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EXECUTIVE SUMMARY

MIDDLE NORTH PLATTE WATERSHED STUDY

WATERSHED MANAGEMENT PLAN

Topical Report RSI-2411

prepared for

Wyoming Water Development Commission
6920 Yellowtail Road
Cheyenne, Wyoming 82002

February 2014

RESPEC
CONSULTING & SERVICES

EXECUTIVE SUMMARY

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WATERSHED MANAGEMENT PLAN

Topical Report RSI-2411

by

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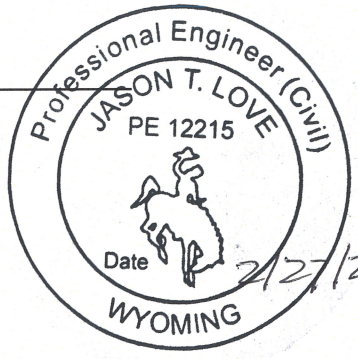
February 2014

I hereby certify that this report was prepared by us or under our direct supervision and that we are duly licensed Professional Geologists and Engineers under the laws of the State of Wyoming.

Jason T. Love, P.E.



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EXECUTIVE SUMMARY

1.1 INTRODUCTION

In August 2011, the Natrona County Conservation District (NCCD) Board of Supervisors requested that the Wyoming Water Development Commission (WWDC) conduct a comprehensive study of the Middle North Platte Watershed Study, Level I to evaluate watershed function, assess wetland and riparian conditions, develop geomorphic classifications, and identify water development opportunities on irrigated lands, rangelands, wetlands, and streams. In 2012, the WWDC approved funding for the study and contracted with RESPEC and Anderson Consulting Engineers, Inc. (ACE), to complete the watershed study. The study area covers approximately 2,323 square miles or 1,486,748 acres and encompasses the drainage area for the North Platte River from Pathfinder Reservoir downstream to east of Casper, Wyoming, where Cole and Muddy creeks enter the North Platte River as shown in Figure 1.1.

1.2 PURPOSE AND OBJECTIVES

The purpose of this study was to combine existing data with generated data into a Watershed Management and Rehabilitation Plan, with the following objectives completed:

- Foster communication among residents and landowners, the NCCD, and the WWDC.
- Solicit public participation in the watershed study.
- Inventory and evaluate the watershed with emphasis on surface water quantity and quality, and upland and riparian ecological conditions.
- Perform a geomorphic classification of the major tributaries in the study area to identify impaired reaches and improvement options to restore channel stability.
- Assess irrigation systems and generate rehabilitation alternatives for the irrigators.
- Evaluate existing surface water features, storage requirements, and potential opportunities to improve water availability for livestock and wildlife.
- Prepare a watershed management and rehabilitation plan that proposes improvements.
- Identify permits, easements, and clearances necessary for plan implementation.
- Estimate costs for proposed improvement alternatives and potential projects.
- Complete an economic analysis and identify potential sources of funding.

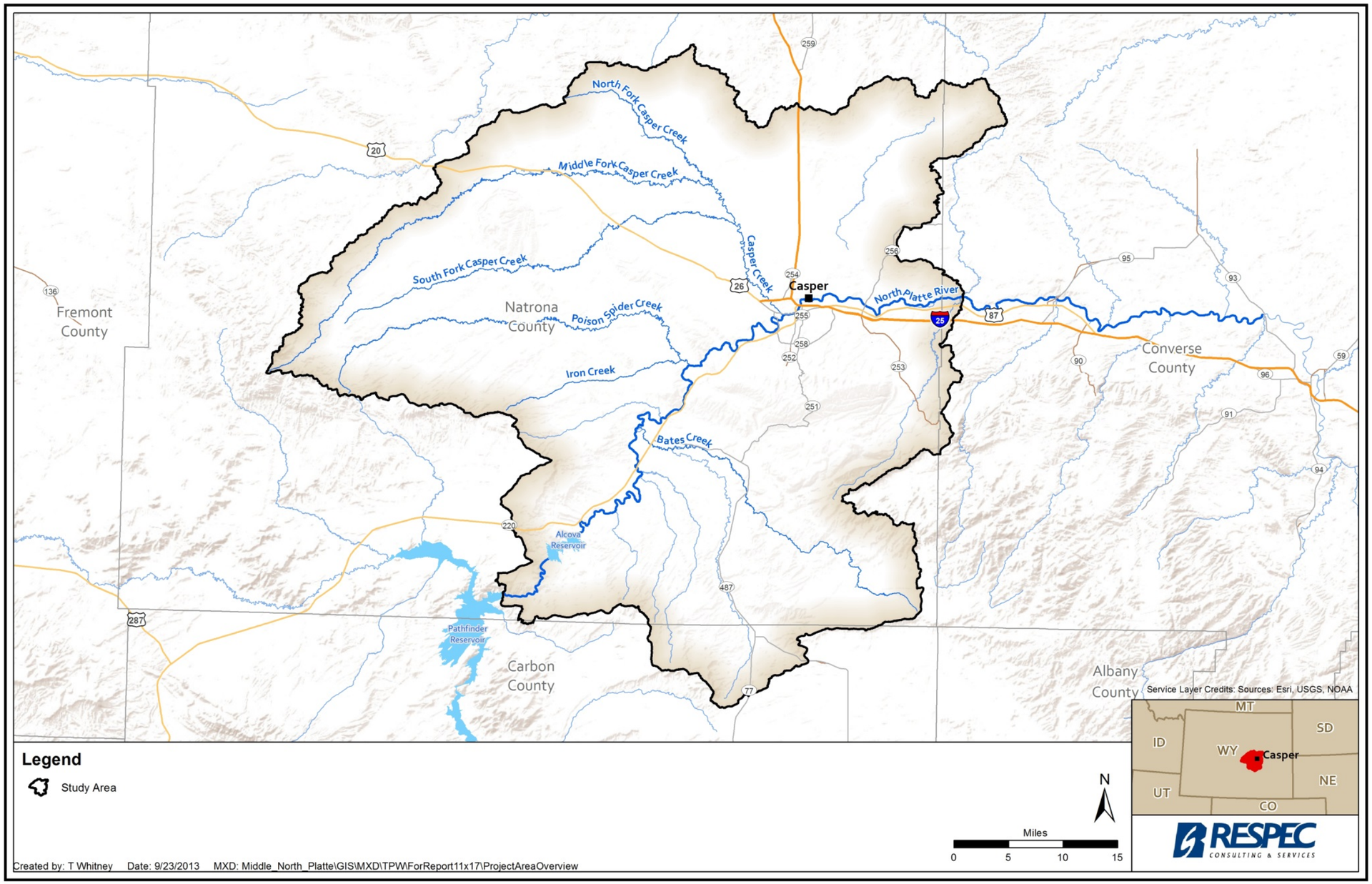

Figure 1.1. Middle North Platte Watershed Study Area.

1.3 WATERSHED INVENTORY

The objective of the inventory was to gather, review, and compile information, which included geology, hydrology, soils, climate, plant communities, wildlife habitat, infrastructure, irrigation, stream conditions, and upland conditions in order to describe problems and identify water development opportunities and improvements within the watershed. The spatial data gathered during the study were mainly obtained from Natrona County, the Wyoming State Engineer's Office (SEO), Wyoming Department of Environmental Quality (WDEQ), Wyoming Geographic Information Science Center (WyGISC), U.S. Department of the Interior's Bureau of Land Management (BLM) and U.S. Geological Survey (USGS), NRCS, Wyoming Game and Fish Department (WGFD), and others. The collected data was compiled into a Geographic Information System (GIS), which can be used to complete permits, assessments, applications, and maps.

1.4 WATERSHED MANAGEMENT AND REHABILITATION PLAN

The Watershed Management and Rehabilitation Plan was developed using the information from the inventory and provides recommendations for improvements associated with the following:

- Irrigation system rehabilitation components
- Livestock/wildlife upland watering opportunities
- Grazing management opportunities
- Storage opportunities
- Stream channel condition and stability
- Wetland enhancement opportunities
- Other watershed management opportunities.

Table 1.1 lists the irrigation system rehabilitation components of the plan. Table 1.2 presents the livestock/wildlife upland watering components. Costs were estimated for the conceptual proposed projects by using the NRCS Environmental Quality Incentives Program (EQIP) cost data, recent costs for similar projects, and manufacturers' and vendors' advertised product prices.

1.5 PERMITS

Information was provided regarding clearances, environmental reviews, agency coordination, and determination of potential impacts that may be necessary in implementing proposed projects. Some projects involve federal lands and funding that would be subject to the National Environmental Policy Act (NEPA) and other federal regulations. State regulatory approval regarding proposed projects may also be applicable. Local zoning ordinances, building and floodplain permits, and road or utility right-of-way may be required within incorporated towns, cities, and counties or from irrigation districts, road districts, and utility or energy entities.

Table 1.1. Middle North Platte Watershed Management and Rehabilitation Plan: Irrigation Rehabilitation Proposed Projects

Rehabilitation Item Number	Priority	Pipeline	Structure for Water Control Small	Structure for Water Control Medium	Structure for Water Control Large	Streambank Protection	Irrigation Reservoir	Construction Costs	Engineering Costs (10%)	Construction and Engineering Subtotal	Contingency (15%)	Total Construction Costs	Final Plans and Specifications	Permits, Fees, Access	Total Project Costs	Total Project Costs
I-01	1	6,500			1			$95,297.49	$9,530	$104,827	$15,724	$120,551	$2,000	$2,000	$124,551	$124,600
I-02	1	300	1					$37,101.17	$3,710	$40,811	$6,122	$46,933	$2,000	$2,000	$50,933	$50,900
I-03	1		1	1	1	100		$47,778.47	$4,778	$52,556	$7,883	$60,440	$2,000	$2,000	$64,440	$64,400
I-04	1	10,200		1			1	$138,471.80	$13,847	$152,319	$22,848	$175,167	$2,000	$2,000	$179,167	$179,200
I-05	1	4,100	1					$53,415.84	$5,342	$58,757	$8,814	$67,571	$2,000	$2,000	$71,571	$71,600

Table 1.2. Middle North Platte Watershed Management and Rehabilitation Plan: Livestock/Wildlife Water Source/Supply Proposed Projects (Page 1 of 2)

Item Number	Plan Component	Description	Priority	Construction Costs ($)	Engineering Costs (10%) ($)	Construction and Engineering Subtotal ($)	Contingency (15%) ($)	Total Construction Costs ($)	Final Plans and Specs ($)	Permits, Fees, Access ($)	Total Project Costs ($)
1	L/W-01	Stinking Water 1 Well and Pipeline	1	52,600	5,260	57,860	8,679	66,539	2,000	2,000	70,500
2	L/W-01A	Stinking Water Stock Reservoir/Wetland Rehabilitation	1	45,600	4,560	50,160	7,524	57,684	3,000	3,000	63,700
3	L/W-02	Middle Fork 2 Well and Pipeline	2	50,620	5,062	55,682	8,352	64,034	2,000	2,000	68,000
4	L/W-03	Middle Fork 3 Well and Pipeline	2	79,720	7,972	87,692	13,154	100,846	2,000	2,000	104,800
5	L/W-03A	Middle Fork 3A Spring Development	2	11,630	1,163	12,793	1,919	14,712	2,000	2,000	18,700
6	L/W-03B	Middle Fork 3B Spring Development	2	11,630	1,163	12,793	1,919	14,712	2,000	2,000	18,700
7	L/W-04	Middle Fork 4 Well and Pipeline	2	69,490	6,949	76,439	11,466	87,905	2,000	2,000	91,900
8	L/W-04A	Middle Fork 4A Pipeline and Tank	2	21,180	2,118	23,298	3,495	26,793	2,000	2,000	30,800
9	L/W-05	Middle Fork 5 Well and Pipeline	2	49,240	4,924	54,164	8,125	62,289	2,000	2,000	66,300
10	L/W-06	Shirley Ridge 1 Well and Pipeline	1	60,700	6,070	66,770	10,016	76,786	2,000	2,000	80,800
11	L/W-07	Shirley Ridge 2 Well and Pipeline	2	51,610	5,161	56,771	8,516	65,287	2,000	2,000	69,300
12	L/W-08	Shirley Ridge 3 Well and Pipeline	2	47,920	4,792	52,712	7,907	60,619	2,000	2,000	64,600
13	L/W-09	Shirley Ridge 4 Well and Pipeline	2	46,600	4,660	51,260	7,689	58,949	2,000	2,000	62,900
14	L/W-09A	Childers Well and Pipeline	2	101,830	10,183	112,013	16,802	128,815	2,000	2,000	132,800
15	L/W-10	McClanahan Well and Pipeline	1	76,900	7,690	84,590	12,689	97,279	2,000	2,000	101,300
16	L/W-11	Davidson 3 South Well and Pipeline	2	58,910	5,891	64,801	9,720	74,521	2,000	2,000	78,500
17	L/W-12	Davidson 3 North Well and Pipeline	2	47,260	4,726	51,986	7,798	59,784	2,000	2,000	63,800
18	L/W-13	Coyote Creek Well and Pipeline	2	52,210	5,221	57,431	8,615	66,046	2,000	2,000	70,000
19	L/W-14	Davidson 2 Well and Pipeline	2	58,810	5,881	64,691	9,704	74,395	2,000	2,000	78,400
20	L/W-15	Davidson South Well and Pipeline	2	32,020	3,202	35,222	5,283	40,505	2,000	2,000	44,500
21	L/W-15A	Forgey East Well and Pipeline	2	86,260	8,626	94,886	14,233	109,119	2,000	2,000	113,100
22	L/W-16	Strohecker 1 Well and Pipeline	1	42,200	4,220	46,420	6,963	53,383	2,000	2,000	57,400
23	L/W-17	Strohecker 2 Well and Pipeline	2	79,100	7,910	87,010	13,052	100,062	2,000	2,000	104,100
24	L/W-18	Pine Mountain Pipeline and Tank	2	26,520	2,652	29,172	4,376	33,548	2,000	2,000	37,500
25	L/W-19	Strohecker 3 Well and Pipeline	1	107,220	10,722	117,942	17,691	135,633	3,000	3,000	141,600
26	L/W-20	South Fork Casper Well and Pipeline	2	104,850	10,485	115,335	17,300	132,635	3,000	3,000	138,600
27	L/W-21	Strohecker 4 Well and Pipeline	2	46,930	4,693	51,623	7,743	59,366	2,000	2,000	63,400
28	L/W-22	West Pine Mountain Spring Development	2	3,320	332	3,652	548	4,200	2,000	2,000	8,200
29	L/W-23	Strohecker 5 Well and Pipeline	2	54,520	5,452	59,972	8,996	68,968	2,000	2,000	73,000
30	L/W-24	Eagle Ridge 1 Well and Pipeline	2	94,290	9,429	103,719	15,558	119,277	3,000	3,000	125,300
31	L/W-25	Eagle Ridge 2 Spring Development	2	6,020	602	6,622	993	7,615	2,000	2,000	11,600
32	L/W-26	Gotheberg Draw Well and Pipeline	2	50,560	5,056	55,616	8,342	63,958	2,000	2,000	68,000
33	L/W-27	Eagle Ridge 3 Well and Pipeline	2	57,880	5,788	63,668	9,550	73,218	2,000	2,000	77,200

Table 1.2. Middle North Platte Watershed Management and Rehabilitation Plan: Livestock/Wildlife Water Source/Supply Proposed Projects (Page 2 of 2)

Item Number	Plan Component	Description	Priority	Construction Costs ($)	Engineering Costs (10%) ($)	Construction and Engineering Subtotal ($)	Contingency (15%) ($)	Total Construction Costs ($)	Final Plans and Specs ($)	Permits, Fees, Access ($)	Total Project Costs ($)
34	L/W-28	Little Red Well and Pipeline	2	67,780	6,778	74,558	11,184	85,742	2,000	2,000	89,700
35	L/W-29	Eagle Ridge 4 Well and Pipeline	2	64,150	6,415	70,565	10,585	81,150	2,000	2,000	85,100
36	L/W-30	Casper Mountain Well and Pipeline	2	64,480	6,448	70,928	10,639	81,567	2,000	2,000	85,600
37	L/W-31	Stinking Creek 1 Spring Development	2	9,650	965	10,615	1,592	12,207	2,000	2,000	16,200
38	L/W-32	Stinking Creek 2 Well and Pipeline	2	46,270	4,627	50,897	7,635	58,532	2,000	2,000	62,500
39	L/W-33	Stinking Creek 3 Well and Pipeline	2	100,230	10,023	110,253	16,538	126,791	3,000	3,000	132,800
40	L/W-34	Hunt Creek Well and Pipeline	2	55,840	5,584	61,424	9,214	70,638	2,000	2,000	74,600
41	L/W-35	Lone Tree Well and Pipeline	2	36,040	3,604	39,644	5,947	45,591	2,000	2,000	49,600
42	L/W-36	Bates Creek 1 Well and Pipeline	2	107,870	10,787	118,657	17,799	136,456	2,000	2,000	140,500
43	L/W-37	Bates Creek 2 Spring Development	2	10,970	1,097	12,067	1,810	13,877	2,000	2,000	17,900
44	L/W-38	Bolton Creek 1 Well and Pipeline	2	31,360	3,136	34,496	5,174	39,670	2,000	2,000	43,700
45	L/W-39	Bolton Creek 1A Stock Pond	2	50,000	5,000	55,000	8,250	63,250	3,000	3,000	69,300
46	L/W-40	Bolton Creek 2 Well and Tank	2	31,360	3,136	34,496	5,174	39,670	2,000	2,000	43,700
47	L/W-41	Bates Creek 3 Well and Tank	2	31,360	3,136	34,496	5,174	39,670	2,000	2,000	43,700
48	L/W-42	Bates Creek 4 Well and Tank	2	31,360	3,136	34,496	5,174	39,670	2,000	2,000	43,700
49	L/W-43	Chalk Creek 1 Well and Pipeline	2	45,610	4,561	50,171	7,526	57,697	2,000	2,000	61,700
50	L/W-44	Chalk Creek 2 Well and Pipeline	2	45,940	4,594	50,534	7,580	58,114	2,000	2,000	62,100
51	L/W-45	Stinking Creek 4 Well and Tank	2	31,360	3,136	34,496	5,174	39,670	2,000	2,000	43,700
52	L/W-46	Stinking Creek 5 Well and Pipeline	2	51,550	5,155	56,705	8,506	65,211	2,000	2,000	69,200
53	L/W-47	Bolton Creek 3 Well and Tank	2	31,360	3,136	34,496	5,174	39,670	2,000	2,000	43,700
54	L/W-48	Stinking Creek 6 Well and Tank	2	31,360	3,136	34,496	5,174	39,670	2,000	2,000	43,700
55	L/W-49	Stinking Creek 7 Well and Tank	2	31,360	3,136	34,496	5,174	39,670	2,000	2,000	43,700
56	L/W-50	Stinking Creek 8 Well and Tank	2	31,360	3,136	34,496	5,174	39,670	2,000	2,000	43,700
57	L/W-51	Soap Creek 1 Well and Tank	2	31,360	3,136	34,496	5,174	39,670	2,000	2,000	43,700
58	L/W-52	Cabin Creek 1 Well and Tank	2	31,360	3,136	34,496	5,174	39,670	2,000	2,000	43,700
59	L/W-53	Cabin Creek 2 Well and Tank	2	31,360	3,136	34,496	5,174	39,670	2,000	2,000	43,700
60	L/W-54	Horse Heaven 1 Spring Development	2	11,030	1,103	12,133	1,820	13,953	2,000	2,000	18,000
61	L/W-55	Cabin Creek 3 Spring Development	2	12,020	1,202	13,222	1,983	15,205	2,000	2,000	19,200
62	L/W-56	Soap Creek 2 Well and Tank	2	31,360	3,136	34,496	5,174	39,670	2,000	2,000	43,700
63	L/W-57	Sand Spring Creek 1 Well and Tank	2	31,360	3,136	34,496	5,174	39,670	2,000	2,000	43,700
64	L/W-58	Sand Spring Creek 2 Well and Tank	2	31,360	3,136	34,496	5,174	39,670	2,000	2,000	43,700
65	L/W-59	Sand Spring Creek 3 Well and Tank	2	31,360	3,136	34,496	5,174	39,670	2,000	2,000	43,700

1.6 FUNDING

Funding for the opportunities in the Watershed Management and Rehabilitation Plan are dependent on local coordination and voluntary cooperation between landowners, managers, irrigators, organizations, and agencies in addressing the land and water resource concerns. The Natrona County Conservation District, the Converse County Conservation District, or the Medicine Bow Conservation District could serve as a sponsor for those funding sources requiring a sponsoring entity. For instance, the WWDC's Small Water Project Program (SWPP) funds sponsored projects which provide multiple benefits where the total project costs (including construction, permitting, construction engineering, and land procurement) are less than $100,000 or where WWDC's maximum financial contribution is 50 percent of project costs or twenty-five thousand dollars ($25,000), whichever is less. By combining funding from additional sources (i.e., NRCS EQIP funding), total costs could be potentially reduced for the participants. Additionally, state and federal agencies, including but not limited to the WGFD, BLM, and NRCS have conservation programs and could potentially assist with project implementation.

1.7 CONCLUSIONS

Following the inventory efforts, proposed projects, opportunities, and recommendations were developed as part of the Watershed Management and Rehabilitation Plan.

1.7.1 Irrigation System Components

- Proposed projects and components for five irrigation systems were completed systems.
- Most structures inventoried require efforts to reduce seepage and conserve water.
- Recommended improvements involve replacing and/or rehabilitating existing but weakened diversion structures and headgates and replacing ditches with pipelines.
- Irrigation system improvements could be implemented individually or entirely at once depending on the goals of the landowner or manager.
- Irrigation projects require minor involvement from regulatory agencies to be completed.

1.7.2 Livestock/Wildlife Upland Watering Opportunities

- Coordination with BLM regarding allotment management is necessary and would require involvement in developing proposed upland water projects beyond the conceptual level.
- There were 64 potential livestock/wildlife water projects identified for development in coordination with participating landowners and allotment permittees.

- Conceptual projects and components along with cost estimates were completed and included water wells, solar pumps, pipelines, and stock tanks and require additional final planning, design, and permitting completed before construction.

1.7.3 Surface Water Storage Opportunities

- The North Platte Decree and the Platte River Recovery and Implementation Program limit the opportunity to create new reservoirs or enlarge existing reservoirs.
- An investigation of Bates Creek Reservoir was completed and alternatives developed.

1.7.4 Stream Channel Condition and Stability

- Several impaired channel reaches were identified during the geomorphic assessment and classification within the study area.
- Locally-led stream channel and habitat improvement projects, such as the North Platte River Master Plan and others, could provide significant benefits to the watershed.

1.7.5 Grazing Management Opportunities

- Reliable water supply projects must be developed in areas with inadequate water sources before adjustments or alternatives in grazing management could be made.
- Available tools such as the ecological site description (ESD) and the state and transition model (STM) can be used to achieve desirable vegetation on a particular range site.

1.7.6 Other Upland Management Opportunities

- Coordinating with the weed and pest control districts should continue especially regarding noxious weed, russian olive, and cheatgrass control and planting of vegetation.

1.8 RECOMMENDATIONS

Several proposed conceptual projects, identified opportunities, suggested alternatives, and initial conclusions have been presented and discussed within this report and watershed management plan. Summary recommendations listed below are included for consideration:

- Several irrigation system rehabilitation projects and livestock/wildlife upland water projects could be eligible to apply for funding through the WWDC SWPP.
- Priority projects should be reviewed, selected, and components implemented once the necessary technical and financial requirements are determined.
- Landowners seeking to participate in the SWPP should coordinate with their local conservation districts, which are eligible sponsors of SWPP applications and agreements.

- The study's GIS and digital library should be used as a tool in planning and developing potential projects and should be updated as necessary from available sources.
- Potential funding opportunities exist for proposed and future improvement projects within the watershed including ranch and farm improvements, irrigation system rehabilitation, riparian/wetland enhancements, river corridor and stream channel restoration, and urban drainage and flood control projects.
- Innovative strategies for coordinated project funding should be investigated and should focus on local, collaborative endeavors that integrate more than one watershed issue or concern that could potentially result in achievement of multiple benefits.