8.0 BASIN ISSUES, STRATEGIES AND WATER USE OPPORTUNITIES

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8.1 INTRODUCTION

As part of River Basin Planning, Basin Advisory Groups (BAGs) were formed to provide a local perspective to the planning process. They assist the Wyoming Water Development Office (WWDO) and the planning teams in identifying water related issues and water use opportunities within their specific basins. In the Snake/Salt River Basin, the first BAG meeting was held May 15, 2001 in Jackson, Wyoming. There were 30 members from a variety of interests such as agriculture, industry, environment, government, and recreation (Sunrise Engineering, Inc., 2003).

A list of water use opportunities was developed for the 2003 Plan. A long list of opportunities was developed first through discussions with the Snake/Salt River BAG. This long list was then evaluated using criteria established by the planning team and the BAG and a short list was created consisting of opportunities that scored well for the Snake and Salt Sub-basins. The short list scoring criteria included water availability, financial feasibility, public and political acceptability, available users/sponsors, legal and environmental constraints, and multiple use feasibility. Both the long list and short list were presented in a technical memorandum completed for the previous Basin Plan: *Future Water Use Opportunities* (Sunrise Engineering, Inc., 2002) and the 2003 Plan final report (Sunrise Engineering, Inc., 2003). Table 8-1 presents the short list of water use opportunities for the Snake River Sub-basin and Table 8-2 presents the short list of opportunities for the Salt River Sub-basin.

TABLE 8-1: SHORT LIST OF WATER USE OPPORTUNITIES FOR THE SNAKE RIVER SUB-BASIN BY WATER USE SECTOR

Water Use Sector	Water Use Opportunities
Agricultural	▪ Convert Spring Gulch Irrigation System to sprinkler ▪ Convert South Park Irrigation System to sprinkler ▪ Construct Cottonwood Creek Reservoir (Gros Ventre)
Municipal/Domestic	▪ Develop additional community water sources ▪ Fire protection wells in outlying areas ▪ Improve winter flood control in Jackson ▪ Meter unmonitored community water systems
Environmental	▪ Improve water quality of surface run-off from developed areas ▪ Re-establish riparian river banks (habitat) ▪ Create additional wetlands (location dependent) ▪ Transfer GTNP water rights to instream flow ▪ Increase flows in west bank spring creeks ▪ Re-establish meandering patterns in rivers
Recreational	▪ Increase snowmaking operations ▪ Make aesthetic ponds a beneficial use by SEO ▪ Initiate Cloud Seeding Operations
Industrial	▪ Promote additional water bottling opportunities

Note: This table was adapted from the previous Basin Plan final report (Sunrise Engineering, Inc., 2003).

TABLE 8-2: SHORT LIST OF WATER USE OPPORTUNITIES FOR THE SALT RIVER SUB-BASIN BY WATER USE SECTOR

Water Use Sector	Water Use Opportunities
Agricultural	▪ Re-construct Cottonwood Lake Dam (Enlarge Reservoir) ▪ Enlarge Strawberry Reservoir ▪ Dredge & enlarge Swift Creek Reservoir ▪ Route runoff for Groundwater Augmentation ▪ Construct Dry Creek Reservoir ▪ Construct reservoir at Headwaters of Salt River ▪ Construct Willow Creek Reservoir ▪ Construct Crow Creek Reservoir ▪ Construct Green Canyon Reservoir ▪ Construct Stump Creek Reservoir ▪ Construct Cedar Creek Reservoir ▪ Construct Stewart Creek Reservoir
Municipal/Domestic	▪ Develop additional community water sources ▪ Meter unmonitored community water systems
Environmental	▪ Create Alpine wetland (Greys River Area) ▪ Re-establish riparian river banks ▪ Create additional wetlands ▪ Re-establish meandering patterns in rivers
Recreational	▪ Construct new dam on Salt River above narrows ▪ Initiate cloud seeding operations
Industrial	▪ Promote additional water bottling opportunities ▪ Construct hydro facilities on existing irrigation systems ▪ Construct low head/open channel hydro projects

Note: This table was adapted from the previous Basin Plan final report (Sunrise Engineering, Inc., 2003)

During development of the Wyoming Framework Water Plan, 2007, water related issues important to the BAG were discussed and listed (WWC Engineering, Inc, 2007). These issues were included as part of Volume II of the Framework Water Plan. As the planning process has continued, the issues developed for the Framework Water Plan were refined and new issues added. Through continued planning with the BAG and the planning team, strategies have been developed to address the issues. A combination of the initial BAG issues, the Framework Water Plan issues, and the strategies is shown in Appendix C.

As part of this planning process, issues, strategies and water use opportunities were combined to form a matrix showing potential strategies and opportunities to address the issues. Table 8-3 displays a summary of the integration and synthesis of all the issues, strategies and water use opportunities by water use sector. A comparison of the short list of opportunities from 2003 and the strategies and opportunities developed as part of the current planning process shows these lists are very similar. Although the 2003 list is more detailed than the list from the current effort, they address the same basic issues for the water use sectors.

TABLE 8-3: SNAKE/SALT RIVER BASIN ISSUES AND WATER USE STRATEGIES AND OPPORTUNITIES BY WATER USE SECTOR

Water Use Sector	Issues	Strategies and Opportunities
Agricultural	Improve water use efficiency	▪ Evaluate and modernize irrigation systems ▪ Encourage water conservation to aid agricultural operations
	Increase irrigation water supply	▪ Reconstruct the dam at Cottonwood Lake ▪ Examine other potentials for reservoir storage
Municipal/Domestic	Economic and population growth – Is there water available?	▪ Plan orderly growth ▪ Evaluate and describe groundwater resources in the basin ▪ Project future water needs to better allocate water resources ▪ Develop additional water supplies
	Municipal and rural domestic water supplies	▪ Maintain and improve existing water supply systems to meet demands ▪ Encourage water conservation and meter water systems
	Wastewater	▪ Evaluate wastewater systems for impacts to water quality ▪ Reuse wastewater. Implement appropriate systems in the basin
	Flooding	▪ Improve winter flood control in Jackson
Environmental	Aesthetics of streams and rivers	▪ Conduct watershed studies to evaluate and define water needed to maintain healthy environments
	Protect riparian areas	▪ Conduct riparian area rehabilitation projects
	Protect and develop wetlands	▪ Conduct wetland rehabilitation projects
	Channel maintenance	▪ Conduct river morphology rehabilitation projects
	Water quality	▪ Maintain surface water quality monitoring programs ▪ Monitor groundwater quality to insure no degradation ▪ Promote proper land management and use to protect water quality
Recreational	Maintain adequate water for recreational use.	▪ Evaluate the amount of water needed for recreational uses including fishing and whitewater rafting
	Consider the aesthetics of water features	▪ Make aesthetic ponds a beneficial water use
	Consider fishing and fisheries	▪ Maintain water quality and fish habitat
	Consider snowmaking operations	▪ Continue snowmaking operations for winter sports areas
Industrial	Economic development	▪ Promote water bottling opportunities

8.2 FUTURE WATER USE OPPORTUNITIES

This section discusses opportunities to develop water storage in the basin as well as developing groundwater sources. Water conservation is also discussed as a method to more efficiently use water and decrease the demand for water resources.

8.2.1 RESERVOIR STORAGE OPPORTUNITIES

There were 12 potential reservoir projects presented in the 2003 Plan short list. One potential reservoir was in the Snake River Sub-basin, and the other 11 were in the Salt River Sub-basin. These projects are listed in Tables 8-1 and 8-2 along with other water resource projects. Figure 8-1 shows the approximate location of the potential reservoirs. The size of the reservoirs and the lands where the water would be used are not provided.

Additionally, the WDO, Dam and Reservoir Section has developed a listing of potential reservoir sites in the Snake/Salt River Basin from past studies. There are a large number of potential sites listed in Teton, Lincoln, and Sublette Counties from the various studies. All of the potential projects presented in the 2003 Plan and in the WDO list, except the Cottonwood Lake reconstruction and enlargement, would require initial reconnaissance studies before they are considered further. The Cottonwood Lake reconstruction and enlargement has undergone several studies and has been funded for Level III permitting and construction through the Water Development Program.

Reservoir water storage benefits irrigated agriculture by providing a predictable water supply and by extending the irrigation season. There may be both benefits and impacts to environmental and recreational water uses from water storage. Minimum reservoir pools and regulated fall and winter releases may benefit environmental and recreational water uses. Loss of stream habitat and continuity as well as changes in stream hydrology may negatively impact these same uses. Cost and potential benefits and/or impacts to the various water uses must be considered on each reservoir project before proceeding.

JACKSON LAKE DAM OUTLET WORKS

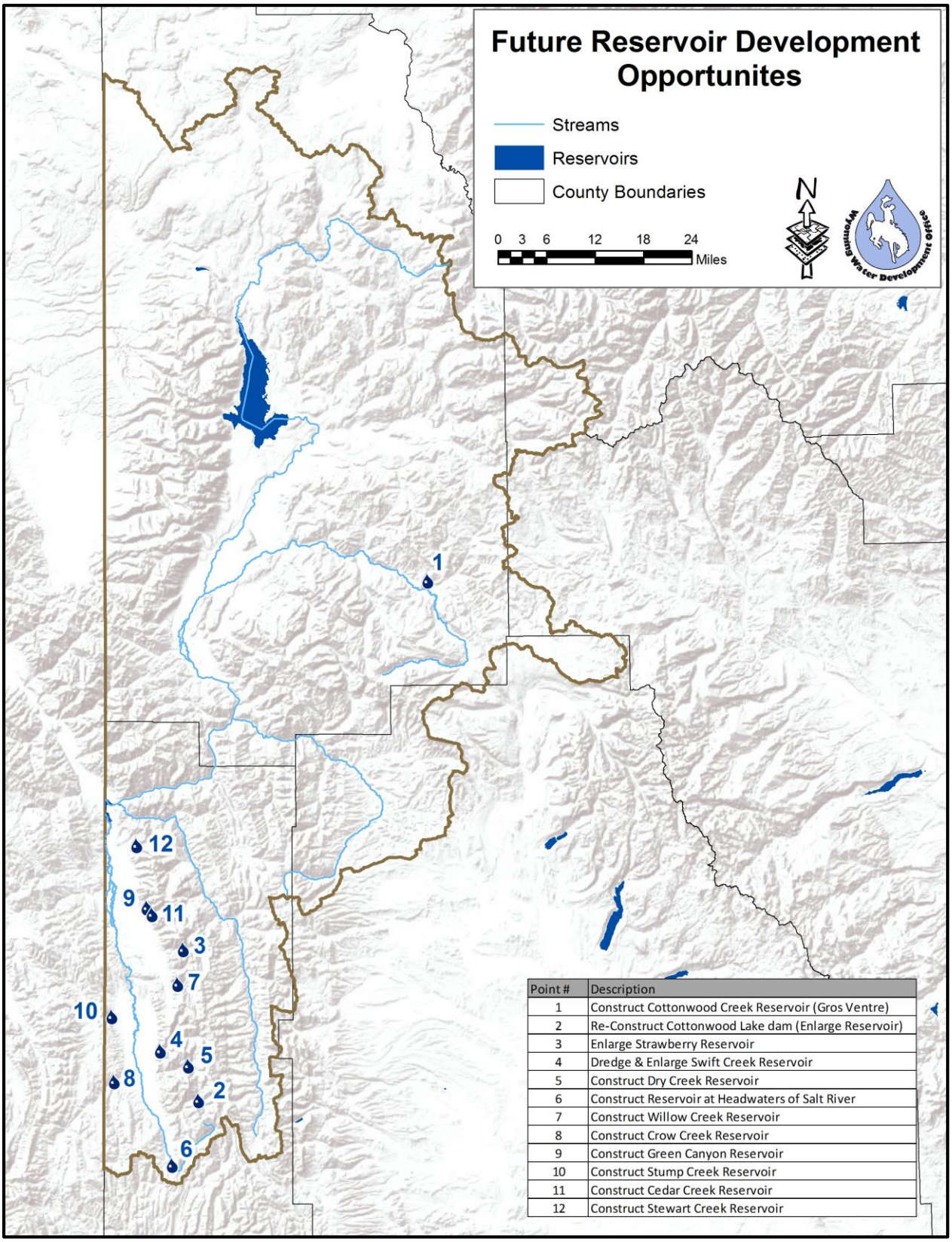

FIGURE 8-1: FUTURE RESERVOIR DEVELOPMENT OPPORTUNITIES

8.2.2 GROUNDWATER USE OPPORTUNITIES

The multiple aquifers in the Snake/Salt River Basin are generally favorable for future groundwater development and use opportunities in most areas of the basin. Currently used aquifers of the basin will continue to be available for additional development and use opportunities. The heavily used Cenozoic aquifers, including the unconsolidated alluvial deposits and Tertiary bedrock formations, have abundant groundwater available for future use.

Older bedrock formations in the Snake/Salt River Basin are generally situated in groundwater compartments formed by the geologic structures of the Overthrust Belt and on the flanks of Precambrian basement-cored uplifts. The use of the older (Paleozoic and Mesozoic aquifers) and deeper aquifers may require site-specific hydrogeologic investigations to help identify favorable well sites, depending on the desired use (municipal, industrial, etc.) for the basin's groundwater resources. Refer to *Technical Memorandum, Available Groundwater Determination – Tab XI [2013]*

8.3 WATER CONSERVATION AND EFFICIENCIES

In the Snake/Salt River Basin, agricultural, environmental, and recreational water uses depend on surface water while municipal, industrial, and domestic water uses depend on groundwater. Irrigated agriculture is the largest water use in the basin, and conservation within this water use sector could produce the greatest water savings. See discussions in Chapter 7 and refer to *Technical Memorandum, Water Conservation- Tab XV [2012]*.

Although there are several methods to conserve water in irrigated agriculture, the greatest savings can be realized by moving from flood irrigation to sprinkler irrigation. Sprinkler irrigation conserves water, improves efficiency and often increases productivity. Using irrigation water more efficiently may make more water available for instream environmental and recreational uses. However, there are also losses to the environment when changing from flood irrigation to sprinkler. Peak stream discharges may be greater, causing flooding and erosion, and reduction in soil and water table recharge from deep percolation may mean reduced return flows to streams in fall and winter.

The most effective tools for conservation in municipal water use are metering and tiered water rates, where rates increase with increased water use. All of the municipalities within the basin depend on groundwater and conservation is important to prevent overdrawing or mining aquifers.

There are no specific conservation methods for rural domestic water use. Rural domestic water use almost always depends on groundwater and the cost of pumping and aquifer draw-down are the controlling factors for this use. As pumping costs increase and water levels drop, water conservation becomes important if not mandatory.

REFERENCES

Sunrise Engineering, Inc. (2002, Nov. 7). Snake/Salt River Basin Plan. *Technical Memorandum Future Water Use Opportunities*. Retrieved from http://waterplan.state.wy.us/plan/snake/techmemos/futwater.pdf

Sunrise Engineering, Inc. (2003, June). *Snake/Salt River Basin Plan Final Report*. Retrieved from http://waterplan.state.wy.us/plan/snake/finalrept/finalrept.html

WWC Engineering, Inc. (2007, October). *Wyoming Framework Water Plan Volume I and Volume II Planning Recommendations*. Retrieved from http://waterplan.state.wy.us/frameworkplan.html