PLATTE RIVER BASIN PLAN
EXECUTIVE SUMMARY

Wyoming Water Development Commission
May 2006

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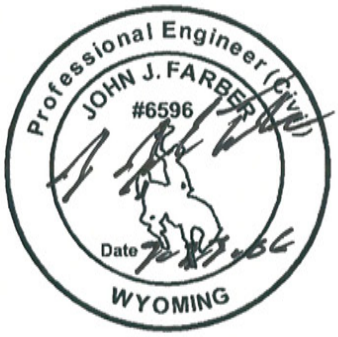

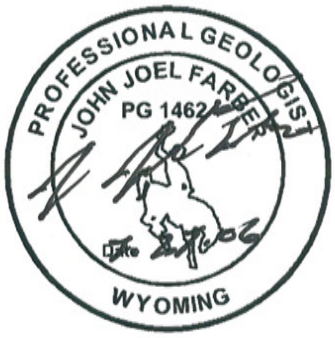

Trihydro CORPORATION

The Platte River Basin Plan is a planning tool developed for the Wyoming Water Development Office. It presents estimated current and estimated future uses of water in Wyoming's Platte River Basin. The Plan is not used to determine compliance with or administration of state law, federal law, court decrees, interstate compacts, or interstate agreements.

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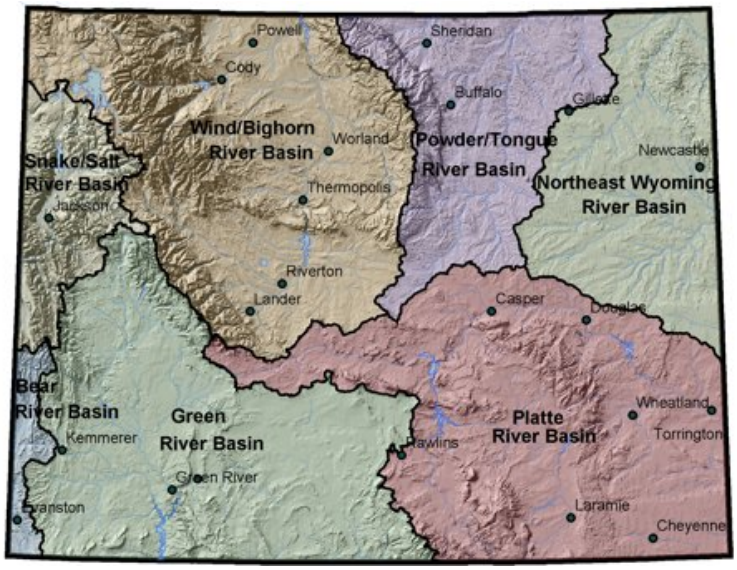


The Platte River Basin Plan is the seventh and last of a series of Wyoming river basin plans prepared for the Wyoming Water Development Commission (WWDC). Wyoming previously completed water plans for the Bear River Basin, Green River Basin, Northeast Wyoming River Basin, Powder/Tongue River Basin, Snake/Salt River Basin, and Wind/Bighorn River Basin.

The Wyoming State Engineer's Office (SEO) and the Wyoming Water Planning Program completed *The Wyoming Framework Water Plan* in 1973. The intent of the 1973 document was to provide a "basis upon which to launch further water resource planning." (Wyoming State Engineer's Office, 1973) This document addressed water issues in all Wyoming river basins. In 1996, the Wyoming Legislature directed the WWDC and the SEO to prepare recommendations for updating the 1973 Framework Water Plan. After reviewing the agencies' recommendations, the 1999 Wyoming Legislature authorized completion of the Bear River and Green River Basin Plans and has subsequently authorized completion of the other basin plans listed above, including this Platte River Basin Plan.

The Wyoming basin planning process is founded on the Prior Appropriation Doctrine and the understanding that the State of Wyoming should manage its water resources "for the benefit of the citizens of the state." (Wyoming Water Development Commission, 2002) Major goals of the basin planning process include:

- Providing accurate, timely Wyoming water information, both to state officials and to the general public
- Maintaining an inventory of water uses
- Assisting Wyoming government officials in developing effective state water policies
- Protecting future water demands
- Keeping Wyoming's water planning process comparable to those of other western states
- Protecting Wyoming's water resources from downstream competitors

The Platte River Basin Plan consists of the following components:

- Technical memoranda containing detailed assessments of specific Platte River Basin water data
- A Geographical Information System (GIS) map-based database containing Platte River Basin water resource information that has been generated for and during this project
- A "Water Atlas" web-based educational tool that is intended to provide key Platte River Basin Plan information to the public in a readily-accessible fashion
- A Platte River Basin Plan Report, which contains a summary of information from the other three components of the project

BASIN DESCRIPTION

The Platte River Basin encompasses nearly one-quarter of the land area of Wyoming and comprises the southeast portion of the state. All of Albany, Laramie, and Platte Counties and portions of Carbon, Converse, Fremont, Goshen, Natrona, Niobrara, Sublette, and Sweetwater Counties are located within the Basin.

The Platte River Basin is part of the Missouri-Mississippi River Basin. The headwaters of the North Platte originate with streams east of the Continental Divide located in the mountains surrounding North Park in Colorado and the Sierra Madre and Snowy Range mountains of southern Wyoming. The river flows northerly through central Wyoming and east on to Nebraska, gathering an average annual run-off of 1.4 million acre-feet. In central Nebraska, the North and South Platte rivers join to form the Platte River flowing eastward to the Missouri River south of Omaha, Nebraska.

The North Platte River drainage in Wyoming was divided into the seven subbasins for the purposes of basin planning:

- Above Pathfinder Reservoir
- Pathfinder Reservoir to Guernsey Reservoir
- Guernsey Reservoir to State Line
- Horse Creek
- Lower Laramie
- Upper Laramie
- South Platte

Although portions of the drainages for both the North and South Platte Rivers exist in Wyoming, only the North Platte River flows through the state. The South Platte River drainage in Wyoming consists of headwater streams that drain into Colorado and Nebraska. The Laramie River is a major tributary of the North Platte River, which headwaters in Colorado.

The topography of the Platte River Basin includes valleys, high plains, hills, and mountains with elevations up to 12,013 feet above mean sea level at Medicine Bow Peak of the Medicine Bow Mountains. The lowest point of elevation in the Platte River Basin in Wyoming is 4,025 feet above mean sea level and is located on the North Platte River where the river crosses the Wyoming-Nebraska State Line.

Precipitation and streamflows throughout the Platte River Basin follow topography and geomorphology. A large portion of the Basin within Wyoming receives an average of 8-12 inches of precipitation annually. Downstream portions of the Basin typically receive an average of 12-16 inches of precipitation annually. The heaviest precipitation in the Basin falls over the mountain ranges. Precipitation increases with elevation and can exceed 60 inches a year at the highest points in the Basin.

PLATTE RIVER WATER MANAGEMENT

The Territory of Wyoming was created on July 25, 1868 and shortly thereafter, the first water laws for Wyoming were drafted. The early laws set the foundation of water law as it exists today by establishing the ideas of priority of appropriation and stewardship of water resources. In 1890, Wyoming was divided into four water divisions, with Division One containing the Platte River Basin. The Carey Act was passed in 1894 to promote reclaiming lands in each of the western states for irrigation and settlement. This prompted investment in water development projects, including the construction of Wheatland No. 1 (1897) and Wheatland No. 2 (1898) Reservoirs on the Laramie River by the Wyoming Development Company. Reservoir construction continued through the early 1900's throughout Division One and the rest of Wyoming.

The construction of several large reservoirs by the Bureau of Reclamation along the North Platte River in Wyoming during the first half of the 20th century has had a significant effect on the use and distribution of water in the Basin. Pathfinder, Seminoe, Kortes, Alcova, Glendo, and Guernsey Reservoir provide storage supplies for federal irrigation projects serving over 226,000 acres, as well as hydropower generation. Along the Laramie River, major reservoirs include Wheatland No. 2, Wheatland No. 3, and Grayrocks. All of these reservoirs store water for irrigation.

Irrigation is the largest use of water in the Platte Basin. The apportionment of water between the States of Wyoming, Colorado, and Nebraska for irrigation use has historically been disputed between the three states. The first interstate lawsuit regarding the apportionment of water was filed by Wyoming in 1911 against the State of Colorado and its use of water from the Big Laramie River. Eleven years later, the Supreme Court ruled that priority of appropriation would be used to apportion waters across state lines since both states recognized that doctrine individually.

With the drought of the 1930's, Nebraska filed a lawsuit against Wyoming in 1934 claiming that priority water rights in Nebraska were not being honored due to diversions in Wyoming for junior rights. In its 1945 decree, the Supreme Court upheld rights in Nebraska and set limitations on appropriations of North Platte water in Wyoming. Subsequently, Nebraska filed a lawsuit reopening the decree in 1986 that resulted in establishment of the Modified North Platte Decree in 2001.

In 1997, the States of Colorado, Wyoming, and Nebraska and the U.S. Department of the Interior (DOI) signed the Cooperative Agreement for Platte River Research and Other Efforts Relating to Endangered Species Habitat Along the Central Platte River, Nebraska (Cooperative Agreement). The purpose of the Cooperative Agreement is to implement certain aspects of the U.S. Fish and Wildlife Service's (USFWS) recovery plans for target species (whooping crane, piping plover, interior least tern, and the pallid sturgeon) that relate to the habitats of these species. This agreement

stipulates the development of a Basin-wide program, the Platte River Recovery Implementation Program (PRRIP), to be implemented following evaluation of the Proposed Alternative and a range of reasonable alternatives in compliance with the National Environmental Policy Act (NEPA) and the Endangered Species Act (ESA).

The Cooperative Agreement led to the creation of a Governance Committee composed of member representatives from the three signatory states, the federal government, environmental groups, and Basin water users. The Governance Committee was charged with developing details of the first 13-year long increment of the PRRIP. Without the PRRIP, each significant water project or activity with a federal nexus in the Platte River Basin would be required to address and comply with federal Endangered Species Act (ESA) regulations individually, a process that could be costly and inefficient and would severely impact the feasibility of any such projects. The Cooperative Agreement is intended to provide an "efficient, effective, and equitable way to create improvements in the habitat" of the four Platte River target species while allowing numerous existing and some proposed Platte River water projects and activities to continue and to meet the requirements of the ESA.

The Governance Committee prepared and submitted a draft PRRIP to the DOI for review under NEPA and for use in preparing a Draft Environmental Impact Statement (DEIS). When submitted, the components of the draft PRRIP were at various stages of development and completion. Following NEPA review, the DOI will issue a Record of Decision. Following issuance of the Record of Decision, the governors of Wyoming, Nebraska, and Colorado and the U.S. Secretary of the Interior may enter into a PRRIP, which is anticipated to occur in 2006.

The U.S. Bureau of Reclamation (USBR) and the USFWS have jointly prepared a DEIS for the first 13-year increment of the Governance Committee's PRRIP. The DEIS assesses the environmental consequences of the PRRIP as required by NEPA. USBR and USFWS released the DEIS for public comment in January 2004. The DEIS is the precursor to an Environmental Impact Statement (EIS) that is required by NEPA.

PLATTE RIVER BASIN PLAN WATER ATLAS EDUCATIONAL TOOL

An online educational tool called the Platte River Basin Water Atlas was also developed as part of this study. The Water Atlas is intended to serve as an information resource accessible to the general public via the internet that broadly educates the public about the water resources of Wyoming's Platte River Basin. The Water Atlas is an ideal way to begin exploring for information presented in the Basin Plan. Access to the Water Atlas is available through the Water Plan website at http://waterplan.state.wy.us.

AGRICULTURAL WATER USE

Almost half of Wyoming's irrigated acres lie within the Platte River Basin, and nearly half of the state's livestock are raised in the Basin. Agricultural operations are the single largest consumer of water in Wyoming's Platte River Basin.

FEDERAL IRRIGATION PROJECTS IN WYOMING'S PLATTE RIVER BASIN

The federal government constructed many dams, diversions, canals, and related facilities during the twentieth century on and near the North Platte River in Wyoming. These structures include the largest reservoirs in Wyoming's Platte River Basin and play a major role in controlling and utilizing Basin surface water resources. These structures are located in the Above Pathfinder and Pathfinder to Guernsey subbasins of Wyoming's Platte River Basin. Dams and reservoirs were constructed as components of large federal irrigation projects, including, in chronological order:

- The North Platte Project
  - Created Pathfinder and Guernsey Reservoirs
  - Developed 2,000 miles of irrigation canals, laterals, and drains
  - Fully supplies irrigation water for 226,000 acres
- The Kendrick Project
  - Major components are Seminoe Dam and Reservoir, Seminoe Powerplant, Alcova Dam and Reservoir, Alcova Powerplant, and the Casper Canal
  - Supplies irrigation water to 24,000 acres
- The Kortes Unit of the Pick-Sloan Missouri River Basin Project
  - Includes Kortes Dam, Reservoir, and Powerplant
- The Glendo Unit of the Pick-Sloan Missouri River Basin Project
  - Includes Glendo Dam and Reservoir, Glendo Powerplant, Gray Reef Dam and Reservoir, and Fremont Canyon Power Plant

These federal facilities are administered by the U.S. Bureau of Reclamation (USBR) and are intended primarily to provide storage of irrigation water and subsequent generation of electrical power as the irrigation water is released.

MUNICIPAL AND DOMESTIC WATER USE

The overall domestic and municipal water use in the Platte River Basin of Wyoming were estimated as part of the Basin Plan. Estimates were prepared independently of Wyoming's Depletions Plan (WDP) and followed a different methodology than what is being considered for the proposed Platte River Recovery Implementation Program. Specific criteria were established to identify municipal verses domestic use.

According to the Environmental Protection Agency (EPA), there are currently 54 active municipal and community public water systems within Wyoming's Platte River Basin. A total of 195,107 people within the Platte River Basin are served by these community systems. This population utilizes a combination of surface water and groundwater and demands an average of 41.0 million gallons per day (mgd), or roughly 210 gallons per capita per day (gpcpd), and a peak daily amount of 110.8 mgd. Based on WWDC (2002) data, it appears that the majority of the municipal and community public water systems in the Platte River Basin have sufficient water to meet current and future needs.

Based on rural domestic and non-community public water system usage, the average total domestic water usage for the Platte River Basin is estimated to range from 8.29 mgd to 15.36 mgd. Assuming a rural domestic population of 47,138 and an average demand of 150 to 300 gallons per capita per day (gpcpd), estimated rural domestic groundwater use ranges from 7.07 mgd to 14.14 mgd. For the 16,270 people in the subbasin who use the 79 non-community public water systems, estimated domestic water usage is 1.22 mgd based on assumed usage of 75 gpcpd.

INDUSTRIAL WATER USE

Basin industry has developed at a fairly slow pace except during boom periods. Industries that consumed the most water in the Platte River Basin between 1981 and 2000 were the oil, coal, and uranium exploration and extraction industries. Power generation facilities, aggregate and cement production plants, an ammonium-nitrate production plant, a sugar beet processing facility, and an ethanol production plant have also been significant users of groundwater and surface water supplies in the Platte River Basin. Total permitted industrial use of water in the Wyoming Platte River Basin is comprised of approximately 75 percent groundwater and 25 percent surface water.

RECREATIONAL WATER USE

Water has many uses in an arid state such as Wyoming, and one of the most important and valued to the culture of Wyoming is recreational use. While water projects were originally developed to provide an adequate water supply for irrigation projects, to control flooding, and to generate hydroelectric power, the use and importance of these waters for recreation continue to grow. There are several types of recreation in the Platte River Basin that are directly contingent upon a stable water resource. These include, but are not limited to, boating, fishing, waterfowl hunting, swimming, camping, skiing, snowmobiling, and golfing. With the exception of irrigation on the Basin's nineteen golf courses, these recreational uses are generally non-consumptive in nature yet rely upon a consistent water source, whether it is a running stream or a standing water body.

ENVIRONMENTAL WATER USE

Environmental water use within the Platte River Basin includes maintenance of minimum stream flow rates and reservoir water levels to protect new and existing fisheries and wildlife habitat. Instream flow filings, instream bypasses, and minimum reservoir releases are three tools used by state and federal agencies to produce and protect fisheries habitat in the Platte River Basin that has been impacted by historical low flow conditions. Due to the non-consumptive nature of environmental water uses, water consumption attributed to environmental use is minimal and is due primarily to evaporative loss.

WATER USE FROM STORAGE

Reservoirs in the Platte River Basin are owned and operated by a variety of entities, including the USBR, municipalities, irrigation districts, and private individuals. Information regarding reservoirs with permitted capacities greater than 50 acre-feet are compiled in the Plan.

The federal reservoirs on North Platte River in Wyoming are a key water supply component to federal irrigation projects located downstream. Federal reservoirs, in order of occurrence on the North Platte River in Wyoming from upstream to downstream, are:

- Seminoe Reservoir
- Kortes Reservoir
- Pathfinder Reservoir
- Alcova Reservoir
- Gray Reef Reservoir
- Glendo Reservoir
- Guernsey Reservoir

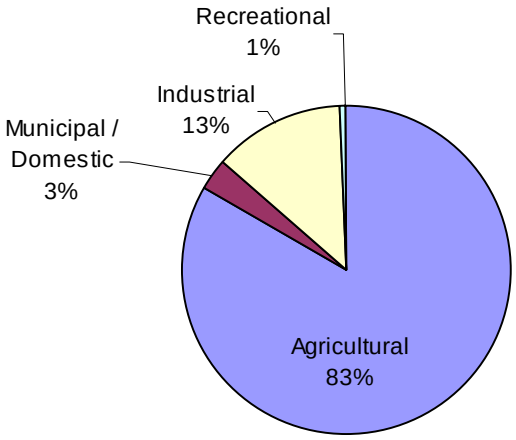
Total storage capacity of these federal reservoirs is in excess of 3 million acre-feet. Benefits from stored water in these federal reservoirs include water supplies for irrigation and power generation, as well as recreation and flood control.

In addition to descriptions of the federal reservoirs, the Plan provides information on reservoirs that have capacities over1,000 acre-feet, or that serve as a significant water supply within the River Basin.

CURRENT WATER USE SUMMARY

As shown in the chart below, agriculture is obviously the most significant water use in the Basin. The industrial sector also uses a comparitively large amount of water. This sector, which includes energy and minerals, has historically added volatility to the Basin economy but has also provided high-paying jobs. While municipal water consumption is a small percentage of the overall water used in the Basin, cities and towns have unique requirements that demand reliability. Travel, tourism, and recreation contribute to the Basin economy, and water plays an important, but somewhat different, role in this sector. Environmental water use is not quantified as it is typically non-consumptive and relates to recreational use.

The current water uses within the Basin are summarized as follows:



AVAILABLE SURFACE WATER

A determination of the available water resources is a significant component to Wyoming's river basin planning. Available surface water has been estimated in other river basins by the development of simple computer models that consider both hydrologic conditions and existing appropriations of the resource that constrain water availability. Because the surface water resources of the Platte River Basin are widely acknowledged to be fully appropriated, the scope for this component of the Platte River Basin Plan was modified, relative to the other river basin plans, to simply characterize the resource. Accordingly, the surface water resources were determined by collection of stream gage data and a study of the historic flow conditions across the Basin.

AVAILABLE GROUNDWATER

In many ways, Wyoming's Platte River Basin presents one of the most complicated groundwater regions in Wyoming for a variety of political, geologic, and hydrogeologic reasons. While groundwater has always been an important water source for municipal, agricultural, and other uses in the planning area, its importance and administrative complexity have increased in recent years.

The North Platte River has been assessed as fully appropriated for some time, and several court decisions and interstate agreements have recognized that hydrologically connected groundwater wells were impacting river flows. Both the Modified North Platte Decree and Cooperative Agreement may affect the use and development of groundwater resources within the Platte River Basin. An important criterion for assessing groundwater supplies is whether the groundwater supply is hydrologically connected with tributary surface waters in the Basin.

The Plan inventories published information on the groundwater resources within the Basin and catalogs the State Engineer's groundwater permit database for the categories of existing groundwater uses. The information is presented

in the form of project Geographic Information System (GIS) data layers for each subbasin, including:

- Permitted active municipal, domestic, industrial, agricultural, recreational, and environmental wells with permitted production rates of 50 gallons per minute or greater
- Coal bed natural gas (methane) wells (where applicable)

The origins and status of the three basin groundwater control areas, including the Prairie Center Control Area, the Laramie County Control Area, and the Platte County Control Area are also presented in the Plan. Other objectives of this Plan included:

- Characterizing the aquifers of the planning area with regard to location, storage, and yield based on existing information
- Summarizing the potential for additional groundwater development and aquifer storage, and any potential impacts of such development to the groundwater and surface water systems in the Basin
- Characterizing coal bed natural gas (methane) development and its short- and long-term effects on groundwater and surface water supplies within subbasins of the Platte River Basin
- Summarizing groundwater interference issues

Groundwater resouces are organized based on aquifer systems in the Basin, which are described by the geologic age of the rock formations that form the aquifers. Groundwater quality in aquifers is variable and dependent upon a variety of factors including, distance from the recharge area, aquifer transmissivity and storage, groundwater flow rates, aquifer rock type, dissolution of soluble salts within the aquifer matrix, and leakage of poor quality water into the aquifer from adjacent units. Generally, the best quality groundwater is present at locations closest to the geologic outcrop areas for the aquifer systems.

DEMAND PROJECTIONS SUMMARY

Information was developed to establish a baseline for projecting long-term economic and demographic activity, and projecting future water demand. Water demands, both in terms of diversions and consumptive use were developed under three scenarios: High, Low, and Mid economic growth. The economic and demographic data were applied to develop water demand projections for the three growth scenarios. In the simplest terms, the High Scenario incorporates an estimation of the most growth in each of the key sectors and in the region that could potentially occur over the forecast horizon. The Low Scenario embodies the estimated lowest simultaneous growth (or largest contraction) reasonably likely to occur in each of the key sectors and in the region over the planning horizon. The Mid Scenario represents the assumed most realistic level of growth likely to occur in each of the key sectors and in the region over the planning horizon.

The following table shows a summary of future water demands for each these growth scenarios categorized by use.

Summary of current and projected water uses (af/yr)

	Current Diversions	Current Consumptive Use	Projected Use by Growth Scenario (acre-feet/yr)					
			Diversions			Consumptive Use		
			Low	Mid	High	Low	Mid	High
Agricultural	1,559,300	668,300	1,527,200	1,559,600	1,647,600	655,200	667,600	707,600
Municipal/Domestic	49,100	24,500	71,000	75,600	89,000	35,400	37,800	44,600
Industrial	104,200	104,200	75,290	92,450	115,760	75,290	92,450	115,760
Recreational	8,440	4,410	8,440	9,740	12,240	4,410	5,010	6,310
Total	**1,721,040**	**801,410**	**1,681,930**	**1,737,390**	**1,864,600**	**770,300**	**802,860**	**874,270**
Surface water	*1,528,000*	*677,000*	*1,511,100*	*1,546,900*	*1,661,400*	*669,400*	*684,400*	*748,200*
Groundwater	*193,040*	*124,410*	*170,830*	*190,490*	*203,200*	*100,900*	*118,460*	*126,070*

Among the economic sectors, the largest projected changes in water demand occur in the municipal and rural domestic sector, though total municipal water demand remains small relative to water demand in the agricultural sector. While the agricultural sector experiences one of the smallest percentage changes over the projection period, the relative magnitude of this sector's water demand allows it to drive much of the projected annual and monthly water use patterns. Although industrial water use declines except under the High Scenario, the sector's diminutive size implies a minimal overall impact on water demand in the Basin under any scenario. The recreational sector is also small and exhibits only moderate changes in demand under the three scenarios. Demand in the environmental sector was defined to include water used in enhancing environmental resources such as fish and wildlife habitat. Scenarios were defined for this sector through assessment of the likelihood of future activity in the Basin; the approval or denial of instream flow water rights largely drives future water demand in this sector by scenario.

PROJECTED ANNUAL WATER DEMANDS - HIGH SCENERIO

Under the assumption of a normal demand year, total Basin water diversion requirements are projected to increase by about 8 percent from year 2005 to year 2035 under the High Scenario, an increase of 144,000 acre-feet. In a high demand year, the increase is projected to be around 8 percent, or 202,000 acre-feet.

Under the High Scenario, total agricultural water demand grows moderately over the projection period. Agriculture continues to comprise the vast majority of total water demand under the High Scenario; agriculture accounts for 88 percent of total water diverted and roughly 81 percent of total consumptive use in normal demand year 2035. Consumptive use is only 43 percent of total diversions for irrigated agricultural production within the Basin, reflecting low efficiencies and reuse of return flows. The vast majority of agricultural water demand remains in irrigated crop production, with less than one percent of total projected agricultural diversions and consumptive use going to direct livestock sustenance.

Under the High Scenario, municipal water demand in the Basin increases by 80 percent over the 30-year projection period. Municipal water demand will remain a relatively small sector, accounting for only five percent of total water diversions and five percent of total consumptive use in a normal demand year 2035.

Water demand within the industrial sector increases by about 11 percent over the projection period under the High Scenario, both consumptive use and diversions. Industrial water demands are likely to continue to be a minor element within the Basin, accounting for 13 percent of total consumptive use and six percent of total diversions under the High Scenario in a normal year 2035.

Consumptively used water demand in the recreational sector increases under the High Scenario. While water use for snowmaking will remain constant, water used for golf course irrigation is projected to increase by roughly 45 percent over the projection period. Overall, recreational water consumption is expected to remain quite small, accounting for less than one percent of Basin water demand.

The share of aggregate water demand met by groundwater resources versus surface water within the Basin remains relatively constant over the projection period under the High Scenario. Almost 90 percent of water needs will continue to come from surface water.

PROJECTED ANNUAL WATER DEMANDS - LOW SCENARIO

Total water diversion requirements under the Low Scenario in a normal demand year are projected to decline by two percent from 2005 to 2035; high demand year diversion requirements are projected to drop by two percent over the same period. Consumptive use is expected to drop slightly more under the Low Scenario, by four percent in a normal demand year and by three percent in a high demand year.

Under the Low Scenario, total agricultural water demand declines slightly over the projection period – just two percent when measured in terms of diversions or consumptive use. Agriculture continues to comprise the vast majority of total water demand under the Low Scenario; agriculture is responsible for 91 percent of total water diverted and roughly 85 percent of total consumptive use in a normal demand year 2035. Consumptive use is only 43 percent of total diversions for irrigated agricultural production within the Basin, reflecting low efficiencies and reuse of return flows. The vast majority of agricultural water demand remains in irrigated crop production, with less than one percent of total projected agricultural diversions and consumptive use going to direct livestock sustenance.

In the municipal sector, the 45 percent increase in both diversions and consumptive use is the direct result of the projected increases in Basin population levels, but it remains a small portion of overall Basin water demands.

Under the Low Scenario, nearly one-third of industrial water demand wanes by 2035 as the oil production sector declines and as mines close. This sector will represent an even smaller portion of overall water demands.

Water demand in the recreational sector remains constant under the Low Scenario as no ski area expansions or golf course developments are assumed to occur during the projection period. Overall, this sector is expected to remain relatively small, accounting for less than one percent of water demand, both diversions and consumptive use.

Under the Low Scenario, the share of total groundwater diversions and consumptive use is expected to decrease slightly, by roughly one to two percent. This change is due primarily to large losses in industrial groundwater use expected under the Low Scenario.

PROJECTED ANNUAL WATER DEMANDS - MID SCENARIO

Assuming a normal demand year, total Basin water diversions and consumptive use are projected to increase by about one percent from year 2005 to year 2035 under the Mid Scenario. In a high demand year, diversions and consumptive use are also expected to increase by around one percent over the planning horizon. The projected difference in aggregate diversions and aggregate consumptive use under normal water demand conditions amounts to roughly 16,000 acre-feet and 1,500 acre-feet, respectively.

Under the Mid Scenario, total agricultural water demand declines very slightly over the projection period, measured in terms of diversions or consumptive use. Agriculture continues to comprise the vast majority of total water demand under the Mid Scenario; agriculture is responsible for 90 percent of total water diverted and roughly 83 percent of total consumptive use in a normal demand year 2035. Consumptive use is only 43 percent of total diversions for irrigated agricultural production within the Basin, reflecting low efficiencies and reuse of return flows. The vast majority of agricultural water demand remains in irrigated crop production, with less than one percent of total projected agricultural diversions and consumptive use going to direct livestock sustenance.

Under the Mid Scenario, while municipal water demand increases by 54 percent over the 30-year projection period, it remains a relatively small sector, accounting for only four percent of total water diversions and five percent of total consumptive use within the Basin in a normal demand year 2035.

Under the Mid Scenario, both water diversions and consumptive use in the Basin industrial sector are projected to decline 11 percent from current levels. Industrial water use will become an even smaller portion of overall Basin water demand, dropping to just five percent of diversions and 12 percent of consumptive use in a normal demand year 2035.

Water demand in the recreational sector grows moderately under the Mid Scenario as two new golf courses begin operation in 2005; snowmaking water demands remain constant. Despite this increase in recreation diversions and consumptive use of 15 percent, this sector remains quite small overall, accounting for less one percent of Basin water demand, both diversions and consumptive use.

Under the Mid Scenario, the share of total diversions and consumptive use from groundwater sources is projected to decrease slightly as large industrial groundwater uses wane over the projection period.

FUTURE WATER USE OPPORTUNITIES

Future development and use of water in Wyoming's Platte River Basin may be limited or otherwise impacted by a variety of factors, including water availability, funding, public involvement, court decrees, Platte River Recovery Implementation Program (PRRIP), water quality, and regulatory issues.

The future water use opportunities that were evaluated are categorized as being either structural or non-structural. Structural future water use opportunities are those that include, but are not limited to, new storage reservoirs, conveyance system upgrades, water distribution enhancements, groundwater development, aquifer storage and recovery projects, in-basin water transfer components, and transbasin diversions. Non-structural future water use opportunities are those that include, but are not limited to, local and Basin-wide conservation and management, modified reservoir operations, municipal water conservation, improved agricultural water use efficiencies, water right transfers and exchanges, water banking, and conjunctive use options.

Potential future Platte River Basin water use opportunities may be assessed on the basis of a variety of considerations. The following factors were considered during BAG discussions regarding further water use opportunities:

- Pertinent water use sectors
- Water availability
- Technical factors
- Economic factors
- Environmental factors
- Legal and institutional factors
- Public acceptance
- Water quality
- Ability to satisfy multiple demands

Following receipt of comments from the WWDC and stakeholders, the final list of future Platte River Basin water use opportunities, was organized on the basis of structural and non-structural water use opportunities.

Structural future water use opportunities include:

- Groundwater augmentation – non-hydrologically connected to North Platte River surface water
- Upper Laramie River storage opportunities
- Transbasin diversions
- Snow fence
- Stormwater capture, storage, treatment, and management; irrigation with treated municipal wastewater; grey water irrigation; and municipal irrigation using untreated water
- Modification of Pathfinder Dam and Reservoir
- Coal bed natural gas (methane)
- Regionalization of public water supply systems

- Co-production of electricity and hydrogen from existing hydropower facilities
- Improving agricultural irrigation system efficiencies

Non-structural future water use opportunities include:

- Drought response planning
- Weather modification
- Water conservation
- Water right transfers
- Enhancing recreational use of water resources
- Increasing runoff from national forests based on modified U.S. Forest Service policies and practices
- Water exchange/banking
- Multi-purpose flood control programs
- Utilization of WWDC's small water project program

FUTURE WATER PLAN DIRECTIVES

The Plan and Water Atlas are intended to be used as references for Wyoming citizens and State agencies to understand the present uses of water and potential for future development of the resources within the Basin. It will be important to update the Plan over time in order to maintain a current base of information on the water resources in Platte River Basin.