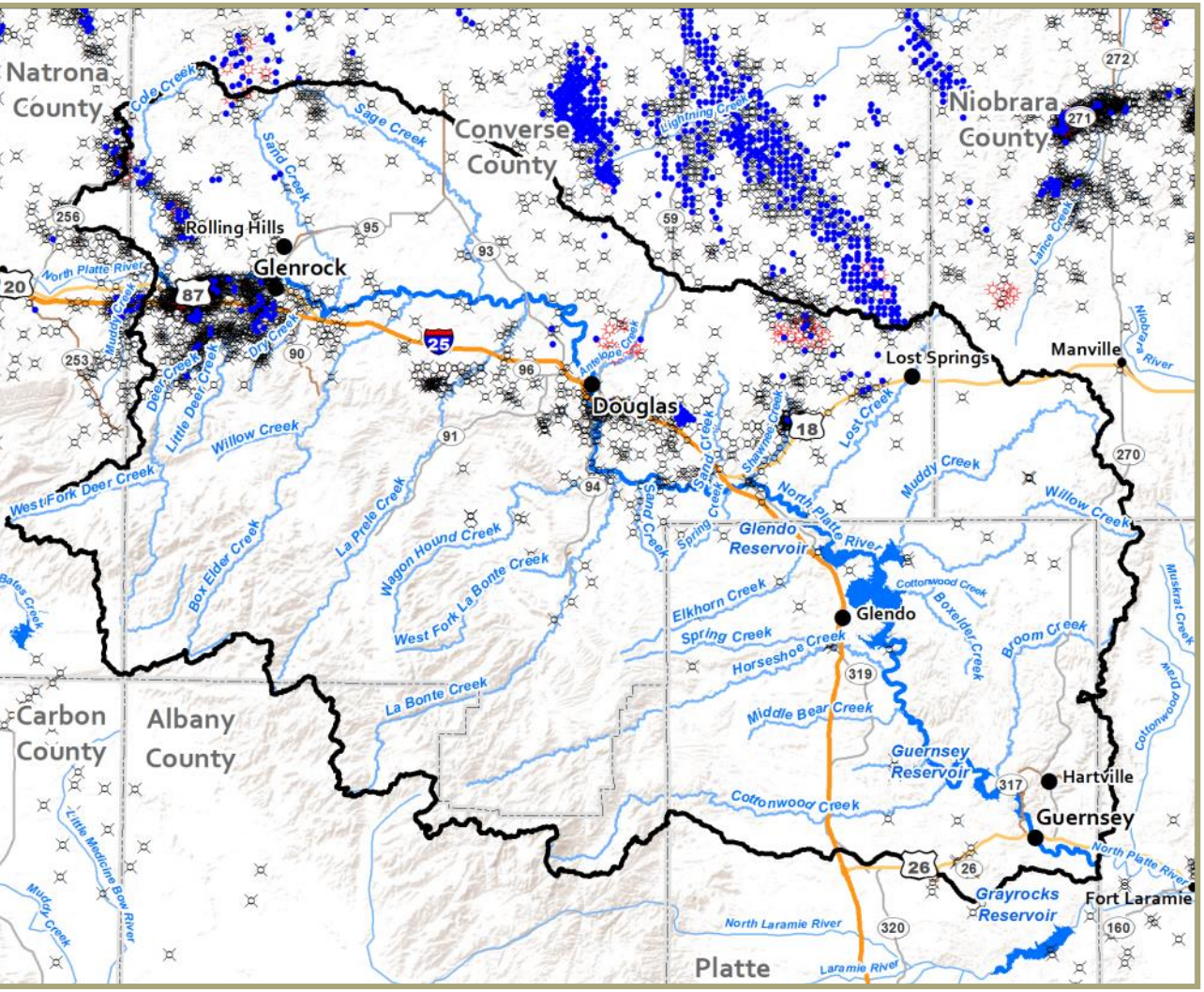


Green Areas



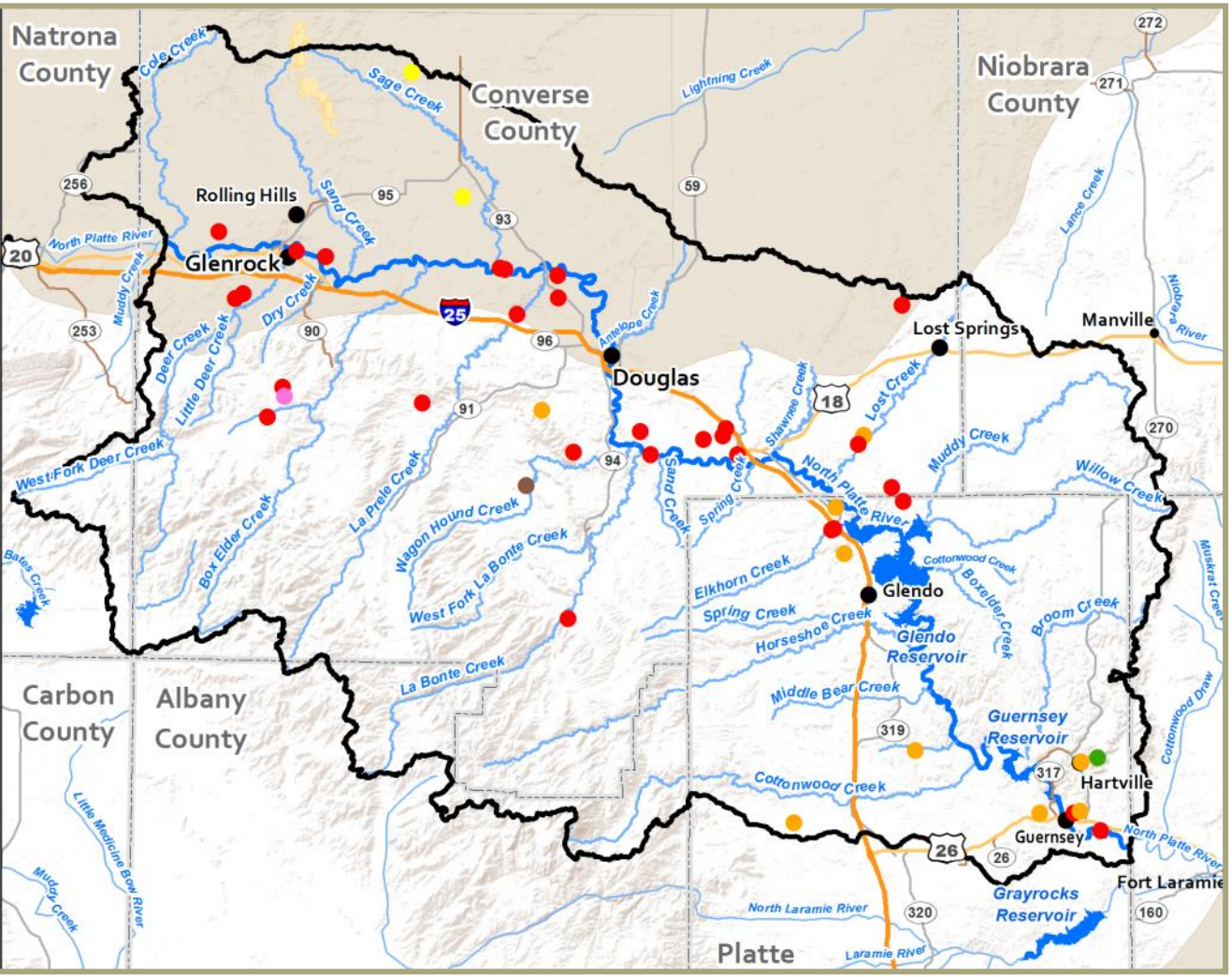
- Hydrologically connected GW use
- 28/40 criteria
- "Green Areas" cover 855,600 acres or 40%
- Outside the "Green Areas", new GW irrigated lands are not typically approved unless the applicant demonstrates a lack of hydraulic connectivity
- Douglas is trying to prove that their Sheep Mountain Well No. 1 (at a depth of 1,165 ft in the Casper Formation is not hydrologically connected
- City is exceeding their permitted depletion rates, which could result providing an outside source of makeup water if connection exists and Stream flows are low

Oil and Gas Wells



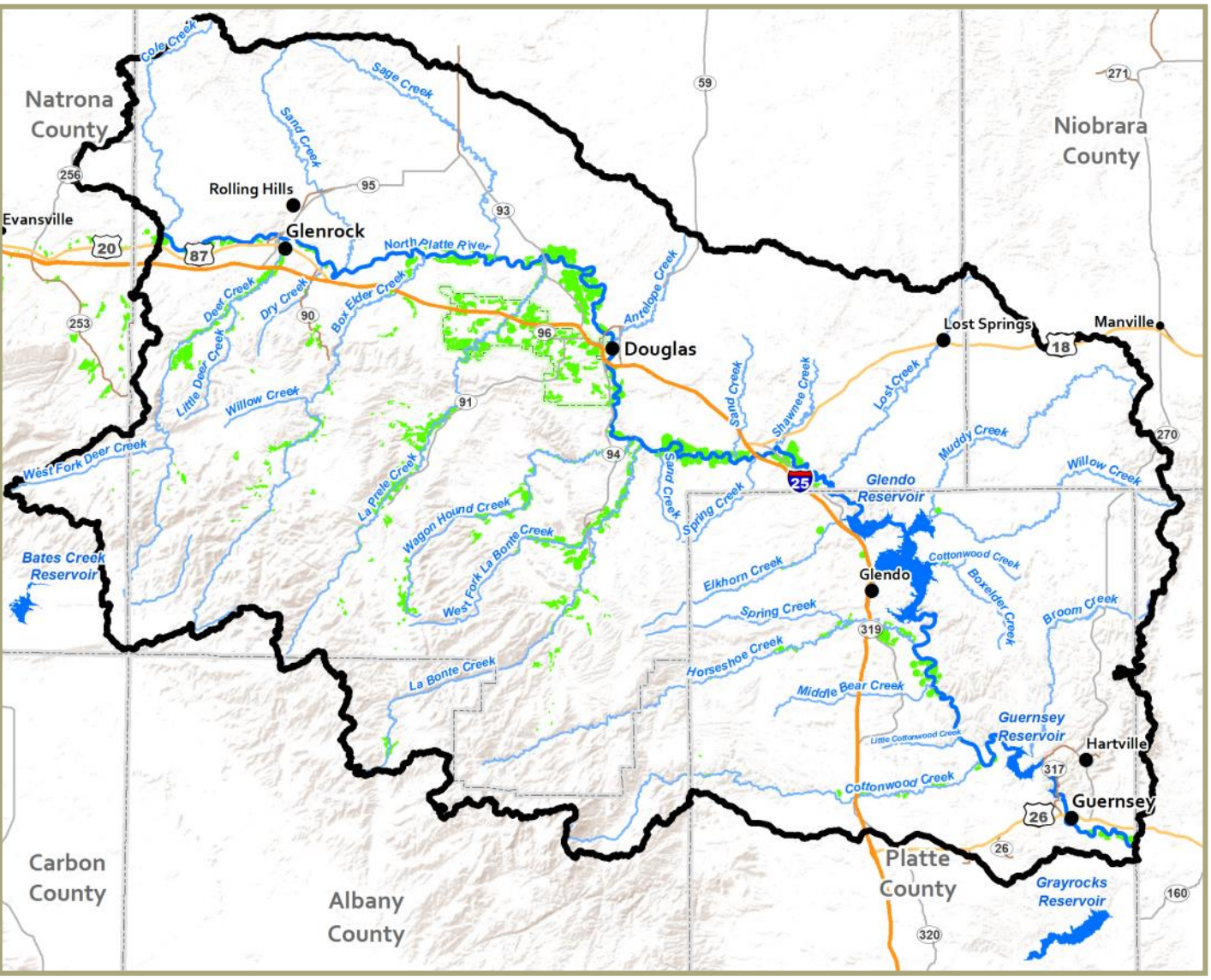
- 126,300 acres of O&G fields
- As of September 2015
  - 129 active oil wells
  - 27 active gas wells
  - 1,685 P&A wells
- In 2015, O&G fields produced 210 million gallons of water
- Sussex and Glenrock South fields produced 160 million gallons of water in 2015
- Proposed to drill an additional 5,000 O&G wells in the next 5 years
- Produced water would range from 55 to 91 million barrels of water per year upon full field development
- Draft EIS for Converse County O&G in 2016

Mining



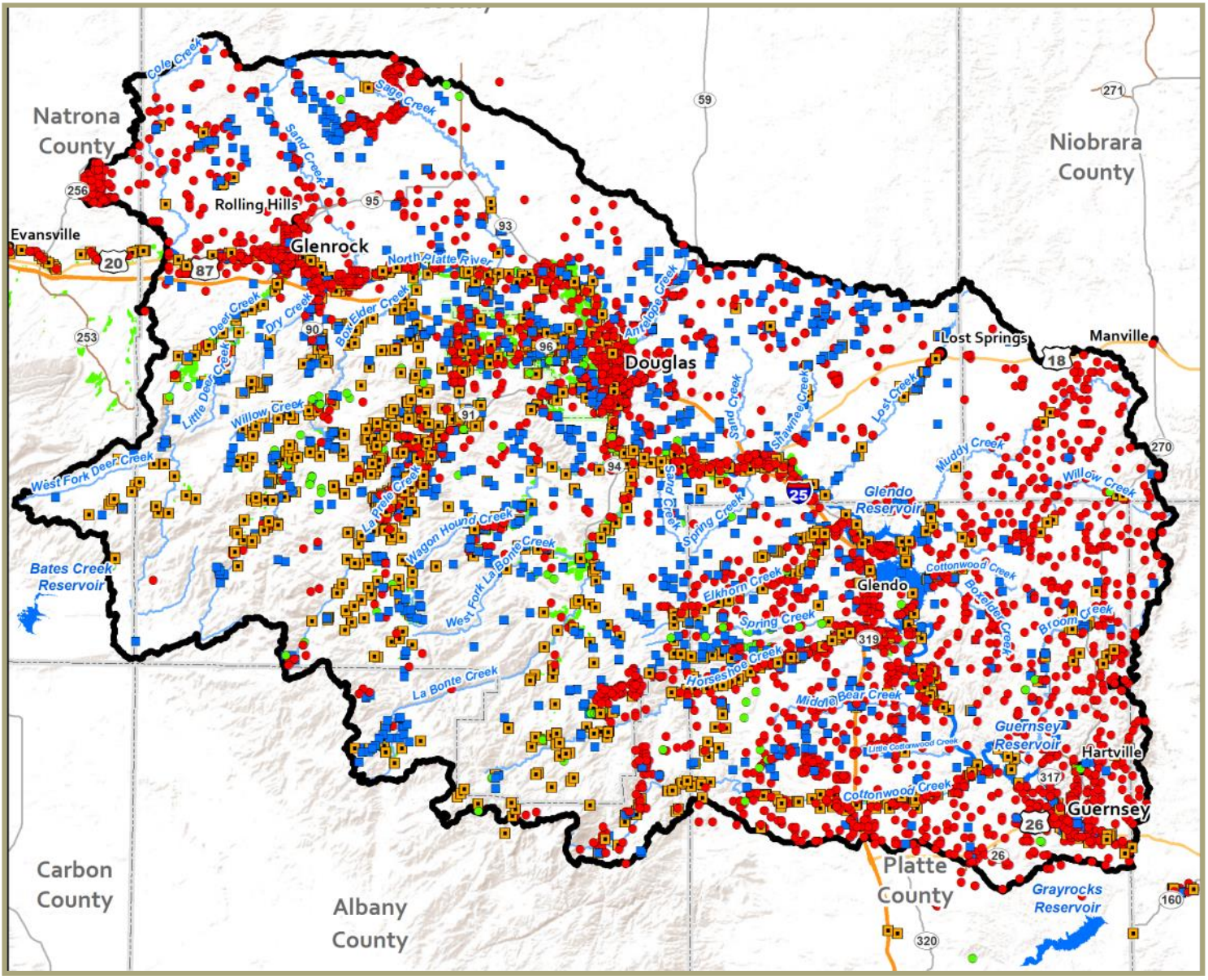
- Paleoindian Period (12,000 to 8,000 BP) at a site near Hartville
- Paleo-Indians mined ochre for paints and ortho-quartzite for tools
- Copper mining occurred from 1880-1887 and resulted in the founding of Sunrise and Hartville
- There are no active coal mines in the study area
- Dave Johnston Coal Mine covered 4,000 acres and operated from 1958-2000
- Over 40 noncoal mines
  - Smith-Highland Uranium Mine operated by Cameco covers 30,000 acres
  - Sand/gravel mines are the majority of permitted sites in the watershed
  - Other minerals mined include feldspar, limestone, and lithium

Irrigation



- 55,150 acres in watershed
- More than 330 miles of Conveyances
- LaPrele Irrigation District with more than 11,000 irrigated acres
- In 2012, there were approximately 36,000 irrigated acres in the Watershed
- In 2012, there were 6,700 irrigated acres in the LaPrele Irrigation District (LID)

Water Right Permits



- 11,264 ePermit records
- 10,901 are categorized
  - 1,453 Reservoirs
  - 227 Springs
  - 3,023 Stream Diversions
  - 6,198 Wells
- 8,679 ePermits in watershed with 2,585 ePermits outside the watershed

-LaPrele Irrigation District (LID)

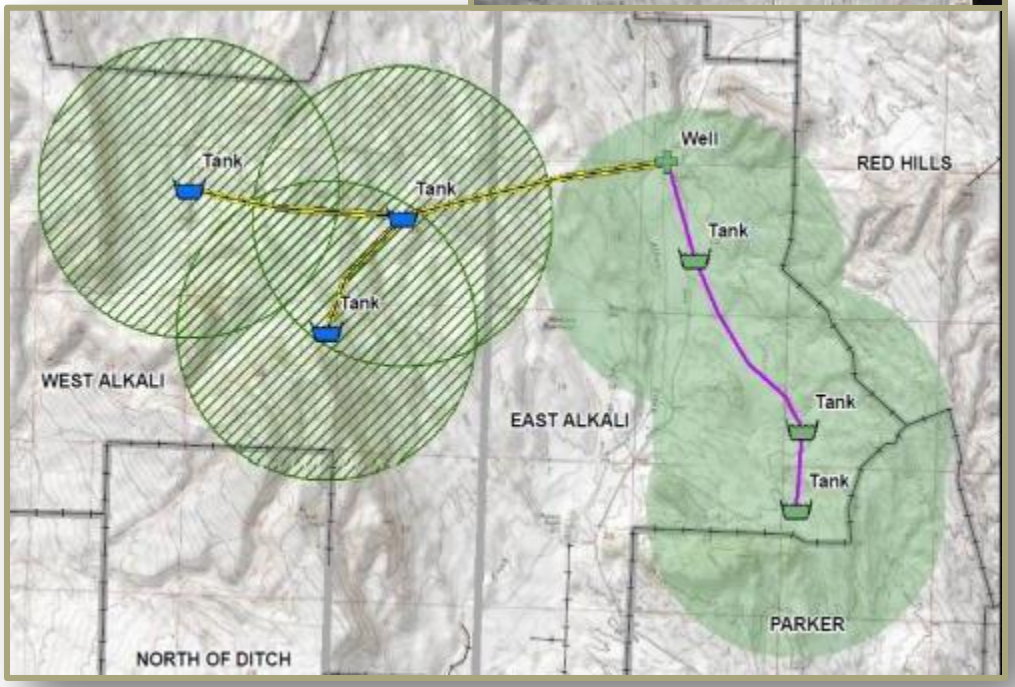
- Encompasses 31,700 acres
- 11,462 irrigated acres
- 103 water users
- 32 miles of conveyances
- 55-65 miles of ditches in the LID
- 30 acre average irrigated field size
- 18 acres median irrigated field size

Watershed Description and Inventory
-Irrigation System Rehabilitation

- Meet with Interested Landowners to Assess Concerns
- Identify Irrigation Rehabilitation Projects

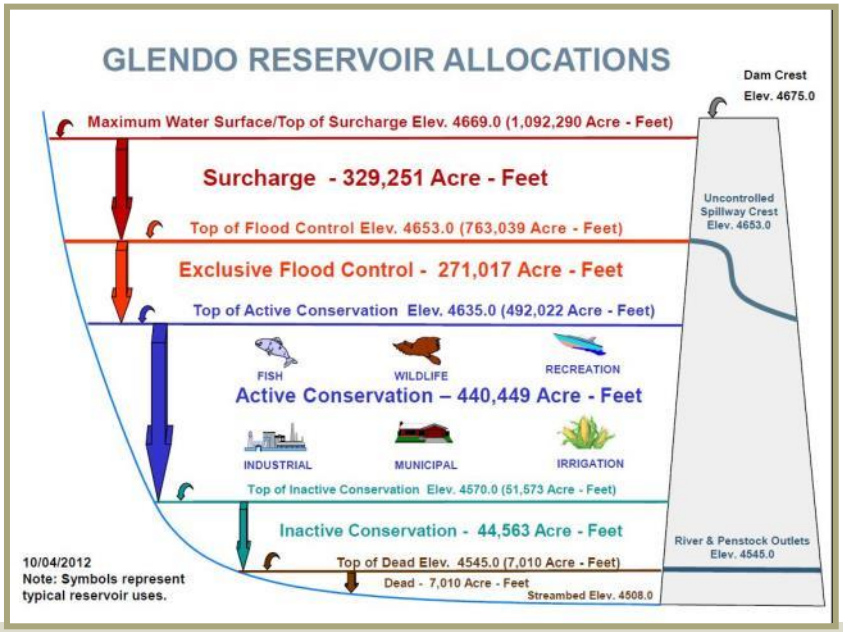
Watershed Description and Inventory -Upland Water Development

- Meet with Interested Landowners to Assess Concerns
- Identify Upland Water Development Projects



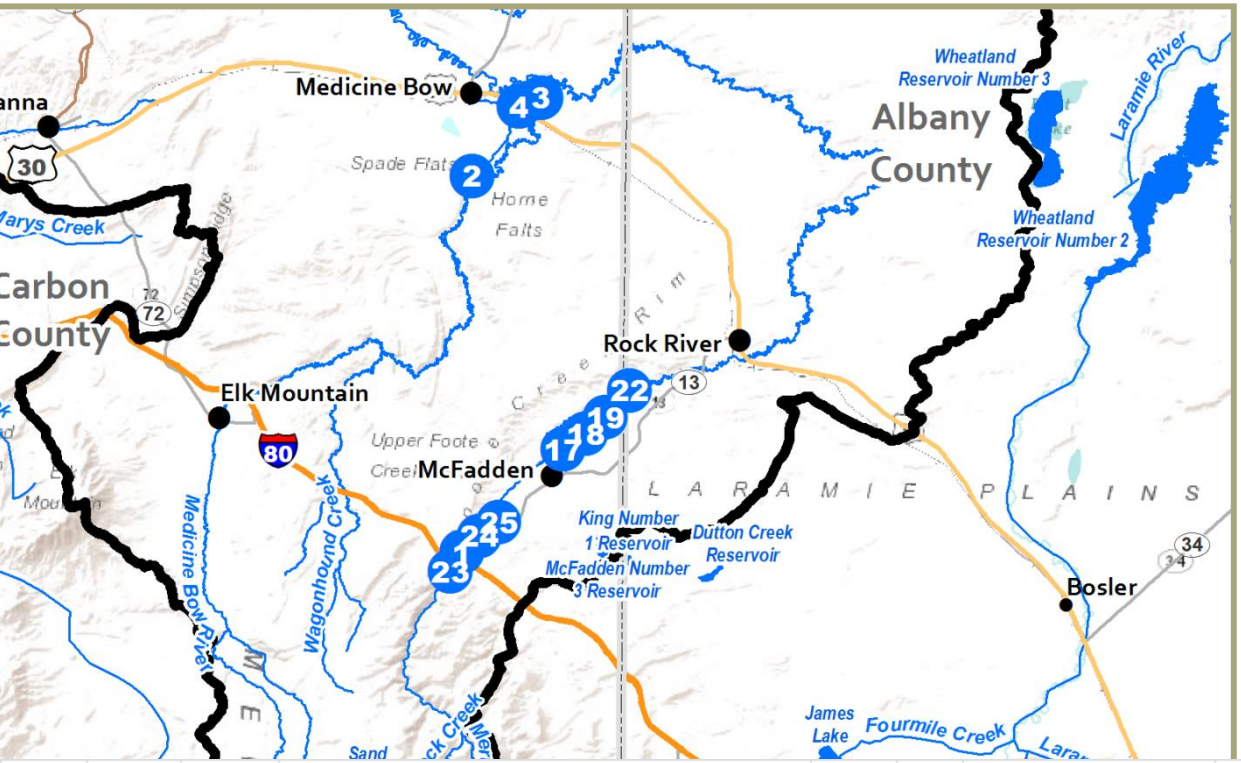
Watershed Description and Inventory
-Water Storage and Flood Control

- Explore
  - Opportunities to Enhance Existing Storage Sites
  - North Platte Decree, Platte River Recovery Implementation Program, and Water Rights
- Identify
  - Potential Water Storage and Wetland Opportunities
- Governor Mead's Wyoming Water Strategy 2015



Work with WWDO, local sponsors, and stakeholders to fully understand potential OPPORTUNITIES and identify any constraints.

Irrigation Rehabilitation Projects

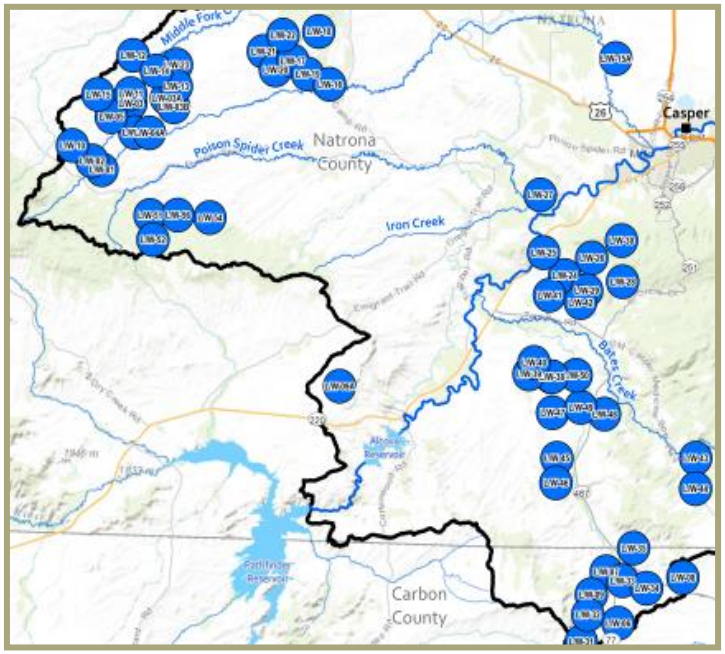


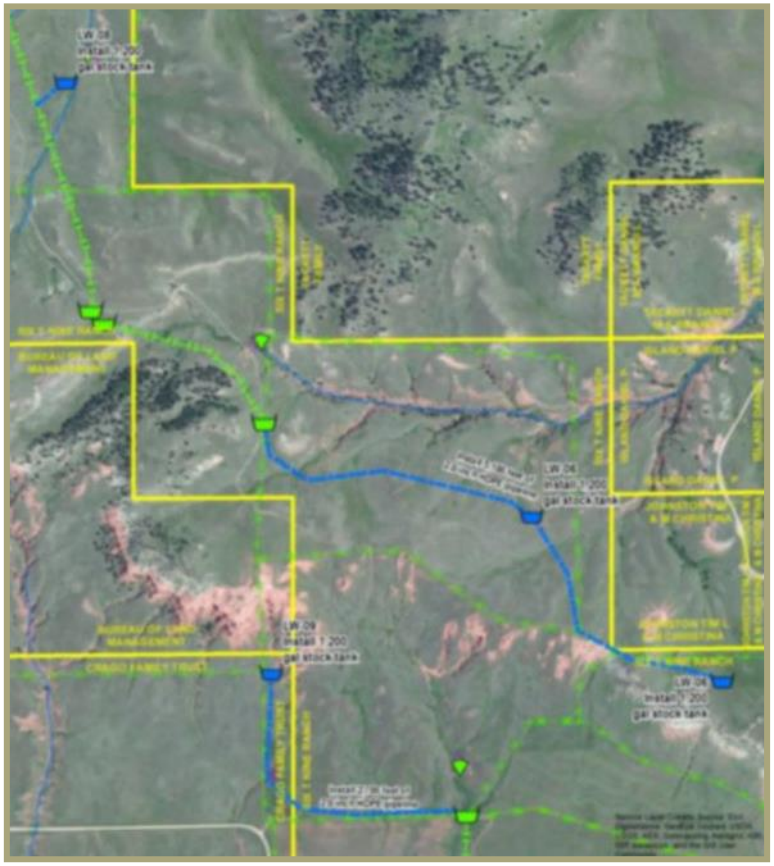
- Rehabilitation Components
- Conceptual Plans and Designs
- Estimated Component and Project Costs

Item No	Type	Plan Item	Description	Pipe LF	NRCS Code	Practice_Name	Component	Units	Unit Type	EQIP Unit Cost	Unit Cost	Estimated Cost
1	Diversion	I-01	Rehabilitate diversion structure and headgate		587	Structure for Water Control	Misc Structure, Large	1	Each	$12,614	$18,827	$18,827
2	Diversion	I-01	Rehabilitate diversion structure and headgate		587	Structure for Water Control	Misc Structure, Large	1	Each	$12,614	$18,827	$18,827
3	Pipeline	I-01	Rehabilitate 3,520 feet of 12-inch PIP pipeline and flume	3,513	430	Irrigation Pipeline	PVC PIP >= 10 inch	3,520	LF	$8.25	$11.00	$38,720
4	Pond	I-01	Install irrigation regulating reservoir		436	Irrigation Reservoir	TBD	TBD	TBD	TBD	TBD	TBD
5	Diversion	I-02	Rehabilitate diversion structure and headgate		587	Structure for Water Control	Misc Structure, Large	1	Each	$12,614	$18,827	$18,827
6	Pipeline	I-02	Rehabilitate 2,620 feet of 12-inch PIP pipeline and flume	2,621	430	Irrigation Pipeline	PVC PIP >= 10 inch	2,620	LF	$8.25	$11.00	$28,820
7	Diversion	I-03	Rehabilitate diversion structure and headgate		587	Structure for Water Control	Misc Structure, Large	1	Each	$12,614	$18,827	$18,827
8	Pipeline	I-03	Install 3,900 feet of 15-inch PIP pipeline	3,896	430	Irrigation Pipeline	PVC PIP >= 10 inch	3,900	LF	$8.25	$11.00	$42,900
9	Pipeline	I-03	Install 2,480 feet of 12-inch PIP pipeline, headgate, flume	2,479	430	Irrigation Pipeline	PVC PIP >= 10 inch	2,480	LF	$8.25	$11.00	$27,280
10	Pipeline	I-03	Install 2,140 feet of 10-inch PIP pipeline and headgate	2,134	430	Irrigation Pipeline	PVC PIP >= 10 inch	2,140	LF	$8.25	$11.00	$23,540
11	Pond	I-03	Install irrigation regulating reservoir		436	Irrigation Reservoir	TBD	TBD	TBD	TBD	TBD	TBD
12	Diversion	I-03A	Install pump		533	Pumping Plant	Electric 10 to 40 hp	30	Hp	$247	$368	$11,037
13	Diversion	I-03A	Install diversion		587	Structure for Water Control	Misc Structure, Large	1	Each	$12,614	$18,827	$18,827
14	Diversion	I-03B	Rehabilitate pump		533	Pumping Plant	Electric 10 to 40 hp	30	Hp	$247	$368	$11,037
15	Diversion	I-03B	Rehabilitate diversion structure		587	Structure for Water Control	Misc Structure, Large	1	Each	$12,614	$18,827	$18,827
16	Diversion	I-04	Install diversion structure and headgate		587	Structure for Water Control	Misc Structure, Large	1	Each	$12,614	$18,827	$18,827

Upland Livestock/Wildlife Water Supply Projects

- Proposed projects and Components
- Conceptual designs
- Conceptual cost estimates

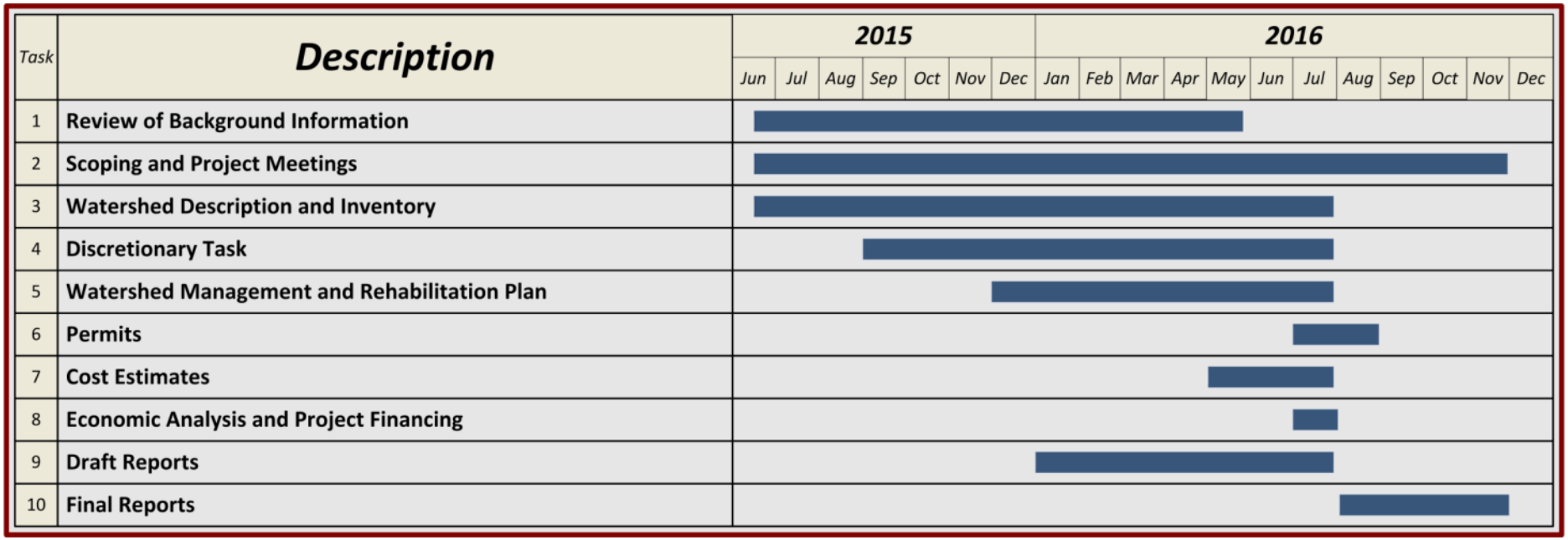




Plan Component	Project Type	Solar Pump-Windmill	Well Construction	Spring Develop-ment	Pipeline	Stock Tank-Trough	Storage Tank	Stock Pond Rehabilitation-Construction
L/W-01	Well/Pipeline		1		6,500	2	1	1
L/W-02	Well/Pipeline	1	1		4,400	3		
L/W-03	Well/Pipeline	1	1		12,400	4		
L/W-03A	Spring/Tank			1	2,100	1		
L/W-03B	Spring/Tank			1	2,100	1		
L/W-04	Well/Pipeline	1	1		9,300	4		
L/W-04A	Pipeline/Tank				5,600	1		
L/W-05	Well/Pipeline	1	1		4,800	2		
L/W-06	Well/Pipeline	1	1		7,500	3	1	
L/W-07	Well/Pipeline	1	1		4,700	3		
L/W-08	Well/Pipeline	1	1		4,400	2		
L/W-09	Well/Pipeline	1	1		4,000	2		
L/W-09A	Well/Pipeline	1	1		19,100	4		
L/W-10	Well/Pipeline	1	1		12,500	5	1	
L/W-11	Well/Pipeline	1	1		4,700	2	1	
L/W-12	Well/Pipeline	1	1		4,200	2		
L/W-13	Well/Pipeline	1	1		5,700	2		
L/W-14	Well/Pipeline	1	1		7,700	2		
L/W-15	Well/Pipeline	1	1		400	1		
L/W-15A	Well/Pipeline	1	1		15,200	3		
L/W-16	Well/Pipeline		1		4,300	2		
L/W-17	Well/Pipeline	1	1		10,000	3	1	
L/W-18	Pipeline/Tank				6,400	2		
L/W-19	Well/Pipeline	1	1		6,400	3		1
L/W-20	Well/Pipeline	1	1		6,500	2		1
L/W-21	Well/Pipeline	1	1		4,100	2		

Project Schedule

- Schedule
  - Field Inventory: June through September 2016
  - Draft Final Report: September 2016
  - Project Completion: November 2016





Thank You

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RESPEC

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