

Building Strong Collaborative Relationships for a Sustainable Water Resources Future:

STATE OF WYOMING

SUMMARY OF STATE WATER PLANNING

U.S. Army Corps of Engineers
Civil Works Directorate
441 G Street NW
Washington, DC 20314-1000

December 2009

The findings contained in this report are based on the information collected from the literature search and interviews for this initiative and should not be construed as an official Department of the Army position, policy or decision unless so designated by other official documentation.

STATE OF WYOMING



Figure 1. Wyoming's 7 Major River Basins

1. WYOMING WATER RESOURCES MANAGEMENT

The Wyoming State Water Plan was developed under the direction of the Wyoming Water Development Commission (WWDC) in conjunction with the State Engineer, Wyoming Game and Fish Department, and the University of Wyoming (UW). The WWDC is responsible for coordinating, developing, and planning Wyoming's water resources including land related resources and consists of 10 appointed commissioners. WWDC has authority over the Wyoming Water Development Program; the program is administered by the professional staff of the Wyoming Water Development Office.

Key Agency Contacts:

Wyoming Water Development Office

Mike K. Purcell, P.E., Director, mpurce@state.wy.us
Jon Wade, P.G., Deputy Director, Planning, jwade@state.wy.us
Philip R. Ogle Supervisor River Basing Planning, pogle@state.wy.us

Mailing Address/Phone:
Wyoming Water Development Office
6920 Yellowtail Road
Cheyenne, Wyoming
82002
Phone: (307) 777-7626
Website: <http://wwdc.state.wy.us/>

The Wyoming State Engineer's Office is responsible for administrating and regulating the water resources within the state.

Patrick T. Tyrrell, State Engineer, seoleg@seo.wyo.gov
 Sue Lowry, Administrator, slowry@seo.wyo.gov
 122 West 25th Street
 4th Floor East
 Cheyenne, WY 82002
 Phone: (307) 777-6150
 Fax: (307) 777-5451
 Website: <http://seo.state.wy.us/>

2. STATE/REGIONAL WATER PLANNING STATUS

The State of Wyoming has a comprehensive water planning process. Wyoming's constitution defines that *all natural waters within the boundaries of the state are declared to be the property of the state*. The premise for Wyoming's water laws includes the priority system, as adopted by the state constitution, "first in time, first in right." *Title 41 - Water* of Wyoming Statutes incorporates the primary water laws. Wyoming's planning is conducted within the context of this constitutional provision and Title 41. Additional constitutional considerations for water planning include:

- Reservoirs – added to the constitution in the early 1900's
- Groundwater sources – added to the constitution in 1940's & 1950's and amended in 1969
- Instream flow – added to the constitution in 1986

The Wyoming Water Development Program was established in 1975 to promote the optimal development of the state's human, industrial, mineral, agricultural, water and recreational resources. The program provides, through the WWDC, procedures and policies for the planning, selection, financing, construction, acquisition, and operation of projects. This can include projects for the conservation, storage, distribution and use of water, necessary in the public interest to develop and preserve Wyoming's water and related land resources. The Wyoming Water Development Office has two major divisions: 1) Planning and 2) Construction. The Planning Division consists of three sections: Project Planning, River Basin Planning, and Dam & Reservoir Planning.

The WWDC was established in 1979 and is currently composed of 10 members appointed by the governor to represent the four state water divisions (western, north central, northeaster and south eastern areas of the state) The WWDC has 4 major program sections: (1) Planning – including basin and project planning; 2) Construction; 3) Dam and Reservoir; and 4) Administration) and the Wind River Reservation. The Wyoming Legislature has established three accounts to fund the Water Development Program. These accounts receive funding from mineral tax distributions to assist with their program/planning process and implementation.

- Water Development Account I is utilized for new development projects.

- Water Development Account II is used to fund the rehabilitation of water projects that have been in existence for 15 years or longer.
- Water Development Account III is used to fund dam and reservoir planning and construction projects. <http://wwdc.state.wy.us/>

The State of Wyoming has been involved in water planning for many decades. In the late 1960's the state embarked on a statewide comprehensive water planning process. This effort culminated in publication of the Wyoming Framework Water Plan in 1973. The Framework Water Plan consisted of an overall statewide framework plan, as well as plans for each of the state's seven major river basins.

In 1979, the Legislature created the WWDC, charging it with responsibility for coordinating water and related land resources planning for the state. Between 1979 and 1995, the WWDC completed several major river basin planning studies, including studies of the Big Horn and Powder River Basins. Planning by the WWDC was mostly project-driven in response to applications from local project sponsors.

In the 1990's, the Colorado River Basin Coordinating Council (CRBCC), located in the Green River Basin, became concerned that Wyoming's Colorado River Compact allocation which has not yet been put to full beneficial use was perhaps vulnerable to growing water demands of Arizona, Nevada, and California. At the request of CRBCC, the 1996 Legislature directed the WWDC, in coordination with the State Engineer's Office (SEO), to prepare recommendations for updating the 1973 Framework Water Plan. The two agencies submitted a joint recommendation to the Governor, the Water Development Commission, and the Legislature Select Water Committee on October 1, 1996. A State Water Planning Process Feasibility Report was completed in October of 1998. This report outlined the basic planning process for river basin planning in Wyoming, which is the foundation for how Wyoming does planning today with some variations.

The First Round of Basin Plans

After successful completion of the above tasks and feasibility study, the Legislature in 1999 authorized funding for the initiation of the Statewide Water Planning Process. This began with completion of River Basin Plans that summarized the following information.

- Basin Water Use Profile
- Surface and Groundwater Determination
- Demand Projections
- Future Water Use Opportunities
- Final Report

The Green and Bear River Basin Plans were authorized in 1999. The Northeast and Powder/Tongue basins were authorized in 2000. The Wind/Bighorn and Snake/Salt Basins were authorized in 2001. The Platte was authorized in 2003. All of the Basin Plans had the same scope of services, with the exception of the Platte River Basin. Large amounts data were collected and

a model was developed as a part of the North Platte River lawsuit, as a result there was no need to develop a spreadsheet model as a part of the plan in the Platte River Basin.

With the completion of the seven basin plans Wyoming then turned its attention to updating the 1973 Framework Plan. Using the information developed in the basin plans, the new Framework Water Plan was completed late in October 2007. The 2007 Framework Water Plan consists of:

- Executive Summary
- Volume I – which summarizes information that was collected and presented in the development of seven individual river basin plans. These basin plans were prepared by the WWDC and its consultants between 2001 and 2006.
- Volume II – which contains planning recommendations

The executive summary of the individual River Basin Plans is included in Volume II of the report. Please see http://waterplan.state.wy.us/plan/statewide/Volume_II.pdf for additional detail.

The 2007 Framework Water Plan is designed to provide decision-making information for a 30-year planning horizon and it is intended to meet the following major purposes:

1. Provide a statewide perspective of the status of Wyoming's water resources.
2. Define improvements to the states planning efforts that can be used as the seven basin plans are updated.
3. Identify water development opportunities to promote interest from potential project sponsors.

For future plans, the 2007 Framework Water Plan recommends discussing climate variability and drought. Drought management in the 2007 Framework Water Plan addresses individual, municipal, and industrial water users.

3. WATER MANAGEMENT VISION AND GOALS

Wyoming Water Development Program Mission Statement:

The purpose and the mission of the WWDP are stated below:

The Wyoming water development program is established to foster, promote and encourage the optimal development of the state's human, industrial, mineral, agricultural, water and recreational resources. The program shall provide, through the commission, procedures and policies for the planning, selection, financing, construction, acquisition and operation of projects and facilities for the conservation, storage, distribution and use of water, necessary in the public interest to develop and preserve Wyoming's water and related land resources. The program shall encourage development of water facilities for irrigation, for reduction of flood damage, for abatement of pollution, for preservation and development of fish and wildlife resources [and] for protection and improvement of public lands and shall help make available the waters of this state for all beneficial uses, including but not limited to

municipal, domestic, agricultural, industrial, instream flows, hydroelectric power and recreational purposes, conservation of land resources and protection of the health, safety and general welfare of the people of the state of Wyoming." (See <http://wwdc.state.wy.us/legreport/legreports.html>)

Water Development Commission Planning Goals

Basinwide Plans – *These plans should be generated for each of the state’s major drainage basins. The plans’ purpose is, in part, to quantify existing uses and to project future needs. The plans should also serve to identify and prioritize water development opportunities. The plans shall document the State’s plan to utilize its compact and decree allocations.*

Project Planning – *The program should assist Wyoming municipalities, irrigation districts, and other public entities’ efforts to plan for the future. This assistance will typically come through the development of reconnaissance and feasibility-level studies, which serve to identify water supply requirements and prioritize water system improvements.*

Federal Funding – *Presently, there are federal programs which provide funding assistance for some types of water development projects. However, in order to access these funds, costly feasibility/environmental studies are often needed. The WWDC shall consider participating in these studies if a proposed project alleviates a water development, management, or rehabilitation problem, or allows the continued beneficial use of water. The amount of the WWDC’s financial participation shall be based on the proponent’s ability to pay.*

Research – *The program should continue its participation in research projects which serve to clarify economic, environmental, water development, and management issues.*

Coordination – *The WWDC should strive to keep informed on proposed state and federal rules and regulations that may affect water use, development, and management.*

(See http://waterplan.state.wy.us/plan/statewide/Volume_I.pdf)

The Plan includes goals of the WWDC although they goals are not separated out for long- and short-term goals. The plan makes projections 30 years out from 2007 and includes recommendations in Volume II. The seven basin plans are supplemental to the Framework Plan.

Wyoming Framework Water Plan Objectives

The Wyoming Framework Water Plan has two objectives:

1. Provide basic data and information regarding Wyoming’s water resources. Volume I is an inventory of the state’s water resources and related lands, a summary of the state’s present water uses, a projection of future water needs, and an identification of alternative decisions to meet the indicated future water needs. The majority of this information was gathered from the seven basin planning process.

2. Provide future water resource planning direction to the State of Wyoming – addressed in Volume II. Volume II is compilation of issues, ideas, opinions, observations, and results from:
 - Water users collected from the Basin Advisory Groups
 - A three-tiered planning survey involving an email survey, water managers, and an agency leaders meeting
 - Results of a planning survey from other western states
 - Basin plan consultants during the assembly of Volume I
 - State agency staff (page 1-1, Volume II)

Miscellaneous Goals of the Plan

- *Attract project sponsors who may be willing to develop a partnership with the Program to pursue a storage project (page 4-1, Volume II).*
- *Maintaining the ability to develop future water supplies and still meet ESA obligations is an important goal of Wyoming's participation in these programs (page 4-7, Volume II).*

Goals of the Basin Planning Process

- *Provide accurate, contemporary water information to enable state and local decision makers to manage water resources efficiently.*
- *Maintain an inventory of water data for use by various state agencies.*
- *Assist the Legislature and the Governor in developing effective state water policies to protect Wyoming's water and promote responsible development.*
- *Give Wyoming citizens access to the water information they need to deal with water issues at the grassroots level.*
- *Project future water demands so the state can prepare for the effects of growth.*
- *Bring Wyoming's water planning program up to par with other Western states.*
- *Provide the state with information to assist in responding to the mandates of federal legislation and regulation.*
- *Protect Wyoming's water resources from downstream competitors (page 1 – Snake/Salt River Basin Water Plan, Executive Summary, Volume II)*

State Engineer's Office and Board of Control Mission

The mission of the Wyoming State Engineer's Office and Board of Control is to provide for the general supervision and protection of both inter- and intra-state waters of this state. This includes the appropriation, distribution and application to beneficial use of water as provided under the prior appropriation doctrine, and to maintain the flexibility within that framework to meet the changing needs of the citizens of Wyoming. The State Engineer's Office collects, analyzes, maintains and provides water related information for ensuring the appropriate management and regulation of Wyoming's water resources.

<http://seo.state.wy.us/index.aspx>

4. SCOPE OF WATER RESOURCES PLANNING

The Wyoming Framework Water Plan summarizes a statewide perspective on water resources. The Plan is set up to include the following topics:

- Web-based Presentation Tools
- Setting: Physical, Socioeconomic, Legal & Institutional
- Resources: Total Surface Water and Groundwater Supply, including where resources are located and their quality
- Water Use: Agriculture; Municipal/Domestic; Industrial; Recreational; Environmental
- Projections: Population; Agriculture; Municipal/Domestic; Industrial; Recreational; Environmental
- Availability: Surface water, Groundwater, and Conservation
- Opportunities: Summarizes information regarding opportunities for meeting the projected water needs of the basins. These opportunities may provide a starting point for existing and future water users seeking to address water supply deficits.
- Project Funding: outlines opportunities for project proponents to obtain state and federal funding assistance.
- Recommendations: Future Plan Structure and Content; Agency Planning; Future River Basin Planning

Trends Impacting Wyoming's Water Resources

The key economic and water use sectors in Wyoming include: agriculture; municipal and domestic; industrial; recreation, travel, and tourism; and environmental. The Plan uses high scenario, mid scenario, and low scenario for 30-year growth projections.

Municipal and Domestic

Municipal water use is defined as water provided by a public water supply system. Domestic water use is defined as water provided by individual wells or small water systems. Wyoming is the least populated state in the nation with roughly 45 percent of the population living in the Platte River Basin. The actual and projected population of Wyoming is shown in Table 1.

The current municipal and domestic water use in Wyoming is approximately 53,600 acre-feet per year for groundwater and 48,600 acre-feet per year for surface water (Table 2). Table 2 shows the projected water use for municipal and domestic water use projected out 30 years.

Table 1. Actual and Projected Populations

River Basin	Population ¹	30-Year Projections		
		High Scenario	Mid Scenario	Low Scenario
	number of people			
Bear	14,550	29,400	21,500	15,100
Green	54,760	91,400	75,000	62,500
Northeast	45,600	75,900	60,700	55,600
Platte	227,330	402,000	343,000	322,000
Powder/Tongue	38,420	52,400	49,100	45,000
Snake/Salt	27,480	75,100	46,700	29,300
Wind/Bighorn	86,050	114,400	94,600	90,400
Total	494,190	840,600	690,600	619,900

¹ Individual basin numbers do not total to 493,782, the 2000 census population, due to differences experienced in disaggregation and assignment of census block data to the river basin areas.

Source: Wyoming Department of Administration and Information, Economic Analysis Division. Profile of General Housing Characteristics by County and Place, 2000. Census Tracts from 2000 Census of Population and Housing, Census 2000, U.S. Census Bureau.

Table 2. Current Municipal and Domestic Water Depletions

River Basin	Depletions		
	Surface Water	Groundwater	Total
	ac-ft per year		
Bear River	2,300	1,000	3,300
Green River ¹	21,800	2,800	24,600
Northeast Wyoming	0	10,100	10,100
Platte River ²	6,700	17,800	24,500
Powder/Tongue River	7,200	2,500	9,700
Snake/Salt River	0	9,100	9,100
Wind/Bighorn River	10,600	10,300	20,900
Total	48,600	53,600	102,200

¹ Municipal depletions in the Green River Basin include 14,400 ac-ft that is diverted into the Platte River Basin for Cheyenne.

² Platte River Basin municipal use had large amounts of conjunctive use that were not separated into surface water and groundwater. The conjunctive use was split into surface water and groundwater based on information found in the tech memos.

Agriculture

Approximately 14 percent of Wyoming's economy is farm related. Agriculture is the largest consumer of water with 79 percent of all of the crops in the state being used for livestock feed and forage such as alfalfa, hay, and pasture. The current consumptive irrigation use is estimated at 2.5 million acre-feet per year (Table 3). The actual water consumed by livestock is 0.1 percent of the water used to grow feed. The technology of flood irrigating is still very popular despite the proven studies that switching from flood irrigation to sprinkler increases crop yield. Flood irrigation has improved some with gated pipe and surge valves. (page 7-16, 17, Volume I)

Table 3. Estimated Average Annual Irrigation Water Supply-Limited Consumptive Use

River Basin	1973 Total CU	Current Total CU	Active Irrigated Lands	Unit CU	Total CU		
	ac-ft	ac-ft	acres		Wet	Normal	Dry
					ac-ft		
Bear ²	65,000	94,000	64,000	1.47			
Green	243,000	401,000	331,000	1.21	432,000	401,000	375,000
Northeast	160,000	86,000	77,000	1.12	88,000	86,000	76,000
Platte ²	686,000	550,000	612,000	0.90	527,000	566,000	515,000
Powder/Tongue	See Note 1	184,000	161,000	1.14	194,000	184,000	178,000
Snake/Salt	84,000	102,000	99,000	1.03	105,000	102,000	94,000
Wind/Bighorn ^{2,3}	1,041,000	1,039,000	600,000	1.73			
Total	2,279,000	2,456,000	1,944,000	1.23⁴			

¹ In 1973 Framework Plan, Powder/Tongue Basin is included in Northeast Wyoming Basin. Also, the 1973 Wind/Bighorn Basin included the Little Bighorn subbasin, but the Little Bighorn is in the 2002 Powder/Tongue Basin.

² Bear, Platte, and Wind/Bighorn values are overall averages, Bear and Wind/Bighorn Basin Plans did not provide normal, dry, and wet year scenarios for consumptive use estimates. Current total CU for other basins taken from "normal" year averages.

³ Wind/Bighorn River Basin Plan provided full-supply consumptive irrigation requirement but not supply-limited consumptive use. Table value was estimated by multiplying historical diversions by overall efficiency and does not include Tribal Futures projects or Popo Agie basin.

⁴Average unit CU.

Industrial

Industry makes up 28 percent of the state's employment, but 41 percent of the payroll. Industry includes:

- Electrical power production (coal & natural gas)
- Mining (coal, uranium, trona, miscellaneous)
- Conventional oil and gas production
- Coalbed methane & natural gas production
- Coal conversion facilities
- Soda ash production
- Miscellaneous industry: hydropower/wind plants, sugar refineries, chemical plants, fertilizer plants, new industry

Table 4 includes the current industrial water use and Table 5 shows the projected water use. For some of the listed industry, water use was not available and best estimates were utilized. Projections were made assuming current practices such as air cooling water from power plants as opposed to wet cooling using water. The general trend for the low- and mid-scenario, 30-year projections show a decrease in industry water use in the Northeast and Powder/Tongue River Basins. This may be attributed to the forecasted reduction in coalbed methane production and conventional oil and gas production.

Table 4. Current Annual Industrial Water Uses

River Basin	Coal-Fired Electric Power	Conventional Oil and Gas	Mining and Mine Reclamation ¹	Trona Mining/ Soda Ash	Coal Bed Methane ⁴	Manufacturing	Misc ²	Aggregate, Cement, Concrete ²	Road and Bridge Construction ²	TOTAL
Surface Water Use (ac-ft)										
Bear	0	300	0	0	0					300
Green	47,800			17,900		560				66,260
Northeast	0			0						
Platte	31,900	2,700	450	0			4,600	580	2,000	42,230
Powder/Tongue	0			0						
Snake/Salt	0		0	0	0					
Wind/Bighorn	0			0	0	15,700				15,700
Total Surface Water	79,700	3,000	450	17,900	0	16,260	4,600	580	2,000	124,490
Groundwater Use (ac-ft)										
Bear	0	90		0	0					90
Green	0	1,600		0	0					1,600
Northeast	1,200	10,400	2,700	0	35,600					49,900
Platte	0	17,600	17,500	0	0		9,300	11,200	0	55,600
Powder/Tongue	0	38,000		0	24,300					62,300
Snake/Salt	0	0	0	0	0	140				140
Wind/Bighorn ³	0	73,800	2,700	0	0	0				76,500
Total Groundwater	1,200	141,490	22,900	0	59,900	140	9,300	11,200		246,130

¹ Green River Basin coal mining water use is included in power generation.
² Estimates for these sectors were made only for the Platte River Basin.
³ Wind/Bighorn Basin conventional oil and gas use is water righted use.
⁴ CBM is water extracted during the gas production phase.
 Note: Blank spaces for water use in a particular basin indicate no estimate was made, not that there was no use.

Table 5. Projected Annual Total Consumptive Water Demands

River Basin	Type of Use											
	Agriculture			Municipal & Domestic			Industrial			Recreational		
	30 Year Projections			30 Year Projections			30 Year Projections			30 Year Projections		
	High Scenario	Mid Scenario	Low Scenario	High Scenario	Mid Scenario	Low Scenario	High Scenario	Mid Scenario	Low Scenario	High Scenario	Mid Scenario	Low Scenario
	ac-ft			ac-ft			ac-ft			ac-ft		
Bear ¹	100,000	94,500	88,900	6,200	4,500	4,700	500	0	0			
Green	438,000	423,000	408,000	13,700	11,500	9,700	166,300	106,400	78,000			
Northeast	75,700	72,800	69,500	15,900	12,700	11,600	17,300	9,100	3,700			
Platte	700,000	661,000	650,000	44,600	37,800	35,400	115,800	92,500	75,300	6,300	5,000	4,400
Powder/Tongue	205,000	194,400	183,800	13,300	12,400	11,400	35,000	17,000	0			
Snake/Salt	128,100	107,100	94,900	18,600	11,500	7,200	50	48	24	1,600	1,300	950
Wind/Bighorn ²	1,576,400	1,305,700	1,165,500	26,500	21,900	21,000	115,000	106,000	92,000			
Total	3,223,200	2,858,500	2,660,600	138,800	112,400	101,000	449,900	331,000	249,000	7,900	6,300	5,400

¹ In the Bear River Basin study, a Mid Scenario was not completed for agriculture. In this table the Mid Scenario is estimated based on the current uses.
² Wind/Bighorn River Basin Industrial use and projections are based on water rights rather than actual consumption. This tends to over state oil and gas industry use as well as other uses.

Recreation, Travel, and Tourism

Recreation, travel, and tourism are significant to Wyoming’s economy with hunters and anglers alone spending over \$7 million in 2000. Recreation including boating, fishing, swimming, and water fowl hunting is considered nonconsumptive water use; however, water quantity and quality are important. Other recreation, travel, and tourism activities consuming water include golfing and skiing (snowmaking). These uses, from a water consumption perspective, are considered to be minimal.

Environmental

Environmental uses are considered a nonconsumptive use and include: instream flow/reservoir bypass; reservoir levels; and wetland/wildlife maintenance. The future environmental water requirements will be partially determined by human desire through existing and new legislation both on the federal and state level. Many of the environmental concerns have a direct correlation with recreation and the state’s economy such as instream flow directly benefits fisheries and anglers.

Water Availability

For surface water assuming dry hydrologic condition, the Bear River Basin, Northeast Wyoming River Basin, and the Platte River Basin has little if any legally available surface water as shown in Table 6. Reports of groundwater level declines and conflicts are concentrated in the Platte and Powder River Basins, although Wind/Bighorn Basin, groundwater levels have dropped in the Riverton and Hyattville areas as a result of municipal and irrigation withdrawals, respectively. No significant areas of groundwater decline were reported for the Bear, Snake/Salt, or Green River Basins Plans.

Table 6. Average Annual Streamflow and Uses - Mid-Level Development - Dry Condition

Basin	State Line Outflow - Natural Conditions ¹	Future Depletions of Streamflow to Wyoming					Depleted Streamflow Leaving Wyoming ³	Wyoming's Remaining Share Under Compact
		Irrigation ²	Municipal, Domestic, & Stock ²	Industrial ²	Reservoir Evaporation ²	Total ²		
ac-ft								
GREAT BASIN								
Bear River	235,200	94,500	3,400	0	5,300	103,200	132,000	0
COLORADO RIVER								
Green River ⁴	1,614,500	423,000	30,800	106,400	121,300	681,500	933,000	150,200
MISSOURI RIVER								
Northeast Wyoming ⁵	145,300	72,800	0	0	23,500	96,300	49,000	2,500
Platte River ⁵	1,110,800	484,600	27,100	61,300	213,800	786,800	324,000	0
Powder/Tongue River	733,300	194,000	15,000	17,000	11,300	237,300	496,000	248,100
Wind/Bighorn River	3,686,100	1,305,700	18,000	38,700	138,700	1,501,100	2,185,000	1,648,000
Yellowstone River ⁷	2,374,000						2,374,000	0
COLUMBIA RIVER								
Snake/Salt River ⁸	2,164,300	107,100	0	0	72,200	179,300	1,985,000	90,000
Total	12,063,500	2,681,700	94,300	223,400	586,100	3,585,500	8,478,000	2,138,800

¹ Estimates are based on outflow plus depletions from the current river basin plans.

² Depletion estimates are from the current river basin plans.

³ Depleted flows are based on outflow estimates from the current river basin plans.

⁴ Depletions for municipal, domestic, and stock include 22,700 acre-feet per year diverted to the N. Platte for City of Cheyenne use.

⁵ Excludes the flows for the Little Missouri and Niobrara Rivers.

⁶ The Platte River system is fully appropriated in that a water supply that is based on a water right with a current day priority cannot be expected to provide a reliable supply due to water rights administration. Estimates exclude the flows and depletions from the Horse Creek and South Platte drainages.

⁷ Drainage area is within Yellowstone National Park and includes estimates for the Madison, Gibbon, Firehole, and Gallatin Rivers.

⁸ Excludes the flows for the Henrys Fork and Teton Rivers.

Conservation

Aside from seasonal shortages, Wyoming residents have adequate water to serve their needs at this time. The Plan acknowledges that a benefit or incentive to the user must be in place for conservation methods to be successful as noted by the statement:

Under the prior appropriation doctrine, water left in the stream is available to other users, and there is presently no mechanism whereby a diverter can capitalize on investment in conserving measures where the saving remains in the stream for use by other interests.

Water Use Opportunities

The Plan lists water use opportunities available to each basin. The list is intended for potential project sponsors and other organizations that need to develop a water supply to satisfy their specific needs.

River Basin Plans

The regional components of the Framework Water Plan consist of seven river basin plans all completed from 2001 – 2006. The Framework Plan – Volume I includes much of the data and information that was gathered during the planning process for the basin plans. *Guidelines for Development of Basin Plans* was developed by the WWDC in 2001. A Basin Advisory Group (BAG), for each basin was established prior to the corresponding River Basin Plan. Each BAG, consisting of individuals selected by the public to represent agriculture, local government, industry, environmental, and recreational interests, developed a report that was submitted to the planning team with water management concerns and comments. For each basin plan, engineering firms were contracted and tasked with the following:

- Basin Water Use Profile
- Surface and Groundwater Determination
- Demand Projections
- Future Water Use Opportunities
- Final Report

Other Considerations

Wyoming's statewide water planning process addresses drought and how water users should plan for drought. The State Drought Plan was revised in 2003. Flooding, fires, earthquakes, security, and emergency information can be found under Wyoming's Office of Homeland Security. As the planning process continues Wyoming intends to evaluate extended drought and changes in water availability. <http://wyohomelandsecurity.state.wy.us/library.aspx>

Funding

Many funding opportunities exist on a statewide level through WWDC and include: 1) new development, 2) rehabilitation, and 3) dams and reservoir development. Other funding exists on a state level through the Wyoming Department of Environmental Quality – water quality projects; State Lands and Investment Board – project development and rehabilitation; and the Wyoming Game and Fish Department – preservation/restoration of wildlife habitat. A Wildlife and Natural Resource Trust Account has been established to enhance Wyoming's wildlife and natural resource heritage.

On a federal level, funding is available through the U.S. Department of Agriculture Rural Development Program for rural water projects and the Natural Resources Conservation Services for wildlife/wetland/watershed projects.

Finally, the Wyoming Plan identified several overarching themes from their own planning process and information gathered from surveying other state planning efforts. The following summary is from the Volume II Framework Plan.

As expected, states all have their unique philosophies and approaches to water planning. Also, some states appear to be more active and effective than others. Based on the examination of planning ideas and methods from the seven other western states, the consulting team formulated several water planning principles for the Wyoming Water Planning program. Many of these principles are already being followed, and therefore, this listing is not a critique of Wyoming's existing process.

1. Complete Projects. *Continue following through on development projects and planning goals.*

Maintain a clear process that allows projects and planning initiatives to be proposed, evaluated, and completed.

2. Set Goals and Objectives. *The planning process should establish goals and objectives to guide water-related decisions. Goals should be lofty and yet achievable. For example, one statewide planning goal might be to ensure that the water legally allocated to Wyoming under interstate compacts and court decrees is not usurped by downstream states that develop uses for this water before Wyoming does. An objective would be to perform incremental steps to achieve these goals. Objectives might be to first quantify these allocations (this requires data on quantity, quality, and use of water resources), then prepare specific plans to develop the water and obtain the necessary permits and designs, even if the actual projects are not constructed until some unknown future date. This would put downstream states on notice that this water is not available for their use just because Wyoming's needs are not immediate.*

3. Pursue a Broad Approach. *Pursue a broad approach to water resource planning that includes evaluating the appropriateness of conservation and resource management techniques in addition to project development.*

4. Create Local Results. *Focus on solving problems and addressing issues that are important to the local residents, which may include referring an issue to another state agency. Place value on citizens seeing local results of water resource planning.*

5. Maintain a Long-term Perspective. *Involving local committees in solving their immediate problems through construction of water supply projects can provide tangible short-term results. However, a comprehensive long-term vision is needed to assure that Wyoming's water resources are being developed and used wisely in the best interests of the residents of the state.*

6. *Remain Flexible. Water planning must be flexible in order to accommodate changing priorities to meet new and unanticipated needs and opportunities while keeping the long-term goals in view.*

7. *Pursue Meaningful Planning. Avoid preparing basin plans for the sake of planning. Update these plans as needed but do not become a slave to a standard cycle of updates when they may not be needed. Instead, include the study and planning of issues that transcend basin boundaries to ensure all important topics are covered.*

8. *Evolve the Planning Process Rather Than Simply Repeating It. Move past the first stage of planning in which data are collected and issues are identified. A deeper level of understanding issues comes from preparing to implement plans. Develop strategic plans to follow through on the results of planning, which may require more detailed information.*

9. *Coordinate the Players. Coordination and communication among program personnel are critical and some type of structure is needed for this to occur. Convene on a regular basis the decision-makers of all agencies that are involved in water resources.*

10. *Involve the Local Citizens in Meaningful Ways. Establish balanced and representative local groups to provide input into water resource planning. Helping these local groups craft and recommend solutions to local issues sustains local participation. When the solutions and implementation strategies come from the local level, a message is sent to the legislature that the water planning program is solving problems and addressing issues.*

11. *Establish a Report Card. A method of measuring progress on achieving long-term goals should be prepared as part of the water planning program. It should focus on two things: the amount of positive influence that was brought to bear on issues and problems, and the level of knowledge and understanding of water issues among the legislature and general public.*

5. PARTNERSHIPS, STAKEHOLDER, AND PUBLIC INVOLVEMENT

Wyoming's planning process has considered not only including stakeholders and the public in their planning process but *how* to most effectively include them in the process. The state's efforts to meet this challenge began during their feasibility study for the framework plan update and included the following two initiatives:

Phase I - Wyoming Statewide Public Opinion Survey

Funding for the planning teams amended feasibility study was approved by the 1997 legislature. The planning team's initial focus was to implement a public involvement program to gauge public opinion on water issues, and to build statewide consensus and support for the water planning process. A mailing list of interested citizens was developed from membership in water or other natural resource organizations, natural resource conference attendee lists, and responses to general solicitations of interest through the planning team's quarterly newsletters. A Water Planning Questionnaire was developed to identify and prioritize water-related issues from a

personal perspective as well as a state perspective, and indicate their degree of support for a comprehensive statewide water plan.

Phase I -Pilot Basin Citizen Advisory Group

During the summer of 1997, the planning team implemented the public involvement portion of the proposed basin planning program. It was localized to demonstrate how "grassroots" input could be incorporated into the water planning process. The Bear River Basin was selected as the pilot basin, and a public meeting was held in Evanston, Wyoming, on January 27, 1998. The planning team selected a Basin Advisory Group (BAG) of 15 people representing agriculture, local government, industry, environmental, and recreational interests. The group met monthly for the next six months with two goals in mind: 1) to identify specific water and water-related management issues in the Bear River Basin, and 2) to create a template for the organization and operation of basin advisory groups in other areas. The BAG submitted a report to the planning team, containing an inventory of Bear River management concerns and comments on the public involvement process.

Based on the success of this preliminary work Wyoming formed BAGs in each of the remaining river basins and established the following mission and purpose:

Basin Advisory Groups Mission and Purpose

Basin Advisory Groups assist the WWDO and the state planning team by identifying water related issues, problems, and concerns in the individual river basins.

Through public participation, the group advises the WWDO and planning team on local issue priorities, data needs, and regional concerns. The Basin Advisory Groups also assist decision makers through the review of basin planning products.

In addition to the BAGs several federal, state, and local agencies/institutions are involved with water resources planning in Wyoming. The following URL contains a list of state and federal contacts involved in water planning: <http://waterplan.state.wy.us/BAG/general/plancoord.html>.

Table 7 lists the various entities involved with Wyoming water resources.

Table 7. Agencies and Groups involved in Water Resource Planning

Agency	Responsibility	URL
Wyoming Water Development Program	Project Planning, River Basin Planning, Dam & Reservoir Planning	http://wwdc.state.wy.us/planning_program/planning_program.html
Wyoming Water Development Office	State Plan, GIS Mapping	http://waterplan.state.wy.us/gis/gis.html
State Engineer's Office	Surface Water, Groundwater, Water Rights	http://seo.state.wy.us/wrdb/index.aspx
Wyoming Water Quality Division	Water Quality	http://deq.state.wy.us/wqd/
Wyoming Game and Fish Department	Preservation of Wildlife Habitat	http://gf.state.wy.us/
Water Resources Data System – Operated by University of WY with WWDC Funding	Clearinghouse of Hydrological and Climatological Data	http://library.wrds.uwyo.edu/
Wyoming Geographic Information Science Center	GIS data	http://www.sdvc.uwyo.edu/clearinghouse/
US Geological Survey	Monitors Streamflow, Groundwater, Water Quality. Operates the Wyoming Water Science Center	http://wy.water.usgs.gov/
US Bureau of Reclamation	Operates 13 Hydroelectric Plants. Monitoring stations	http://www.usbr.gov/gp/wyao/ http://www.usbr.gov/gp/hydromet/
Basin Advisory Groups	Identifies Water Related Issues/Problems/Concerns in Individual River Basins. Reviews Basin Planning Products	http://waterplan.state.wy.us/BAG/BAG.html

As stated previously, Volume II of the Plan offers planning and management direction as a culmination of issues, ideas, observations, and results from meetings and surveys from the public, interest groups, agency staff, consultants, etc.

6. PLAN IMPLEMENTATION STRATEGY

Wyoming's statewide and basin plans quantify current water resources use and project future needs. Several state and federal funding sources in the form of grants and loans exist to assist water users in achieving their goals. In Volume II, a *Recommendation for Future Plan Structure and Content* is to include strategies for how to achieve the goals arrived at during the planning process.

The WWDC provides funding for a variety of water projects based on following prioritized categories:

- Multipurpose programs
- Water storage projects
- New water supply projects
- New supply (conveyance) system projects
- Hydropower projects
- Purchase of existing storage projects
- Watershed improvement projects
- Recreation projects
- Drinking Water State Revolving Fund projects. (Section 9, Volume I)

The Wyoming Game and Fish Department administers a trust fund to preserve and restore wildlife habitat and open spaces. The income from the trust fund is used to supply grants to nonprofit and government groups for specific projects. Information regarding the fund is available at <http://gf.state.wy.us>. (Section 9, Volume I)

The Wyoming Framework Plan, Volume II also provided the following general summary of issues and recommendations:

Northeast River Basins

- *Promote proper land management and use to protect and preserve water quality.*
- *Encourage careful control and management of coal bed natural gas (CBNG) discharge water to reduce the impacts to land and water.*
- *Evaluate and describe groundwater resources of the northeast basins.*
- *Evaluate ways for municipalities to meet their future water demands.*

Bear River Basin

- *Continue participation in Bear River Regional Water Quality Task Force to protect Wyoming's Water Resources.*
- *Assist in planning for future growth to properly manage and allocate Wyoming's water resources.*
- *Continue to work on ways to meet agricultural water needs.*
- *Evaluate ways to meet the increasing municipal and domestic water demands.*
- *Evaluate and describe groundwater resources of the Bear River Basin.*

Green River Basin

- *Identify and pursue water storage opportunities to improve the reliability of the irrigation water supply on the tributaries of the Upper Green River Basin.*
- *Obtain accurate data on the water supply and use in the Green River Basin*
- *Continue to reduce salt loading to the Green River and its tributaries*
- *Assist in planning for future growth to properly manage and allocate Wyoming's water resources.*

- *Plan for future industrial and municipal water needs within the basin.*
- *Evaluate and describe the groundwater resources of the Green River Basin.*

Powder/Tongue River Basins

- *Evaluate and describe groundwater resources of the Powder/ Tongue River Basins.*
- *Identify and protect groundwater recharge areas to preserve existing groundwater quality.*
- *Improve groundwater quality data collection to monitor impacts.*
- *Encourage careful control of CBNG discharge water to reduce the impacts to land and water resources.*
- *Maintain and improve existing water supply infrastructure to allow local water systems to meet the demands of population growth.*
- *Help municipalities to develop appropriate water supplies to meet existing and future demands.*
- *Promote proper land management and use to protect water quality.*

Snake/Salt River Basins

- *Maintain and improve existing water supply infrastructure to allow local water systems to meet the demands of population growth.*
- *Project future water needs to ensure sufficient water is available to meet the anticipated demands.*
- *Promote Regional water systems.*
- *Evaluate and describe groundwater resources of the basins.*
- *Monitor groundwater quality to ensure that there is no degradation.*
- *Promote proper land management and use to protect water quality.*
- *Work to promote water conservation within the basins.*
- *Continue to support Irrigated Agriculture in the Snake /Salt Basin*

Wind/Bighorn River Basins

- *Project future agricultural and municipal water system needs and compare to current and future water availability.*
- *Evaluate and describe groundwater resources of the basins.*
- *Study current groundwater supplies to determine safe yield and prevent groundwater mining.*
- *Maintain existing agricultural and municipal water supply infrastructure.*
- *Evaluate the potential for conservation in agricultural and municipal water uses.*

Platte River Basin

- *Identify water supplies to meet future needs within the basin.*
- *Manage the water resources of the Platte River Basin to maximize Wyoming's use of its share of the river.*
- *Evaluate and describe groundwater resources of the basin.*
- *Manage groundwater usage to prevent aquifer mining.*
- *Support non-tributary groundwater development in the basin.*

- *Promote proper land management and use to protect water quality.*
- *Promote Regional Water Systems.*
- *Increase water storage capacity in the basin with the completion of the Pathfinder Modification Project.*

State Wide Recommendations

- *Quantify municipal and agricultural water infrastructure deferred maintenance needs.*
- *Consider long-term climate variability in river basin planning.*
- *Use watershed planning as a tool in water resource planning and project development.*
- *Assist with rehabilitation and improvement of municipal and agricultural water supply infrastructure.*
- *Support regionalization of municipal and domestic water supplies to best manage water resources and protect water supplies.*
- *Continue the river basin planning process to assist in development, protection and conservation of Wyoming's water resources.*
- *Initiate the process of describing and evaluating the groundwater resources of the state.*
- *Encourage collection of surface water data regarding flows and uses to allow accurate modeling of the river basins.*

A conceptual overview of the planning process as outlined in the Volume II Framework Plan is provided below.

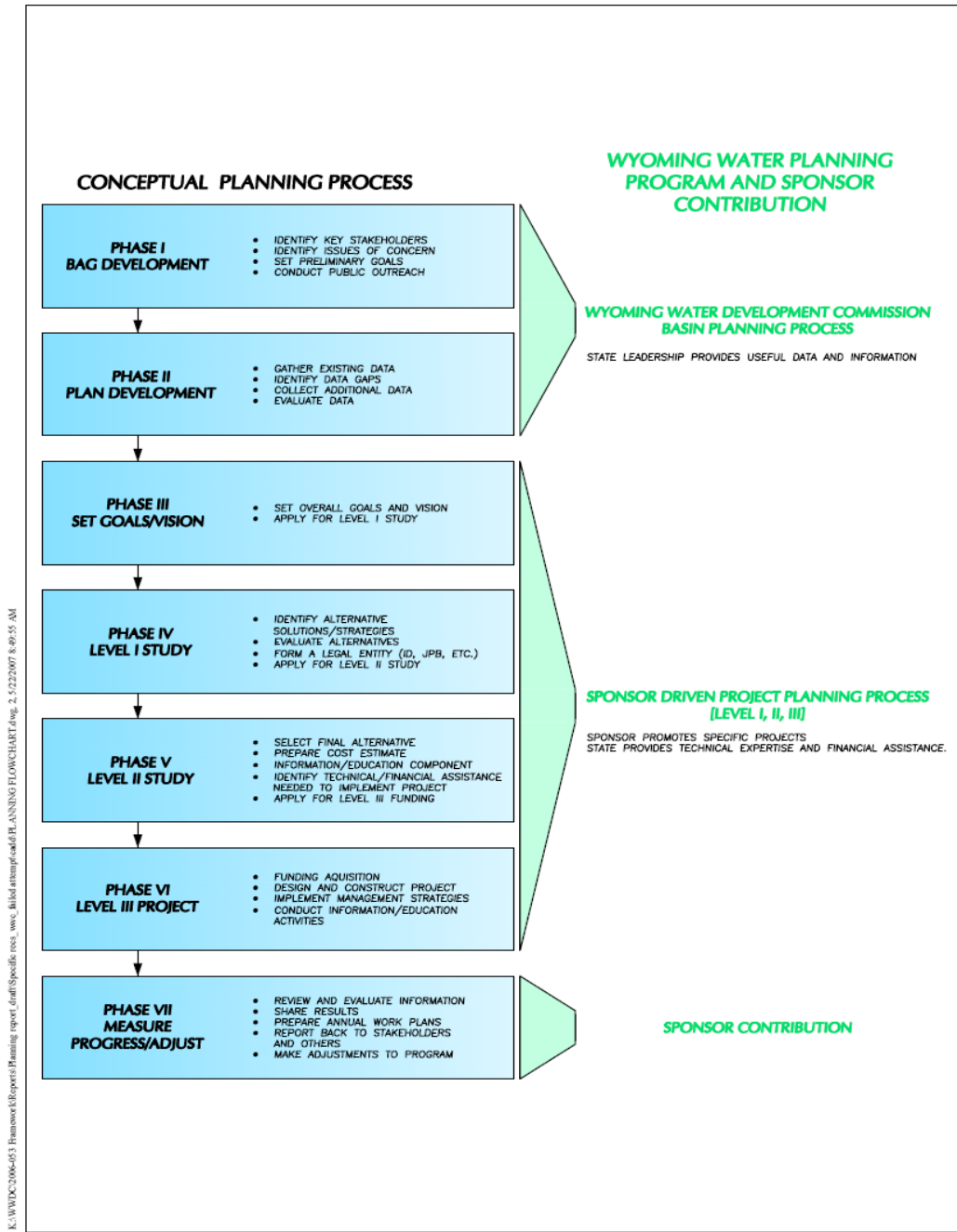


Figure 2. Wyoming Water Planning Process

7. OUTCOMES ASSESSMENT PROCESS

Wyoming does not utilize a quantitative assessment process for its planning efforts (see above discussion). The state focuses on providing data and information to local water users and providers. The state then relies on local sponsors to build consensus and develop a funding plan to address a resource need. Wyoming can then be a financial partner via loans or grants to help advance the project. A graphic summary of the process is provided in Figure 3. The state does provide reports as needed and requested to the legislature and Governor. This approach has worked well for the state and most water resource needs and issues are addressed when they are ready to move forward.

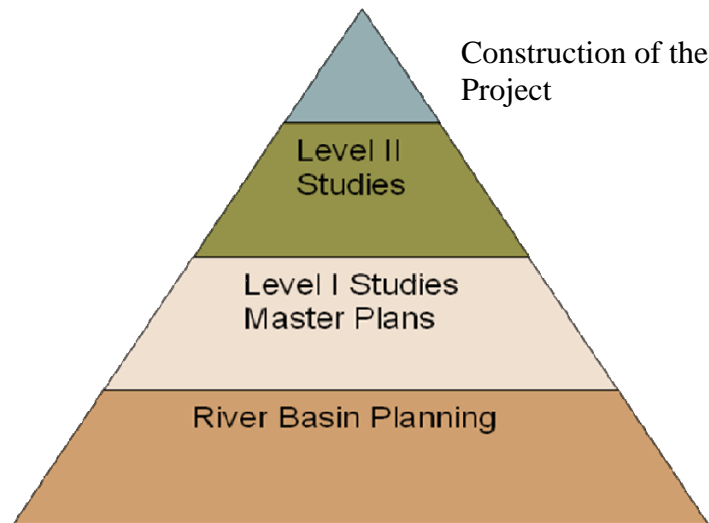


Figure 3. Overview of Wyoming Planning to Implementation Process

8. NEEDS, CHALLENGES AND CRITICAL PRIORITIES - INTERVIEW INSIGHTS

The Water Plan – “Implementation Strategy” and “Scope of Water Resources Planning” sections of this document provide a general overview of the needs, challenges and priorities in the state. In general the state is experiencing increasing need for municipal and domestic water supplies to address population growth; agricultural and industrial water use remains important water uses in the state. Recreation is an important source of income to the state and environmental needs are closely tied to the recreation industry.

In regard to implementing projects the sponsor’s lack of ability to repay a portion of the project costs is the largest impediment to moving a project forward. The federal permitting process and inability to quickly partner with the federal government have created inefficiencies or been impediments to implementing cooperative projects.

Responsible energy development will be important to ensure adequate water quality and quantity. This includes coal bed natural gas, and other industrial uses such as; electrical power production from coal and natural gas, oil and gas production, soda ash and other hydropower/wind and chemical industries.

Obtaining and managing water supply, ground water, and current versus future water needs data are of varying degrees of importance in different areas of the state. Developing more information on climate variability, watershed planning and administration tools are a priority. Supporting regional water supply solutions that conserve and protect Wyoming's water resources are important statewide goal.

9. REFERENCES

Much of the language and information in this summary comes directly from reports published by the Wyoming Water Development Commission/Wyoming Water Development Office.

Wyoming Water Development Commission. October 2007. Wyoming's Framework Water Plan. Executive Summary – <http://waterplan.state.wy.us/plan/statewide/execsummary.pdf>
Volume I – http://waterplan.state.wy.us/plan/statewide/Volume_I.pdf
Volume II – http://waterplan.state.wy.us/plan/statewide/Volume_II.pdf

Wyoming Water Development Commission.

Bear River Basin – <http://waterplan.state.wy.us/plan/bear/finalrept/finalplan.pdf>

Green River Basin – http://waterplan.state.wy.us/plan/green/finalrept/finalrept_lores.pdf

Northeast River Basin – http://waterplan.state.wy.us/plan/newy/finalrept/finalrept_lores.pdf

Platte River Basin – http://waterplan.state.wy.us/plan/platte/finalrept/Final_report.pdf

Powder/Tongue River Basin –

http://waterplan.state.wy.us/plan/powder/finalrept/finalrept_lores.pdf

Snake/Salt River Basin – <http://waterplan.state.wy.us/plan/snake/finalrept/finalrept.pdf>

Wind/Bighorn River Basin – http://waterplan.state.wy.us/plan/bighorn/finalrept/final_report.pdf

Wyoming Water Development Commission. Wyoming Drought Plan, 2003 –

<http://www.wrds.uwyo.edu/sco/drought/droughtplan.pdf>

Water Quality Division – <http://soswy.state.wy.us/rules/search.htm>

Additional Planning Information: <http://waterplan.state.wy.us/sites.html>

- [Water Resources of Wyoming \(US Geological Survey\)](#)
- [US Bureau of Reclamation Hydromet \(Great Plains Region\)](#)
- [US Bureau of Reclamation Hydromet \(Pacific Northwest Region\)](#)
- [Wyoming Water Association](#)
- [Wyoming Association of Rural Water Systems](#)
- [Wyoming Local Drinking Water Information \(EPA\)](#)
- [Wyoming Department of Environmental Quality \(Water Quality Division\)](#)
- [The Water Librarians Home Page](#)
- [Western Waters Digital Library](#)