Executive Summary

The Southwest New Mexico Water Planning Region (Southwest Region), which includes Catron, Grant, Hidalgo, and Luna Counties (Figure ES-1), is one of 16 water planning regions in the State of New Mexico that are in the process of developing a regional water plan. Regional water planning was initiated in New Mexico in 1987, its primary purposes being (1) to demonstrate an in-state need for water, thereby providing a legal basis for denying an out-of-state appropriation and protecting water resources for New Mexico citizens and (2) to ensure that each region is prepared to meet future water demands. Regional water planning activities have been funded through and overseen by the New Mexico Interstate Stream Commission (ISC).

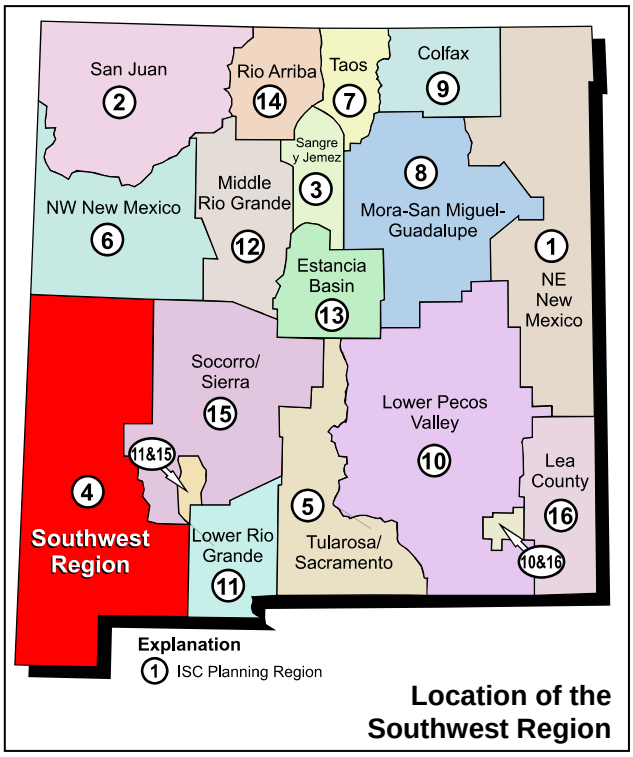


Figure ES-1

All of the Southwest Region water planning activities are overseen by a steering committee consisting of representatives of the counties, municipalities, agricultural and mining water users, and others with water interests in the region, and the fiscal agent is the City of Deming. The City retained the team of Daniel B. Stephens & Associates, Inc. (DBS&A), Engineers, Inc., and Southwest Planning and Marketing to develop the regional water plan.

Key water issues in the Southwest Region include:

- Declining groundwater levels in the Animas, Mimbres, and Nutt Hockett Basins (central and southern part of the region) due to heavy pumping for municipal and agricultural use

- Use of Central Arizona Project water, a renewable resource, to meet current and future needs

- Protection of natural environment of the Gila and San Francisco Rivers (which supply agricultural demands in the northern to central part of the region) to support recreation uses and endangered species

- Watershed management in National Forest and private forested lands to guard against catastrophic forest fires, to protect water quality, and potentially to increase yields in key areas

- Agricultural sector (the largest water use in the region) issues, including agricultural water conservation and mechanisms for short-term leasing of agricultural water rights

- Protection of and planning for water resources that are shared with Mexico

Regional water planning in New Mexico is guided by the template outlined in the ISC *Regional Water Planning Handbook* (ISC, 1994), which defines the scope and content of regional water plans. According to the template, a regional water plan must address the following key questions:

1. What is the water supply available to the region?

2. What is the region's current and projected future demand for water?

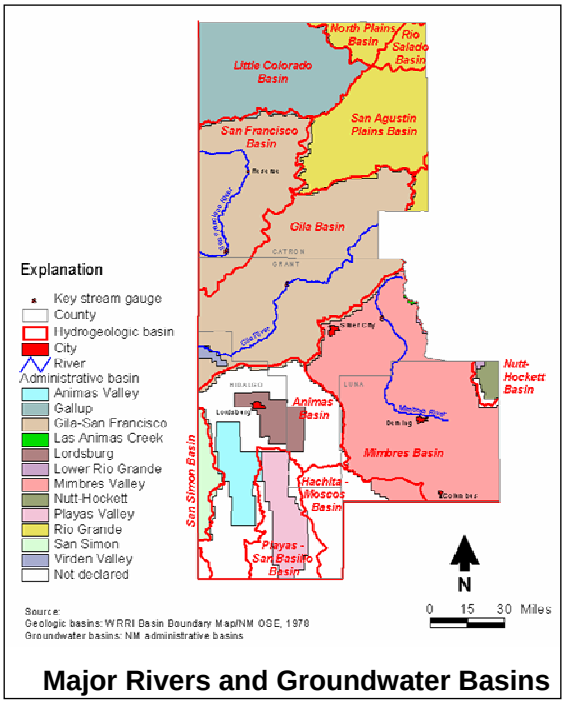
3. What are the region's alternatives for using available supplies to meet projected future water demands and how will they be implemented?

To address these questions, this plan discusses both the physical availability of water and the water rights and legal constraints that affect the availability of water, projects future demands for water, and identifies and evaluates alternatives for meeting future demands.

Water Supply

As required by ISC guidance, existing sources of information about surface water and groundwater supplies in the four counties (Catron, Grant, Hidalgo, and Luna) were used to

characterize the regional water supply. The sources of information used to assess water supply included documents by federal, state, and local agencies, academic research, and privately funded works.



Major Rivers and Groundwater Basins

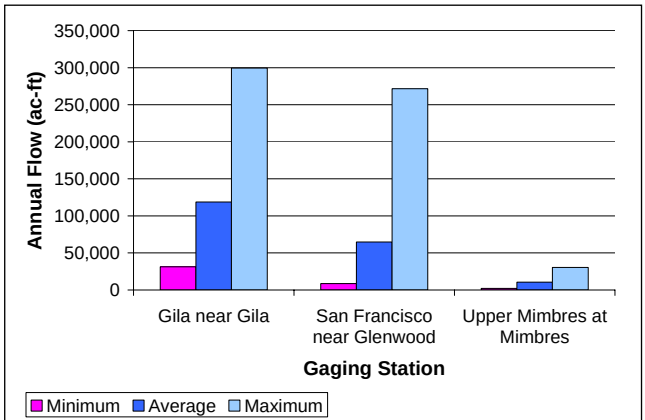
Figure ES-2

Surface Water

The majority of surface water in the planning region is found within the Gila River Basin, San Francisco River Basin, and the upper Mimbres River Basin. These three rivers and a few of their larger tributaries are the primary perennial (year-round) streams in the planning region (Figure ES-2).

Surface water flows originate primarily in the higher elevations, as snowmelt during the spring and as monsoonal rainfall during the late summer. Flows are highly varied from year to year, and the streams are typically characterized by prolonged durations of low flows punctuated by short-duration, high-volume flows. Figure ES-3 shows annual flows observed at the Gila River near Gila, New Mexico, the San Francisco River near Glenwood, and the Mimbres River at Mimbres U.S. Geological Survey gaging stations.

Water in the three river basins in the planning region is used primarily for irrigation and mining. Major cities within the planning region do not rely on the rivers for domestic supply purposes. The surface water resources, particularly the Gila and San Francisco River systems, are used for fishing and other types of recreation, and there is considerable interest in protecting the natural ecosystems in these areas.



Typical Surface Water Flows, 1950-2002

Figure ES-3

Groundwater

The Southwest Region contains 12 hydrogeologic basins and 10 separate groundwater basins declared by the New Mexico Office of the State Engineer (OSE), as well as several other areas that have not been declared (Figure ES-2). Nearly all of the groundwater resources within the planning region are contained within the declared basins. Groundwater availability is controlled to a large extent by the nature of the geology present, which in the planning region falls into three distinct geologic regions or "provinces."

Hidalgo, Luna, and southern Grant Counties are within the Mexican Highland Section of the Basin and Range province, where the predominant aquifers are comprised of basin (or bolson) fill and the Gila Conglomerate. These aquifers are good sources of water, with water tables typically within 200 feet of ground surface and moderate to high permeabilities (which allow higher pumping rates). These aquifers are recharged along the surrounding mountain fronts.

The northwestern corner of Catron County lies within the Navajo Section of the Colorado Plateau Province, where groundwater occurs primarily within Mesozoic sedimentary formations. The water tables in these formations are often below 200 feet from ground surface and permeabilities are low (which prevents higher pumping rates); thus these aquifers are not as good a water supply as those in the Mexican Highland Section. The most extensive regional aquifer in this province is the Dakota Sandstone. Other sedimentary formations and alluvium provide small amounts of water for stock tanks and private domestic wells.

The remainder of Catron County and northern Grant County lie within the Mogollon-Datil section of the Transition Zone Province. This area is characterized by localized uplifts from Tertiary igneous intrusions and volcanics that are separated by intermontane basins. Aquifers in these units can be good or poor sources of groundwater, depending upon location. Productive aquifers in this area are located in the San Agustin Basin and the Baca Formation, where groundwater can be found within 200 feet of ground surface and localized fracturing produces high permeabilities.

As pumping from these groundwater sources increases, exceeding natural recharge in some areas, water tables are dropping. Areas within the region where groundwater infrastructure is unlikely to meet future demand include the municipal well fields of Santa Clara, Bayard, Silver City, and Columbus-Deming, and agricultural wells in the Animas Valley, Playas Valley, and Lordsburg declared basins. As an example, a recent OSE study estimates that by 2020 agricultural use in the Animas Valley Basin will have decreased water levels by 100 feet below pre-development levels. Additional wells and deepening of existing wells can in most cases preserve production levels, but long-term planning should focus on reducing depletion rates in order to preserve water availability for the future.

Water Quality

Both surface water and groundwater quality is generally very good throughout the Southwest Region. It is well suited for agriculture use and for private domestic wells and is easily treated for use in public water supply systems. There are, however, a number of existing water quality concerns:

- Surface water resources in the planning region include 67.3 river miles that have been identified by the New Mexico Environment Department as being impacted. However, NMED is reviewing its standards for determining which streams are impacted, and the outcome may affect the designated impacts in each stream. The water quality in most lakes and reservoirs in the planning region is good, but there are concerns about potential impacts from excessive nutrients.

- Groundwater quality in the planning region is impacted in localized areas by leaking gasoline storage tanks, elevated sulfates and total dissolved solids from mining operations, and nitrates from septic tanks.

- Although the vast majority of surface water and groundwater resources are not impacted, watershed protection planning would help ensure that these resources remain healthy and should be a priority in developing a regional water plan.

Legal Issues

Regional water planning is subject to "laws relating to impact on existing rights" (NMSA 72 14-44C(7)) and planners have no authority over allocation or ownership of water rights. However, legal issues can place limits on the water supply in certain circumstances and must therefore be fully understood and incorporated into actions or recommendations included in the Southwest New Mexico Regional Water Plan.

Water Rights in New Mexico

The right to use water in New Mexico is based on the following principles of State water law:

- The State of New Mexico has sole authority to grant or recognize rights to use waters of New Mexico.

- The granting of rights to use New Mexico groundwaters and surface waters is based on beneficial use. Examples of beneficial use include agricultural, municipal, domestic, and industrial uses, among others.

- The first person to put water to beneficial use has a prior right and must continue to use the right in order to maintain it.

The agency responsible for managing water rights in New Mexico is the OSE. To withdraw groundwater or divert surface water, a user must have a water right or obtain a water permit from the OSE. Water permits list (1) how much water a user can withdraw within any given year, (2) the location and type of well or surface water diversion that will be used to withdraw the water, and (3) the beneficial use of the water.

Within the Southwest Region are all or parts of 10 groundwater basins that have been "declared" by the OSE (Figure ES-2), that is, proclaimed by the State Engineer as a groundwater source that has reasonably ascertainable boundaries. Once an underground basin is declared, the OSE requires a permit for new groundwater withdrawals and may also impose additional administrative criteria that further limit usage, especially in declining or mined aquifers.

Water rights may be transferred, sold, or leased, but such transactions are subject to protest, cannot impair existing water rights, and must not be contrary to public welfare or conservation. If water rights are not used during four consecutive years, they may be lost (after notice from the OSE).

Major Legal Issues in Southwest New Mexico Region

A number of unique issues facing the Southwest region are described below.

The ***Globe Equity Decree*** of 1935 was the result of a settlement among water users in the Upper Gila River of Arizona and the Virden Valley in New Mexico. A provision of this decree directs a court-appointed Water Commissioner to apportion for diversion to the water users in the upper Gila River Valley the amount of water being stored in San Carlos reservoir, regardless of the priority rights of the San Carlos Apache Tribe and Gila River Indian Community below the dam. This use of stored water acts as a buffer against curtailment of the upper valley users' junior right. Over the last 15 years, litigation concerning the decree has become intense, as the San Carlos Apache and Gila River Indian Community tribes in Arizona have sought to increase river flows to their lands. In addition, New Mexico water users, who were unhappy with the resulting distribution of water under the decree, violated the decree and have been found in contempt of court.

In a 1964 decree commonly referred to as the ***Gila River Apportionment,*** the U.S. Supreme Court adopted a stipulation by the states of Arizona and New Mexico decreeing an equitable apportionment of Gila River waters between the two states. The decree limits surface water and groundwater uses in the Gila Basin in New Mexico, except for the Virden Valley

In 1968, the ***Central Arizona Project*** (CAP) was authorized by the Colorado River Basin Project Act (43 U.S.C. 1524). Section 304 of the Act directed the Secretary of the Interior to contract with water users in New Mexico for water from the Gila River, its tributaries, and underground water sources. In any period of 10 consecutive years, the amounts that can be contracted must permit consumptive use of water in New Mexico of up to 180,000 acre-feet over and above the consumptive uses provided for by the Gila River Apportionment. The Act authorizes the construction of a reservoir as a unit of the CAP to allow New Mexico to consume

the average annual amount of 18,000 acre-feet. In exchange for New Mexico's diversion, Section 304 also directed the Secretary to deliver CAP water to water users in Arizona in sufficient quantities to fully replace any diminution of Gila River System water by water users in New Mexico. However, New Mexico never built facilities or contracted with the Secretary of the Interior to try to utilize the exchange water.

The 1968 Act was amended in 2004 by the ***Arizona Water Settlements Act*** (AWSA). This legislation resolves the disputes between Arizona and New Mexico and the major water users on the Gila and finalizes issues related to the CAP. The AWSA includes the Central Arizona Project Settlement Act of 2004, the Gila River Indian Community Water Rights Settlement Act of 2004, and the Southern Arizona Water Rights Settlement Amendments Act of 2004. After much negotiation, the AWSA became law in December 2004.

Section 212 of the AWSA describes the New Mexico Unit of the CAP, reduces the annual amount of exchange water allowed from 18,000 acre-feet to 14,000 acre-feet, and approves the New Mexico Consumptive Use and Forbearance Agreement (CUFA), a lengthy document negotiated between the two States (New Mexico and Arizona) and Arizona water users. The agreement includes provisions for delivery of CAP water to the Gila River Indian Community and the San Carlos Irrigation and Drainage District in exchange for the right of the New Mexico unit of the CAP to divert Gila water. The agreement also contains provisions by which upper Gila River Valley users will not object to the New Mexico unit's diversions as long as the unit abides by river bypass minimums, or in other words, only diverts when there are specified high flows.

Section 107 of the Act allows for the disbursement from the Lower Colorado Basin Development Fund of $66 million to $128 million to pay for construction of the New Mexico unit. Even if no New Mexico CAP unit is built, up to $66 million may be used for water-related projects and planning in the Southwest Region. The funding would be available beginning in 2012.

The bulk of the legislation is the Gila Settlement Agreement which, except for the San Carlos Apache claims, settles the litigation over the Globe Equity Decree. The Agreement reduces or extinguishes the rights of users in the upper Gila River Valley by generally prohibiting irrigation of lands that have not been irrigated since 1997 and by further reducing lands irrigated by these

users by about 8 percent of the total, including about 240 acres in the Virden Valley. It also protects domestic wells in the Virden Valley by allowing the withdrawal of 1 acre-foot per year per household. Overall, the Gila Settlement appears to be favorable to Virden Valley farmers and domestic well owners and to New Mexico

Population and Water Use

In order to plan for future water needs, regional water planners must estimate future population growth. Accordingly, population projections for each county in the Southwest Region were developed. Additionally, water demand by sector for each county was analyzed as a tool for understanding water use in each county.

The population projections were based on information from interviews with selected community representatives, from historical population trends, and from the University of New Mexico Bureau of Business & Economic Research population projections. Based on this information, both high growth rate and low growth rate scenarios for future population development were determined. The population projections do not take into account the large transient population present in the region during the tourism season; however, the transient demand is incorporated into commercial water use projections.

Under the high growth scenario, population is expected to increase by about 38,000, from 65,800 people in 2000 to 103,900 in 2004. More than 70 percent of this growth is projected to occur in Luna County.

In ***Catron County,*** irrigated agriculture has historically used and continues to use the largest amount of water, accounting for 81 percent of water consumption (Figure ES-4). Accordingly, changes in irrigated agriculture will likely drive water consumption more than changes in population. New industrial activities such as lumber mills are not expected to have a large impact on population or water use. Reopening of the Mogollon Mining District due to an increase in the price of silver and gold could increase the demand for industrial water and would also increase the population of the county.

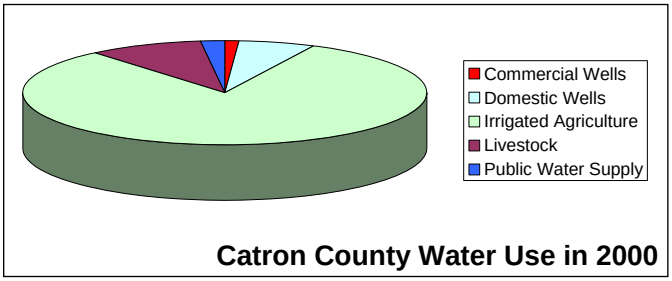


Figure ES-4

The population of Catron County is projected to remain flat (low growth scenario) or grow at a slow rate (high growth scenario), driven primarily by new subdivisions in the northeastern part of the county.

Mining has historically used and continues to use the largest amount of water in ***Grant County,*** consuming 62 percent, followed by irrigated agriculture which consumes approximately 23 percent. Combined mining and irrigated agriculture account for approximately 85 percent of the water consumed in Grant County (Figure ES-5).

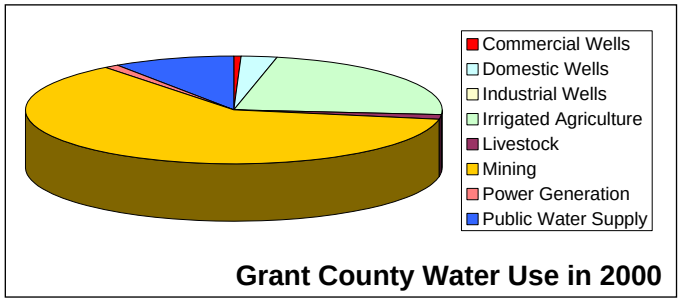


Figure ES-5

Water use in mining operations fluctuates with the minerals market, and due to a drop in world copper market prices in recent years, Phelps Dodge Mining Company has significantly curtailed their mining operations near Silver City. Copper prices are rising again, and it is expected that mining operations (and water usage) will rebound.

An area of potential growth in Grant County is residential development. The population projections for the county indicate a growth trend in this segment and consequently a rise in water usage for this purpose, primarily in Silver City and surrounding communities in the mining district.

Irrigated agriculture has historically used and continues to use the largest amount of water in ***Hidalgo County,*** consuming 82 percent (Figure ES-6). Consequently, trends in this sector will have more impact on water use than population growth. Although irrigated agriculture and its associated water use is expected to remain steady, a 20,000-head cattle feedlot is expected to begin operating in 2004 or 2005, with the possibility of another 20,000-head feedlot in the next five years. These large feedlots may require increased water.

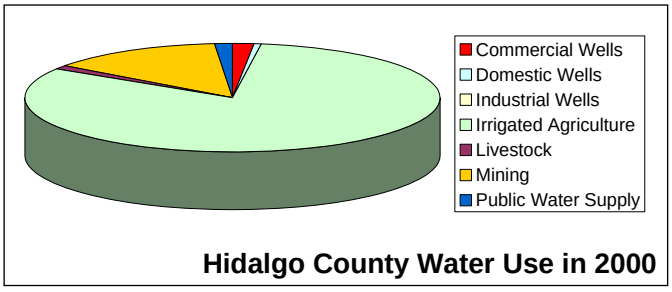


Figure ES-6

The low population projection for Hidalgo County is an extrapolation of historical trends. The high population projection takes into account research and training activities in the community of Playas, which are expected to provide several hundred new jobs in Hidalgo. This could help to increase the population by 500 to 1,000 new residents over the next 20 years, increasing demand for water in the residential, commercial, and municipal sectors.

Irrigated agriculture has historically used and continues to use the largest amount of water in ***Luna County,*** consuming 95 percent (Figure ES-7), and trends in this sector will thus have more impact on water use than population growth. The amount of acreage with irrigation water rights has reportedly been as high as 73,950 acres, but the Natural Resources Conservation Commission indicated that only about 32,000 acres were irrigated in 2000. Nonetheless, Luna County has the most land in irrigated agriculture in the Southwest Region.

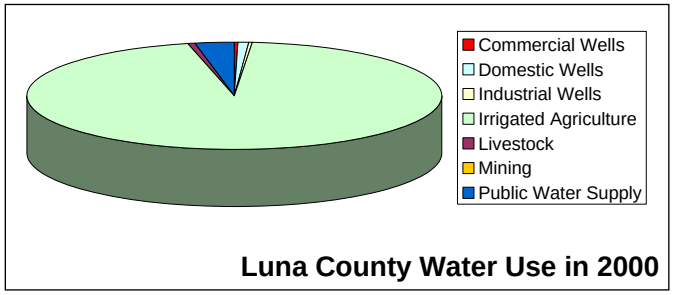


Figure ES-7

Other sectors in which growth may affect water use are power generation and industrial uses. Substantial growth is expected in the power generation sector over the next 10 to 20 years. In addition, with one of the largest industrial parks in the region located in Deming, industrial activity and its associated water use may increase in Luna County, dependent on transportation access, land availability, and apparent water availability for future growth.

Industrial and retirement community development in the county's major population center, Deming, and along the U.S.-Mexico border will be the primary drivers for population growth in Luna County.

Water Budget

A water budget is an accounting of total inflow and total outflow of water in a given area, such as a surface water or groundwater basin. Like a financial budget, a water budget takes into account each of the primary sources of inflow and each of the primary sources of outflow in

order to determine if one is greater than the other. Groundwater budgets were developed for each of the 12 hydrogeologic basins shown on Figure ES-2, and surface water budgets were developed for the three perennial stream systems in the region (i.e., San Francisco, Gila, Mimbres).

The inflow and outflow sources for groundwater and surface water were estimated or obtained from the best available information in the literature. Groundwater diversions are metered for large municipal and industrial wells and represent the best known component of the water budget. Precipitation and streamflow are also measurable water sources, although they are typically measured at only a few locations. By comparison, evaporation, evapotranspiration by plants, infiltration, return flows, movement of groundwater between sub-basins, domestic well usage, and spring and seep discharges are usually estimated. Consequently, because they rely heavily on estimates (based on prior studies and expert judgment) instead of actual measurements, water budget calculations generally have a high degree of uncertainty and should be used with considerable caution. This is especially true for groundwater because a region-wide groundwater assessment has never been done.

Groundwater budgets for the 12 hydrogeologic groundwater basins were prepared to evaluate the current balance between inflows and outflows. To maintain water levels, the total inflow and outflow components in a groundwater budget should be equal. However, if outflow is greater than the inflow, as shown in the water budget for the Mimbres Basin (Figure ES-8), water levels will lower in the aquifer and the volume of water in storage will decrease. Outflows also exceed inflows in the Animas and Nutt-Hockett Basins, where widespread water level declines confirm that the aquifer is being mined. Figure ES-8 shows the estimates for inflow and outflow components for all 12 of the basins analyzed.

Surface water budgets for the San Francisco, Gila, and Mimbres basins were prepared based on the surface water inflow and outflow components for both average and drought conditions. The major input—runoff from rain and snowmelt—was quantified based on gaged streamflows for average conditions as well as for drought conditions, the latter of which were based on 10th-percentile streamflows (flows at a level that 10 percent of all flows fall below and 90 percent above).

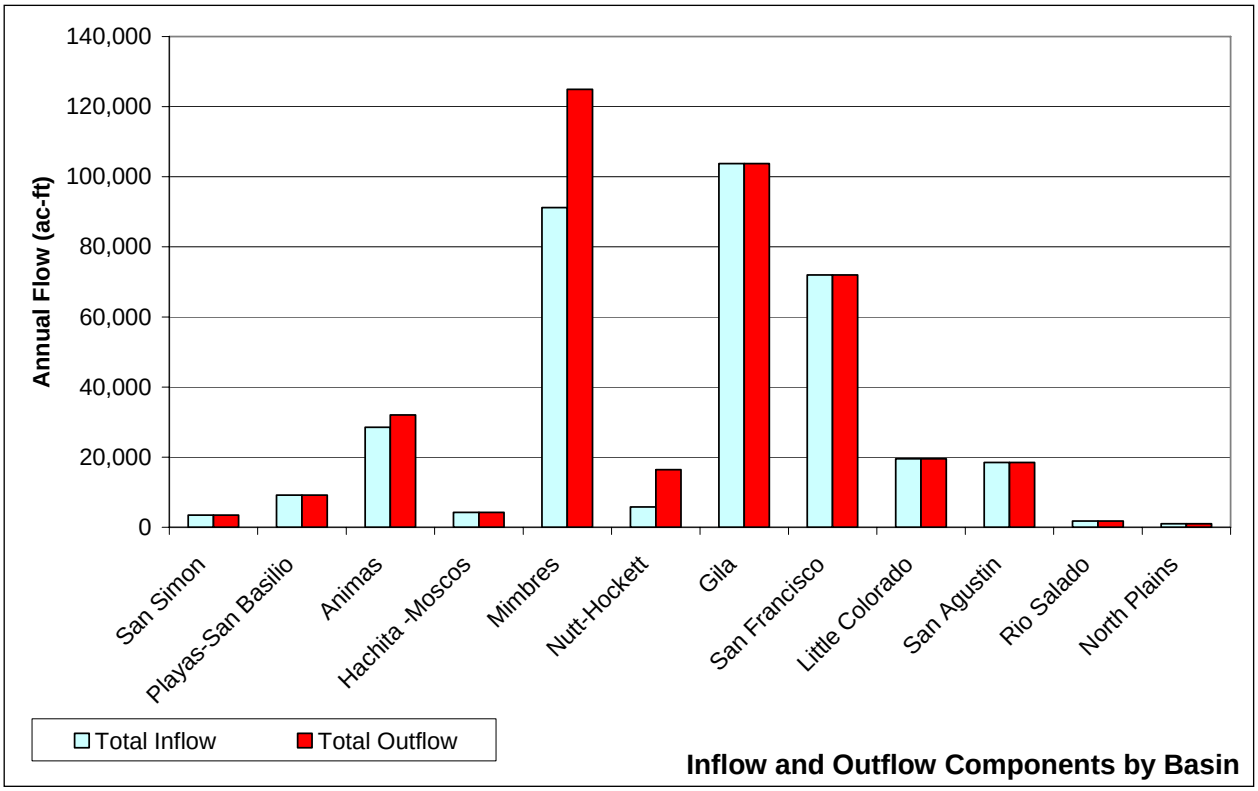


Figure ES-8

The results of the surface water budgets showed that inflows were greater than outflows in the San Francisco and Gila systems for both average and drought conditions. However, due to legal restrictions on the use of surface water, no excess surface water is currently available to meet new demands in these systems, although some new water may be available in the future from the 14,000 acre-feet of Gila River water authorized under the CAP. In the Mimbres system, inflows were greater than outflows under average conditions and approximately equal to outflows in drought conditions, but again, no excess surface water is available to meet new demands in the Mimbres due to legal restrictions.

Alternatives

Once the region has studied their water supply and projected future demand for water, the next key component of the regional water plan is to develop alternatives for meeting the projected water demand. Alternatives are actions that the region can take to increase supply, reduce demand, protect or improve water quality, or better manage water resources so that the water supply of the region continues to be viable.

To identify and select alternatives for meeting the projected gap between supply and demand in the Southwest Region, an initial list of potential alternatives was developed at meetings of the Southwest New Mexico Regional Water Planning Steering Committee, which are open to the public, and at public meetings. The Steering Committee also identified criteria to help determine which of the alternatives were the most important to analyze and include in the regional water plan. These criteria included:

- Economic feasibility/practicality
  - Local costs
  - Project costs

- Institutional feasibility
  - Equity of cost/benefit
  - Regional political and stakeholder support
  - Technical feasibility
  - Legal feasibility

- Water resources enhancement
  - Water quality
  - Water quantity

- Quality of life enhancement
  - Environment
  - Social and cultural impacts
  - Economic vitality of the region

As an initial evaluation, these criteria were used to score all of the alternatives. Scores for financial, legal, and technical criteria were prepared by DBS&A and were reviewed and revised by the Steering Committee. Scores for quality of life and political criteria were prepared by the Steering Committee.

Based on the scores and weightings assigned to individual criteria by the Steering Committee, a list of priority alternatives was developed:

- Municipal conservation and management
- Agricultural water conservation
- Watershed management
- Enhancement of surface recharge
- Provide water for natural riparian and aquatic habitat on the Gila and San Francisco Rivers
- Aquifer storage and recovery of Gila River flows
- Water banking
- Groundwater development

In accordance with the ISC template, these priority alternatives were evaluated with regard to their technical feasibility, political feasibility, social and cultural impacts, financial feasibility, and hydrologic and environmental impacts.

In addition to the priority alternatives, the Steering Committee identified several other alternatives that are important actions but that do not warrant as much analysis. For these alternatives, background information, key issues, and implementation considerations were evaluated. The alternatives that received limited analysis are:

- Water quality protection
- Groundwater management planning
- Border groundwater management
- Rain harvesting
- Industrial conservation
- Restrictions on domestic wells

For each of the alternatives, implementation is feasible in the region; however, there are financial, legal, and institutional challenges that must be overcome for successful implementation of these alternatives. Alternative implementation will be carried out by local governments, soil and water conservation districts, and other entities that can pursue individual projects. Leadership and education will be required for successful alternative implementation.