Basin Report Objectives

This report is designed to provide a local perspective on the Statewide Water Supply Initiative 2010 (SWSI 2010) report. This basin report was prepared in consultation with the local Basin Roundtable established by House Bill 05-1177 and some sections of the report were directly produced by basin roundtable members. As such, the report not only summarizes basin-specific data from SWSI 2010, but also seeks to document progress, problems, and a path forward from the basin's perspective. The State of Colorado fully supports the basin roundtable process, yet the substantive conclusions of this report are those of the basin roundtable and are not necessarily endorsed by the State of Colorado.

This report is intended to provide reconnaissance-level data that employs consistency in data collection and forecast methodology across the state while maximizing available data. The methods utilized in this approach are for the purpose of general statewide and basinwide planning and are not intended to replace the efforts of local entities for project-specific purposes.

THIS PAGE INTENTIONALLY LEFT BLANK

Contents
Southwest Basin

Figures

Tables

Acronyms

AF	acre-feet
AFY	acre-feet per year
ARSG	Animas River Stakeholders Group
ASMD	Aspen Springs Metro District
AWF	A Way Forward
BLM	Bureau of Land Management
BOR	U.S. Bureau of Reclamation
CBEF	Center for Business and Economic Forecasting
CDM	Camp Dresser & McKee Inc.
CDOW	Colorado Division of Wildlife
CDPHE	Colorado Department of Public Health and Environment
CDSS	Colorado Decision Support System
cfs	cubic feet per second
CRSP	Colorado River Storage Project
CRWAS	Colorado River Water Availability Study
CU	consumptive use
CU&L	Consumptive Uses and Losses
CWCB	Colorado Water Conservation Board
DMRP	Drought Mitigation and Response Plan
DNR	Department of Natural Resources
DRD	Dolores River Dialogue
DR-RAP	Dolores River - Restoration Action Plan
DRRP	Dolores River Restoration Partnership
DWCD	Dolores Water Conservancy District
EAP	Emergency Action Plan
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FWCD	Florida Water Conservancy District
GCM	General Circulation Model
GIS	geographic information system
gpcd	gallons per capita per day
GPWA	Goodman Point Water Association
HB	House Bill
HUC	Hydrologic Unit Code
IBCC	Interbasin Compact Committee
IDA	Incremental Damage Analysis
IDF	Inflow Design Flood
IPPs	identified projects and processes
ISF	instream flow
IWR	Irrigation Water Requirement
LAPLAWD	La Plata Archuleta Water District
LPWCD	La Plata Water Conservancy District
LPWWA	La Plata West Water Authority
M&I	municipal and industrial
MOU	Memorandum of Understanding
MVIC	Montezuma Valley Irrigation Company
NCA	National Conservation Area
NCNA	Nonconsumptive Needs Assessment
NHD	National Hydrography Dataset
NRCS	Natural Resources Conservation Service
ORV	Outstandingly Remarkable Value

PAWSD	Pagosa Area Water and Sanitation District
PRID	Pine River Irrigation District
RICD	recreational in-channel diversion
RPW	River Protection Workgroup
SB	Senate Bill
SDO	State Demographer's Office
SEO	State Engineer's Office
SJCA	San Juan Citizens Alliance
SJWCD	San Juan Water Conservancy District
SMWCD	San Miguel Water Conservancy District
SRGAP	Southwest Regional Gap Analysis Project
SSI	self-supplied industrial
SUIT	Southern Ute Indian Tribe
SWCD	Southwestern Water Conservation District
SWSI	Statewide Water Supply Initiative
TNC	The Nature Conservancy
TU	Trout Unlimited
UMUT	Ute Mountain Ute Tribe
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
W&S	Wild and Scenic
WSL CU	Water Supply Limited Consumptive Use
WSR	Wild and Scenic River
WSRA	Water Supply Reserve Account

THIS PAGE INTENTIONALLY LEFT BLANK

Section 1
Introduction

1.1 Southwest Basin Roundtable

New alignments have characterized the first 5 years of the Southwest Basin Roundtable. The individual sub-basins that make up the basin roundtable's area (San Juan, Dolores, and San Miguel) are geographically and culturally distinct, with different needs and values. Through the dialogue provided by the basin roundtable, members have learned to align themselves in more holistic understandings and mutual support.

Another challenge has been to align consumptive and nonconsumptive needs and values. The basin roundtable held a series of meetings in all of our sub-basins to gather and document input on nonconsumptive uses and values. The basin roundtable used this input and placed it in a geo-database that is integrated with the state nonconsumptive layers, as well as the location of the basin's identified projects and processes (IPPs).

This ability to overlay locally generated data with information coming out of the statewide process characterizes another alignment that has emerged. The Southwest Basins are isolated by mountain passes and are as far away from Denver as anywhere in the state. The relationship to state level water policy through the Interbasin Compact Committee (IBCC) and Colorado Water Conservation Board (CWCB) staff has gone a long way to overcome this isolation. A good example of this is the basin roundtable's participation in the Colorado River Water Supply Availability Study (CRWAS). Since decisions concerning the Colorado River and its tributaries have a large impact on the Southwest Basin, basin roundtable members were very engaged in providing constructive feedback on this report.

San Miguel River

Another alignment is an integrated approach to agricultural and municipal and industrial (M&I) water needs. The Southwest Basin Roundtable has supported a number of M&I projects, which are designed to meet growing M&I needs without diminishing agricultural water supplies, by increased efficiency, storage capacity, and more creative operational strategies.

Insight into all of these emerging alignments has been catalyzed by the opportunity and the responsibility for helping with the approval of the Water Supply Reserve Account (WSRA). Decisions relating to these allocations have been the proving ground for all the alignments described above: cooperation among sub-basins, consumptive and nonconsumptive needs, M&I and agricultural supplies, and local and state level water planning and policy.

In 2010, the Southwest Basin hosted the annual tour sponsored by the Colorado Foundation for Water Education. This experience re-enforced the area's identity as a basin. In addition, the tour led to plans for increased education and outreach efforts during the Southwest Basin Roundtable's next 5 years.

1.2 Overview of the Water for the 21st Century Act

In 2005, the Colorado General Assembly passed the Colorado Water for the 21st Century Act (House Bill [HB] 05-1177). This legislation set up a framework that provides a permanent forum for broad-based water discussions, and it created two new structures—1) the IBCC, a statewide committee that addresses issues between basins; and 2) the basin roundtables, which were established in each of the state's eight major river basins plus the Denver Metro area. The purpose of the basin roundtables is to facilitate discussions on water issues and encourage locally-driven collaborative solutions. The broad-based, collaborative nature of this process is reflected in the basin roundtable membership.

The purpose of the basin roundtables is to facilitate discussions on water issues and encourage locally-driven collaborative solutions.

To help the basin roundtables accomplish their major responsibility of developing basinwide needs assessments, they have relied on groundwork completed during the Statewide Water Supply Initiative (SWSI) Phase 1 study. To further develop their needs assessments, support water activities in each of the basins, and implement identified water projects and methods, it was clear that the basin roundtables needed staff support as well as technical and financial assistance. Using resources provided through HB 06-1400, the CWCB provides staff support and technical assistance to the basin roundtables and the IBCC for the ongoing implementation of the Colorado Water for the 21st Century Act. The basin roundtables were also provided financial resources through Senate Bill (SB) 06-179, which established the WSRA. The WSRA appropriates money to the CWCB to help implement the consumptive and nonconsumptive water supply projects and methods identified by the basin roundtables. These bills and other relevant legislation are summarized below. The purpose of this report is to summarize the results of the Southwest Basin Roundtable's needs assessment that have been completed to date.

SB03-110 authorized SWSI 1, which implemented a collaborative approach to water resources issues by establishing SWSI roundtables. SWSI 1 focused on using a common technical basis for identifying and quantifying water needs and issues.

HB05-1177 or The Colorado Water for the 21st Century Act provides a permanent forum for broad-based water discussions. It creates two new structures: 1) the IBCC, and 2) the basin roundtables. There are nine basin roundtables based on Colorado's eight major river basins and the Denver Metro area.

SB06-179 created the WSRA. Throughout SWSI and Colorado Water for the 21st Century Act processes, there has been a clear recognition that financial assistance is needed to address the water challenges in our state. This legislation funds the WSRA, which directs the State Treasurer to annually transfer $10 million from the Operational Account of the Severance Tax Trust Fund to the WSRA. These monies are available to the basin roundtables to fund water activities.

HB06-1385 created the CWCB's Intrastate Water Management and Development Section, which implements SWSI, the WSRA, develops reconnaissance level water supply alternatives, and tracks and supports water supply projects and planning processes. This section is now called the Water Supply Planning Section.

HB06-1400 appropriated money to the CWCB to fund staffing of the Water for the 21st Century Act process and monies for a contractor to technical assistance the basin roundtables.

SB09-106 authorized the funding of the WSRA in perpetuity.

Basin roundtables are legislatively required to be made up of a diverse set of stakeholders, including representatives from counties, municipalities, water conservancy districts, the environmental and recreational communities, agriculture, and industry. The responsibilities of the basin roundtables can be grouped into three categories—procedural, substantive, and public involvement. Each basin roundtable adopted bylaws that include the basin roundtable's goals, objectives, and operating procedures. These bylaws reflect the specific needs of the basin roundtable and reflect the uniqueness of each basin. Each basin roundtable developed procedures and selected two members of the IBCC.

The most extensive substantive responsibility assigned to each basin roundtable is to develop a basinwide water needs assessment. This is performed in cooperation with local governments, area water providers, and other stakeholders. The Colorado Water for the 21st Century Act states "Using data from the Statewide Water Supply Initiative and other appropriate sources and in cooperation with the ongoing Statewide Water Supply Initiative, develop:

- An assessment of consumptive water needs (municipal, industrial, and agricultural)
- An assessment of nonconsumptive water needs (environmental and recreational)
- An assessment of available water supplies (surface and groundwater) and an analysis of any unappropriated waters
- Proposed projects or methods to meet any identified water needs and achieve water supply sustainability over time"

Equally important to selecting members of the IBCC and developing a basinwide water needs assessment, the basin roundtables serve as a forum for public involvement. The basin roundtable activities are required by law to be open, public meetings. The basin roundtable process creates an expanded foundation for public involvement.

This SWSI 2010 Report was largely based on basin roundtables' water needs assessments. This report is a summary of the Southwest Basin Roundtable's needs assessment results that were utilized in the SWSI 2010 Report and that were chosen by the basin roundtable to be included in this Southwest Basin Roundtable Needs Assessment Report.

1.3 Overview of the SWSI 2010 Report

The last decade brought many changes to the State of Colorado's water supply outlook. Despite the recent economic recession, the state has experienced significant population growth, and Colorado's population is expected to nearly double within the next 40 years. Colorado needs to provide an adequate water supply for its citizens and the environment, yet Colorado is transitioning from an era of undeveloped resources to an era of managing a more developed resource. Meeting the state's municipal, industrial, agricultural, environmental, and recreational water needs will involve implementing a mix of local water projects and processes, conservation, reuse, agricultural transfers, and the development of new water supplies, all of which should be pursued concurrently. Ultimately, the future of Colorado—both its vibrancy and its beauty—is dependent on how our water resources are sustained, used, and developed.

The CWCB is statutorily charged to conserve, protect, manage, and develop Colorado's water resources for current and future generations.

To help understand and address these trends, the CWCB undertook a number of important initiatives. The CWCB is statutorily charged to conserve, protect, manage, and develop Colorado's water resources for current and future generations. In advancing this mission, the CWCB helps ensure that water is utilized to meet the needs of Colorado's citizens while protecting the environment.

In the last few years, state leaders and resource management agencies have increasingly focused on helping ensure that Colorado has an adequate water supply for its citizens, agriculture, and the environment. In 2003, the Colorado General Assembly recognized the critical need to understand and better prepare for our long-term water needs and authorized the CWCB to implement the SWSI. SWSI 1, approved by the CWCB Board in 2004, was a comprehensive identification of Colorado's current and future water needs, and it examined a variety of approaches Colorado could take to meet those needs. SWSI 1 implemented a collaborative approach to water resource issues by establishing "basin roundtables"—diverse groups of individuals representing water interests who provide input on water issues.

This was followed by SWSI 2, which established four technical roundtables—Conservation, Alternative Agricultural Water Transfers, Environmental and Recreational Needs, and Addressing the Water Supply Gap. The overall goal of SWSI 2 was to develop a range of potential solutions that would help water providers, policymakers, and stakeholders gain a deeper understanding of the relative role that water efficiency, agricultural transfers, and new water development can play in meeting future needs and the trade-offs associated with these solutions.

In 2005, the legislature reaffirmed the need to prepare for a future in which water resources are increasingly limited by passing the Colorado Water for the 21st Century Act. This legislation institutionalized nine basin roundtables and created a voluntary, collaborative process to help the state address its water challenges. This process is based on the premise that Coloradoans can work together to address the water needs within the state.

Figure 1-1 illustrates the nine basin roundtables, which were organized to represent Colorado's eight major river basins and a separate basin roundtable for the Denver Metro area. The Yampa-White, Colorado, Gunnison, and Southwest Basin Roundtables are all based on tributaries to the Colorado River. The North Platte, Metro, and South Platte Basin Roundtables represent watersheds tributary to the Platte River. The Arkansas and Rio Grande Basin Roundtables are the headwaters of these river systems.

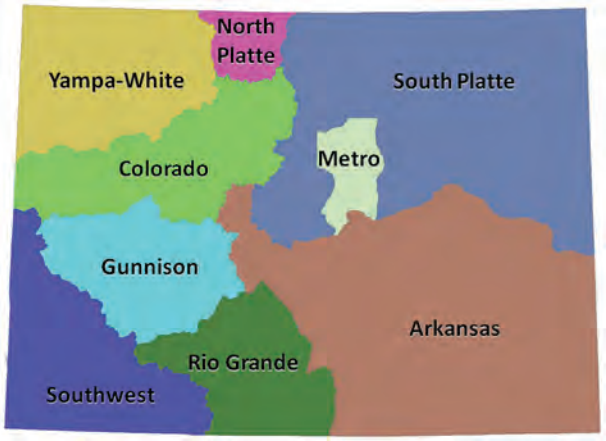


Figure 1-1 Colorado's nine basin roundtables provide a voluntary and collaborative process to help the state address its water challenges

In addition to the nine basin roundtables, the Colorado Water for the 21st Century Act established the 27-member IBCC to facilitate conversations between basins and to address statewide issues. The IBCC established its charter in 2006, which was soon ratified by Colorado's General Assembly. The charter outlines the roles of the IBCC—to provide a "framework that creates incentives for successful deliberations, agreements, and their implementation." To help advance this role, the IBCC embarked on a visioning process, through which the IBCC, CWCB, and basin roundtables agreed to evaluate water demand and supply strategies that could help address Colorado's water supply future.

1.4 SWSI 2010 Report Recommendations

With the completion of the SWSI 2010, CWCB has updated its analysis of the state's water supply needs and recommends Colorado's water community enter an implementation phase to determine and pursue solutions to meeting the state's consumptive and nonconsumptive water supply needs. This will be accomplished through the following recommendations.

These recommendations do not necessarily represent a statewide consensus. The CWCB has deliberated on the information contained in SWSI 2010 and has put forth its view of how to move forward.

1. Actively encourage projects to address multiple purposes, including municipal, industrial, environmental, recreational, agricultural, risk management, and compact compliance needs.

2. Identify and utilize existing and new funding opportunities to assist in implementing projects and methods to meet Colorado's consumptive and nonconsumptive water supply needs.

3. Continue to lead the dialogue and foster cooperation among water interests in every basin and between basins for the purpose of implementing solutions to Colorado's water supply challenges.

4. Support water project proponents and opponents in resolving conflict and addressing concerns associated with implementing IPPs that will reduce the M&I water supply gap. Identify IPPs that could be implemented by 2020.

5. Support meeting Colorado's nonconsumptive water needs by working with Colorado's water stakeholders to help:

   - Promote recovery and sustainability of endangered, threatened, and imperiled species in a manner that allows the state to fully use its compact and decreed entitlements.
   - Protect or enhance environmental and recreational values that benefit local and statewide economies.
   - Encourage multi -purpose projects that benefit both water users and native species.
   - Pursue projects and other strategies, including CWCB's Instream Flow Program, that benefit consumptive water users, the riparian and aquatic environments, and stream recreation.
   - Recognize the importance of environmental and recreational benefits derived from agricultural water use, storage reservoirs, and other consumptive water uses and water management.

Rafting on the Dolores River

6. Help meet Colorado's agricultural water supply needs by incorporating agricultural water needs into the development of water supply portfolios and supporting the implementation of multi-purpose agricultural water supply projects.

7. In order to determine the appropriate combination of strategies (IPPs, conservation, reuse, agricultural transfers, and the development of new water supplies) and portfolios to meet the water supply needs, CWCB will identify what it considers is achievable for each portfolio element and how those portfolio elements could be implemented.

8. Evaluate multi-purpose projects or packages of projects to develop new water supplies for use on the West Slope and the Front Range.

9. Develop and support risk management strategies so that Colorado can fully use its compact and decree entitlements to best balance Colorado's diverse water needs.

10. Support, encourage, and incentivize water providers in planning for and implementing M&I active conservation best management practices and other demand management strategies.

11. Work with water providers to identify opportunities where additional water could be made available by increased regional cooperation, storage, exchanges, and other creative opportunities.

12. Continue the evaluation of Colorado's water supply availability in all basins to help provide water users with viable analysis tools.

13. Help safeguard Colorado's water supply during times of drought by incorporating drought mitigation and response in statewide and local water supply planning.

14. Support local water supply planning.

15. The CWCB, in consultation with other state agencies, shall develop and implement a plan to educate and promote stewardship of water resources that recognizes water's critical role in supporting the quality of life and economic prosperity of all Coloradoans.

16. Establish a 6-year planning cycle for assessing Colorado's long-term consumptive and nonconsumptive water needs and support the implementation of projects and methods to meet those needs.

1.5 Southwest Basin Roundtable Needs Assessment Report Overview

This report presents the information utilized in the SWSI 2010 Report and needs assessment information developed by the basin roundtable that is specific to the Southwest Basin. Following is a description of the contents of this Basin Needs Assessment Report:

- **Section 2** is a summary of the **Southwest Basin Nonconsumptive Needs Assessment** that have been completed to date. The roundtable has completed an extensive inventory of its environmental and recreational attributes and has summarized this information in focus area mapping.

- **Section 3** provides an overview of **Southwest Basin Nonconsumptive Projects and Methods** that have been summarized by the basin roundtable. In addition, projects and methods collected by CWCB are also included in this section.

- **Section 4** summarizes the basin's M&I and agricultural water demands into a basinwide look at the **Southwest Basin's Consumptive Needs Assessment**. The consumptive demands utilize a planning horizon of 2050.

- In **Section 5**, projects and methods to meet consumptive needs are considered. As part of the summary, the **Projects and Methods to Meet Southwest Basin M&I Needs** are described at a regional level. This information was compiled by the basin roundtables. In addition, CWCB's M&I gap analysis is included in this section.
- The CWCB recently developed the draft CRWAS. In **Section 6, Water Availability** is considered statewide including a summary of the analyses considered in CRWAS as well as water availability information developed by the Basin Roundtables as part of their basinwide needs assessments and during SWSI 1.
- **Section 7** is a summary of the **Southwest Basin Roundtable's Recommendations** and provides a summary of the basin roundtable's recommended next steps.

THIS PAGE INTENTIONALLY LEFT BLANK

Section 2
Southwest Basin Nonconsumptive Needs Assessment

2.1 Overview of Nonconsumptive Needs Assessments

As discussed in Section 1, the basin roundtables are required to complete Nonconsumptive Needs Assessments (NCNAs). This effort has included an extensive inventory, analysis, and synthesized mapping effort that built upon the Statewide Water Supply Initiative (SWSI) 2 environmental and recreational attribute mapping as a common technical platform for the basin roundtables. **Figure 2-1** shows the process that was utilized by the Colorado Water Conservation Board (CWCB) and basin roundtables in completing their NCNAs. The basin roundtables have utilized environmental and recreational mapping to identify where the nonconsumptive focus areas are in their basins. The Southwest Basin nonconsumptive identified projects and methods are summarized in Section 3 of this report.

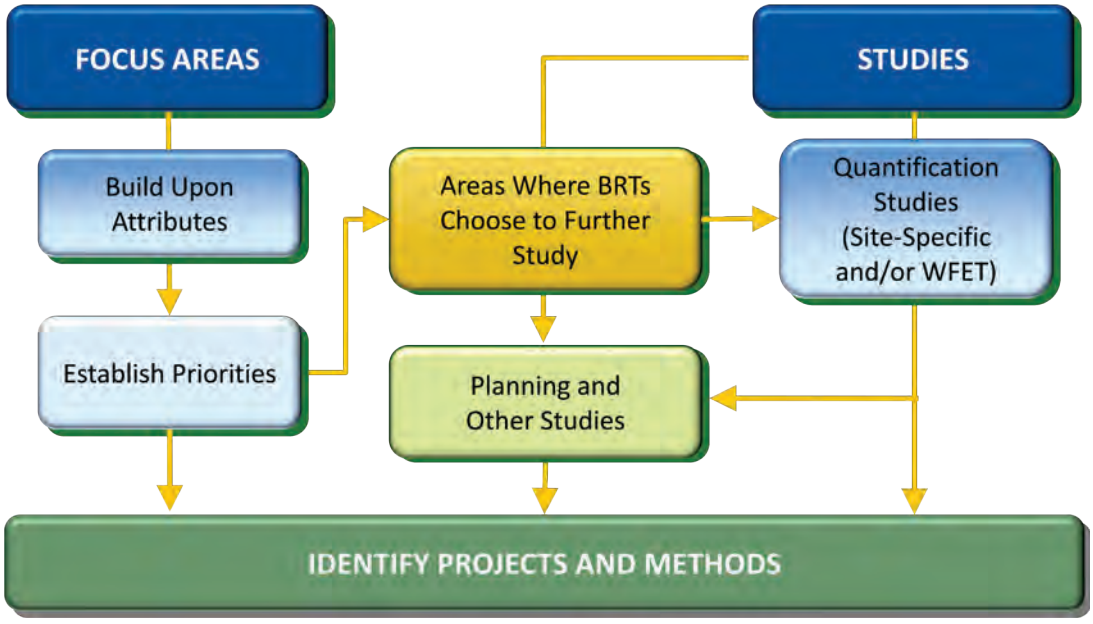


Figure 2-1 Nonconsumptive Needs Assessment Methodology

The focus area maps developed by each basin roundtable are based on a common set of environmental and recreational attributes and represent where Colorado's important water-based environmental and recreational attributes are located. The maps are reflective of stakeholder input for the focus areas and also reflect stream reaches and subwatersheds with higher concentrations of environmental and recreational qualities.

These maps were generated to provide information to the basin roundtables on important environmental and recreational areas in their basins but were not intended to dictate future actions. It should be noted, and as will be shown in this section, that this effort has not identified all streams as important. The NCNAs are not intended to create a water right for the environment and will not diminish, impair, or cause injury to existing absolute or conditional water rights. The CWCB and basin roundtable developed the environmental and recreational focus area mapping for the following purposes:

- The maps are intended to serve as a useful guide for water supply planning so that future conflicts over environmental and recreational needs can be avoided.
- The maps can assist in identifying environmental and recreational water needs status, such as where needs are being met, where additional future study may need to take place, or where implementation projects in the basin are needed.
- The maps can help basins plan for the water needs of species of special concern so that they do not become federally-listed as endangered or threatened in the future.
- The maps can provide opportunity for collaborative efforts for future multi-objective projects.

2.2 Focus Area Mapping Methodology

Underlying the work done by the basin roundtables is a common technical platform, which builds off SWSI 2, as described above. This common technical platform approach recognizes the need for each basin roundtable to utilize the technical work in the most effective manner for the stakeholders and concerns within the basin. For example, some basins that were focused on wetlands or bird habitat issues used a watershed approach, while others focused on instream habitat.

Overall, the basin roundtables used three methods to identify their focus areas as shown in **Figure 2-2**. After the basin roundtables gathered additional data layers beyond existing SWSI 2 geographic information system (GIS) data layers, they each developed a summary map that highlighted environmental and recreational focus areas for their basin. The Southwest Basin Roundtable utilized Method 2, which employed GIS software to summarize information at a stream segment level. The basin roundtable had many data layers that they summarized into "categories," such as threatened and endangered species, riparian communities, and recreational boating areas. Using GIS software, the number of categories in each stream reach was counted, and using varying color scales, GIS stream reaches with a higher number of categories were highlighted in a darker color.

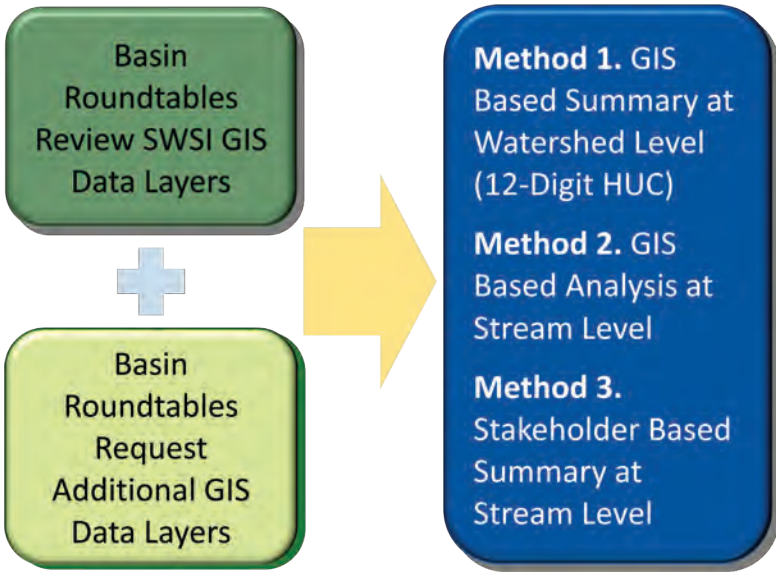


Figure 2-2 Basin Roundtable Focus Area Mapping Methodology

GIS software was used to organize the data layers for environmental and recreational attributes associated with nonconsumptive water needs for each basin. The term "data layer" refers to geographic data that represents a specific type of feature or attribute (e.g., wetlands or species habitat) and can also be referred to as a shapefile. Multiple data layers, organized collectively, are referred to as a dataset. The environmental and recreational data layers for each basin were selected using the SWSI 2 GIS data layers as a starting point. The basin roundtables reviewed the available data layers compiled during SWSI 2 and then suggested and contributed additional data layers as deemed appropriate for each basin. The SWSI 2010 Report's Appendix C contains the *Nonconsumptive Needs Assessment Focus Mapping Final Report* that provides the detailed methodology utilized by each basin roundtable in developing their focus area map.

2.2.1 SWSI 2 GIS Data Layers

The Environmental and Recreational Technical Roundtable that was formed under SWSI 2 developed a list of select environmental and recreational GIS data layers that could potentially be used by decisionmakers to determine areas of focus for environmental and recreational water needs. The complete list of SWSI 2 GIS data layers is shown in **Table 2-1**.

Table 2-1 SWSI 2 Environmental and Recreational Data Layers

Arkansas Darter	Gold Medal Trout Streams
Audubon Important Bird Areas	Greenback Cutthroat Trout
Bluehead Sucker	Greenback Cutthroat Trout
Bonytail Chub	Humpback Chub
Boreal Toad Critical Habitat	Rafting and Kayak Reaches
Colorado Department of Public Health and Environment Water Quality Control Division 303(D) Listed Segments	Rare Riparian Wetland Vascular Plants
Colorado Pikeminnow	Razorback Sucker
Colorado River Cutthroat Trout	Recreational In-Channel Diversions
CWCB Instream Flow Rights	Rio Grande Cutthroat Trout
CWCB Natural Lake Levels	Rio Grande Sucker
CWCB Water Rights Where Water Availability had a Role in Appropriation	Roundtail Chub
Flannelmouth Sucker	Significant Riparian/Wetland Communities
Gold Medal Trout Lakes	

In addition to the SWSI 2 environmental and recreational GIS data layers, the basin roundtables requested the attainment and development of other important environmental and recreational GIS data layers. Some of the additional GIS data were received directly from state and federal agencies, nongovernmental organizations and municipalities, or downloaded from their official websites. Other additional GIS data were digitized from available information, lists, or maps provided by basin roundtables, specialists (biologists, recreation guides), and other stakeholders. **Table 2-2** contains a list of additional environmental and recreational data layers that were collected based on basin input.

Table 2-2 Additional Environmental and Recreational Data Layers Collected Statewide Based on Basin Roundtable Input

Additional Fishing	National Wetlands Inventory
Additional Greenback Cutthroat Trout Waters	Northern Leopard Frog Locations
Additional Paddling/Rafting/Kayaking/Flatwater Boating	Northern Redbelly Dace
Additional Rio Grande Sucker and Chub Streams	Osprey Nestsites and Foraging Areas
Bald Eagle Winter Concentration	Piping Plover
Bald Eagle Active Nestsites	Plains Minnow
Bald Eagle Summer Forage	Plains Orangethroat Darter
Bald Eagle Winter Forage	Preble's Meadow Jumping Mouse
Brassy Minnow	River Otter Confirmed Sightings

Table 2-2 Additional Environmental and Recreational Data Layers Collected Statewide Based on Basin Roundtable Input (continued)

Colorado Birding Trails	River Otter Overall Range
Colorado Outstanding Waters	Rocky Mountain Biological Laboratory (scientific and educational reaches)
Common Garter Snake	Sandhill Crane Staging Areas
Common Shiner	Southwestern Willow Flycatcher
Ducks Unlimited Project Areas	Stonecat
Educational Segments	Waterfowl Hunting Areas
Eligible/Suitable Wild and Scenic	Wild and Scenic Study Rivers
Grand Mesa, Uncompahgre, and Gunnison Wilderness Waters/Areas	Wildlife Viewing
High Recreation Areas	Yellow Mud Turtle
Least Tern	

2.2.2 Categorization of Data Layers

Once the basin roundtables identified the focus environmental and recreational data layers in their basins, the data layers were grouped into subcategories representing a collective environmental or recreational category. This method had two advantages—1) it moderated redundancy among comparable, geographically overlapping individual data layers, and 2) it allowed for a more comprehensible presentation of the GIS data. For example, Colorado pikeminnow, razorback sucker, humpback chub, and bonytail chub and federal critical habitat individual data layers were all grouped under the subcategory "Federally Endangered Fish," which was included in the overarching environmental category. The Southwest Basin's subcategories are shown as an example below in **Figure 2-3**.

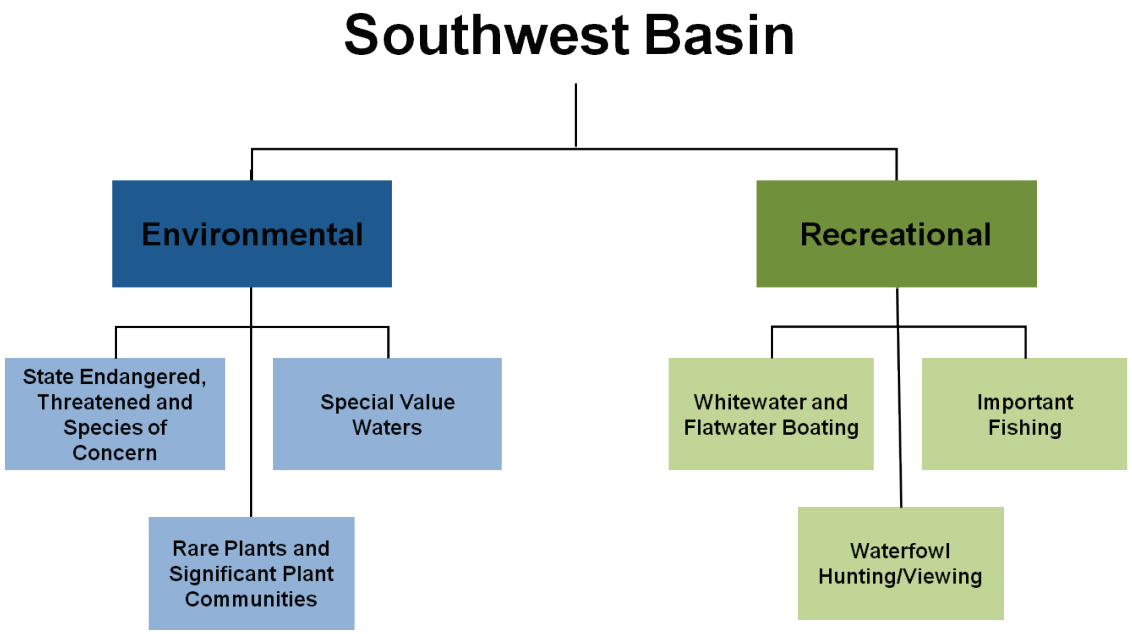


Figure 2-3 Southwest Basin Environmental and Recreational Subcategories

2.2.3 GIS Analysis of Data Layers

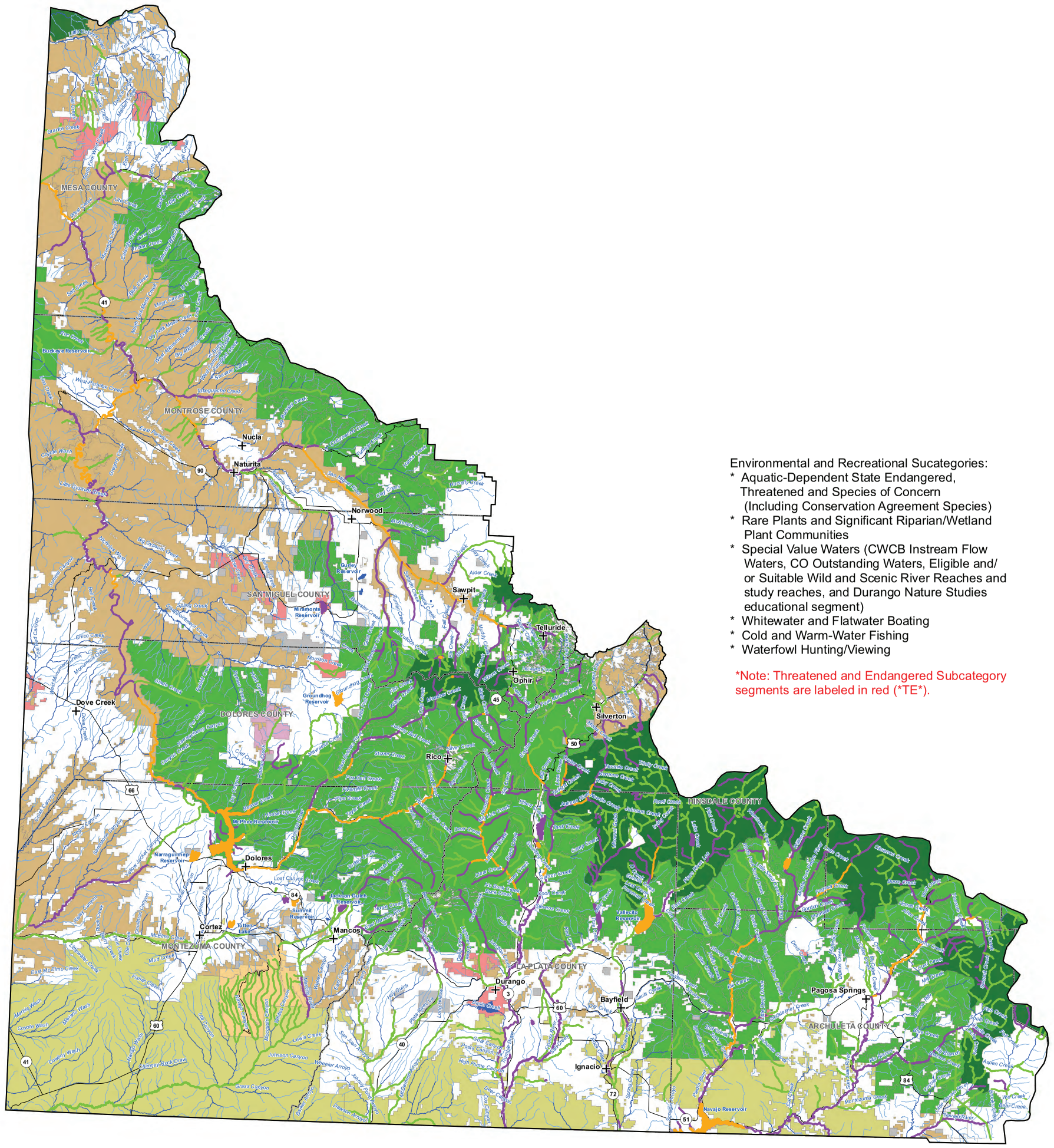
The Southwest Basin Roundtable summarized their environmental and recreational attributes on a stream segment basis. This information was also summarized using U.S. Geological Survey (USGS) information for stream segments provided by National Hydrography Dataset (NHD). Each stream segment that was included as a focus area by the basin roundtables was summarized at the NHD segment level and is related to the USGS NHD stream layers using the common identifier for the NHD database.

The Southwest Basin Roundtable summarized information at the stream reach level. Using GIS, the recreational and environmental category layers were summarized using GIS and then a buffer was applied to the stream segments. Environmental and recreational category layers within the buffer were summarized by developing a density of number of environmental and recreational categories within the buffer. Detailed procedures for this analysis are described in Appendix C of the SWSI 2010 Report.

2.3 Nonconsumptive Focus Area Mapping Results

Using the methodologies and techniques outlined above, the Southwest Basin developed a unique map showing focus areas with nonconsumptive environmental and recreational water needs. The basin map was created as a Geospatial PDF file, or GeoPDF, to allow the user the ability to "click" areas of the map and view characteristics of that portion of the map such as what attribute subcategories are present for a given Hydrologic Unit Code or stream segment. In addition, the presence of specific attributes (e.g., Arkansas darter, trout, kayaking, etc.) is also summarized as well as information designated by the basin roundtable through creation of tables associated with their map. **Figure 2-4** can be used as a GeoPDF in the electronic version of this report. To utilize the map interactively, select the tools dropdown list, then select the analysis tools arrow and then click on the "object data tool." Using this tool, triple click a reach for additional information that will appear on the left side.

Figure 2-4 shows the environmental and recreational focus mapping for the Southwest Basins. This figure was developed as a GeoPDF that enables the viewer to select the environmental and recreational focus area segment and display the specific attributes associated with that stream segment. As discussed previously, the segments are presented at the NHD stream reach level. In the Southwest Basin, a large portion of the streams and lakes contained at least one environmental or recreational subcategory. The majority of streams found in the Weminuche Wilderness and U.S. Forest Service areas between Durango and Silverton were highlighted for their nonconsumptive water needs and nearly the entire lengths of the major rivers (the San Juan, San Miguel, and Dolores Rivers) are highlighted because they contain environmental and recreational subcategories deemed important by the basin roundtable. The GeoPDF allows the user to select individual NHD stream segments and display their specific attributes using Adobe Reader.



Environmental and Recreational Sucategories:

* Aquatic-Dependent State Endangered, Threatened and Species of Concern (Including Conservation Agreement Species)
* Rare Plants and Significant Riparian/Wetland Plant Communities
* Special Value Waters (CWCB Instream Flow Waters, CO Outstanding Waters, Eligible and/or Suitable Wild and Scenic River Reaches and study reaches, and Durango Nature Studies educational segment)
* Whitewater and Flatwater Boating
* Cold and Warm-Water Fishing
* Waterfowl Hunting/Viewing

*Note: Threatened and Endangered Subcategory segments are labeled in red (*TE*).

Legend

Environmental and Recreational Subcategory Count by Stream Segment

- 1
- 2 - 3
- 4 - 6
- Roads
- Rivers and Streams
- Cities and Towns
- County Boundary
- Wilderness Areas

Land Management

- BLM
- BOR
- CDOW
- CITY
- COUNTY
- FWS
- LAND TRUST
- NPS
- PRIVATE
- SCHOOL DISTRICT
- SLB
- STATE
- STPARKS
- TRIBE
- USFS

N
W E
S

0 4.5 9 18 27
Miles

1 inch = 4.5 miles

Figure 2-4

Southwest Basin Nonconsumptive Needs Assessment Environmental and Recreational Subcategory Count per Stream Segment

Section 3
Southwest Basin Nonconsumptive Projects and Methods

3.1 Nonconsumptive Projects and Methods Background

The nonconsumptive needs subcommittee of the Southwest Basin Roundtable has been working in concert with the Colorado Water Conservation Board (CWCB) to identify nonconsumptive needs in the basin. As a reminder, basin roundtables are charged very specifically with identifying and addressing nonconsumptive needs throughout the state.

House Bill 05-1177. Colorado Water for the 21st Century Act.
37-75-104. (2.c) Basin Roundtables.

> Using data and information from the Statewide Water Supply Initiative [SWSI] and other appropriate sources and in cooperation with the ongoing SWSI, develop a basinwide consumptive and nonconsumptive water supply needs assessment, conduct an analysis of available unappropriated waters within the basin, and propose projects or methods, both structural and nonstructural, for meeting those needs and utilizing those unappropriated waters where appropriate.

To date, local input has been an important and ongoing process, which has included meetings across the basin to identify needs and projects throughout the region. The SWSI 2010 Basin Report update was the first tangible opportunity for the nonconsumptive needs subcommittee to take the next step in the SWSI process, moving needs to Identified Processes or Projects (IPPs) similar to the consumptive needs and planning efforts. This chapter represents a snapshot of current activities and does not address all needs within the basin nor imply full roundtable endorsement of any one particular IPP.

San Miguel River, Telluride, CO

In order to be listed as a nonconsumptive IPP, projects or processes could be in three general phases—completed, ongoing, or in the planning stage. The criteria for determining if the IPP was eligible for listing required active engagement on the ground level. For example, either a collaborative workgroup or a single agency could have a nonconsumptive IPP as long as the workgroup or agency was working well beyond a conceptual level with stakeholders identified and/or involved as appropriate. The nonconsumptive needs committee chose not to create a secondary list of future needs at this time but rather to focus their energy on creating a solid list of IPPs and to showcase some of the remarkable IPPs currently underway. It is anticipated that this committee will update the nonconsumptive IPPs list more frequently than the 6-year SWSI updates planned by the CWCB. CWCB will be notified of interim updates as they occur.

The nonconsumptive needs subcommittee is open to any roundtable member interested and for this update included participation from the following roundtable members:

- At-large representatives (three)
- Colorado Division of Wildlife (CDOW)
- CWCB representative
- Environmental representative
- Hinsdale County representative
- Recreation representative
- San Miguel County
- San Miguel Municipal

The nonconsumptive chapter is comprised of the following sections:

3.2 – Nonconsumptive Needs Assessment – Overview of the Southwest Geodatabase (Linking Consumptive and Nonconsumptive Needs and IPPs)

3.3 – Nonconsumptive Projects and Methods

- 3.3.1 Process for Gathering Nonconsumptive IPPs
- 3.3.2 Showcase of Current IPPs
  - 3.3.2.1 Dolores River Dialogue
  - 3.3.2.2 Lower Dolores Working Group – A Way Forward
  - 3.3.2.3 Dolores River Restoration Partnership
  - 3.3.2.4 River Protection Workgroup
  - 3.3.2.5 Animas River Stakeholders Group
  - 3.3.2.6 San Miguel Instream Flow
- 3.3.3 Map of All Nonconsumptive IPPs in the Southwest Basin
- 3.3.4 Table of All Nonconsumptive IPPs
- 3.3.5 Visual Examples of Nonconsumptive Projects from the Database
  - 3.3.5.1 Lightner Creek
  - 3.3.5.2 Beaver Creek
- 3.3.6 List of Nonconsumptive Projects Previously Funded by the Roundtable and/or CWCB

3.4 – CWCB Nonconsumptive Projects and Methods

3.2 Nonconsumptive Needs Assessment – Overview of the Southwest Geodatabase

This summary is intended to provide a broad overview of the effort by the Southwest Basin Roundtable to build a comprehensive geographic information system (GIS) and database project. This project is intended to put all the consumptive and nonconsumptive data in one "bucket." Below is the list of reasons for building this project:

- Provide a transparent and simple method to review existing data
- Provide a mechanism for updating and linking (all) data to Hydrologic Unit Code (HUC)
- Provide a method of generating reports by county that is delineated by "Concern"

The following is the Statement of Work used to acquire funding from the state for this project.

Water Activity Name – Southwestern Basin Roundtable Database
Grant Recipient – Southwest Basin Roundtable
Funding Source – Basin Funds
Introduction and Background

The goal is to update current nonconsumptive use GIS information, adding community input data, as well as consumptive use locations for the Southwest Basin. This information will then be combined to create a database for use by the Southwest Basin Roundtable. All data will be compatible with the current layers and data used by the State of Colorado.

3.2.1 Objectives

Objectives of the project include completing the Southwest Basin nonconsumptive and consumptive GIS layers in order to create a geodatabase for the entire Southwest Basin. In addition, data collected from a series of community meetings will also be added to this database. The goal is to have a useable database that is easy to use and allows individuals to quickly and easily see locations and issues related to nonconsumptive and consumptive use projects and/or concerns.

3.2.2 Geodatabase Tasks

3.2.2.1 Task 1

Add needed data to GIS layers for linking data. This includes adding HUC, Concern (.shp files used by the state), and Issue (themes used by the state) data to over 13,000 records in the GIS mapping project created by Camp Dresser & McKee Inc. (CDM).

Method/Procedure

Using a professional GIS program (Manifold); all GIS layers and their corresponding tables will be updated using the additional column headings described above. The deliverable includes a Geodatabase and .mdb file.

3.2.2.2 Task 2

Build Microsoft *Access* database.

Method/Procedure

Use Standard database tools (i.e., tables, queries, forms, records, and macros) to build the database.

Deliverable

End user will open screen in Microsoft *Access* allowing the use of simple buttons to see queries built by HUC watershed and county, identifying Issues and Concerns. Screen will also have a map showing the locations of the Issues and Concerns. This database will also include a simple form for allowing authorized users to update the database using additional state and community data.

3.2.2.3 Reporting and Final Deliverable

Reporting: The applicant shall provide the CWCB a progress report every 6 months, beginning from the date of the executed contract. The progress report shall describe the completion or partial completion of the tasks identified in the Statement of Work including a description of any major issues that have occurred and any corrective action taken to address these issues.

Final Deliverable: At completion of the project, the applicant shall provide the CWCB a final report that summarizes the project and documents how the project was completed. This report may contain photographs, summaries of meetings, and engineering reports/designs.

Following are screen capture images showing examples from the database (**Figures 3-1 through 3-8)**.

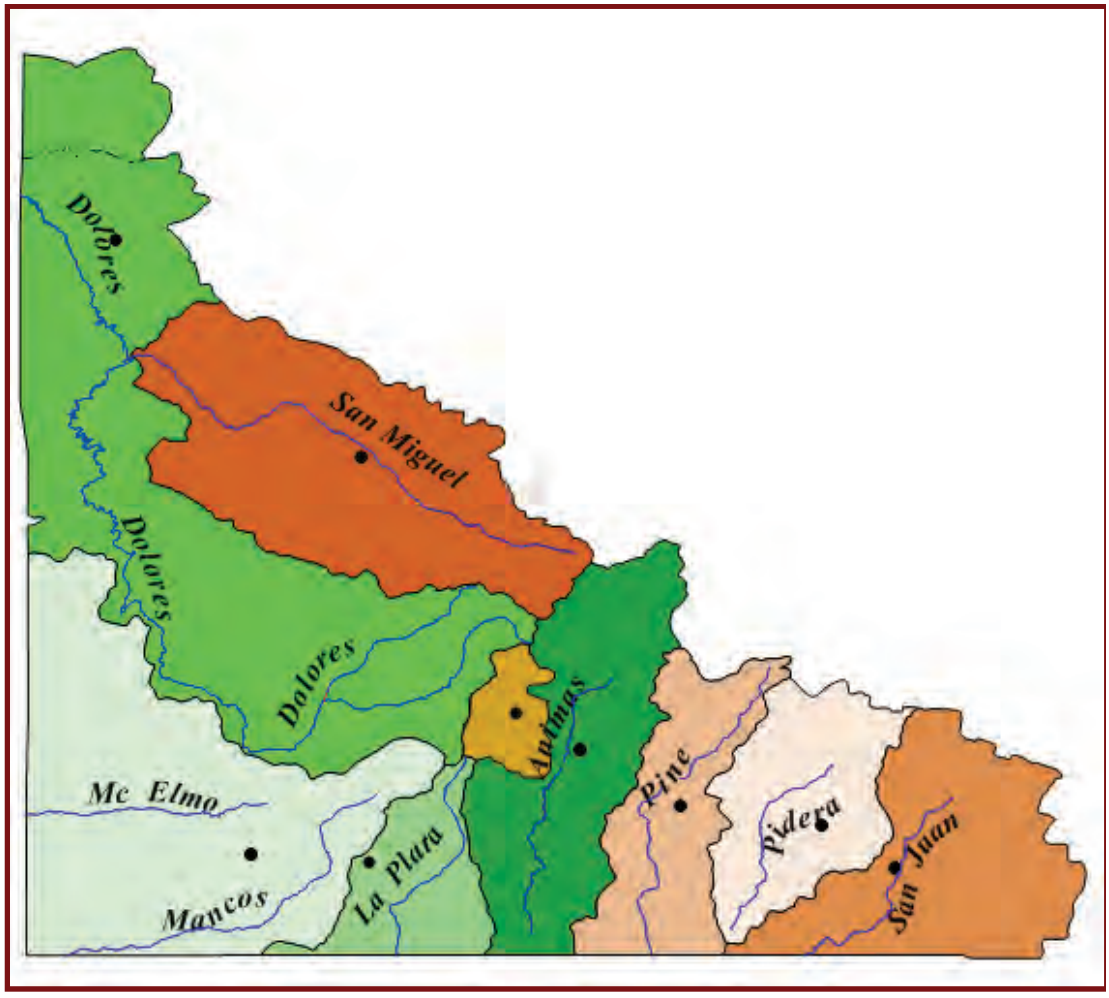


Figure 3-1 Area of Study for Geodatabase

This figure shows the area the GIS and Database project derives data.
Note: Subbasin names are used for the purpose of local knowledge. HUC codes follow USGS HUC8-names.

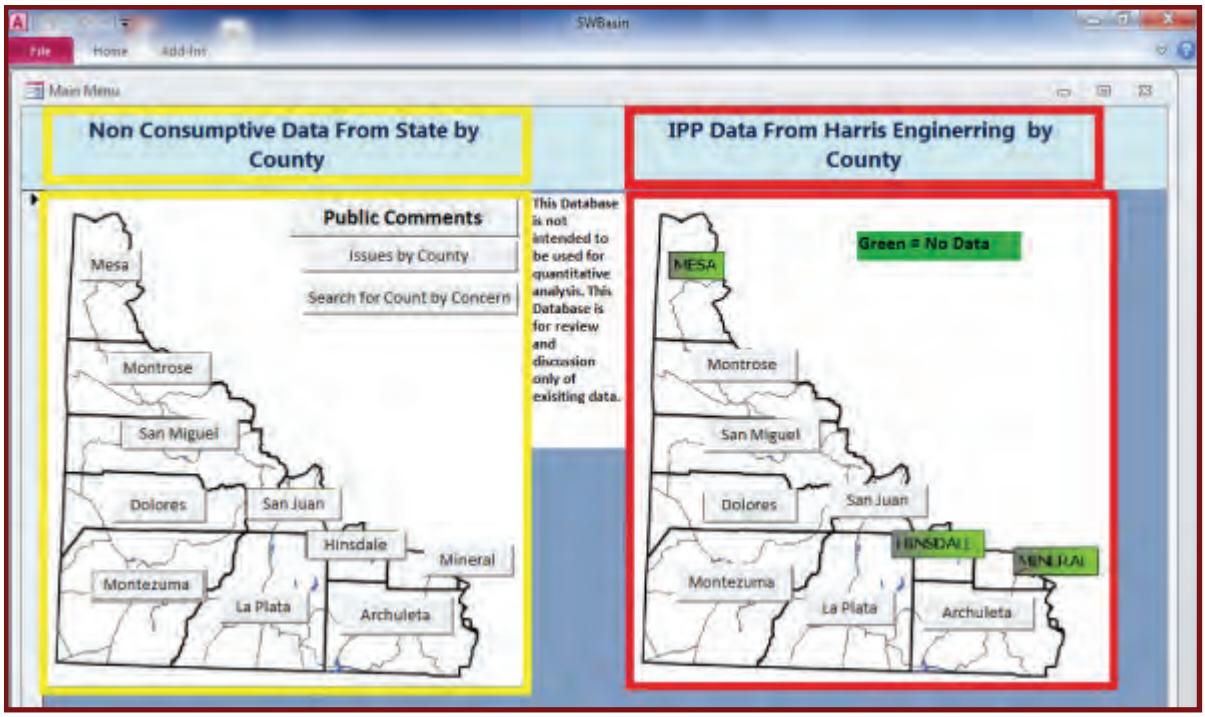


Figure 3-2 Main Screen from Geodatabase

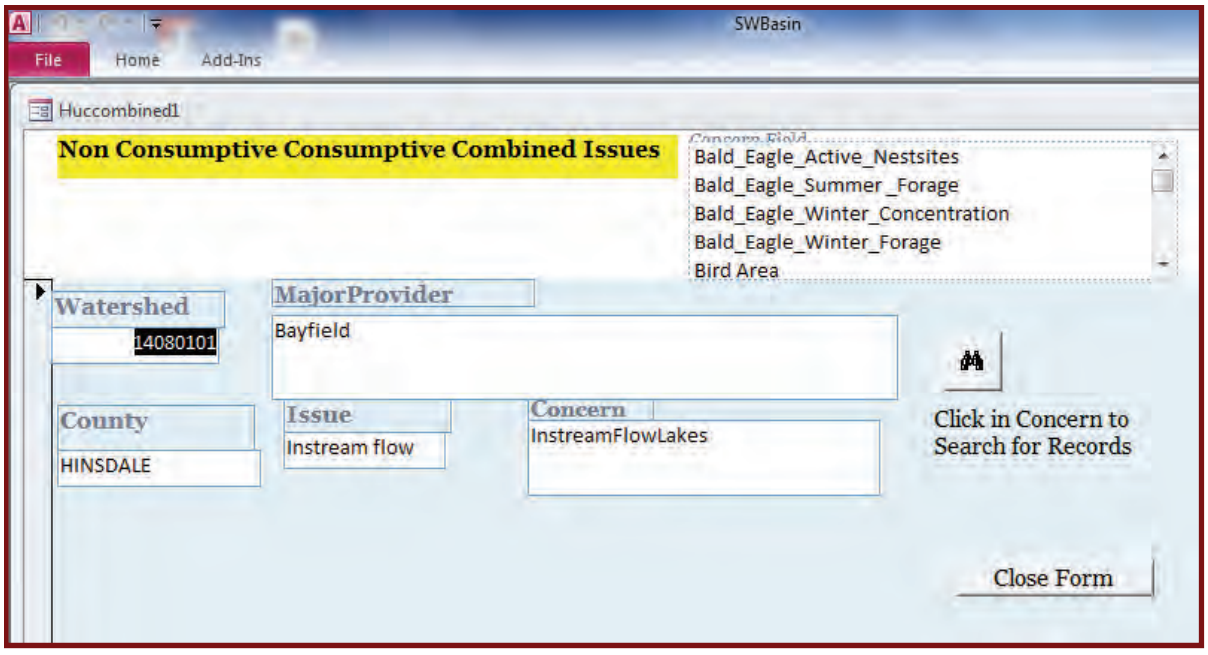


Figure 3-3 Geodatabase Search Screen

This figure shows the result of clicking on the "Search for County by Concern" button on main screen.

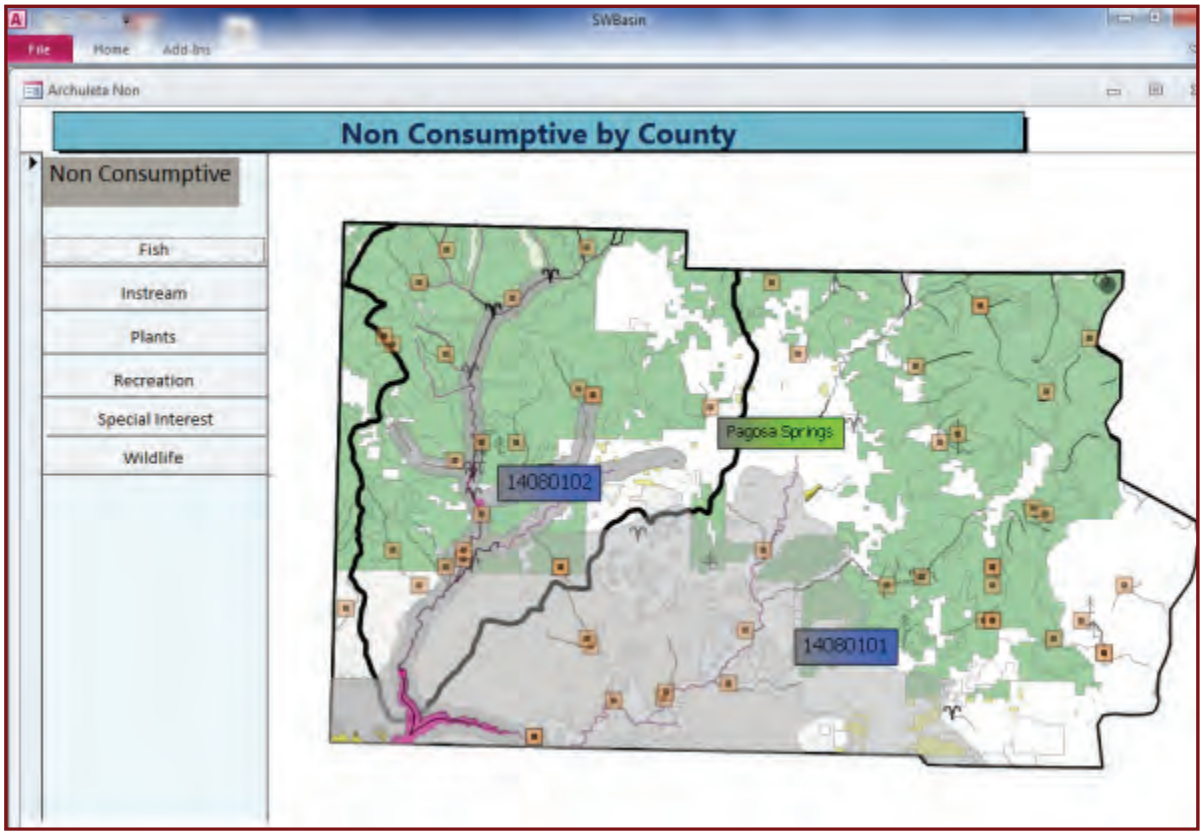


Figure 3-4 Geodatabase Example Search Results

This figure shows screen that appears when the button labeled "Archuleta" is activated on the "Nonconsumptive Data by County" screen.

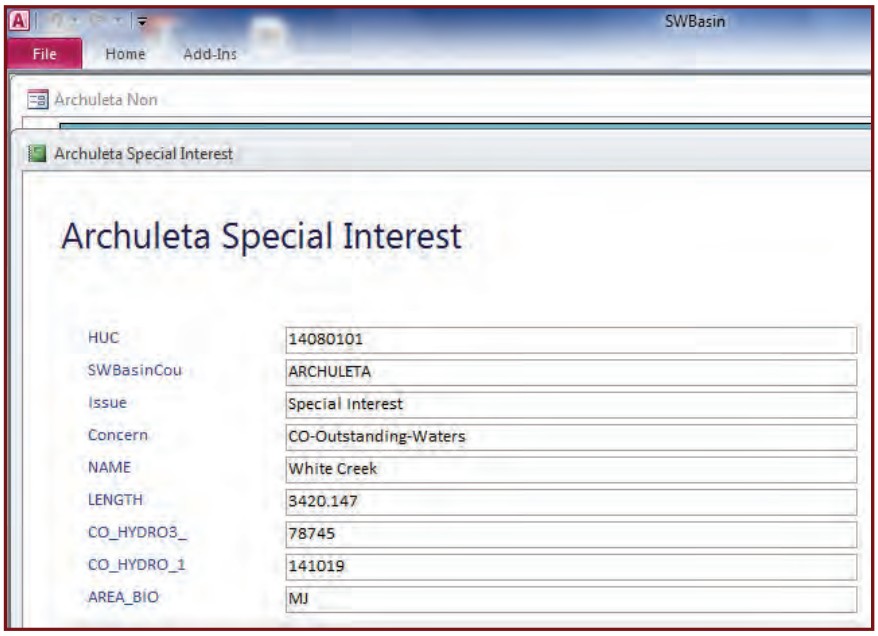


Figure 3-5 Geodatabase Example Output

This figure shows screen that appears when the "Special Interest" button is activated.
Note: All buttons will produce similar reports as per labeled concern.

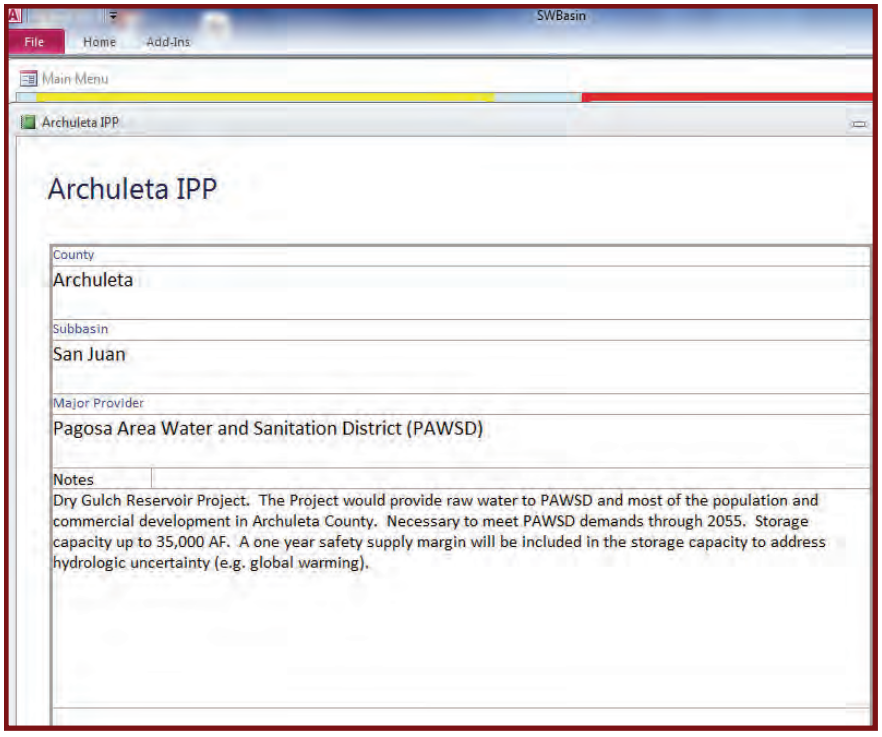


Figure 3-6 Geodatabase IPP Output

This figure shows the screen that appears when the button on the "IPP Data by Harris Engineering by County" is activated.
Note: All buttons from the main data screen will produce similar reports.

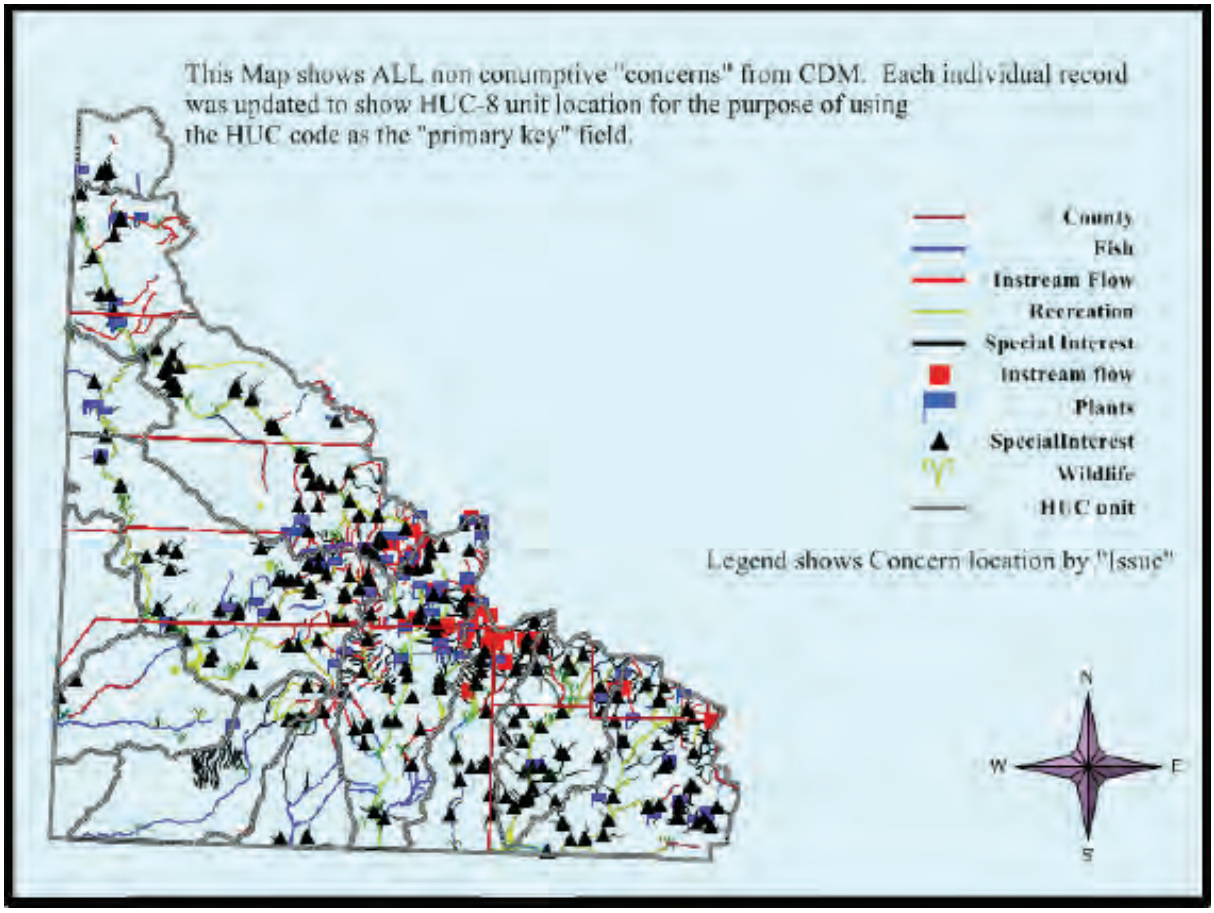


Figure 3-7 Example Figure from Geodatabase

This figure from GIS project shows how the Nonconsumptive data looks when viewed as one drawing from geodatabase.

HUC	SWBasin County	Issue	Concern
14080203	SAN MIGUEL	Special Interest	SW_TandE
14080104	SAN JUAN	Wildlife	Bald_Eagle_Summer _Forage
14030003	MONTROSE	Wildlife	Bald_Eagle_Winter_Concentration
14080202	MONTEZUMA	Wildlife	Bald_Eagle_Active_Nestsites
14030004	MESA	Wildlife	Bird Area
14080101	LA PLATA	Wildlife	RiverOtter_confirmed_sightings
14080101	HINSDALE	Wildlife	Bald_Eagle_Summer _Forage
14030002	DOLORES	Wildlife	RiverOtter_confirmed_sightings
14080101	ARCHULETA	Wildlife	Bald_Eagle_Active_Nestsites

Figure 3-8 GIS Project Table

This figure is a screen capture from the GIS project table showing how HUC units are tied to County, Issue, and Concern.

3.2.3 Conclusion

This effort has been accomplished through the support of the Southwest Basin Roundtable and funding by the State of Colorado. The database has been made available to the state, Southwest Water Conservation District (SWCD), and San Juan Citizens Alliance (SJCA). All data was reviewed for the best possible accuracy. It is the hope of the basin roundtable that as funding opportunities present themselves, the State of Colorado will consider using a standalone database program and use HUC units as the primary key field to link all data statewide.

3.3 Nonconsumptive Projects and Methods

This section contains the following information:

3.3.1 Process for Gathering Nonconsumptive IPPs

There are two key elements in putting together a nonconsumptive needs assessment for the Southwest Basin:

1. Identifying nonconsumptive needs.
2. Connecting needs with an IPP.

For nonconsumptive IPPs to receive roundtable or CWCB funding and support, documenting the IPP in the SWSI 2010 Basin Report is crucial. The Southwest Basin Roundtable Nonconsumptive Needs Assessment Committee had the following objectives in preparing information for the SWSI 2010 Needs Assessment:

- Goal one was to gather concise descriptions of all known IPPs in the San Juan, Dolores, and San Miguel Basins. The stakeholder groups that have developed IPPs to meet nonconsumptive needs completed a nonconsumptive IPP table.
- To highlight nonconsumptive IPPs in subbasins that are well established and respond to the seven questions listed below.

3.3.1.1 Nonconsumptive Identified Projects and Processes Table

An IPP table was filled in by any entity or collaborative group that wanted to have an IPP listed in the SWSI 2010 Report. The roundtable agreed to list any nonconsumptive process or project as an IPP that has involved active engagement by a public entity and/or collaborative group at a subbasin level. Nonconsumptive projects that wished to be highlighted in more detail were required to answer seven questions under Section 3.3.1.2.

3.3.1.2 Identified Projects and Processes to be Highlighted in SWSI 2010

For those interested in having a nonconsumptive IPP highlighted in the SWSI 2010 Basin Report, entities responded to the questions below in two pages or less. A third page with photos relevant to your IPP was also included as appropriate.

1. What is (are) the nonconsumptive need(s) the IPP is intended to address, and where (what segment of what river, stream, or water body) is the focus of the IPP?
2. Who are the stakeholders that are directly involved in the process and how are they working together?
3. What strategies for meeting the nonconsumptive need(s) have been agreed to or are under serious consideration?
4. What projects are underway to implement strategies to meet nonconsumptive needs?
5. Does the IPP involve flow levels or quantities?
6. Has the IPP been approved for roundtable (Water Supply Reserve Account [WSRA]) funding? If yes briefly describe the purpose and use of the funds.
7. What is the status of the IPP and what are the critical steps moving forward?

3.3.2 Showcase of Current IPPs

Following are the nonconsumptive IPPs the Southwest Basin would like to showcase in this report:

1. Dolores River Dialogue
2. Lower Dolores Working Group – A Way Forward (AWF)
3. Dolores River Restoration Partnership
4. River Protection Workgroup
5. Animas River Stakeholders Group
6. San Miguel Instream Flow

3.3.2.1 Dolores River Dialogue (http://ocs.fortlewis.edu/drd/)

1. What is (are) the nonconsumptive need(s) that the IPP is intended to address, and where (what segment of what river, stream, or water body) is the focus of the IPP?

Ponderosa Gorge, Dolores River, Reach 2

The Dolores River Dialogue (DRD) began in 2004 and is a coalition of diverse interests whose purpose is to explore management opportunities, build support for and take action to improve the ecological conditions downstream of McPhee Reservoir while honoring water rights, protecting agricultural and municipal water supplies, and the continued enjoyment of rafting and fishing. The DRD is primarily focused on working below McPhee Dam to the confluence of the river with the Colorado near Moab. The nonconsumptive needs under discussion include riparian ecology, geomorphology, cold-water trout fishery, warm-water fishery, and whitewater recreation.

2. Who are the stakeholders that are directly involved in the process and how are they working together?

The following stakeholders are official members of the larger DRD. Those with an (*) also have members that serve on a Steering Committee that meets monthly:

Dolores River Working Group Field Trip

U.S. Bureau of Reclamation[BOR] (*); Colorado Division of Water Resources; Colorado Division of Natural Resources (DNR); CDOW (*); CWCB; Dolores County; Dolores Public Lands Office (U.S. Forest Service [USFS]/Bureau of Land Management [BLM]); Dolores River Action Group (local private boaters); Dolores River Coalition (*) (represents 20 groups); Dolores Water Conservancy District (*); Federal Army Corps of Engineers; Montezuma County; Montezuma Valley Irrigation Company (*); public at large; San Juan Citizens Alliance (*); San Juan Public Lands Center; San Miguel County; The Nature Conservancy [TNC] (*); U.S. Fish and Wildlife Service [USFWS]; and the Ute Mountain Ute Tribe.

3. What strategies for meeting the nonconsumptive need(s) have been agreed to or are under serious consideration?

The activities of the DRD are listed in question No. 4 below. Through a project called the Framework Proposal Project (find it at: http://ocs.fortlewis.edu/drd/framework.htm.), the DRD is currently discussing, debating, and/or acting upon doable proposals that address the purpose statement. It serves as a process for evaluating complex and possibly controversial proposals from various interests and entities.

4. What projects are underway to implement strategies to meet nonconsumptive needs?

The DRD has multiple ongoing projects including:

- Serving as an ongoing forum to bring together various interests to explore issues, develop common understandings, and complete projects – towards the goal of defining and acting upon doable actions that address the purpose statement.
- Carrying out field- and literature-based investigations to address scientific questions that relate to the DRD purpose statement, and coordinating with other entities that are conducting science, data gathering, and monitoring in the area.
- Linking with the Lower Dolores Plan Working Group, which is working on a National Conservation Area as an alternative to Wild and Scenic River (WSR) and the project AWF (refer to separate write-up for details).
- Overseeing a "319 Watershed Study" – a nonpoint source pollution assessment and management plan for the Dolores River Watershed.
- Collaborating with other groups working in the Lower Dolores area to communicate, coordinate, and share resources and information (e.g., The Dolores River Restoration Partnership, Dolores Public Lands Office (USFS/BLM), CDOW, etc.).
- Producing and disseminating factual and educational materials about the Lower Dolores River.

5. Does the IPP involve flow levels or quantities?

Rafting Trip along Dolores River

Potentially, flows on the Lower Dolores River have historically been a source of much discussion and some conflict. There is no unappropriated water in McPhee Reservoir and contracts are in place that guide how water in McPhee is used. The annual spill, if one occurs, is dedicated to rafters as per the original Environmental Impact Statement (EIS) and a fish pool was established in the 1990s, which is overseen by the CDOW—and is for the purpose of the trout fishery. In recent years, native fish have increasingly become a topic that both water managers and conservation groups are joining together to evaluate and develop plans for—with a goal of conserving the native fishery population in the river and avoiding a federal listing on the Endangered Species List. It is widely known that some in the DRD and from the larger public desire more water going downstream. These desires and ideas, along with many others, are being discussed at length in the context of the Framework Proposal Project. The DRD assesses and evaluates proposals in the context of the best scientific information available, Colorado Water Law, available water, and project contracts.

6. Has the IPP been approved for roundtable (WSRA) funding? If yes, briefly describe the purpose and use of the funds.

No – the DRD has not yet applied for roundtable funding.

7. What is the status of the IPP and what are the critical steps moving forward?

Dolores Dialogue Stakeholders

The intention of the DRD is to ensure that at least two proposals are successful in 2011. The most critical step in moving forward is for the DRD Steering Committee and the full DRD to continue to discuss ideas and work hard to get consensus on doable approaches that will be acceptable to all the various parties involved. Further, the DRD will continue to oversee a robust science effort that brings respected scientific information to the table to use in decisionmaking. Finally, a newly formed Hydrology Committee is active in providing hydrological information and educating the DRD about complex hydrological data, contracts, and trends. Through the Lower Dolores Plan Working Group, the AWF project—the DRD Steering Committee and the full DRD will continue to link across projects, workgroups, and committees, and will eventually discuss the ideas and "doable proposals" that are the project's goal.

3.3.2.2 A Way Forward – A Project of the Lower Dolores Plan Working Group

1. What is (are) the nonconsumptive need(s) that the IPP is intended to address, and where (what segment of what river, stream, or water body) is the focus of the IPP?

A Way Forward: The Dolores River Below McPhee Reservoir is an inquiry into the status of native fish on the Lower Dolores River combined with a multi-stakeholder consensus-building process that is intended to result in doable alternatives while honoring water rights and Dolores Project allocations. This effort is organized by the Lower Dolores Plan Working Group's Legislative Subcommittee. The Lower Dolores Plan Working Group was formed through the DRD in December 2008 and met their charge in finding an alternative to the WSR suitability status on the river. In March 2010, the Working Group reached consensus to pursue federal legislation as that alternative. This legislation, if passed, would establish a National Conservation Area and permanently remove WSR suitability. The Working Group further appointed a 10-member Legislative Subcommittee, including two members who are Ex-Officio, to develop the parameters and principles of the legislation. The subcommittee, after meeting numerous times, agreed to much of the legislation's content and so did the larger Working Group at its July 2010 meeting. However, several unresolved—and significant—issues remain around flows and native fish. The Legislative Subcommittee believes that a greater priority needs to be put on the native fish but their desire to prioritize the native fisheries met with opposition from interests uncertain about the impact of changes in management. Past efforts to gain consensus among key stakeholders about the exact status of the native fish, as well as options for management, has generally met with a lack of consensus and considerable disagreement. Thus, the Legislative Subcommittee decided that a more flexible, transparent, and participatory approach should be taken, which resulted in AWF.

AWF brings about a unique "marriage" of linked but often diverse interests. Water managers and users have a high interest in avoiding a listing of native fish by the USFWS and also, they have an interest in removing the prospect of a federally reserved water right that would result if Congress designated the river as Wild & Scenic. A USFWS listing could involuntarily divert Dolores Project storage water downstream, and thus would dramatically hurt the economies and agriculture bases in Dolores and Montezuma Counties. Next, many groups and individuals in the conservation and environmental communities are interested in improving the status of the fisheries below McPhee and specifically the native fish. The Roundtail Chub, one of three native fish on the Lower Dolores, was singled out by the BLM as an "Outstandingly Remarkable Value (ORV)" and is one reason for WSR suitability status on the Lower Dolores River. The CDOW is charged with managing the fisheries below the dam including a cold water and warm

water fishery. Many believe that the fisheries below the dam are declining. Thus, water managers, conservationists, federal and state agencies, and local governments, as well as the public at large, have a common interest in resolving management issues about the native fish.

2. Who are the stakeholders that are directly involved in the process and how are they working together? The Lower Dolores Plan Work Group is made up of the following interests with those in italics serving on the Legislative Subcommittee:

American Whitewater; BOR; City of Cortez; Colorado DNR; CDOW; CWCB; Dolores County; Dolores Public Lands Office; Dolores River Coalition; Dolores Water Conservancy District; DRD Science; Federal Elected Official Staff; Livestock/grazers; Mining/Minerals/Oil & Gas; Montezuma County; Montezuma Valley Irrigation Company; Natural History/ Science/Archeology; Property owners; Recreation (boaters, fishing, motorized); SJCA; San Miguel County; TNC; Town of Dove Creek; Trout Unlimited (TU); Ute Mountain Ute Indian Tribe; and the Wilderness Support Center

Lower Dolores Work Group

3. What strategies for meeting the nonconsumptive need(s) have been agreed to or are under serious consideration?

The Legislative Subcommittee has devised the strategies detailed in the answer to question #4. The AWF project is expected to conclude in August 2011.

4. What projects are underway to implement strategies to meet nonconsumptive needs?

The deliverables from this project will be: an objective scientific report, using available sources on what is known about the status of native fish below McPhee Dam, opportunities to improve their status, an evaluation of how opportunities for improvement can be undertaken within the available water supply, and institutional requirements for any changes in management needed to pursue doable opportunities.

Observing Biological Sampling

The following activities are underway to achieve these deliverables: a) fundraising for the project ($90,000); b) selecting, contracting, and working with three scientists; c) selecting a body of scientific and hydrological information, along with other key data and reports, to provide to the scientists; d) selecting and coordinating a Scientific and Water User Oversight Panel; and e) organizing meetings with the scientists and Legislative Subcommittee, along with the Lower Dolores Plan Work Group and the DRD to achieve the final outcomes.

5. Does the IPP involve flow levels or quantities?

Potentially, flows on the Lower Dolores River have historically been a source of much discussion and some conflict. There is no unappropriated water in McPhee Reservoir and contracts are in place that guide how water in McPhee is used. The annual spill, if one occurs, is dedicated to rafters as per the original EIS and a fish pool was established in the 1990s, which is managed by the CDOW and is for managing the trout fishery. It is widely known that many interests and people desire more water going downstream. The

doable alternatives that will come out of the AWF effort will consider these desires, the best-known science, Colorado Water Law, available water, and project contracts.

6. Has the IPP been approved for roundtable (WSRA) funding? If yes, briefly describe the purpose and use of the funds.

Yes, AWF received $25,000 in funding in 2010.

7. What is the status of the IPP and what are the critical steps moving forward?

The most critical step in moving forward is to proceed with completing the work plan for AWF by August 2011. There is much momentum that has been created so it is important to capture this momentum, working with the DRD Steering Committee and the DRD, as well as other groups to finally define a way forward for the Lower Dolores.

3.3.2.3 Dolores River Restoration Partnership

1. What is (are) the nonconsumptive need(s) the IPP is intended to address, and where (what segment of what river, stream, or water body) is the focus of the IPP?

There are approximately 2,600 acres of tamarisk infestation along the Dolores River mainstem below McPhee Dam to Moab. In 2009, approximately 1,900 acres of these tamarisk infestations are estimated to occur on riparian sites. In many cases, tamarisk control and the reestablishment of native vegetation is the most critical activity required to begin the restoration of western river systems. Tamarisk stands can out-compete and displace native riparian and adjacent upland vegetation, exploit valuable water resources, provide inferior habitat and forage for wildlife, increase the risk of damage to native vegetation by wildfire, and provide a seed source for continued infestations. Therefore, the Dolores River Restoration Partnership (DRRP) was formed in 2008 and seeks to control tamarisk and revegetate approximately 1,900 acres along the Dolores River.

Dolores River

The DRRP purpose is: (1) to articulate the science-driven, tamarisk related vision, goals, and site selection criteria common to Dolores River stakeholders in both Colorado and Utah to facilitate a consistent approach throughout the watershed; and (2) to initiate and facilitate an increased level of collaboration and communication among the stakeholders to enhance information transfer, adaptive management, and likelihood of large-scale, meaningful success. The vision for the DRRP is stated as: A Dolores River watershed dominated by native vegetation, where the threats from tamarisk and other associated invasive species have been mitigated and the riparian areas of the watershed continue to become more naturally-functioning, self-sustaining, diverse, and resilient over time. This ecologically focused vision is a step toward the overarching vision of the DRRP of a thriving Dolores River system that is ecologically, socially, and economically sustainable in a multiuse context.

The 5-year goals are:

- **Ecological** – increase the number of sustainable, healthy riparian plant communities while reducing those dominated by tamarisk and other invasive, non-native plant species. The aim is that by 2014, tamarisk will be reduced to 5 percent of the watershed while other invasive, non-native plants will

be reduced to 15 percent of the watershed. Each treated site will be monitored and actively maintained.

- **Social** – develop a professional, competitive, and efficient work force, improve aesthetic enjoyment, increase public safety, and increase the protection of property.
- **Economic** – increase employment opportunities, improve cost benefit ratio for contractors and youth service corps, improve effectiveness and financial efficiency of riparian restoration, and enhance visitor travel to the area.
- **Management** – adaptively manage, incorporate education and interpretation, garner support from agency budgets and attract other sources of funding, and facilitate communications between land managers and partners.

The planning phase for the DRRP started in 2008, which resulted in a document that has been agreed to by the DRRP called the Dolores River – Restoration Action Plan (DR-RAP) (available by request).

2. Who are the stakeholders that are directly involved in the process and how are they working together?

The DRRP is led by TNC, the Tamarisk Coalition, Conservation Corps, and the BLM with primary funding from The Walton Family Foundation but also including investments from other funders. Secondary partners include:

a) The Colorado counties of Dolores, San Miguel, Montrose, and Mesa. The Utah county of Grand pledges their support of grant applications, and lends support through their County Weed Programs.

b) The CDOW and the Utah Division of Wildlife Resources assists in providing input on restoration activities in areas of critical riparian habitat.

c) The Natural Resources Conservation Service (NRCS) and Conservation Districts help identify private land owners and leverages financial support from their organizations for specific projects on private lands (there are 12 landowners in the corridor).

d) The Colorado Department of Transportation will ensure that restoration activities do not interfere with highway safety.

e) The Rocky Mountain Bird Observatory ensures that wildlife studies are not compromised.

3. What strategies for meeting the nonconsumptive need(s) have been agreed to or are under serious consideration?

The activities described in below are agreed to by the DRRP.

4. What projects are underway to implement strategies to meet nonconsumptive needs?

The main activity of the DRRP is the removal of tamarisk and other non-native plants in the corridor by passive and active means (i.e., bio control, and mechanical and nonmechanical treatments). Each of the four BLM offices, working with the DRRP, has developed implementation plans that guide the work regarding what is removed and where. These plans include but are not limited to: site-specific project goals; project timeline and scheduling; a site-specific, pre-project baseline data monitoring plan; work force selection; determination of active or passive tamarisk management techniques and materials; a post-project monitoring plan; and mechanism for maintenance. A monitoring program is underway to determine if the overall goals are being met. A social goals element consists of hiring trained Conservation Corps workers for most of the labor and evaluating their experiences. Three committees are in place: Education/Outreach,

Monitoring, and Funding. The DRRP meets twice a year as a full partnership with Committees and the Core Team (responsible for the day-to-day operations) very active on a monthly basis.

5. Does the IPP involve flow levels or quantities?

No – flow and water quantities are not involved in the DRRP's work.

6. Has the IPP been approved for roundtable (WSRA) funding?

No.

7. What is the status of the IPP and what are the critical steps moving forward?

The DRRP is in full operation. Last year, the first year of work "on the ground," 320 acres were treated. A forum will be held this year on grazing and specifically how this public land use relates to tamarisk removal and restoration efforts. At a recent "Core Team" retreat, detailed plans were made to strengthen the partnership including starting a monthly e-newsletter and improving the committees, as well as starting a website. Over the 5-year project period (2010 to 2014), the total expected cost is $4,000,000, with a variety of funders involved. The monitoring protocols will be solidified by next. The key players at a March 2011 DRRP meeting will sign a Memorandum of Understanding (MOU). Concerted efforts are being made by TNC to work with private landowners in close tandem with the NRCS. A very important part of the effort is ensuring monitoring and maintenance efforts continue past the project time period on those lands treated working closely with the BLM and private land owners.

3.3.2.4 River Protection Workgroup (http://ocs.fortlewis.edu/riverprotection/)

1. What is (are) the nonconsumptive need(s) that the IPP is intended to address, and where (what segment of what river, stream or water body) is the focus of the IPP?

Organized in late 2006 by the SWCD and the SJCA, the River Protection Workgroup (RPW) project planned and kicked off a community process to involve the public in developing measures to protect the natural values of selected streams in the region while allowing water development to continue. The river/stream segments addressed include: Animas; Hermosa Creek; Piedra; Upper San Juan – East and West Forks; and Vallecito Creek/Pine. The RPW started as an outgrowth of discussions among various regional water planning and resource protection organizations where a need became apparent for a collaborative process to select long-term, reliable federal, state, and/or other measures to protect the identified values of regional streams. A wide range of "tools" are being considered including, but not limited to, the federal WSR Act. Funding is from in-kind donations from many of the entities involved and grants from SJCA, SWCD, TU, CWCB, the Southern Ute Indian Tribe (SUIT), The Wilderness Society, and the National Forest Foundation. Other grants are pending or planned.

Hermosa Creek

2. Who are the stakeholders that are directly involved in the process and how are they working together?

The RPW has a Steering Committee that guides the overall process, handles funding and administrative tasks, and leads the effort with representatives from: Colorado DNR (Divisions of Wildlife and Water Resources, and the CWCB); SJCA; San Juan Public Lands Center (USFS/BLM); SUIT; SWCD; staff from the local offices of U.S. Senator Michael Bennet, U.S. Senator Mark Udall, U.S. Representative Scott Tipton (invited); Five Rivers Chapter of TU; TNC; and The Wilderness Society. They are working together by convening the five Workgroups from 2008 to mid-2012. Workgroups are made up of any persons,

governments, or organizations wishing to participate. For example, over 45 very diverse people/interests were involved in the Hermosa Creek Workgroup (http://ocs.fortlewis.edu/riverprotection/resourceDocuments.htm) and about 30 were involved in the San Juan Workgroup (http://ocs.fortlewis.edu/riverprotection/sanjaun/resourceDocuments.htm

3. *What strategies for meeting the nonconsumptive need(s) have been agreed to or are under serious consideration?*

The activities described below have been agreed to by the RPW Steering Committee.

4. *What projects are underway to implement strategies to meet nonconsumptive needs?*

The RPW, when it started, first designed a process and framework for forming and operating the Workgroups. A specific model is followed (available on the website) and the Workgroups end result is a set of recommendations for what they believe are the appropriate tools for protecting the identified values. The Workgroups operate on consensus with a set of guiding principles, and in some cases a range of opinions are expressed in the final reports. The values discussed are not only the ORVs identified by the USFS/BLM in their 2007 Draft Land Management Plan, but other social, cultural, ecological, and economic values as well. The success for each Workgroup is defined as: a) implementation and completion of a collaborative community process that includes diverse stakeholders; and b) establishment of agreements regarding future action(s) or a determination that current stream protections are adequate to protect priority values.

Next, what is being called a "Regional Discussion" will ensue in the fall of 2012 and led by the RPW Steering Committee with representatives from each local Workgroup. The goal of the Regional Discussion is to create a regional approach(es) that can garner as much support as possible from all the diverse interests. The initial list of the specific issues to be discussed and addressed include (note: draft list as of March 10, 2011):

a) What are ways that values (economic, ecological, and social) in the entire region can be protected building upon and using the range of strategies defined and/or agreed to in each of the public Workgroups?

b) How can the region balance the need for water development and planning for future consumptive needs with the goal of also preserving and conserving natural values?

c) Are there areas of the region where future water development makes sense?

d) Are there areas of the region where WSR makes sense and there is support?

e) What about other tools proposed by the Workgroups?

f) If there is no consensus to support WSR, what tools can be agreed to in order to protect the values indentified in the Workgroups as well as the values identified by the USFS's ORVs (which led to certain rivers being identified as "eligible" and other ones as "suitable" for the WSR designation).

g) Are there areas where removal of WSR "eligibility" and "suitability" can be supported because a different plan has been devised?

5. Does the IPP involve flow levels or quantities?

As the Regional Discussion unfolds, yes, quantities of water and flow levels may be part of the eventual agreements made and certainly will be part of the discussions, which may lead to formal negotiations. The RPW recognizes that many issues are important in reaching any compromises/agreements such as the preservation and conservation of natural, aesthetic, recreational, and ecological values. Those values will be discussed in the context of planning for future water supplies, water rights, and Colorado's Compact Entitlements. It is envisioned that if consensus can be crafted for a regional approach(es) , federal and/or state legislation could be an outcome. And, the RPW believes it is very important to continue to involve the local Workgroups in the Regional Discussion as it proceeds.

6. Has the IPP been approved for roundtable (WSRA) funding? If yes, briefly describe the purpose and use of the funds.

The RPW has received funding ($80,000 approved) from the CWCB.

7. What is the status of the IPP and what are the critical steps moving forward?

The RPW will finish the Vallecito Creek/Pine Group (May 2011), and the Animas and Piedra Groups (likely mid-2012), and start the Regional Discussion with a target date to conclude in 2013. Other ongoing activities include planning and hosting the next round of Workgroups; finalizing the "Regional Discussions" model; funding the project; keeping a website up to date; educating the communities involved about the RPW; and tracking on regional and state issues as they related to the RPW's goals.

3.3.2.5 Animas River Stakeholders Group

1. What is (are) the nonconsumptive need(s) the IPP is intended to address, and where (what segment of what river, stream or water body) is the focus of the IPP?

For many decades, high concentrations of metals have affected the fishery and other aquatic organisms throughout much of the length of the Animas River. The metals originate in the river's headwaters around Silverton where geologic processes have created deposits of elements such as gold, silver, iron, lead, aluminum, zinc, cadmium, copper, manganese, etc. Natural processes carry these elements into the Animas River itself. In addition, hundreds of historic mines have enabled and accelerated these processes by exposing ores to water and oxygen through tunnels underground and by deposits of mine waste left on the surface. Mining has added substantially more metal loading to stream systems beyond what is naturally occurring. Poor water quality in the form of high metal concentrations has essentially the same impacts as depleted or non-existent flows in a stream, namely an impaired or eliminated fishery and associated aquatic systems. Metal loading has impacted aquatic life in the Animas River from above Silverton through Durango. This stretch of river is the target segment.

2. Who are the stakeholders that are directly involved in the process and how are they working together?

The Animas River Stakeholders Group (ARSG) consists of a wide range of entities including: U.S Environmental Protection Agency (EPA); BLM; USFS; BOR; U.S. Geological Survey (USGS); CDOW; Colorado Water Quality Control Division; Colorado Division of Hazardous Waste and Materials; Colorado Division of Reclamation; Mining and Safety; SWCD; San Juan County; Town of Silverton; City of Durango; San Juan Resource, Development, and Conservation Council; Sunnyside Gold Corp.; Silver Wing Mining Corp.; Salem Minerals; San Juan Mining Corp.; Gold King Mining Corp.; SJCA; TU; and private citizens. The group has had a great deal of success in working in a collaborative fashion by developing consensus for its actions. There are no official members to the group, and there is no voting on proposals. For more information on ARSG, see http://www.animasriverstakeholders.org/.

3. What strategies for meeting the nonconsumptive need(s) have been agreed to or are under serious consideration?

Since 1994, ARSG has utilized several strategies to improve water quality and nonconsumptive uses. First, the group worked to delineate the differences in metal loading from natural sources versus mining-related activities. Then it developed a feasibility plan for remediation of a number of mine sites that are the biggest metal loaders. Based upon the feasibility plan, ARSG recommended attainable, site-specific water quality standards to the Colorado Water Quality Control Commission in 2001. Those standards were adopted. In addition to these studies, ARSG or individual members of ARSG have sponsored or conducted approximately 50 mine remediation projects in order to improve water quality. Most of the work has been remediation of mine waste piles as opposed to treatment of draining mines. Treating mine drainage carries liabilities that in many circumstances, members of ARSG are unwilling to take on. Twice ARSG has developed federal legislation to address the liability issue and asked Representative McInnis and later Representative Salazar to introduce bills. Unfortunately, no hearings were held on either bill. See ARSG's website http://goodsamaritaninfo.org/ for more information on the liability issue.

4. What projects are underway to implement strategies to meet nonconsumptive needs?

Over the past year, ARSG did a couple of mine remediation projects in the Mineral Creek Basin and has a bulkhead grouting project lined up for the summer of 2011.

5. Does the IPP involve flow levels or quantities?

Generally, most of the water quality improvement projects associated with ARSG have not included water rights or instream flows (ISFs). Though for one project, ARSG purchased water rights that were a transbasin diversion. The ditch conveying the water out of the Animas drainage to the Uncompahgre drainage near Red Mountain Pass traversed over a mine, and water was seeping into the workings where it picked up high concentrations of metals. After purchase, the water rights were dedicated to ISFs on the Animas side of the divide where they provide more dilution of metal concentrations, and the ditch was removed and reclaimed to stop the seepage.

6. Has the IPP been approved for roundtable (WSRA) funding? If yes briefly describe the purpose and use of the funds.

ARSG has not yet approached the Southwest Basin Roundtable. However, ARSG may want to approach the roundtable in the future in its efforts to improve nonconsumptive uses in the Animas River Basin.

7. What is the status of the IPP and what are the critical steps moving forward?

Mine remediation efforts have led to improvements in water quality in certain subbasins, especially Mineral Creek. Throughout the Animas River headwaters, there are still several mine waste piles and about 30 draining mines that ARSG wants to address in order to meet water quality standards. Currently, the main focus of the group is to address several draining mines that are very large metal loaders in the Gladstone area up in Cement Creek. These are the largest metal loaders in the Animas Basin. There are a number of difficult technological, operational, financial, liability, and permitting issues that the group is working to resolve.

Koehler Dump before Remediation

Koehler Dump after Remediation

Longfellow Dump before Remediation

Longfellow Dump after Remediation

3.3.2.6 San Miguel Instream Flow Process

1. What is the nonconsumptive need the IPP is intended to address and where is the focus?

The section of the San Miguel River, between Calamity Draw and the Dolores confluence, is a major tributary to the lower Dolores River and known to support a healthy population of flannelmouth sucker, bluehead sucker, and roundtail chub. The roundtail chub is recognized by the State of Colorado as a species of special concern and the roundtail chub and flannel mouth sucker and blue head sucker are considered sensitive species by the BLM. CDOW, BLM, and five other state wildlife agencies have developed a "Rangewide Conservation Agreement Strategy" to direct management for these species. This plan provides directions and goals for research and management of projects. The success of these plans could potentially curtail the need for federal listing of the three species under the Endangered Species Act (ESA).

San Miguel River

The lower San Miguel River is also known to provide habitat for important riparian communities and other important riparian communities, because of the free-flowing hydrology of the river. These communities include New Mexico Privet riparian shrubland and Skunkbrush riparian shrubland. Other important riparian communities include Narrowleaf Cottonwood Communities and Fremont Cottonwood communities. The Colorado Natural Heritage Program has identified two potential conservation areas along this reach of the river because of these riparian communities and species.

2. Who are the stakeholders directly involved in the process?

BLM and CDOW initiated this ISF process with the CWCB in 2007. In 2009, SWCD initiated an effort with San Miguel and Montrose counties to determine future water needs, including the impact of the ISF on future water supply needs. As a result of SWCD's effort, as well as the ongoing outreach effort of CWCB, the Towns of Norwood, Nucla, and Naturita and Lone Cone Reservoir Company, filed conditional water right applications in December 2010, prior to CWCB's intent to appropriate in January 2011. Other stakeholders in the process include Farmers Water Development Company, TNC, Sheep Mountain Alliance, and TU.

3. What are the strategies for meeting the nonconsumptive needs?

Since BLM and CDOW initiated the ISF process in 2007, agency and CWCB staff, as well as SWCD, have attended multiple public meetings within the watershed to explain the ISF proposal and its potential impact of future water supplies. San Miguel County also held several public meetings to take public comment.

This section of the river was also identified as suitable for BLM Wild and Scenic (W&S) designation. During public meetings on the W&S eligibility process, it was discussed how the ISF could negate any future potential need for a federal water right under W&S designation.

4. What projects are underway to implement strategies to meet nonconsumptive needs?

In addition to strategies identified under the five state "Rangewide Conservation Agreement Strategy" to protect the fish species, strategies have been identified by the Colorado DNR and CDOW to protect the native warm water fish on the Dolores. In addition to the San Miguel ISF, there are ongoing discussions regarding how to improve the Dolores River below McPhee dam in several processes including the Dolores River Dialogue, the Lower Dolores Working Group, and the AWF project.

5. Does the IPP involve flow levels of quantities?

CDOW's and BLM's flow recommendation to the CWCB for the San Miguel ISF are listed below with dates in parentheses:

- 325 cubic feet per second (cfs): (4/15-6/14)
- 170 cfs: (6/15-731)
- 115cfs:(8/1-8/31)
- 80cfs:(9/1-2-29),115cfs: (3/1-4/14)

Several additional studies have been initiated by Montrose County and Farmers Water that question these ISF amounts as being the minimum amount necessary for the fish species.

6. Has the IPP been approved for roundtable funding?

No roundtable funding has been used; however, SWCD has provided significant funding and resources to help water users identify their future needs prior to the ISF filing. SWCD also provided $25,000 for the Town of Norwood's engineering costs related to filing conditional water rights prior to the ISF as well as provided in-kind legal services for the filing.

7. What is the status of the IPP and what are the critical steps for moving forward?

The success of the San Miguel ISF depends on CWCB and water court determinations. This ISF process has included 3 years of meetings and has allowed water providers to address their future water needs and make conditional water right filings as appropriate. Since 2008, 89,881 acre-feet (AF) (655 cfs) of conditional water rights and 356 AF (144 cfs) of absolute water rights have been filed on the San Miguel River. As a result of this process, municipalities, such of the Town of Norwood, are conducting more detailed engineering and analysis of their future water supplies, preparing for the next 50 years.

The CWCB unanimously declared its intent to appropriate an ISF in January 2011. Concerned parties had until March 31, 2011 to file a notice to contest, and a contested hearing will occur at the CWCB September 2011 meeting if necessary. If the ISF filing is not contested, the CWCB board can make a determination at its May 2011 meeting.

3.3.3 Map of All Nonconsumptive IPPs in the Southwest Basin

Figure 3-9 below shows the spatial distribution and densities off IPPs in the Southwest Basin. These are summarized by HUC. The darker HUCs have higher numbers of IPPs.

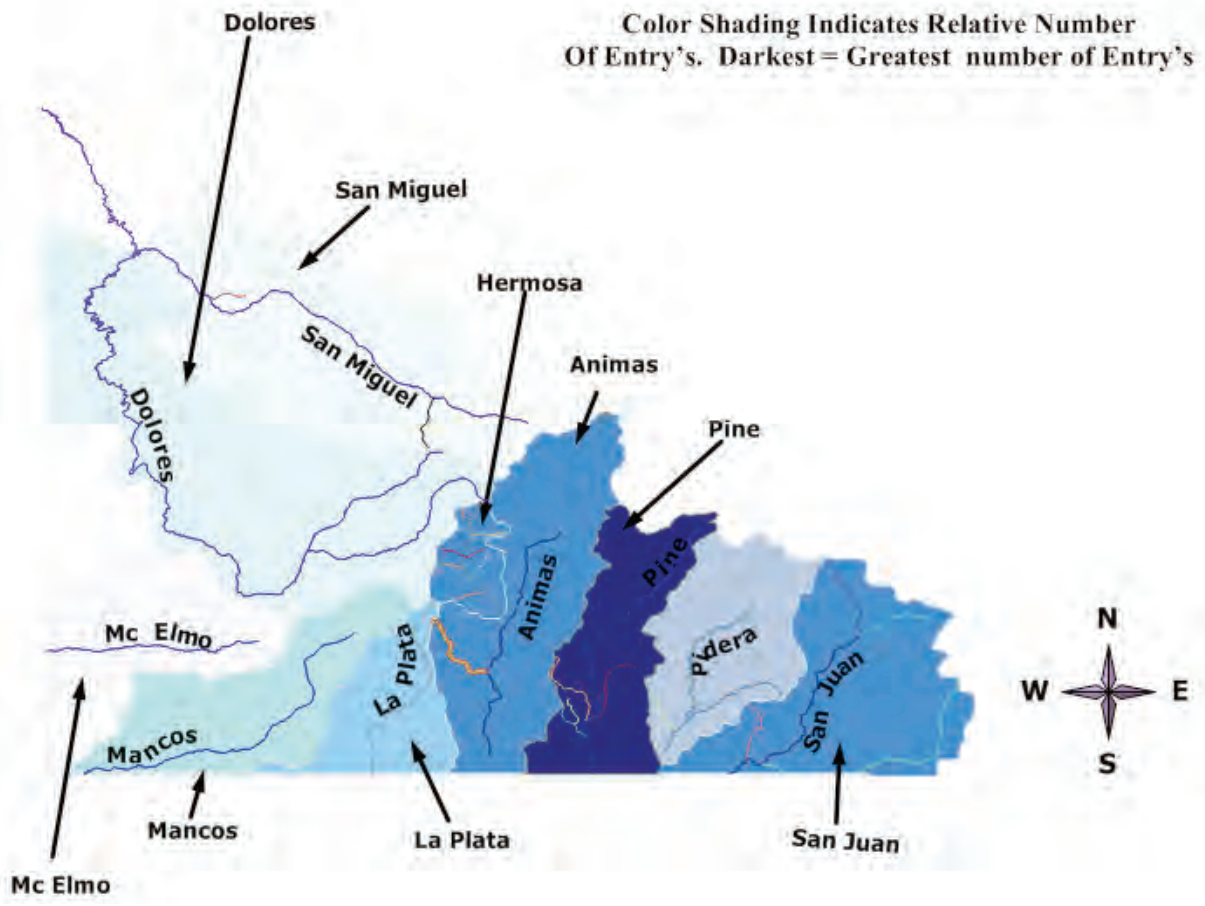


Figure 3-9 Map of All Nonconsumptive IPPs in Southwest Basin

3.3.4 Table of All Nonconsumptive IPPs

Table 3-1 summarizes all of the IPPs in the Southwest Basin. The IPPs listed in this table meet the basin roundtable requirements as outlined previously in this section.

Table 3-1. Southwest Basin Nonconsumptive Identified Projects and Processes Summary

County	Subbasin	Stream Segment	Nonconsumptive Need	Nonconsumptive IPP Process Project to Address the Need	Amount of Water Needed Source Status Notes	Stakeholders	Source of Information
Montezuma	Mancos	Mancos River	Outstanding/ remarkable, scenery/ recreation, water source	Enhance the quality and health of the Mancos watershed; including riparian restoration, testing, and research on mine tailings pollution sources and cleanup. Watershed protection protocols, education outreach -AG COMPONENT-re-work of headgates and diversion structures.	None at this time working with natural flow regimes	Mancos Watershed Group, Mancos Water Conservation District, Town of Mancos, Mancos Valley Resources, Forest Service, Ute Mountain Tribe, Mesa Verde National Park, Montezuma Land Conservancy, CDOW	Mancos Conservation District
La Plata	Animas	All	Water quality education	Children's Water Festival.	SUIT participation in a public education process related to water issues. Annual participation 2008-present	Coordinated by The Water Information Program the annual program includes a varying and diverse array of stakeholders/ presenters	SUIT Educational Program
La Plata	Animas	Animas River watershed upstream of Bakers Bridge	Watershed values are defined by the collaborative workgroup and include outstandingly remarkable values scenery, geology, recreation, cultural/ historical, wildlife, and ecological	River Protection Workgroup leading local process to involve the public in protecting natural values while allowing water development to continue.	Workgroup to kick off in 2012	SWCD, SJCA, TU, TWS, SUIT, CDWR, CWCB, SJPL, Private landowners and citizens	River Protection Workgroup

Table 3-1. Southwest Basin Nonconsumptive Identified Projects and Processes Summary, continued

County	Subbasin	Stream Segment	Nonconsumptive Need	Nonconsumptive IPP Process Project to Address the Need	Amount of Water Needed Source Status Notes	Stakeholders	Source of Information
San Juan	Animas	Animas River watershed upstream of Bakers Bridge	Watershed values are defined by the collaborative workgroup and include outstandingly remarkable values scenery, geology, recreation, cultural/ historical, wildlife, and ecological	River Protection Workgroup leading local process to involve the public in protecting natural values while allowing water development to continue.	Workgroup to kick off in 2012	SWCD, SJCA, TU, TWS, SUIT, CDWR, CWCB, SJPL, Private landowners, and citizens	River Protection Workgroup
La Plata	Animas	Animas River Headwaters to Stateline	Water quality protection and/or improvement for all uses, including aquatic habitat, recreation	Animas Watershed Partnership contracting preparation of Animas Watershed Based Plan for entire river - CO and NM, with focus on identifying sources of and reducing non-point source pollutants.		City of Durango, SJCA, SUIT, SWCD, TU 5 Rivers Chapter, Citizens	Ann Oliver, AWP Grant Writer
San Juan	Animas	Animas Watershed from headwaters through Durango	Meet Water Quality Standards to protect aquatic species and improve aquatic habitat, Maggie Gulch to Silverton and Silverton through Durango	Remediation of 33 mine waste sites and 36 draining mines. Most of the mine waste sites have been completed. About five draining mines have been addressed.	Currently, no water needed, although water rights have been purchased in the past	SWCD, SJCA, TU, TWS, SUIT, CDWR, CWCB, USFS, Private landowners and citizens	ARSG Coordinating Committee (Bill Simon, Peter Butler, Steve Fearn)
La Plata	Animas	SUIT tribal boundaries	In-channel habitat enhancement	Animas River Basin Creek, 0.5 miles of channel and riparian habitat improvements.	Completed 2004	SWCD, SJCA, TU, TWS, SUIT, CDWR, CWCB, USFS, Private landowners and citizens	SUIT Wildlife

Table 3-1. Southwest Basin Nonconsumptive Identified Projects and Processes Summary, continued

County	Subbasin	Stream Segment	Nonconsumptive Need	Nonconsumptive IPP Process Project to Address the Need	Amount of Water Needed Source Status Notes	Stakeholders	Source of Information
La Plata	Animas	SUIT tribal boundaries	In-channel habitat enhancement	Animas River High Flume, 1.4 miles of channel and riparian habitat improvements.	Completed 2004, 2006	SWCD, SJCA, TU, TWS, SUIT, CDWR, CWCB, USFS, Private landowners and citizens	SUIT Wildlife
La Plata	Animas	Within Southern Ute Indian Tribal boundaries	Riparian health, non-native vegetation control	Animas River vegetation management.	Ongoing annual project by SUIT to improve the riparian corridor by managing non-native vegetation. Annual program from 2002-present.	SUIT	SUIT Wildlife Division
Dolores	Dolores	McPhee Dam to confluence with San Miguel River (DRD Reaches 1-5)	Native Fish (Roundtail Chub, Flannel Mouth Sucker, Bluehead Sucker)	A Way Forward: The Dolores River Below McPhee Reservoir is an inquiry into the status of Native Fish on the Lower Dolores River combined with a multi-stakeholder consensus-building process that is intended to result in "doable" alternatives while honoring water rights and Dolores Project allocations. Results will guide adaptive management opportunities and address fish and flow issues as part of a National Conservation Area (NCA) legislative proposal.	Five independent fish biologists have been hired to evaluate what is known about the status of Native Fish, and recommend "doable opportunities" to improve status via management of available water supplies and possibility of an additional 6,000 acre-feet. Work will be guided by an oversight panel made up of: TNC, DWCD, USBR, CDOW, DWR, FS/BLM, and NGO Biologist appointed by Legislative Subcommittee detailed in column to right.	The Lower Dolores Working Group (50 stakeholders addressing WSR and alternatives) appointed a Legislative Subcommittee (drafting NCA legislative principles) who hired Way Forward Science contractors and appointed an oversight panel to guide contractors. Subcommittee includes County, Environmental, Water Manager, Landowner, Land Manager, Congressional Staff representation.	Mike Preston, DWCD

Table 3-1. Southwest Basin Nonconsumptive Identified Projects and Processes Summary, continued

County	Subbasin	Stream Segment	Nonconsumptive Need	Nonconsumptive IPP Process Project to Address the Need	Amount of Water Needed Source Status Notes	Stakeholders	Source of Information
Montezuma	Dolores	McPhee Dam to confluence with San Miguel River (DRD Reaches 1-5)	Native Fish (Roundtail Chub, Flannel Mouth Sucker, Bluehead Sucker)	A Way Forward: The Dolores River Below McPhee Reservoir is an inquiry into the status of Native Fish on the Lower Dolores River combined with a multi-stakeholder consensus-building process that is intended to result in "doable" alternatives while honoring water rights and Dolores Project allocations. Results will guide adaptive management opportunities and address fish and flow issues as part of a NCA legislative proposal.	Five independent fish biologists have been hired to evaluate what is known about the status of Native Fish, and recommend "doable opportunities" to improve status via management of available water supplies and possibility of an additional 6,000 acre-feet. Work will be guided by an oversight panel made up of: TNC, DWCD, USBR, CDOW, DWR, FS/BLM, and NGO Biologist appointed by Legislative Subcommittee detailed in column to right.	The Lower Dolores Working Group (50 stakeholders addressing WSR and alternatives) appointed a Legislative Subcommittee (drafting NCA legislative principles) who hired Way Forward Science contractors and appointed an oversight panel to guide contractors. Subcommittee includes County, Environmental, Water Manager, Landowner, Land Manager, Congressional Staff representation.	Mike Preston, DWCD

Table 3-1. Southwest Basin Nonconsumptive Identified Projects and Processes Summary, continued

County	Subbasin	Stream Segment	Nonconsumptive Need	Nonconsumptive IPP Process Project to Address the Need	Amount of Water Needed Source Status Notes	Stakeholders	Source of Information
Montrose	Dolores	McPhee Dam to confluence with San Miguel River (DRD Reaches 1-5)	Native Fish (Roundtail Chub, Flannel Mouth Sucker, Bluehead Sucker)	A Way Forward: The Dolores River Below McPhee Reservoir is an inquiry into the status of Native Fish on the Lower Dolores River combined with a multi-stakeholder consensus-building process that is intended to result in "doable" alternatives while honoring water rights and Dolores Project allocations. Results will guide adaptive management opportunities and address fish and flow issues as part of a NCA legislative proposal.	Five independent fish biologists have been hired to evaluate what is known about the status of Native Fish, and recommend "doable opportunities" to improve status via management of available water supplies and possibility of an additional 6,000AF. Work will be guided by an oversight panel made up of: TNC, DWCD, USBR, CDOW, DWR, FS/BLM, and NGO Biologist appointed by Legislative Subcommittee detailed in column to right.	The Lower Dolores Working Group (50 stakeholders addressing WSR and alternatives) appointed a Legislative Subcommittee (drafting NCA legislative principles) who hired Way Forward Science contractors and appointed an oversight panel to guide contractors. Subcommittee includes County, Environmental, Water Manager, Landowner, Land Manager, Congressional Staff representation.	Mike Preston, DWCD

Table 3-1. Southwest Basin Nonconsumptive Identified Projects and Processes Summary, continued

County	Subbasin	Stream Segment	Nonconsumptive Need	Nonconsumptive IPP Process Project to Address the Need	Amount of Water Needed Source Status Notes	Stakeholders	Source of Information
San Miguel	Dolores	McPhee Dam to confluence with San Miguel River (DRD Reaches 1-5)	Native Fish (Roundtail Chub, Flannel Mouth Sucker, Bluehead Sucker)	A Way Forward: The Dolores River Below McPhee Reservoir is an inquiry into the status of Native Fish on the Lower Dolores River combined with a multi-stakeholder consensus-building process that is intended to result in "doable" alternatives while honoring water rights and Dolores Project allocations. Results will guide adaptive management opportunities and address fish and flow issues as part of a NCA legislative proposal.	Five independent fish biologists have been hired to evaluate what is known about the status of Native Fish, and recommend "doable opportunities" to improve status via management of available water supplies and possibility of an additional 6,000AF. Work will be guided by an oversight panel made up of: TNC, DWCD, USBR, CDOW, DWR, FS/BLM, and NGO Biologist appointed by Legislative Subcommittee detailed in column to right.	The Lower Dolores Working Group (50 stakeholders addressing WSR and alternatives) appointed a Legislative Subcommittee (drafting NCA legislative principles) who hired Way Forward Science contractors and appointed an oversight panel to guide contractors. Subcommittee includes County, Environmental, Water Manager, Landowner, Land Manager, Congressional Staff representation.	Mike Preston, DWCD

Table 3-1. Southwest Basin Nonconsumptive Identified Projects and Processes Summary, continued

County	Subbasin	Stream Segment	Nonconsumptive Need	Nonconsumptive IPP Process Project to Address the Need	Amount of Water Needed Source Status Notes	Stakeholders	Source of Information
Dolores	Dolores	McPhee Dam to confluence with the Colorado River (DRD Reaches 1-8). Primary focus to date on McPhee Dam to confluence with San Miguel River (DRD Reaches 1-5).	Native Fish (Roundtail Chub, Flannel Mouth Sucker, Bluehead Sucker), Riparian Vegetation, Trout Fishery, Rafting	Dolores River Dialogue: Formed in 2004 to explore management opportunities to improve the ecological conditions downstream of McPhee Reservoir while honoring water rights, protecting agricultural and municipal water supplies, and the continued enjoyment of rafting and fishing. Meets twice a year, Steering Committee meets monthly, supported by science committee and hydrology committee. Monitoring site at Big Gypsum. Sponsored Lower Dolores Working Group to address protection of WSR ORVs including Archeology; Fish; Wildlife, Riparian Ecology; Geology; Recreation; and Scenery. The DRD is also sponsoring a 319 Watershed Plan on the Lower Dolores.	An annual 31,798 acre-foot fish pool is released out of McPhee Dam with oversight by a Biology Committee led by CDOW. There are also managed rafting spills, when run-off exceeds reservoir capacity, which support recreation, as well as ecological benefits. During managed spills fish pool water is saved and can be used over a shorter duration. Refinements in spill and fish pool management as well as the possible lease of up to 6,000 acre-feet are adaptive management strategies being evaluated by DRD to benefit the downriver ecology.	USBR (*); CDWR; CDNR; CDOW (*); CWCB; Dolores County; Dolores Public Lands Office (USFS/BLM); Dolores River Action Group (local private boaters); Dolores River Coalition (*) (represents 20 groups) ; DWCD (*); Army Corps of Engineers; Montezuma County; MVI (*); public at large; SJCA (*); SJPLC; San Miguel County; TNC (*); USFWS; and the Ute Mountain Ute Tribe. (*) = Steering Committee Representation.	Mike Preston, DWCD

Table 3-1. Southwest Basin Nonconsumptive Identified Projects and Processes Summary, continued

County	Subbasin	Stream Segment	Nonconsumptive Need	Nonconsumptive IPP Process Project to Address the Need	Amount of Water Needed Source Status Notes	Stakeholders	Source of Information
Montezuma	Dolores	McPhee Dam to confluence with the Colorado River (DRD Reaches 1-8). Primary focus to date on McPhee Dam to confluence with San Miguel River (DRD Reaches 1-5).	Native Fish (Roundtail Chub, Flannel Mouth Sucker, Bluehead Sucker), Riparian Vegetation, Trout Fishery, Rafting	Dolores River Dialogue: Formed in 2004 to explore management opportunities to improve the ecological conditions downstream of McPhee Reservoir while honoring water rights, protecting agricultural and municipal water supplies, and the continued enjoyment of rafting and fishing. Meets twice a year, Steering Committee meets monthly, supported by science committee and hydrology committee. Monitoring site at Big Gypsum. Sponsored Lower Dolores Working Group to address protection of WSR ORVs including Archeology; Fish; Wildlife, Riparian Ecology; Geology; Recreation; and Scenery. The DRD is also sponsoring a 319 Watershed Plan on the Lower Dolores.	An annual 31,798 acre-foot fish pool is released out of McPhee Dam with oversight by a Biology Committee led by CDOW. There are also managed rafting spills, when run-off exceeds reservoir capacity, which support recreation, as well as ecological benefits. During managed spills fish pool water is saved and can be used over a shorter duration. Refinements in spill and fish pool management as well as the possible lease of up to 6,000 acre-feet are adaptive management strategies being evaluated by DRD to benefit the downriver ecology.	USBR (*); CDWR; CDNR; CDOW (*); CWCB; Dolores County; Dolores Public Lands Office (USFS/BLM); Dolores River Action Group (local private boaters); Dolores River Coalition (*) (represents 20 groups) ; DWCD (*); Army Corps of Engineers; Montezuma County; MVI (*); public at large; SJCA (*); SJPLC; San Miguel County; TNC (*); USFWS; and the Ute Mountain Ute Tribe. (*) = Steering Committee Representation.	Mike Preston, DWCD

Table 3-1. Southwest Basin Nonconsumptive Identified Projects and Processes Summary, continued

County	Subbasin	Stream Segment	Nonconsumptive Need	Nonconsumptive IPP Process Project to Address the Need	Amount of Water Needed Source Status Notes	Stakeholders	Source of Information
Montrose	Dolores	McPhee Dam to confluence with the Colorado River (DRD Reaches 1-8). Primary focus to date on McPhee Dam to confluence with San Miguel River (DRD Reaches 1-5).	Native Fish (Roundtail Chub, Flannel Mouth Sucker, Bluehead Sucker), Riparian Vegetation, Trout Fishery, Rafting	Dolores River Dialogue: Formed in 2004 to explore management opportunities to improve the ecological conditions downstream of McPhee Reservoir while honoring water rights, protecting agricultural and municipal water supplies, and the continued enjoyment of rafting and fishing. Meets twice a year, Steering Committee meets monthly, supported by science committee and hydrology committee. Monitoring site at Big Gypsum. Sponsored Lower Dolores Working Group to address protection of WSR ORVs including Archeology; Fish; Wildlife, Riparian Ecology; Geology; Recreation; and Scenery. The DRD is also sponsoring a 319 Watershed Plan on the Lower Dolores.	An annual 31,798 acre-foot fish pool is released out of McPhee Dam with oversight by a Biology Committee led by CDOW. There are also managed rafting spills, when run-off exceeds reservoir capacity, which support recreation, as well as ecological benefits. During managed spills fish pool water is saved and can be used over a shorter duration. Refinements in spill and fish pool management as well as the possible lease of up to 6,000 acre-feet are adaptive management strategies being evaluated by DRD to benefit the downriver ecology.	USBR (*); CDWR; CDNR; CDOW (*); CWCB; Dolores County; Dolores Public Lands Office (USFS/BLM); Dolores River Action Group (local private boaters); Dolores River Coalition (*) (represents 20 groups) ; DWCD (*); Army Corps of Engineers; Montezuma County; MVI (*); public at large; SJCA (*); SJPLC; San Miguel County; TNC (*); USFWS; and the Ute Mountain Ute Tribe. (*) = Steering Committee Representation.	Mike Preston, DWCD

Table 3-1. Southwest Basin Nonconsumptive Identified Projects and Processes Summary, continued

County	Subbasin	Stream Segment	Nonconsumptive Need	Nonconsumptive IPP Process Project to Address the Need	Amount of Water Needed Source Status Notes	Stakeholders	Source of Information
San Miguel	Dolores	McPhee Dam to confluence with the Colorado River (DRD Reaches 1-8). Primary focus to date on McPhee Dam to confluence with San Miguel River (DRD Reaches 1-5).	Native Fish (Roundtail Chub, Flannel Mouth Sucker, Bluehead Sucker), Riparian Vegetation, Trout Fishery, Rafting	Dolores River Dialogue: Formed in 2004 to explore management opportunities to improve the ecological conditions downstream of McPhee Reservoir while honoring water rights, protecting agricultural and municipal water supplies, and the continued enjoyment of rafting and fishing. Meets twice a year, Steering Committee meets monthly, supported by science committee and hydrology committee. Monitoring site at Big Gypsum. Sponsored Lower Dolores Working Group to address protection of WSR ORVs including Archeology; Fish; Wildlife, Riparian Ecology; Geology; Recreation; and Scenery. The DRD is also sponsoring a 319 Watershed Plan on the Lower Dolores.	An annual 31,798 acre-foot fish pool is released out of McPhee Dam with oversight by a Biology Committee led by CDOW. There are also managed rafting spills, when run-off exceeds reservoir capacity, which support recreation, as well as ecological benefits. During managed spills fish pool water is saved and can be used over a shorter duration. Refinements in spill and fish pool management as well as the possible lease of up to 6,000 acre-feet are adaptive management strategies being evaluated by DRD to benefit the downriver ecology.	USBR (*); CDWR; CDNR; CDOW (*); CWCB; Dolores County; Dolores Public Lands Office (USFS/BLM); Dolores River Action Group (local private boaters); Dolores River Coalition (*) (represents 20 groups) ; DWCD (*); Army Corps of Engineers; Montezuma County; MVI (*); public at large; SJCA (*); SJPLC; San Miguel County; TNC (*); USFWS; and the Ute Mountain Ute Tribe. (*) = Steering Committee Representation.	Mike Preston, DWCD

Table 3-1. Southwest Basin Nonconsumptive Identified Projects and Processes Summary, continued

County	Subbasin	Stream Segment	Nonconsumptive Need	Nonconsumptive IPP Process Project to Address the Need	Amount of Water Needed Source Status Notes	Stakeholders	Source of Information
La Plata	Hermosa	Hermosa Creek headwaters to USFS Boundary	Water quality protection and/or improvement for all uses, including aquatic habitat, recreation.	River Protection Workgroup leading local process to involve the public in protecting natural values while allowing water development to continue.		SWWCD, SJCA, TU, TWS, SUIT, CDWR, CWCB Private landowners and citizens	Ann Oliver, RPW Steering Committee member
La Plata	Hermosa	Upper Hermosa Ck above cliff barrier	Colorado River Cutthroat Trout (State Sensitive Species)	Collaborative effort to create an isolated meta-population of CO River cutthroat trout in the Hermosa Ck watershed. Some barriers currently installed; some need installation; next steps include non-native trout removal and re-linkage of mainstem and trib	CWCB minimum ISFs occur on Hermosa mainstem and tribs; project is structural to create upstream migration barriers, cleanse existing mixed salmonic population, and subsequently link upper watershed and tribs into genetically clean meta-population.	Multiple Local partners (fed, state, local, NGOs, etc…)	DG (CDOW)
San Juan	Hermosa Ck	Upper Hermosa Ck above cliff barrier	Colorado River Cutthroat Trout (State Sensitive Species)	Collaborative effort to create an isolated meta-population of CO River cutthroat trout in the Hermosa Ck watershed. Some barriers currently installed; some need installation; next steps include non-native trout removal and re-linkage of mainstem and tributaries.	CWCB minimum ISFs occur on Hermosa mainstem and tribs; project is structural to create upstream migration barriers, cleanse existing mixed salmonic population, and subsequently link upper watershed and tribs into genetically clean meta-population.	Multiple Local partners (fed, state, local, NGOs, etc…)	DG (CDOW)

Table 3-1. Southwest Basin Nonconsumptive Identified Projects and Processes Summary, continued

County	Subbasin	Stream Segment	Nonconsumptive Need	Nonconsumptive IPP Process Project to Address the Need	Amount of Water Needed Source Status Notes	Stakeholders	Source of Information
La Plata	La Plata	SUIT tribal boundaries	In-channel habitat enhancement	La Plata River (Doughty), 450 feet of channel and riparian habitat improvements	2010-2011. As of March 2011 - currently under construction	SUIT, NRCS, BOR	SUIT Wildlife
La Plata	La Plata	Within Southern Ute Indian Tribal boundaries on the La Plata river	Management of weeds, tamarisk and Russian olive control	Ecosystem enhancement/non-native riparian vegetation control	Annual program from 2002 - present		SUIT Division of Water Resources
La Plata	Lightner Creek	Main channel of Lightner Creek to USFS boundary	Heavy sediment loading degrading channel health and causing impacts to private property owners and aesthetic water quality	Issue is addressed through the Animas Watershed Partnership via a Lightner Creek workgroup	Priority sediment loading sites have been identified. - funding has been sought (FY2011)	San Juan Citizens Alliance, Trout Unlimited, Division of Wildlife, Mountain Studies Institute, Southwestern Water Conservation District, USFS, Animas Watershed Partnership	Meghan Maloney, San Juan Citizens Alliance
Montezuma	Mancos	Mancos River	Water quality , aquatic habitat	Mancos Valley Salinity Control Project Plan and Environmental Assessment		NRCS, MCD, Ute Mtn Ute Tribe, private landowners	Chester Anderson, BUGS Consulting
Montezuma	Mancos	Mancos River from Ute Reservation Northern Boundary to Stateline	Roundtail Chub, Flannelmouth Sucker, Bluehead Sucker are sensitive species (CDOW); and species of concern (BLM)	Ute Mountain Ute Tribe has stocked native suckers		Ute Mountain Ute Tribe, CDOW	Ann Oliver

Table 3-1. Southwest Basin Nonconsumptive Identified Projects and Processes Summary, continued

County	Subbasin	Stream Segment	Nonconsumptive Need	Nonconsumptive IPP Process Project to Address the Need	Amount of Water Needed Source Status Notes	Stakeholders	Source of Information
Montezuma	Mancos	Mancos River near Mancos	Native fish, aquatic habitat	Mancos River Instream Flow study: Working with Mancos Conservation District for new Instream Flow Appropriations and for opportunities for acquisition. Also conducting basin wide assessment.		MCD	Chester Anderson, BUGS Consulting
Montezuma	Mancos	Mancos River Watershed to State Line	Water quality, aquatic habitat, channel function, riparian function, fisheries	Mancos River Watershed Stakeholders completing Watershed-Based Plan to identify goals, sources and practices to implement to protect and improve water resources in the Mancos River watershed.		MCD, CWCB, CO NPS, Ute Mtn Ute Tribe, Mesa Verde National Park, private landowners	Chester Anderson, Project Director, BUGS Consulting
Montezuma	Mancos	Mancos River Watershed to Ute Mountain Ute Tribal Boundary	Trout Fishery, Native fish, aquatic habitat	Mancos River Diversion Project: Analysis of potential for instream flows in the Mancos River.		MCD, USBR, Colorado Water Trust, CWCB, SW Basins Roundtable, private landowners/irrigators.	Chester Anderson, Project Director, BUGS Consulting
Montezuma	Mancos	The upper West and Middle Mancos River Watershed	Drinking water quality and quantity	Source Water Protection Plan		CRWA, Town of Mancos, Mancos Rural Water Company, Mesa Verde National Park, MCD, Ute Mountain Ute Tribe	Eddy Balch, CRWA

Table 3-1. Southwest Basin Nonconsumptive Identified Projects and Processes Summary, continued

County	Subbasin	Stream Segment	Nonconsumptive Need	Nonconsumptive IPP Process Project to Address the Need	Amount of Water Needed Source Status Notes	Stakeholders	Source of Information
Montezuma	Mancos	Willis Ditch that lies in the Town of Mancos and continuing down to the Bolen Ditch.	Trout Fishery, Native fish, aquatic habitat, riparian habitat	Mancos River Diversion Project: evaluating and designing new diversion structures along the Mancos River beginning with the Willis Ditch that lies in the Town of Mancos and continuing down to the Bolen Ditch.		MCD, USBR, CWCB, SW Basins Roundtable, private landowners/ irrigators.	Chester Anderson, Project Director
Archuleta	Piedra	Piedra River headwaters to Highway 160 including East Fork, Middle Fork, main stem of Piedra River	Watershed values are defined by the collaborative workgroup and include outstandingly remarkable values scenery, fish, geology, archeology, and recreation.	River Protection Workgroup leading local process to involve the public in protecting natural values while allowing water development to continue.	Workgroup to kick off in 2011.	SWWCD, SJCA, TU, TWS, SUIT, CDWR, CWCB, SJPL, Private landowners and citizens	River Protection Workgroup
Hinsdale	Piedra	Piedra River headwaters to Highway 160 including East Fork, Middle Fork, main stem of Piedra River	Watershed values are defined by the collaborative workgroup and include outstandingly remarkable values scenery, fish, geology, archeology, and recreation.	River Protection Workgroup leading local process to involve the public in protecting natural values while allowing water development to continue.	Workgroup to kick off in 2011.	SWWCD, SJCA, TU, TWS, SUIT, CDWR, CWCB, SJPL, Private landowners and citizens	River Protection Workgroup

Table 3-1. Southwest Basin Nonconsumptive Identified Projects and Processes Summary, continued

County	Subbasin	Stream Segment	Nonconsumptive Need	Nonconsumptive IPP Process Project to Address the Need	Amount of Water Needed Source Status Notes	Stakeholders	Source of Information
Mineral	Piedra	Piedra River headwaters to Highway 160 including East Fork, Middle Fork, main stem of Piedra River	Watershed values are defined by the collaborative workgroup and include outstandingly remarkable values scenery, fish, geology, archeology, and recreation.	River Protection Workgroup leading local process to involve the public in protecting natural values while allowing water development to continue.	Workgroup to kick off in 2011.	SWWCD, SJCA, TU, TWS, SUIT, CDWR, CWCB, SJPL, Private landowners and citizens	River Protection Workgroup
La Plata	Piedra	Stolsteimer Creek	In-channel habitat enhancement	Stolsteimer Creek #1, 3 miles of channel and riparian habitat improvements	Completed 2005	SUIT, USEPA	SUIT Wildlife
La Plata	Piedra	Stolsteimer Creek	In-channel habitat enhancement	Stolsteimer Creek #2, 0.3 miles of channel and riparian habitat improvements	Completed 2008	SUIT, USFWS	SUIT Wildlife
La Plata	Piedra	Stolsteimer Creek	In-channel habitat enhancement	Stolsteimer Creek #3, 0.3 miles of channel and riparian habitat improvements	2009 - present (pending)	SUIT, NRCS	SUIT Wildlife
La Plata	Piedra	SUIT tribal boundaries	Bank stabilization and habitat enhancement	(ME&M Ditch) 400 ft. of bank stabilization and habitat enhancement including 5 J-hooks	Completed 2004-2006	SUIT, BOR	SUIT Division of Water Resources
La Plata	Piedra	SUIT tribal boundaries	In-channel habitat enhancement	Piedra River Phase I and Phase II, 2.25 miles of channel and riparian habitat improvements	Completed 2000	SUIT, BOR	SUIT Wildlife
La Plata	Piedra	SUIT tribal boundaries	In-channel habitat enhancement	Piedra River Phase III, 0.5 miles of channel and riparian habitat improvements	Completed 2007	SWWCD, SJCA, TU, TWS, SUIT, CDWR, CWCB, USFS, Private landowners and citizens	SUIT Wildlife

Table 3-1. Southwest Basin Nonconsumptive Identified Projects and Processes Summary, continued

County	Subbasin	Stream Segment	Nonconsumptive Need	Nonconsumptive IPP Process Project to Address the Need	Amount of Water Needed Source Status Notes	Stakeholders	Source of Information
La Plata	Pine	Beaver Creek	Bank stabilization and habitat enhancement	200 ft. of bank stabilization and habitat enhancement including 2 arm vane weirs, 3 J'hooks, and construction of a backwater	Completed 2010	SUIT, BOR	SUIT Division of Water Resources
La Plata	Pine	Beaver Creek	Ecosystem restoration/water quality improvement	Beaver Creek, 2000 feet of channel work and riparian restoration	Complete. Spring 2010	SUIT, USEPA	SUIT Enviro. Programs
La Plata	Pine	Dry Creek	Ecosystem restoration/water quality improvement	Dry Creek, 3000 feet of channel work and riparian restoration	Complete. Fall 1999	SUIT, USEPA	SUIT Enviro. Programs
La Plata	Pine	Ignacio Creek	Ecosystem restoration/water quality improvement	Ignacio Creek, 2500 feet of channel work and riparian restoration	Complete. Spring 2008	SUIT, USEPA	SUIT Enviro. Programs
La Plata	Pine	Pine River watershed - headwaters to USFS boundary	Watershed values are defined by the collaborative workgroup and include the outstandingly remarkable values of scenery and recreation	River Protection Workgroup leading local process to involve the public in protecting natural values while allowing water development to continue.	Final Meeting in June 2011	SWWCD, SJCA, TU, TWS, SUIT, CDWR, CWCB, USFS, Private landowners and citizens	River Protection Workgroup Steering Committee
Hinsdale	Pine	Pine River watershed - headwaters to USFS boundary	Watershed values are defined by the collaborative workgroup and include the outstandingly remarkable values of scenery and recreation	River Protection Workgroup leading local process to involve the public in protecting natural values while allowing water development to continue.	Final Meeting in June 2011	SWWCD, SJCA, TU, TWS, SUIT, CDWR, CWCB, USFS, Private landowners and citizens	River Protection Workgroup Steering Committee

Table 3-1. Southwest Basin Nonconsumptive Identified Projects and Processes Summary, continued

County	Subbasin	Stream Segment	Nonconsumptive Need	Nonconsumptive IPP Process Project to Address the Need	Amount of Water Needed Source Status Notes	Stakeholders	Source of Information
La Plata	Pine	Rock Creek	Ecosystem restoration/water quality improvement	Rock Creek I, 4000 feet of channel work and riparian restoration	Complete. Spring 2001	SWWCD, SJCA, TU, TWS, SUIT, CDWR, CWCB, USFS, Private landowners and citizens	SUIT Enviro. Programs
La Plata	Pine	Rock Creek	Ecosystem restoration/water quality improvement	Rock Creek II, 2500 feet of channel work and riparian restoration	Complete. Spring 2003	SWWCD, SJCA, TU, TWS, SUIT, CDWR, CWCB, USFS, Private landowners and citizens	SUIT Enviro. Programs
La Plata	Pine	Rock Creek	Ecosystem restoration/water quality improvement	Rock Creek IV, 3500 feet of channel work and riparian restoration	Complete. Spring 2006	SWWCD, SJCA, TU, TWS, SUIT, CDWR, CWCB, USFS, Private landowners and citizens	SUIT Enviro. Programs
La Plata	Pine	SUIT tribal boundaries	Bank stabilization and habitat enhancement	Naranjo, 1100 ft. of bank stabilization and habitat enhancement including 6 J-hooks, construction of an earthen berm and backwater	Completed 2008	SWWCD, SJCA, TU, TWS, SUIT, CDWR, CWCB, USFS, Private landowners and citizens	SUIT Division of Water Resources
La Plata	Pine	SUIT tribal boundaries	In-channel habitat enhancement	Pine River #1, 1 mile of channel and riparian habitat improvements	Completed 2005	SUIT, BOR	SUIT Wildlife
La Plata	Pine	SUIT tribal boundaries	In-channel habitat enhancement	Pine River #2, 0.5 miles of channel and riparian habitat improvements	Completed 2006	SUIT, BOR	SUIT Wildlife
La Plata	Pine	SUIT tribal boundaries	In-channel habitat enhancement	Pine River #3, 0.5 miles of channel and riparian habitat improvements	Completed 2009	SWWCD, SJCA, TU, TWS, SUIT, CDWR, CWCB, USFS, Private landowners and citizens	SUIT Wildlife

Table 3-1. Southwest Basin Nonconsumptive Identified Projects and Processes Summary, continued

County	Subbasin	Stream Segment	Nonconsumptive Need	Nonconsumptive IPP Process Project to Address the Need	Amount of Water Needed Source Status Notes	Stakeholders	Source of Information
La Plata	Pine	SUIT tribal boundaries	lack of instream flow	Technical work and negotiations to develop a plan for reservoir operations to provide instream flow	2011 - On-going and pending	SUIT, PRID, CWCB	SUIT Division of Water Resources
La Plata	Pine	SUIT tribal boundaries	Bank stabilization and habitat enhancement	Watts, 850 ft. of bank stabilization and habitat enhancement including 8 bendway weirs, 1 J-hook, and 1400 ft. of livestock exclusion fence	Completed 2010	SUIT, BOR	SUIT Division of Water Resources
Archuleta	Rio Blanco	Rio Blanco River		This project is an environmental enhancement which is nearing completion. It is included because it is not yet completed.			SJWCD

Table 3-1. Southwest Basin Nonconsumptive Identified Projects and Processes Summary, continued

County	Subbasin	Stream Segment	Nonconsumptive Need	Nonconsumptive IPP Process Project to Address the Need	Amount of Water Needed Source Status Notes	Stakeholders	Source of Information
Archuleta	San Juan	Cat Creek Watershed	Watershed issues	Erosion control	– This watershed has some serious soil erosion and grazing management issues. Cat Creek itself is very unstable in many places with down cutting of the channel bottom and erosion of streambanks taking place. Efforts to restore the creek would have to include addressing resource problems on the uplands as well as the creek. We have done very little in this watershed but plan to explore the possibility of developing a watershed management project if there is enough landowner interest.		Jerry R. Archuleta, NRCS District Conservationist Pagosa Springs Field Office
Archuleta	San Juan	East Fork of the San Juan River	Nonconsumptive and consumptive values	River Protection Workgroup leading local process to involve the public in protecting natural values while allowing water development to continue.		SWWCD, SJCA, TU, TWS, SUIT, CDWR, CWCB Private landowners and citizens	Ann Oliver, RPW Steering Committee Member

Table 3-1. Southwest Basin Nonconsumptive Identified Projects and Processes Summary, continued

County	Subbasin	Stream Segment	Nonconsumptive Need	Nonconsumptive IPP Process Project to Address the Need	Amount of Water Needed Source Status Notes	Stakeholders	Source of Information
Archuleta	San Juan	Lower Piedra River from Hwy 160 to Navajo Lake.	Bank stabilization	stabilization work with individual landowners	Some landowners have started to look at working together to treat complete section of the river and hopefully this will progress to the stage that a comprehensive project could be developed.		Jerry R. Archuleta, NRCS District Conservationist Pagosa Springs Field Office
Archuleta	San Juan	Navajo River	reduction in aquatics habitat values	Navajo River Restoration	The Navajo river seems to have many of the same problems that the Lower Blanco had before restoration of that river was recently completed. The stream channel is wide for the low flows created by the water diversion resulting in shallow flow depths. The shallow depth contributes to high water temperatures and reduction in aquatics habitat values. We have work with a few individuals to install rock structure that improve habitat values but there has not been a strong, unified effort by landowners along the river. Education of the landowners probably needs to be the first step.		Jerry R. Archuleta, NRCS District Conservationist Pagosa Springs Field Office

Table 3-1. Southwest Basin Nonconsumptive Identified Projects and Processes Summary, continued

County	Subbasin	Stream Segment	Nonconsumptive Need	Nonconsumptive IPP Process Project to Address the Need	Amount of Water Needed Source Status Notes	Stakeholders	Source of Information
Archuleta	San Juan	San Juan River from Pagosa Springs to Navajo Lake	bank stability issues	Channel Assessment	There are bank stability issues all along the San Juan River from Pagosa Springs to Navajo Lake. The problem seems to worsen the closer you get to Navajo Lake, but an assessment would need to be done to determine if this is actually the case. We have completed work on some properties but this would be a very large project and would probably have to be broken down into smaller section.		Jerry R. Archuleta, NRCS District Conservationist Pagosa Springs Field Office
Archuleta	San Juan	Watershed of the East Fork of the San Juan River	Watershed values are defined by the collaborative workgroup and include the outstandingly remarkable value of geology	River Protection Workgroup leading local process to involve the public in protecting natural values while allowing water development to continue.		SWWCD, SJCA, TU, TWS, SUIT, CDWR, CWCB, SJPL, Private landowners and citizens	River Protection Workgroup
Mineral	San Juan	Watershed of the East Fork of the San Juan River	Watershed values are defined by the collaborative workgroup and include the outstandingly remarkable value of geology	River Protection Workgroup leading local process to involve the public in protecting natural values while allowing water development to continue.		SWWCD, SJCA, TU, TWS, SUIT, CDWR, CWCB, SJPL, Private landowners and citizens	River Protection Workgroup

Table 3-1. Southwest Basin Nonconsumptive Identified Projects and Processes Summary, continued

County	Subbasin	Stream Segment	Nonconsumptive Need	Nonconsumptive IPP Process Project to Address the Need	Amount of Water Needed Source Status Notes	Stakeholders	Source of Information
Mineral	San Juan	Watershed of the West Fork of the San Juan River	Watershed values are defined by the collaborative workgroup and include the outstandingly remarkable value of geology, scenery, and wildlife.	River Protection Workgroup leading local process to involve the public in protecting natural values while allowing water development to continue.		SWWCD, SJCA, TU, TWS, SUIT, CDWR, CWCB, SJPL, Private landowners and citizens	River Protection Workgroup
Archuleta	San Juan	Watershed of the West Fork of the San Juan River	Watershed values are defined by the collaborative workgroup and include the outstandingly remarkable value of geology, scenery, and wildlife.	River Protection Workgroup leading local process to involve the public in protecting natural values while allowing water development to continue.		SWWCD, SJCA, TU, TWS, SUIT, CDWR, CWCB, SJPL, Private landowners and citizens	River Protection Workgroup
Western Slope	San Juan/ Colorado	San Juan Basin Recovery Implementation Program	Colorado Pikeminnow; Razorback Sucker (Federally listed endangered species under the ESA)	Federally listed fish species under the ESA - project ongoing since 1988 in Upper Co River Basin (San Juan also??)	Federal program affecting water management throughout Upper Co and San Juan River Basins; both basins operated under Programmatic Biological Opinion (PBO) allowing depletions under a cumulative cap w/out individual consultation on each project. San Juan program extended through 2023.		DG (CDOW)

Table 3-1. Southwest Basin Nonconsumptive Identified Projects and Processes Summary, continued

County	Subbasin	Stream Segment	Nonconsumptive Need	Nonconsumptive IPP Process Project to Address the Need	Amount of Water Needed Source Status Notes	Stakeholders	Source of Information
Western Slope	San Juan/ Colorado	warm water streams w/in San Juan/ Co River drainages	Roundtail Chub, Flannelmouth Sucker, Bluehead Sucker are sensitive species (CDOW); and species of concern (BLM)	6-State Range-Wide Conservation Agreement (NM, WY, UT, NV, AZ, CO) to expedite conservation measures for three native warm water fish that occupy lower reaches of all the San Juan/ Dolores/ San Miguel drainages. BOR, BLM, USFS also signatories to this agreement.	This Conservation Agreement signed in 2004 initiated formal inter-state consultation and cooperation to conserve these species. CO still drafting strategy document to coordinate implementation of conservation measures.	CO, AZ, NM, UT, NV, WY; BOR, BLM, USFS	DG (CDOW)
Montrose	San Miguel	Between Calamity Draw and Dolores Confluence (17.24 miles)	Roundtail Chub, Flannelmouth Sucker, Bluehead Sucker are sensitive species (CDOW); and species of concern (BLM)	In Stream Flow (ISF): 325 cfs: (4/15-6/14), 170 cfs: (6/15-731),115cfs:(8/1-8/31),80cfs:(9/1-2-29),115cfs: (3/1-4/14)	CWCB declared intent to appropriate 1/2011. Montrose County has provided additional information on flow/ habitat relationships that is being reviewed by CWCB staff.	CWCB, BLM, CDOW, Montrose County	April Montgomery, 2011 CWCB Board Member
Archuleta	Vallecito	Vallecito Creek headwaters to USFS boundary	Nonconsumptive and consumptive values	River Protection Workgroup leading local process to involve the public in protecting natural values while allowing water development to continue.		SWWCD, SJCA, TU, TWS, SUIT, CDWR, CWCB Private landowners and citizens	Ann Oliver, RPW Steering Committee Member

Table 3-1. Southwest Basin Nonconsumptive Identified Projects and Processes Summary, continued

County	Subbasin	Stream Segment	Nonconsumptive Need	Nonconsumptive IPP Process Project to Address the Need	Amount of Water Needed Source Status Notes	Stakeholders	Source of Information
Hinsdale	Vallecito	Vallecito Creek headwaters to USFS boundary	Nonconsumptive and consumptive values	River Protection Workgroup leading local process to involve the public in protecting natural values while allowing water development to continue.		SWWCD, SJCA, TU, TWS, SUIT, CDWR, CWCB Private landowners and citizens	Ann Oliver, RPW Steering Committee Member
La Plata	Vallecito	Vallecito Creek watershed - headwaters to USFS boundary	Watershed values are defined by the collaborative workgroup and include the outstandingly remarkable values of scenery and recreation	River Protection Workgroup leading local process to involve the public in protecting natural values while allowing water development to continue.		SWWCD, SJCA, TU, TWS, SUIT, CDWR, CWCB, SJPL, Private landowners and citizens	River Protection Workgroup
San Juan	Vallecito	Vallecito Creek watershed - headwaters to USFS boundary	Watershed values are defined by the collaborative workgroup and include the outstandingly remarkable values of scenery and recreation	River Protection Workgroup leading local process to involve the public in protecting natural values while allowing water development to continue.		SWWCD, SJCA, TU, TWS, SUIT, CDWR, CWCB, SJPL, Private landowners and citizens	River Protection Workgroup
Montrose	San Miguel	Between Calamity Draw and Dolores Confluence (17.24 miles)	Roundtail Chub, Flannelmouth Sucker, Bluehead Sucker are sensitive species (CDOW); and species of concern (BLM)	In Stream Flow (ISF): 325 cfs: (4/15-6/14), 170 cfs: (6/15-731),115cfs:(8/1-8/31),80cfs:(9/1-2-29),115cfs: (3/1-4/14)	CWCB declared intent to appropriate 1/2011. Montrose County has provided additional information on flow/ habitat relationships that is being reviewed by CWCB staff.	CWCB, BLM, CDOW, Montrose County	April Montgomery, CWCB

Table 3-1. Southwest Basin Nonconsumptive Identified Projects and Processes Summary, continued

County	Subbasin	Stream Segment	Nonconsumptive Need	Nonconsumptive IPP Process Project to Address the Need	Amount of Water Needed Source Status Notes	Stakeholders	Source of Information
Montrose	San Miguel	Tabeguache Creek (Confluence with N. Frk Tabeg. Crk to confluence with 47 mile Crk) (3.66 miles)	Supports self sustaining fish populations (speckled dace, rainbow trout, molted sculpin, blue head sucker. Also diverse riparian habitat	In Stream Flow: 3.5 cfs (4/1 - 6/30), 2.0 cfs (7/1 - 10/31), 1.6 cfs (11/1 - 3/31)	CWCB declared intent to appropriate 1/2011. There has been no opposition to date.	CWCB, BLM, CDOW, Montrose County	April Montgomery, CWCB
Montrose	San Miguel	Red Canyon Creek	Supports self sustaining populations of native Co River Cutthroat trout and mottled sculpin.	In Stream Flows: 1.2 cfs (4/1 - 6/30), .25 cfs 7/1 - 10/31)	CWCB declared intent to appropriate 1/2011. There has been no opposition to date.	CWCB, BLM, CDOW, Montrose County	April Montgomery, CWCB
Montrose	San Miguel at CCC-Ditch	San Miguel at CCC-Ditch	Provide fish passage at CCC-ditch diversion	Construct Fish Ladder that abuts CCC-ditch, add electronic gauge to assist in diversion	no additional water associated with this project	CCC-Ditch, CWT, BLM, CDOW, TNC, SWCD, CWCB, Telluride Foundation	Peter Mueller, The Nature Conservancy (TNC)
Montrose	San Miguel below Naturita	San Miguel, Calamity Creek	Naturita and Nucla are in the process of identifying how to meet new water quality standards for sewer discharge; Naturita must meet standards by summer 2011	Identify best means of improving water quality to meet State standards		Towns of Nucla and Naturita	Peter Mueller (TNC), George Glasier
Montrose	San Miguel, Nucla and Naturita area	CCC-Ditch to Calamity Creek	Identify nonconsumptive need to support fisheries in times when CCC-Ditch divert most or all water	Identify willing lessor for 3 in 10 year paid lease of water	unknown at this time	CDOW, TNC, CWT, and others as needed	Peter Mueller (TNC)

Table 3-1. Southwest Basin Nonconsumptive Identified Projects and Processes Summary, continued

County	Subbasin	Stream Segment	Nonconsumptive Need	Nonconsumptive IPP Process Project to Address the Need	Amount of Water Needed Source Status Notes	Stakeholders	Source of Information
San Miguel	Howards Fork	Howards Fork above Ophir; Carbenaro Mine Reclamation	Mine Tailings Reclamation	USFS initiating tailings removal from riparian area east of Ophir	no water needed	USFS, SMWC, Town of Ophir, TLR, San Miguel Conservation Foundation, GOCO	Peter Mueller (TNC), Pat Willits
San Miguel	Howards Fork	Carbenaro Mine Audit Reclamation	Reduce or Treat the contaminated water - heavy metals, principal contributor to Howards Fork	Investigate what options exist to mitigate heavy metal loading	no water needed	EPA, Division of Water Safety; CDPHE, DRMS, private landowner	Peter Mueller (TNC), Pat Willits
San Miguel	Howards Fork	Carribou Mine Tailings and Audit	Improve water quality	Investigate how best to reclaim	no water needed	USFS, private land owner, DRMS, EPA, CDPHE et al	Peter Mueller (TNC), Pat Willits
San Miguel	Fall River	Fall River and tributaries above Woods Lake	Colorado River Cutthroat Trout (State Sensitive Species)	The CDOW w/ partners is continuing implementation of a cutthroat *refugio* concept at Woods Lake, and has completed 2 (of 3) infrastructure improvement projects designed to isolate this fishery from exposure to non-native trout (mainly brook trout)	CDOW has obtained internal funding and is working in partnership w/ the Hughes Ditch Co to modify the diversion structure to facilitate cutthroat isolation and allow diversion of existing water rights.	CDOW, USFS, Hughes Ditch Co, San Miguel County	DG (CDOW)
San Miguel	San Miguel	Telluride to Society Turn	Valley Floor restoration of historic river channel	Riparian habitat restoration. Flows to protect wetlands.	Existing flows may be sufficient	Town of Telluride	Telluride, Lance McDonald

Table 3-1. Southwest Basin Nonconsumptive Identified Projects and Processes Summary, continued

County	Subbasin	Stream Segment	Nonconsumptive Need	Nonconsumptive IPP Process Project to Address the Need	Amount of Water Needed Source Status Notes	Stakeholders	Source of Information
La Plata	Animas	Animas River – approx. 1,200 linear feet in vicinity of Smelter rapid adjacent to Santa Rita Park.	Recreational In-Channel Diversion	Provide a boating park that allows for rafting, kayaking, tubing and other water sports	Water needs depend on the time of year. Water rights secured in 2009. Construction of the anchored rock facility awaits funding.	City of Durango, La Plata County, Animas River Task Force	City of Durango
La Plata	Florida	Upper Florida	Drinking Water Protection	Source Water Protection		City of Durango, Edgemont Ranch Metro District, Forest Groves Home Owners, El Rancho Florida Homeowners, Durango-La Plata Regional Airport, La Plata County, SJPL, CRWA, COWQCC	Eddy Balch, CRWA
La Plata	Animas	Lake Nighthorse	Recreational Use of Lake Nighthorse	Provide boating and fishing and swimming opportunities	No new water needs now that the reservoir is full	Animas La Plata Water Conservancy District, Bureau of Reclamation, La Plata County, City of Durango	City of Durango
Montrose	Dolores	Paradox Valley	Salinity Control	BOR Desalination Plant intercepts and collects saline water flowing toward Dolores River within the Paradox Valley and stores that water in deep wells.	Losses to Dolores surface flows are mitigated with 700AF/year out of McPhee Reservoir. Managed as part of the downstream fishery water, and does not share shortages.	BOR, DWCD, CDOW.	Bruce Whitehead, SWWCD
La Plata	Animas	Cascade Creek	Mitigate impacts to flows incurred on Cascade Creek by Tacoma Power Plant.	FERC relicensing process.		Xcel, SWWCD, SJPL, SJCA, TU, DWCD, MVIC	Bruce Whitehead, SWWCD

3.3.5 Visual Examples of Nonconsumptive Projects from the Database

Figures 3-10 and **3-11** show examples of the nonconsumptive projects included in the Southwest Basin Roundtables geodatabase. Figure 3-10 shows an example IPP for Lightner Creek and Figure 3-11 shows an example for Beaver Creek.

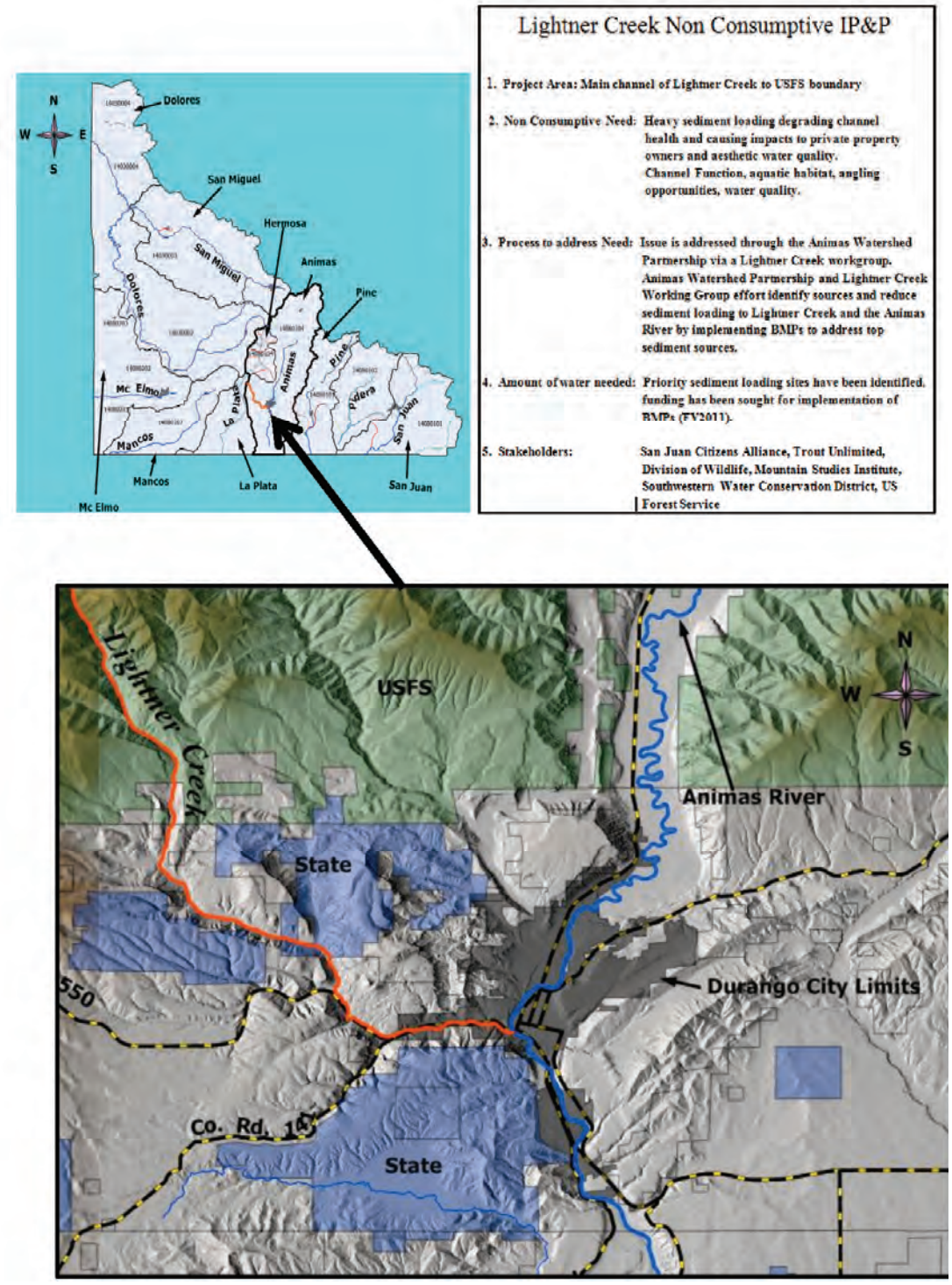


Figure 3-10 Lightner Creek IPP Project Area Map and Description

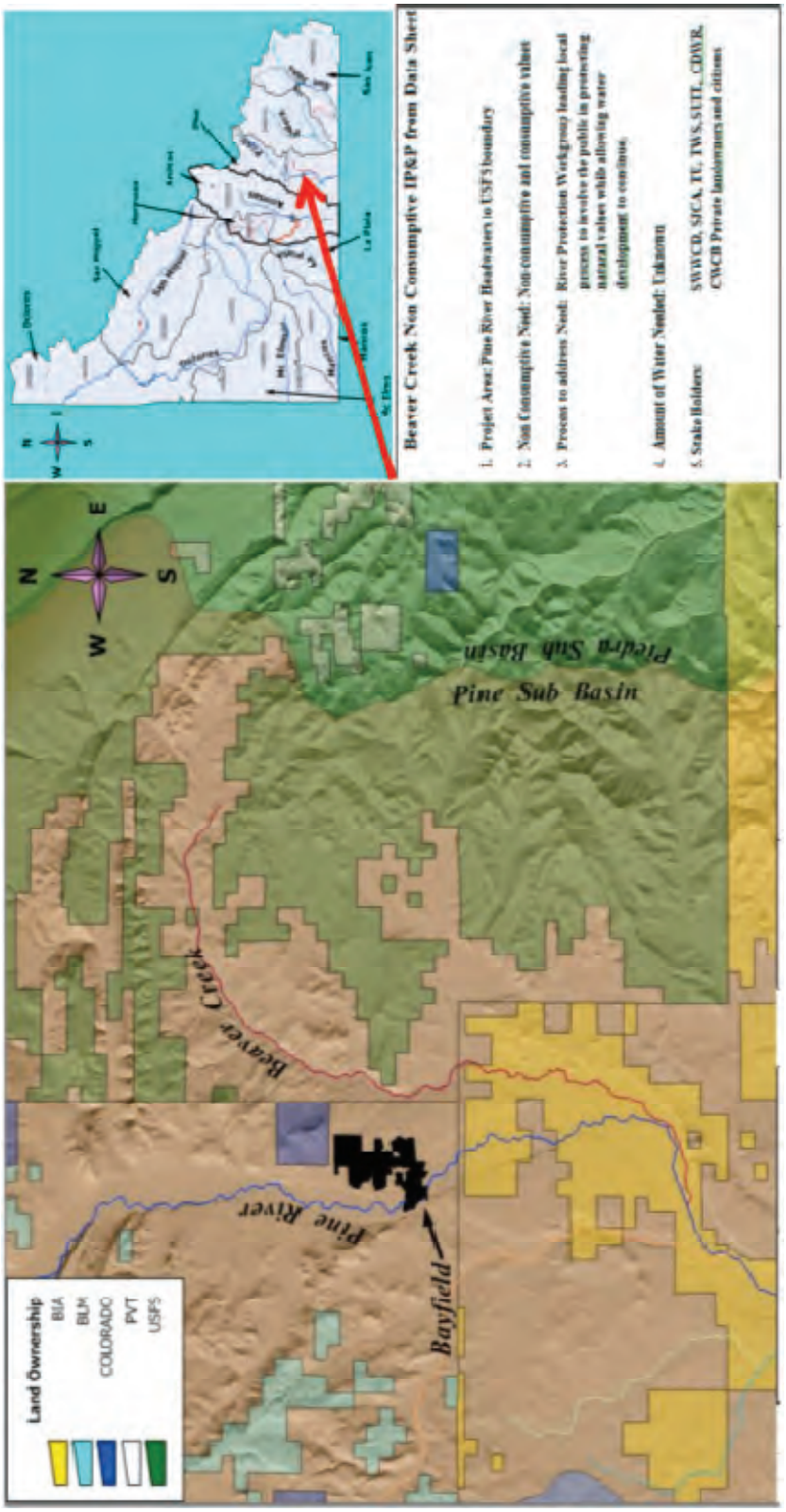
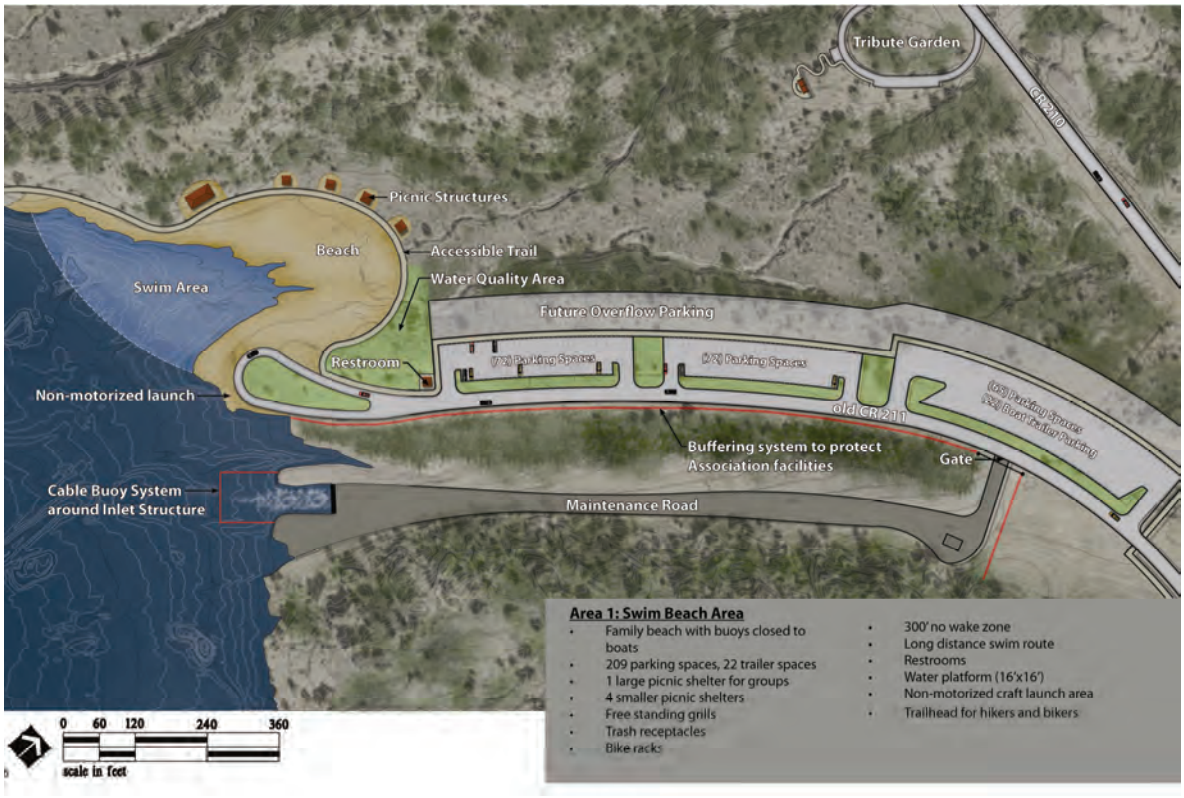


Figure 3-11 Beaver Creek Nonconsumptive IPP

3.3.6 List of Nonconsumptive Projects Previously Funded by the Roundtable Process

Following are nonconsumptive projects that have been funded by the Southwest Basin Roundtable.

Lake Nighthorse Recreation Master Plan
$25,000 Basin
May 2010



Purpose: To assist in writing three components of the Lake Nighthorse Recreation Plan that includes Water Quality Treatment Guidelines, Invasive Species Management, and Wildlife Habitat Enhancements.

Lower Blanco POA – Lower Blanco River Restoration Project
$100,000 Basin **$150,000 State**
March 2009 **September 2009**

Purpose: To restore some of the aquatic life function that was lost when the San Juan-Chama Diversion was implemented, diverting water to New Mexico.

Mancos Conservation District – Mancos River Diversion Phase 1
$24,753 Basin
November 2009

Purpose: To study and evaluate opportunities for improving in-stream flows that would enhance fish passage upstream.

Conserving Farmland Partnership
$31,500 Basin
November 2009

Purpose: To research barriers to protecting land exclusively for agriculture and obtain feedback on possible solutions.

San Juan Citizens Alliance – Dolores River "A Way Forward"
$25,000 Basin
September 2010

Purpose: To help fund a process that will determine alternatives and best management opportunities for improving the status of native fish within the Lower Dolores River. Diverse interests will be represented in the project.

San Juan Resource Conservation & Development – Animas Watershed Needs Assessment
$57,000 Basin
September 2009

Purpose: To develop a water-quality and a geographical database for the purpose of identifying sources of pollution and impacts to the assimilative and natural water storage capacity of the Animas River.

3.4 CWCB Nonconsumptive Projects and Methods

The CWCB has also collected nonconsumptive projects and methods statewide. This section summarizes the information collected by CWCB. In January 2010, CWCB developed a survey to collect information on where there are existing or planned nonconsumptive projects, methods, and studies. Studies were included since they may recommend or inform the implementation of projects or methods that will provide protection or enhancement of environmental and recreational attributes. This survey was distributed through CWCB's basin roundtable and e-mail database. On February 10, 2010, CWCB conducted a workshop in Silverthorne, Colorado to discuss the Phase II efforts and to collect information on nonconsumptive projects, methods, and studies from the workshop attendees. At the workshop, information on 116 stream segments and 209 projects, methods, or studies was provided to CWCB. In addition, CWCB also gathered information on individuals and organizations to follow up with the data collection effort. Since the February 2010 meeting, an additional 57 meetings have occurred to gather data on additional projects, methods, and studies. **Table 3-2** below summarizes the number of individuals or organizations contacted since the February 2010 meeting; the number of follow-up meetings held; and the number of projects, methods, and studies identified to-date for each basin. Table 3-2 details the number of projects, methods, and studies that are in the focus areas and the number of projects outside of the focus areas. In total, 648 projects were identified from the outreach effort. Examples of the types of projects collected during this outreach effort include:

- Habitat restoration projects such as bank stabilization projects or instream habitat restoration such as pool and riffle development. Another example of habitat restoration area projects that focus on the maintaining connectivity for fish passage such as fish ladders.
- Flow protection projects such as voluntary flow agreements, ISF donations, or voluntary re-operation of reservoirs for releases for environmental or recreational needs.

Table 3-2 Summary of Meetings to Collect Nonconsumptive Projects and Methods Information

Basin Roundtable	No. of Individuals or Organizations Contacted	No. of Meetings	No. Projects and Methods in Focus Areas	No. Projects and Methods Outside Focus Areas	Total No. Projects and Methods
Arkansas	7	5	40	0	40
Colorado	21	12	168	35	203
Gunnison	9	4	44	15	59
Metro	See South Platte	See South Platte	See South Platte	See South Platte	See South Platte
North Platte	1	1	41	7	48
Rio Grande	10	5	59	0	59
South Platte	17	14	54	53	107
Southwest	**17**	**12**	**84**	**10**	**94**
Yampa-White	9	4	22	16	38
TOTAL	91	57	512	136	648

In addition, there is a great deal of information gathered from divisions within the Colorado DNR that have been integrated into the projects and methods database. For instance, **Table 3-3** summarizes CWCB's ISFs for each basin roundtable. Decreed ISFs have been confirmed by the water court. Pending ISFs have been approved by the CWCB Board and are going through the water court process. Recommended ISFs include those areas submitted to CWCB as a recommendation, but not yet approved by the CWCB Board at this time.

Table 3-3 Summary of CWCB Instream Flows and Natural Lake Levels

Basin Roundtable	Natural Lakes	ISF Decreed	Pending ISF	Recommended ISF
Arkansas	86	171	11	8
Colorado	150	404	12	6
Gunnison	82	259	15	2
Metro	0	24	0	0
North Platte	31	45	1	3
Rio Grande	49	141	0	0
South Platte	31	208	2	2
Southwest	**50**	**151**	**4**	**6**
Yampa-White	150	175	7	5
TOTAL	**494**	**1,578**	**52**	**32**

The CWCB's Watershed Protection and Flood Mitigation section oversees the agency's watershed restoration efforts. In addition, many of the WSRA grants fully or partially address nonconsumptive needs. **Table 3-4** shows the funding programs implemented by CWCB and project type associated with each program. The table shows the status of the projects; pending in this case means that either the contract has not yet been signed, but has CWCB approval, or that applicants have applied, but are not yet approved by the CWCB.

Table 3-4 Summary of CWCB's Watershed Restoration and Nonconsumptive WSRA Projects

Funding Source	Type	Complete	On-going	Pending	Total
Colorado Healthy Rivers Fund	Report	19	9	3	31
Colorado Healthy Rivers Fund	Restoration Project	15	7	6	28
Colorado Watershed Restoration Program	Report	1	3	0	4
Colorado Watershed Restoration Program	Restoration Project	2	9	1	12
Fish and Wildlife Resources Fund	Restoration Project	2	2	0	4
Multi-Objective Watershed Protection Plan	Report	5	0	1	6
Multi-Objective Watershed Protection Plan	Restoration Project	6	0	4	10
WSRA Nonconsumptive Related Grants	Report	8	15	3	26
WSRA Nonconsumptive Related Grants	Restoration Project	13	12	4	29
TOTAL		**71**	**57**	**22**	**150**
Total Restoration Projects	**Restoration Project**	**38**	**30**	**15**	**83**
Total Reports	**Report**	**33**	**27**	**7**	**67**
TOTAL CWCB Dollars Spent/Encumbered		$14,499,625			
TOTAL Estimated Match Dollars		$34,323,697			
TOTAL Approximate Expenditures		**$ 48,823,322**			

The CDOW is mandated by statute to manage the state's fishery and wildlife resources for the benefit of the citizens and visitors to the State of Colorado. The CDOW Aquatic Section takes the lead for fishery management for the agency, and to this end has mapped every waterbody, stream, or river segment in Colorado and associated a water management classification relating back to fishery objectives for that waterbody. The CDOW has participated in the basin roundtable processes throughout in order to provide data and information on basin fisheries, indicate fishery management priorities, and also to communicate where the most significant threats are currently located. CDOW recognizes that human uses of water will often conflict directly or indirectly with the ability to manage fisheries to meet these objectives. CDOW anticipates that as water resources are more intensively managed in the future, that pre-emptive coordination between water developers and conservation interests can minimize and in some cases improve their ability to meet fishery objectives in Colorado.

As has been recognized elsewhere in this document and others, the fisheries in Colorado are nationally renowned; as such, the economy of many headwater communities, especially in the Colorado River Basin,

are substantially dependent on the health and viability of the aquatic community. Lower in the basin, the Colorado River also has a significant reach of 'Critical Habitat' listed under the ESA to support endangered populations of Colorado pikeminnow and razorback sucker inhabiting these reaches (Rifle to the state line). Managing recreational, listed, and non-listed conservation species (e.g., Colorado River cutthroat trout, roundtail chub) are the primary goals for the Aquatic Section staff, and include a substantial commitment to raising fish in hatcheries for recreational and conservation purposes. Included below is a list of tasks that fishery managers and staff routinely undertake to manage fisheries:

- Monitoring of fisheries for population estimates, measures of 'quality' (e.g., Gold Medal Waters), and species composition;
- Growth and stocking of recreational and conservation cold- and warm-water species;
- Aquatic nuisance species monitoring and control (e.g., quagga and zebra mussels; virile crayfish; non-native predatory fish);
- Fishery regulatory review and implementation (i.e., establishment of and updates to fishery bag and possession limits);
- Participation in Federal Endangered Fish Recovery Programs;
- Serving as the CWCB's 'biological consultants' for ISF appropriations;
- Aquatic pathogen and water quality contamination research, response, and spill investigation;
- Work with local communities and stakeholder groups to implement local projects, such as removing migration barriers (or in the case of native cutthroat trout, installing migration barriers to stratify native and non-native populations of trout) or stream habitat improvement projects;
- Formal regulatory processes governed by state or federal statute (county 1041 consultation, National Environmental Policy Act, U.S. Army Corps of Engineers Section 404 permitting, Water Quality Control Commission hearings);
- Participation as official liaisons to the basin roundtable processes.

The CDOW is aware of the inherent conflict between additional development of water resources and its mandate to manage fishery resources for the people of Colorado and its visitors. However, there are also many examples of a beneficial synergy between fishery management objectives and water development, such as below certain dams where enhanced tailwater fisheries develop with augmented summer and fall streamflows; the benefits of certain agricultural practices that divert a relatively small portion of the high volume flows that return slowly through fields and alluvial aquifers to supplement streamflow later in the year; or flow management agreements with water providers that meet multiple objectives. As noted, CDOW is continually engaged in projects and processes that are intended to meet nonconsumptive environmental needs, specifically the management of fisheries statewide. Itemizing only specific projects CDOW is working on at the time of this publication may create a misunderstanding about the direct role CDOW continually plays preserving and protecting nonconsumptive environmental attributes.

Finally, CWCB included the Southwest Regional Gap Analysis Project (SRGAP), coordinated by USGS into the projects and methods database. The SRGAP created detailed, seamless GIS data layers of land cover, all native terrestrial vertebrate species, land stewardship, and management status values. The management status values quantify the relationship between land management and biodiversity throughout the State of Colorado. Four management status values are as described below:

- Status 4 lands are where there are no known public or private institutional mandates or legally recognized easements or deed restrictions held by the managing entity to prevent conversion of natural habitat types to anthropogenic habitat types. The area generally allows conversion to unnatural land cover throughout.

- Status 3 lands comprise areas having permanent protection from conversion of natural land cover for the majority of the area, but subject to extractive uses of either a broad, low-intensity type (e.g., logging) or localized intense type (e.g., mining). It also confers protection to federally-listed endangered and threatened species throughout the area.

- Status 2 lands are areas having permanent protection from conversion of natural land cover and a mandated management plan in operation to maintain a primarily natural state, but which may receive uses or management practices that degrade the quality of existing natural communities, including suppression of natural disturbance.

- Status 1 lands include areas having permanent protection from conversion of natural land cover and a mandated management plan in operation to maintain a natural state within which disturbance events (of natural type, frequency, intensity, and legacy) are allowed to proceed without interference or are mimicked through management.

For this effort, CWCB include areas with a status between 1 and 2.5 as a project and method in the nonconsumptive projects database.

The project and method information collected by CWCB, as described in Section 3.2, was spatially digitized in GIS. Each project was digitized separately using an existing stream database called National Hydrography Dataset (NHD) 12-digit segments. The average length of a NHD segment is 1.5 miles. Depending on the length of the project, multiple NHD segments could represent one project. Also, depending on the project location, multiple projects could exist on the same NHD segment. A unique Project ID and Segment ID were given to all surveyed and interviewed projects within the Nonconsumptive Needs Assessment database. In addition, the WSRA grant project locations were digitized in a similar fashion. The CWCB ISFs and natural lake levels, CWCB restoration projects, and the USGS SRGAP information had previously been summarized using GIS; therefore, this data did not have to be digitized. The USGS SRGAP information was analyzed further to calculate a weighted management status value for each NHD segment. This value was calculated in GIS for each NHD 12-digit HUC by a weighted average of each land management status within the HUC.

Following are the assumptions used in digitizing the nonconsumptive projects and methods:

- No NHD segment was edited (i.e., if the project was smaller than an NHD segment, the whole NHD segment was used to represent the project location).

- Projects were digitized based on hand-drawn locations and/or brief descriptions. This information is still under review by the basin roundtables.

Following are the types of information included in the GIS geodatabase for each project:

- Project or Method Name
- Project or Method Type (i.e., study, flow protection, or restoration project)
- Project or Method Location
- Comments
- Project or Method Status (i.e., ongoing, planned, or completed)
- Project or Method Identification Number

- Project or Method Contact Name
- Project or Method Contact Identification Number

Figure 3-12 at the end of this section is a summary of the projects and methods developed to-date by CWCB and represents the spatial information for all nonconsumptive projects and methods that are planned, ongoing, or completed in the Southwest Basin. This map contains all nonconsumptive projects and methods including—1) CWCB interviews and workshops, 2) CWCB watershed restoration projects, 3) WSRA grants, 4) ISFs, 5) USGS SRGAP information, and 6) CDOW projects. This map includes projects and methods inside the designated focus areas to spatially display the full extent of any project collected by CWCB. This information is also summarized in **Table 3-5**. This table summarizes the project name, location, type, and status. In addition, it summarizes the attributes located within the project boundary and also summarizes information about the type of protections the project provides as defined below.

In addition to identifying the spatial extent and status of the identified projects and methods, CWCB also examined what type of protection the project or method may provide to a given environmental or recreational attribute. CWCB has classified the projects as having direct or indirect protections based on a given environmental or recreational attribute. The definitions used for direct and indirect protections are as follows:

- **Direct Protection** – Projects and methods with components designed intentionally to improve a specific attribute. For example, ISFs have direct protection of fish attributes. Additionally, restoration of a stream channel would also provide direct protections for aquatic species.

- **Indirect Protection** – Projects and methods with components that were not designed to directly improve the specific attribute but may still provide protection. For example, flow protection for a fish species may also indirectly protect riparian vegetation that is located in the area of the flow protection. Another example includes protective land stewardship or a wetland or bank stabilization effort that could indirectly protect aquatic species.

Table 3-5 CWCB Collected Projects and Methods Summary in the Southwest Basin

Project Name	Project Location	Project Type	Project Status	Basin Roundtable Attributes Identified	Project Protections
319 Watershed Study to identify sources of non-point pollution and develop watershed plan	Lower Dolores - McPhee Reservoir to Utah stateline	Information	Ongoing	Active Bald Eagle Nests, Bluehead Sucker, CWCB ISF water rights, Eligible W&S, Flannelmouth Sucker, Flatwater Boating, Northern Leopard Frog , Other Fishing Streams and Lakes, Rare Plants, River Otter, Roundtail Chub, Significant Riparian/Wetland Communities, Waterfowl hunting/viewing parcels, Whitewater Boating	
Ames Hydroelectric Project Final Environmental Assessment	Lake Fork of San Miguel to South Fork to Mainstem of San Miguel	Information	Completed	Colorado Outstanding Waters, CWCB ISF water rights, Other Fishing Streams and Lakes, Rare Plants, Significant Riparian/Wetland Communities	
Animas - La Plata Project Vegetation and Wildlife Mitigation Final Report	La Plata River between Red Mesa and junction with Highway 40	Information	Completed	Active Bald Eagle Nests, Bluehead Sucker, CWCB ISF water rights, Flannelmouth Sucker, Roundtail Chub	
Animas River Fish Passage and Canal Entrainment Evaluation and Recommendations	Animas River between Ridges Basin Dam and stateline	Information	Completed	Active Bald Eagle Nests, Bluehead Sucker, Flannelmouth Sucker, Other Fishing Streams and Lakes, Roundtail Chub, Whitewater Boating	
Animas-La Plata Project wetland and riparian restoration - weed control, grazing exclusion, channel and floodplain restoration, re-seeding and re-planting with desirable species	La Plata River between Red Mesa and junction with Highway 40	Project	Completed	Active Bald Eagle Nests, Bluehead Sucker, CWCB ISF water rights, Flannelmouth Sucker, Roundtail Chub	
Bank Stabilization and Fish Habitat Improvement	Piedra River	Project	Completed	Active Bald Eagle Nests, Bluehead Sucker, CWCB ISF water rights, Eligible W&S, Flatwater Boating, Northern Leopard Frog , Other Fishing Streams and Lakes, Rare Plants, River Otter , Significant Riparian/Wetland Communities, Waterfowl hunting/viewing parcels, Whitewater Boating	Roundtail Chub-I

Table 3-5 CWCB Collected Projects and Methods Summary in the Southwest Basin, continued

Project Name	Project Location	Project Type	Project Status	Basin Roundtable Attributes Identified	Project Protections
Bank Stabilization and Fish Habitat Improvement	Animas River - Basin Creek - T34N, R10W, Sec. 13	Project	Completed	Active Bald Eagle Nests, Bluehead Sucker, Flannelmouth Sucker, Other Fishing Streams and Lakes, Roundtail Chub, Whitewater Boating	Flannelmouth Sucker -I, Roundtail Chub-I
Bank Stabilization and Fish Habitat Improvement	Animas River - T33N, R10W, Sec. 13	Project	Completed	Active Bald Eagle Nests, Bluehead Sucker, Flannelmouth Sucker, Other Fishing Streams and Lakes, Roundtail Chub, Whitewater Boating	Flannelmouth Sucker -I, Roundtail Chub-I
Bank Stabilization and Fish Habitat Improvement	Piedra River - T33N, R2W, Sec. 2	Project	Completed	Active Bald Eagle Nests, Bluehead Sucker, CWCB ISF water rights, Other Fishing Streams and Lakes, River Otter , Significant Riparian/Wetland Communities, Whitewater Boating	Roundtail Chub-I
Bank Stabilization and Riparian Restoration	Stollsteimer Creek	Project	Completed	Active Bald Eagle Nests, Ducks unlimited projects, River Otter , Significant Riparian/Wetland Communities	Significant Plant Communities-I
Bank Stabilization and Water Quality Improvement	Rock Creek	Project	Completed	Active Bald Eagle Nests, Significant Riparian/Wetland Communities	
Barrier work done to isolate Greenback Cutthroat Trout from Rainbow population	Rio Lado Creek	Project	Completed	Colorado River Cutthroat Trout	Bluehead Sucker-I
BLM Suitability Study (slated for June 2011). BLM RMP also covering ACECs	Not available	Information	Ongoing	Active Bald Eagle Nests, Bluehead Sucker, CWCB ISF water rights, Eligible W&S, Flannelmouth Sucker, Flatwater Boating, Northern Leopard Frog , Other Fishing Streams and Lakes, Rare Plants, River Otter , Roundtail Chub, Significant Riparian/Wetland Communities, Waterfowl hunting/viewing parcels, Whitewater Boating	
Burn Rehabilitation Work	Red Creek	Project	Completed	Active Bald Eagle Nests, CWCB ISF water rights, Significant Riparian/Wetland Communities	Bluehead Sucker-I, Flannelmouth Sucker -I, High Recreation Lakes and Reservoirs -I, Roundtail Chub-I

Table 3-5 CWCB Collected Projects and Methods Summary in the Southwest Basin, continued

Project Name	Project Location	Project Type	Project Status	Basin Roundtable Attributes Identified	Project Protections
Burn Rehabilitation Work	Coon Creek	Project	Completed	Significant Riparian/Wetland Communities	Bluehead Sucker-I, Flannelmouth Sucker -I, High Recreation Lakes and Reservoirs -I, Roundtail Chub-I
Carbon Lakes Ditch Removal	Not available	Project/Flow Protection	Completed	CWCB ISF water rights, Significant Riparian/Wetland Communities	Flannelmouth Sucker -D, High Recreation Lakes and Reservoirs -D, Roundtail Chub-D
CCC Ditch Headgate Reconstruction	San Miguel River (above Naturita at CCC Ditch Headgate)	Project	Planned	Active Bald Eagle Nests, Bluehead Sucker, Flannelmouth Sucker, Other Fishing Streams and Lakes, River Otter , Roundtail Chub, Whitewater Boating	Flannelmouth Sucker -D, High Recreation Lakes and Reservoirs -D, Roundtail Chub-D
Conservation Easement of former Piamo Creek ski resort	East Fork and West Fork of the San Juan River	Flow Protection	Completed	Active Bald Eagle Nests, Bluehead Sucker, Colorado Outstanding Waters, CWCB ISF water rights, Other Fishing Streams and Lakes, Significant Riparian/Wetland Communities, Southwestern Willow Flycatcher, Whitewater Boating	BLM -Wilderness Study Areas-D, Bluehead Sucker-I, Colorado Outstanding Waters-D, Durango Natural Studies-D, Flannelmouth Sucker -I, High Recreation Lakes and Reservoirs -I, High Recreation Rivers -D, Important Wetlands-D, Reservoir and Lake Fishing -I, River Otter-D, Roundtail Chub-I, Significant Plant Communities-D
Current CWCB ISF study	Mainstem of the San Miguel	Information	Ongoing	Active Bald Eagle Nests, Bluehead Sucker, CWCB ISF water rights, Ducks Unlimited projects, Flannelmouth Sucker, Northern Leopard Frog , Other Fishing Streams and Lakes, River Otter , Roundtail Chub, Significant Riparian/Wetland Communities, Waterfowl hunting/viewing parcels, Whitewater Boating	

Table 3-5 CWCB Collected Projects and Methods Summary in the Southwest Basin, continued

Project Name	Project Location	Project Type	Project Status	Basin Roundtable Attributes Identified	Project Protections
Current W&S Rivers study (Uncompahgre Field Office)	Mainstem of the San Miguel	Information	Ongoing	Active Bald Eagle Nests, Bluehead Sucker, CWCB ISF water rights, Ducks Unlimited projects, Flannelmouth Sucker, Northern Leopard Frog , Other Fishing Streams and Lakes, River Otter , Roundtail Chub, Significant Riparian/Wetland Communities, Waterfowl hunting/viewing parcels, Whitewater Boating	
Dolores River Dialogue Correlation Report	Lower Dolores - McPhee Reservoir to Utah stateline	Information	Completed	Active Bald Eagle Nests, Bluehead Sucker, CWCB ISF water rights, Eligible W&S, Flannelmouth Sucker, Flatwater Boating, Northern Leopard Frog , Other Fishing Streams and Lakes, Rare Plants, River Otter, Roundtail Chub, Significant Riparian/Wetland Communities, Waterfowl hunting/viewing parcels, Whitewater Boating	
Dolores River Restoration Project -tamarisk removal and restoration	Lower Dolores - McPhee Reservoir to Utah stateline	Project	Ongoing	Active Bald Eagle Nests, Bluehead Sucker, CWCB ISF water rights, Eligible W&S, Flannelmouth Sucker, Flatwater Boating, Northern Leopard Frog , Other Fishing Streams and Lakes, Rare Plants, River Otter, Roundtail Chub, Significant Riparian/Wetland Communities, Waterfowl hunting/viewing parcels, Whitewater Boating	Important Wetlands-I, Significant Plant Communities-I
Fish habitat improvement	Pine River	Project	Completed	Active Bald Eagle Nests, Ducks Unlimited projects, Flannelmouth Sucker, River Otter, Significant Riparian/Wetland Communities	Flannelmouth Sucker -I
Fish habitat improvement	Cunningham Creek	Project	Completed	Colorado Outstanding Waters, CWCB ISF water rights, CWCB natural lake level water rights, Rare Plants	National Wetlands Inventory-I
Fish habitat improvement	Lime Creek	Project	Completed	CWCB ISF water rights, Other Fishing Streams and Lakes, Significant Riparian/Wetland Communities, Whitewater Boating	

Table 3-5 CWCB Collected Projects and Methods Summary in the Southwest Basin, continued

Project Name	Project Location	Project Type	Project Status	Basin Roundtable Attributes Identified	Project Protections
Habitat work in upper reaches	Bear Creek	Project	Ongoing	CWCB ISF water rights, Other Fishing Streams and Lakes, River Otter, Significant Riparian/Wetland Communities	
Habitat work to create pools for over-wintering	Fish Creek	Project	Completed	CWCB ISF water rights, River Otter, Significant Riparian/Wetland Communities	
Habitat work to create pools for over-wintering	Barlow Creek	Project	Completed	CWCB ISF water rights, Rare Plants, Significant Riparian/Wetland Communities	
Hermosa Creek Workgroup Final Report	Hermosa Creek	Information	Completed	Active Bald Eagle Nests, Bluehead Sucker, Colorado Outstanding Waters, Colorado River Cutthroat Trout , CWCB ISF water rights, Other Fishing Streams and Lakes, Significant Riparian/Wetland Communities, Whitewater Boating	
Installing barriers, conducting non-native removal and stocking Colorado Cutthroat Trout	Hermosa Creek headwaters, E Fork and Relay and Sig Creeks	Project	Ongoing	Colorado Outstanding Waters, Colorado River Cutthroat Trout , CWCB ISFwater rights	Bluehead Sucker-I
ISF data collection occurring	Hermosa Creek headwaters, E Fork and Relay and Sig Creeks	Information	Ongoing	Colorado Outstanding Waters, Colorado River Cutthroat Trout , CWCB ISF water rights	
Introduced Colorado Cutthroat Trout	Deer Creek	Project	Completed	Colorado Outstanding Waters, Colorado River Cutthroat Trout , CWCB ISF water rights, Rare Plants	Bluehead Sucker-I
Introduced Colorado Cutthroat Trout and installed barriers	Deep Creek	Project	Completed	Significant Riparian/Wetland Communities	Bluehead Sucker-I
James Ranch Animas River Bank Stabilization Project	Animas River - south of Stevens Creek but north of Falls Creek	Project	Completed	Active Bald Eagle Nests, Bluehead Sucker, Flannelmouth Sucker, River Otter , Significant Riparian/Wetland Communities, Whitewater Boating	Flannelmouth Sucker -I, Roundtail Chub-I, Significant Plant Communities-I
Mancos River ISF	Mancos River (Near Mancos)	Information	Planned	Active Bald Eagle Nests, Bluehead Sucker	
Mancos Valley Salinity Control Project Plan and Environmental Assessment	Mancos River from Ute Mountain Ute Reservation Northern Boundary to Stateline	Information	Completed	Active Bald Eagle Nests, Bluehead Sucker, Colorado Outstanding Waters, Flannelmouth Sucker, Northern Leopard Frog , Roundtail Chub	

Table 3-5 CWCB Collected Projects and Methods Summary in the Southwest Basin, continued

Project Name	Project Location	Project Type	Project Status	Basin Roundtable Attributes Identified	Project Protections
Measuring instream flows to apply for CWCB ISF	Coyote Wash	Flow Protection	Ongoing	Rare Plants, River Otter	
Mitigation for Lower Dolores by Xcel - mandatory non-CWCB ISF	Cascade Creek	Flow Protection	Ongoing	Active Bald Eagle Nests, CWCB ISF water rights, CWCB natural lake level water rights, Other Fishing Streams and Lakes, Significant Riparian/Wetland Communities, Whitewater Boating	
Monitoring Greenback Cutthroat Trout population	Taylor Creek - S Fork (Little Taylor Creek)	Information	Ongoing	Colorado River Cutthroat Trout , CWCB ISF water rights	
National Monument Designation	Cross Canyon	Flow Protection	Completed	Northern Leopard Frog	
National Monument Designation	Yellow Jacket Canyon	Flow Protection	Completed	Bluehead Sucker, CWCB ISF water rights, Flannelmouth Sucker, Northern Leopard Frog	Flannelmouth Sucker -I, Roundtail Chub-I
Non-native removal and stocking of native fish	Fall Creek - Woods Lake	Project	Ongoing	Colorado Outstanding Waters, CWCB ISF water rights, Flatwater Boating, Northern Leopard Frog , Other Fishing Streams and Lakes, Rare Plants, Significant Riparian/Wetland Communities, Waterfowl hunting/viewing parcels	
Ongoing mine tailing cleanup in three locations	Howard Fork	Project	Ongoing	CWCB ISF water rights	Bluehead Sucker-I, Flannelmouth Sucker -I, High Recreation Lakes and Reservoirs -I, Roundtail Chub-I
Ongoing study of environmental impacts of mine tailings	Howard Fork	Information	Ongoing	CWCB ISF water rights	
PAWSD Source Water Protection Plan	Stollsteimer Creek	Information	Completed	Active Bald Eagle Nests, Ducks Unlimited projects, River Otter, Significant Riparian/Wetland Communities	
Pipeline diversion structure with non-CWCB ISF requirement under special use permit	Fourmile Creek	Flow Protection	Ongoing	Colorado Outstanding Waters, Significant Riparian/Wetland Communities	

Table 3-5 CWCB Collected Projects and Methods Summary in the Southwest Basin, continued

Project Name	Project Location	Project Type	Project Status	Basin Roundtable Attributes Identified	Project Protections
Planned Animas Watershed Plan for entire river - Colorado and New Mexico	Animas River	Information	Planned	Active Bald Eagle Nests, Bluehead Sucker, CWCB ISF water rights, Eligible W&S, Flannelmouth Sucker, Gold Metal Trout Streams, Northern Leopard Frog , Other Fishing Streams and Lakes, River Otter, Roundtail Chub, Significant Riparian/Wetland Communities, Whitewater Boating	
Planned report to CWCB on Red Canyon flow protection	Horsefly Creek	Information	Planned	Significant Riparian/Wetland Communities	
Planned valley floor restoration effort	San Miguel - Telluride Valley Floor	Project	Planned	CWCB ISF water rights, Other Fishing Streams and Lakes, Whitewater Boating	
Possible wilderness designation	Hermosa Creek	Flow Protection	Proposed	Active Bald Eagle Nests, Bluehead Sucker, Colorado Outstanding Waters, Colorado River Cutthroat Trout , CWCB ISF water rights, Other Fishing Streams and Lakes, Significant Riparian/Wetland Communities, Whitewater Boating	
Proposed Lease of MVIC water for instream flow/fish pool purposes	Lower Dolores - McPhee Reservoir to Utah stateline	Flow Protection	Proposed	Active Bald Eagle Nests, Bluehead Sucker, CWCB ISF water rights, Eligible Wild and Scenic, Flannelmouth Sucker, Flatwater Boating, Northern Leopard Frog , Other Fishing Streams and Lakes, Rare Plants, River Otter, Roundtail Chub, Significant Riparian/Wetland Communities, Waterfowl hunting/ viewing parcels, Whitewater Boating	
Proposed mining cleanup and restoration project	Animas River between Silverton and Eureka	Project	Proposed	CWCB ISF water rights, Significant Riparian/Wetland Communities, Whitewater Boating	

Table 3-5 CWCB Collected Projects and Methods Summary in the Southwest Basin, continued

Project Name	Project Location	Project Type	Project Status	Basin Roundtable Attributes Identified	Project Protections
Proposed National Conservation Area legislation to protect ORVs designated as preliminarily suitable	Lower Dolores - McPhee Reservoir to Utah stateline	Flow Protection	Ongoing	Active Bald Eagle Nests, Bluehead Sucker, CWCB ISF water rights, Eligible W&S, Flannelmouth Sucker, Flatwater Boating, Northern Leopard Frog , Other Fishing Streams and Lakes, Rare Plants, River Otter, Roundtail Chub, Significant Riparian/Wetland Communities, Waterfowl hunting/viewing parcels, Whitewater Boating	
Proposed Recreational In-Channel Diversion or similar concept	San Miguel - Bilk Creek to Confluence with Dolores	Flow Protection	Proposed	Active Bald Eagle Nests, Bluehead Sucker, CWCB ISF water rights, Ducks Unlimited projects, Flannelmouth Sucker, Northern Leopard Frog , Other Fishing Streams and Lakes, River Otter, Roundtail Chub, Significant Riparian/Wetland Communities, Waterfowl hunting/viewing parcels, Whitewater Boating	
Recreational flow needs assessment for mainstem of Dolores to state line -- American Whitewater	Mainstem of the Dolores River from McPhee Reservoir to Confluence with the San Miguel and to stateline	Information	Planned	Active Bald Eagle Nests, Bluehead Sucker, CWCB ISF water rights, Eligible W&S, Flannelmouth Sucker, Flatwater Boating, Northern Leopard Frog , Other Fishing Streams and Lakes, Rare Plants, River Otter, Roundtail Chub, Significant Riparian/Wetland Communities, Waterfowl hunting/viewing parcels, Whitewater Boating	
Removed cattle grazing for riparian restoration	Hermosa Creek headwaters, E Fork and Relay and Sig Creeks	Project	Completed	Colorado Outstanding Waters, Colorado River Cutthroat Trout , CWCB ISF water rights	

Table 3-5 CWCB Collected Projects and Methods Summary in the Southwest Basin, continued

Project Name	Project Location	Project Type	Project Status	Basin Roundtable Attributes Identified	Project Protections
Riparian Conservation efforts	Mainstem of the San Miguel	Information	Ongoing	Active Bald Eagle Nests, Bluehead Sucker, CWCB ISF water rights, Ducks Unlimited projects, Flannelmouth Sucker, Northern Leopard Frog , Other Fishing Streams and Lakes, River Otter, Roundtail Chub, Significant Riparian/Wetland Communities, Waterfowl hunting/viewing parcels, Whitewater Boating	Flannelmouth Sucker -I, Important Wetlands-D, Roundtail Chub-I, Significant Plant Communities-D
Rivers Protection Group (similar to Hermose Effort)	East Fork and West Fork of the San Juan River	Information	Planned	Active Bald Eagle Nests, Bluehead Sucker, Colorado Outstanding Waters, CWCB ISF water rights, Other Fishing Streams and Lakes, Significant Riparian/Wetland Communities, Southwestern Willow Flycatcher, Whitewater Boating	
San Miguel Highway Embankment Project	San Miguel, just downstream of Leopard Creek	Water Quality Protection	Completed	CWCB ISF water rights, Other Fishing Streams and Lakes, River Otter, Whitewater Boating	Bluehead Sucker-I, Flannelmouth Sucker -I, Roundtail Chub-I
Special management designation - similar to wilderness	Tabeguache Creek	Flow Protection	Ongoing	Bluehead Sucker, Flannelmouth Sucker, Other Fishing Streams and Lakes, River Otter, Significant Riparian/Wetland Communities	
Stabilization of stream bank and adjacent irrigation ditch	Piedra River - T33N, R2W, Sec. 2	Project	Completed	Active Bald Eagle Nests, Bluehead Sucker, CWCB ISF water rights, Other Fishing Streams and Lakes, River Otter, Significant Riparian/Wetland Communities, Whitewater Boating	Roundtail Chub-I
Stocking native suckers	Mancos River from Ute Mountain Ute Reservation Northern Boundary to Stateline	Project	Completed	Active Bald Eagle Nests, Bluehead Sucker, Colorado Outstanding Waters, Flannelmouth Sucker, Northern Leopard Frog , Roundtail Chub	Flannelmouth Sucker -I, Roundtail Chub-I
Stocking native suckers	Mineral Creek	Project	Completed	CWCB ISF water rights, Significant Riparian/Wetland Communities	Flannelmouth Sucker -I, Roundtail Chub-I
Stream and water quality restoration	Cunningham Creek	Project	Ongoing	Colorado Outstanding Waters, CWCB ISF water rights, CWCB natural lake level water rights, Rare Plants	

Table 3-5 CWCB Collected Projects and Methods Summary in the Southwest Basin, continued

Project Name	Project Location	Project Type	Project Status	Basin Roundtable Attributes Identified	Project Protections
Studying ISF donation downstream of Big Branch confluence	Rio Blanco	Information	Ongoing	Active Bald Eagle Nests, Bluehead Sucker, Colorado Outstanding Waters, CWCB ISF water rights, Flannelmouth Sucker, Northern Leopard Frog , Significant Riparian/Wetland Communities, Whitewater Boating	
Suitability for W&S	San Juan River - E Fork	Flow Protection	Ongoing	Active Bald Eagle Nests, Bluehead Sucker, CWCB ISF water rights, Flannelmouth Sucker, Other Fishing Streams and Lakes, River Otter , Whitewater Boating	
Suitability for W&S	San Juan River - W Fork	Flow Protection	Ongoing	Active Bald Eagle Nests, Bluehead Sucker, CWCB ISF water rights, Flannelmouth Sucker, Other Fishing Streams and Lakes, River Otter , Whitewater Boating	
Suitability for W&S	Piedra River	Flow Protection	Ongoing	Active Bald Eagle Nests, Bluehead Sucker, CWCB ISF water rights, Eligible W&S, Flatwater Boating, Northern Leopard Frog , Other Fishing Streams and Lakes, Rare Plants, River Otter, Significant Riparian/Wetland Communities, Waterfowl hunting/viewing parcels, Whitewater Boating	
Suitability for W&S	Pine River	Flow Protection	Ongoing	Active Bald Eagle Nests, Ducks Unlimited projects, Flannelmouth Sucker, River Otter, Significant Riparian/Wetland Communities	
Suitability for W&S	Disappointment Creek	Flow Protection	Ongoing	Active Bald Eagle Nests, Significant Riparian/Wetland Communities	
Suitability for W&S	Hermosa Creek	Flow Protection	Ongoing	Active Bald Eagle Nests, Bluehead Sucker, Colorado Outstanding Waters, Colorado River Cutthroat Trout , CWCB ISF water rights, Other Fishing Streams and Lakes, Significant Riparian/Wetland Communities, Whitewater Boating	
Suitability for W&S	Coyote Wash	Flow Protection	Ongoing	Rare Plants, River Otter	

Table 3-5 CWCB Collected Projects and Methods Summary in the Southwest Basin, continued

Project Name	Project Location	Project Type	Project Status	Basin Roundtable Attributes Identified	Project Protections
SWSI Dolores River Below McPhee		Information	Ongoing	Active Bald Eagle Nests, CWCB ISFwater rights, Eligible W&S, Other Fishing Streams and Lakes, River Otter, Roundtail Chub, Significant Riparian/ Wetland Communities, Whitewater Boating	
SWSI Long Hollow/La Plata Mitigation Flows		Flow Protection	Ongoing	Active Bald Eagle Nests, Bluehead Sucker, Flannelmouth Sucker, Roundtail Chub	Bluehead Sucker-D, Flannelmouth Sucker -D, High Recreation Lakes and Reservoirs -D, Roundtail Chub-D
SWSI Woods Lake Cutthroat Refugio		Project	Completed	CWCB ISF water rights, Other Fishing Streams and Lakes	Bluehead Sucker-D
Tamarisk Removal	San Miguel - Telluride to confluence with Dolores	Project	Completed	Active Bald Eagle Nests, Bluehead Sucker, CWCB ISF water rights, Ducks Unlimited projects, Flannelmouth Sucker, Northern Leopard Frog , Other Fishing Streams and Lakes, River Otter, Roundtail Chub, Significant Riparian/ Wetland Communities, Waterfowl hunting/viewing parcels, Whitewater Boating	Significant Plant Communities-I
Tamarisk Removal	Disappointment Creek	Project	Ongoing	Active Bald Eagle Nests, Significant Riparian/Wetland Communities	Important Wetlands-I, Significant Plant Communities-I
Tamarisk restoration work	Yellow Jacket Canyon	Project	Ongoing	Bluehead Sucker, CWCB ISF water rights, Flannelmouth Sucker, Northern Leopard Frog	Important Wetlands-I, Significant Plant Communities-I
Tamarisk restoration work	Rock Creek	Project	Ongoing	Active Bald Eagle Nests, Significant Riparian/Wetland Communities	
Tamarisk restoration work	McElmo Creek - various parcels west of Cortez	Project	Ongoing	Bluehead Sucker, Flannelmouth Sucker, Northern Leopard Frog , Roundtail Chub	Important Wetlands-I, Significant Plant Communities-I

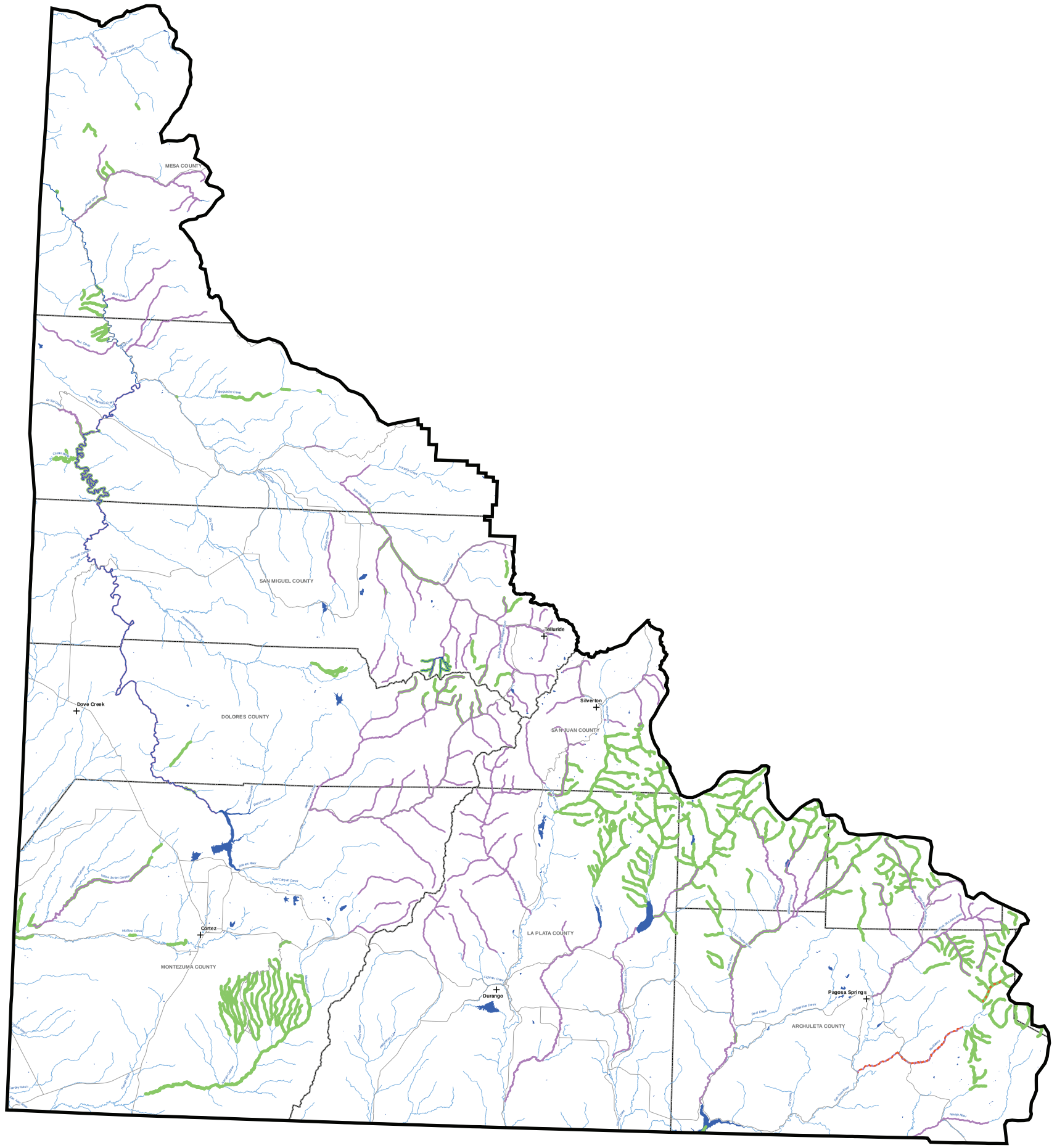
Table 3-5 CWCB Collected Projects and Methods Summary in the Southwest Basin, continued

Project Name	Project Location	Project Type	Project Status	Basin Roundtable Attributes Identified	Project Protections
Watershed Plan	Mainstem of the San Miguel	Information	Ongoing	Active Bald Eagle Nests, Bluehead Sucker, CWCB SF water rights, Ducks Unlimited projects, Flannelmouth Sucker, Northern Leopard Frog , Other Fishing Streams and Lakes, River Otter, Roundtail Chub, Significant Riparian/ Wetland Communities, Waterfowl hunting/viewing parcels, Whitewater Boating	
Whitewater Park on San Miguel	Mainstem of the San Miguel	Project	Planned	Active Bald Eagle Nests, Bluehead Sucker, CWCB ISF water rights, Ducks Unlimited projects, Flannelmouth Sucker, Northern Leopard Frog , Other Fishing Streams and Lakes, River Otter, Roundtail Chub, Significant Riparian/ Wetland Communities, Waterfowl hunting/viewing parcels, Whitewater Boating	
Wilderness Study work ongoing	Bear Creek	Information	Ongoing	CWCB ISF water rights, Other Fishing Streams and Lakes, River Otter, Significant Riparian/Wetland Communities	

The projects and methods identified through interviews were individually evaluated and compared to the environmental and recreational attributes gathered by the basin roundtables during their focus area mapping effort. This information is included in Table 3-5 above. CWCB examined the various attributes summarized by the roundtables in their focus area mapping efforts (Section 2) and indentified if these areas have projects and methods that provide direct or indirect protections. The interviewed projects and methods, instream flows, and stewardship information were assigned direct or indirect protections based on roundtable attribute. In the Southwest Basin, the basin roundtable identified 3,600 miles of water bodies as focus areas. For these focus areas, 60 percent have an associated project or method. **Table 3-6** below summarizes the project and method protections identified for the Southwest Basin. In the attribute column of Table 3-6, the environmental and recreational attributes collected by the basin roundtable are summarized. The recreation attribute category includes attributes from whitewater and flatwater boating. The Warm Water Fish State Endangered, Threatened and Species of Special Concern category includes Flannelmouth Sucker, Bluehead Sucker and Roundtail Chub. Important Riparian and Wetland Areas category includes significant riparian areas, Audubon important bird areas, and rare plant communities. Finally, the fishing attribute category includes streams and identified lakes as fishing areas.

Table 3-6 Summary of Protections for Southwest Basin Environmental and Recreational Attributes

Attribute Category	Percent of Attribute Length with Direct Protections	Percent of Attribute Length with Indirect Protections	Percent of Attribute Length with Direct and Indirect Protections	Total Percent of Attribute Length with Protections
Recreation	0%	0%	0%	0%
Colorado River Cutthroat Trout	48%	17%	2%	67%
Warm Water Fish State Endangered, Threatened and Species of Special Concern	30%	12%	9%	51%
Important Riparian and Wetland Areas	0%	40%	0%	40%
Fishing	0%	0%	0%	0%
Waterfowl Hunting/Viewing	0%	3%	0%	3%

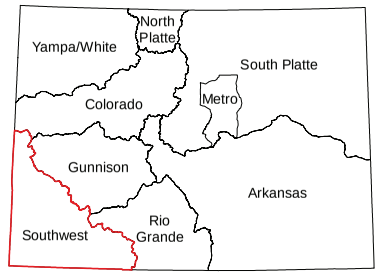


Legend

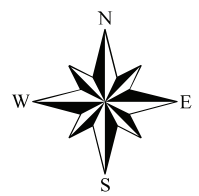
- River and Stream
- Lake and Reservoir
- City and Town
- Road
- County Boundary
- Basin

Projects

- CDOW
- CWCB
- ISF
- Stewardship
- WSRA



Colorado Basins



10 5 0 10

Miles

Figure 3-12

Southwest Basin Nonconsumptive Needs Assessment Focus Areas with Projects and Methods

\\dengissvr1\cdmGIS\SWSI\NONCONSUMPTIVE\SOUTHWEST\MXD\Basin_Projects_Southwest.mxd

THIS PAGE INTENTIONALLY LEFT BLANK

Section 4
Southwest Basin Consumptive Needs Assessment

4.1 Overview of Consumptive Needs Assessment Process

Water in Colorado is managed to meet the needs of Colorado's citizens, agriculture, and environment. Colorado's economy, quality of life, recreational opportunities, and the environment are all dependent on water. The broad diversity of water uses in Colorado is indicative of the many ways in which we are affected by the water that is available to us and our environment, and how we choose to use it. Severe and continuing drought conditions throughout the state in the early 2000s in conjunction with rapid economic growth and concern over interstate compact obligations have brought focus to the constraints on our state's water resources and the challenges associated with meeting multiple objectives and needs.

Ranch in Telluride, CO

The objectives of the consumptive needs part of this Southwest Basin Needs Assessment Report is to:

- Update population projections and extend them to 2050
- Update municipal and industrial (M&I) per capita estimates including passive conservation
- Extend the Statewide Water Supply Initiative (SWSI) 1 consumptive water use projections to 2050 for the M&I sector
- Update the self-supplied industrial (SSI) sector forecast to 2050
- Update the current tally of irrigated acres throughout Colorado and forecast irrigated acres in 2050
- Update current agricultural demands and shortages
- Update the consumptive demand forecast to 2050 for the agricultural sector

The analyses summarized in this section use a water forecast horizon of 2050 for a number of reasons. The Colorado Water Conservation Board (CWCB) determined that the forecast horizon for the water demand projections needed to be extended to the year 2050 to better represent the long-term water needs that the state will face.

The following sections provide an overview of the methods used in determining reconnaissance level consumptive water use projections for 2050, and the results of those analyses. Sections 4.2.1 and 4.2.2 describe the methods and results of projecting M&I demands, including population forecasting, estimation of per capita water use, and the application of passive conservation measures. The methods used to estimate SSI demands, and the results thereof, are presented in Section 4.2.3. Section 4.2.4 summarizes the statewide results of the M&I and SSI demand projections. Section 4.3 summarizes the same for agricultural demands. Detailed descriptions of these methodologies and results are available in Appendices H and I of the SWSI 2010 Report.

4.2 M&I and SSI Consumptive Needs

Standard methods were used for projecting future M&I and SSI water demands in the Southwest Basin. The objectives were to develop a reconnaissance level water use forecast that employs consistency in data collection and forecast methodology across the state and maximizes available data. The methods utilized in this approach are for the purpose of general statewide and basinwide planning and are not intended to replace demand projections prepared by local entities for project-specific purposes.

County and statewide population projections are the most accepted predictor of future growth for the state.

The M&I water demands forecast takes on a "driver multiplied by rate of use" approach. This is a commonly accepted forecast methodology that accounts for changes in water demand resulting from changes in the driver. County and statewide population projections are the most accepted predictor of future growth for the state. Therefore, the driver for the M&I water demands forecast is population and the rate of use is gallons per capita per day, or gpcd.

4.2.1 Future Population Projections

Population projections were estimated using the forecasting process and models utilized by the Colorado State Demographer's Office (SDO). Because of the uncertainty in projecting economic conditions and employment levels in 2050, low, medium, and high scenario population projections were developed. A detailed analysis of the population projections is included in Appendix H of the SWSI 2010 Report.

4.2.1.1 2050 Population Projection Methodology

The first step in developing 2050 population projections was to identify a population forecasting methodology that could meet the needs of the 2050 water demand projections. To be suitable, the water demand projections would need to satisfy the following criteria:

- The forecasting methodology must be valid and widely acceptable, both by users of the results and demographic forecasting practitioners.
- The forecasting approach must be transparent and understandable to the extent possible.
- The projections must be replicable.
- In keeping with state-of-the-art practices employed by the SDO, the projections must be economically based and then linked to demographic factors in an integrated manner.
- The projections must be able to produce population forecasts for each county to the year 2050 under high, medium, and low economic development assumptions.

It was determined that the forecasting process and models utilized by the SDO, in conjunction with its consultant, the Center for Business and Economic Forecasting (CBEF), met all of those criteria. Therefore, the SDO forecasting process was adopted for the 2050 effort.

As of 2010, the SDO/CBEF projections are available through the year 2035. It was determined that the forecasting models, equations, and algorithms could be extended or adjusted as needed from 2035 to 2050. To adjust the models from 2035 to 2050 assumptions regarding national and international driving forces behind Colorado's basic economic sectors were developed.

Basic economic sectors include those activities that bring money and economic stimulus into a geographic area. Employment was projected for each of Colorado's basic economic sectors on the basis of the assumptions for the driving forces behind those basic sectors. With projections of basic employment, industry-specific employment multipliers were applied to arrive at total Colorado jobs.

Because of the uncertainty in projecting economic conditions and employment levels in 2050, low, medium, and high employment scenarios were developed for each key employment sector, leading to low, medium, and high population projections. Each of the scenarios reflects unique assumptions for the economy and for each employment sector. These assumptions are detailed in Appendix H of the SWSI 2010 Report. Additionally, populations for counties that lie within two or more basins were allocated to the respective basins based on estimates from known population centers within each basin.

4.2.1.2 2050 Population Projection Results

Between the years 2008 and 2050, the State of Colorado is projected to grow from approximately 5.1 million people to between 8.6 million and 10 million people. Under low economic development assumptions, state population is projected to grow to about 8.6 million people, or by about 71 percent. Under high economic development assumptions, including a 550,000 barrel per day oil shale industry, the state's population is projected to grow to just over 10 million people, or by 98 percent, as compared to Colorado's 2008 population. On average, statewide population projections from 2008 forward indicate an increase of about 1.4 million people every 15 years.

On average, statewide population projections from 2008 forward indicate an increase of about 1.4 million people every 15 years.

Table 4-1 shows how population growth will vary across the state during the next 40 years. Based on these projections, the Arkansas, Metro, and South Platte Basins will continue to have the largest population in the state. However, the West Slope will continue to grow at a faster rate than the Front Range of Colorado. **Figure 4-1** shows how population growth will vary throughout the Southwest Basin at the county level. The Southwest Basin is projected to grow by about 2.1 times between the year 2008 and 2050 under medium economic development assumptions. La Plata County will remain the most populous county in that basin and will continue to experience robust growth. Tourism was the most important basic sector in the Southwest Basin in 2007, followed by household basic jobs and regional and national service jobs. Similar to the Colorado Basin, household basic jobs are expected to grow at the fastest rate of any sector between 2007 and 2050, but tourism will remain the Southwest Basin's largest source of employment. By 2050, mining jobs in the basin will have decreased compared to 2007.

Table 4-1 Population Projections by River Basin

Basin	2008	2035	Percent Change 2008 to 2035	Percent Average Annual Growth Rate	2050			Percent Change 2008 to 2050	Percent Average Annual Growth Rate
					Low	Medium	High		
Arkansas	948,000	1,451,000	53	1.6	1,581,000	1,688,000	1,841,000	67-94	1.2-1.6
Colorado	307,000	558,000	82	2.2	661,000	725,000	832,000	115-171	1.8-2.4
Gunnison	105,000	184,000	75	2.1	206,000	220,000	240,000	96-129	1.6-2.0
Metro	2,513,000	3,622,000	44	1.4	4,018,000	4,144,000	4,534,000	60-80	1.1-1.4
North Platte	1,500	1,800	20	0.7	2,000	2,200	2,500	33-67	0.7-1.2
Rio Grande	50,000	68,000	36	1.2	74,000	80,000	87,000	48-74	0.9-1.3
South Platte	977,000	1,622,000	66	1.9	1,808,000	1,902,000	2,065,000	85-111	1.5-1.8
Southwest	**105,000**	**185,000**	**76**	**2.1**	**204,000**	**224,000**	**249,000**	**94-137**	**1.6-2.1**
Yampa-White	45,000	81,000	80	2.2	94,000	117,000	153,000	109-240	1.8-3.0
TOTAL	**5,051,500**	**7,772,800**	**54**	**1.6**	**8,648,000**	**9,102,200**	**10,000,000**	**71-98**	**1.3-1.6**

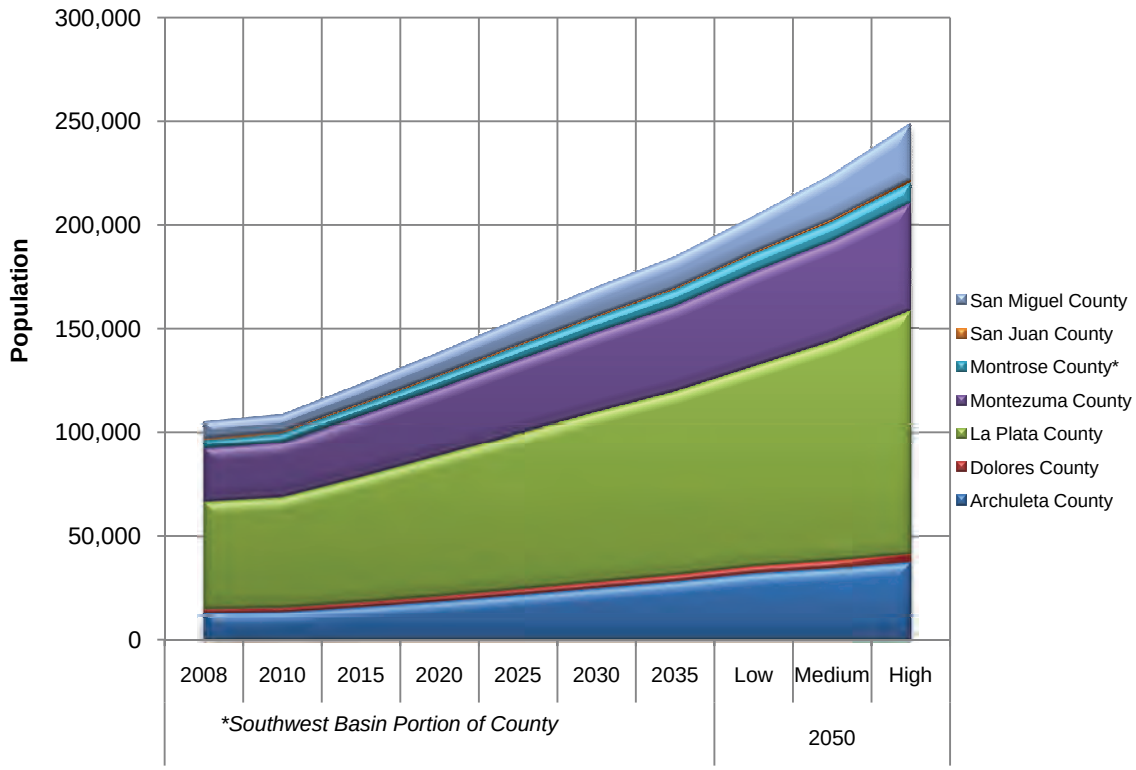


Figure 4-1 Southwest Basin Population Projections through 2050

4.2.2 Future M&I Water Demands

The M&I demand forecast is aimed at capturing the water needs of an increased population. M&I demands are the water uses typical of municipal systems, including residential, commercial, light industrial, non-agricultural related irrigation, non-revenue water, and firefighting. For the current effort, the M&I demand forecast also captures households across the basin that are self-supplied and thus not connected to a public water supply system. **Table 4-2** contains the definitions of the M&I demand terms used throughout this report.

Table 4-2 Definition of M&I Demand Terms

Demand Terminology	Definition
M&I Demand	All the water uses of typical municipal systems, including residential, commercial, industrial, irrigation, and firefighting
SSI Demand	Large industrial water uses that have their own water supplies or lease raw water from others
M&I Demand and SSI Demand	The sum of M&I and SSI demand

The updated demands presented in this document include both baseline demands (without passive conservation) and baseline demands minus passive conservation. It is important to note that the M&I demand forecasts do not include potential increases in demand due to climate change or potential decreases in demand due to active conservation programs.

4.2.2.1 2050 M&I Water Demands Methodology

The methodology used for the M&I water demands forecast in this update is nearly identical to the methodology employed in SWSI 1. The method is based on a sample of water providers throughout the state as described in this section. The estimated per capita water use rates for each county were multiplied by the projected population of each county to estimate current and future municipal water demand (i.e., the residential, commercial, and industrial water use) of each county.

The M&I demand forecasts do not include potential increases in demand due to climate change or potential decreases in demand due to active conservation programs.

It is critical to note that the methods utilized in this approach are for the purpose of general basinwide and statewide planning and are not intended to replace demand projections prepared by local entities for project-specific purposes. County and statewide population projections are the most accepted predictor of future growth for the state. Therefore, it was determined the SWSI 1 methodology was most appropriate. The methodology employed is a commonly accepted forecast methodology for statewide water supply planning purposes, but is not appropriate for project-specific purposes or for direct comparisons between basins or counties.

Estimates of Per Capita M&I Water Use

The M&I water demands forecast is developed by multiplying the population projections outlined in Section 4.2.1 by a rate of use. The rate of use is systemwide gpcd. Numerous factors affect per capita water use rates, and through the course of SWSI 1 and the current SWSI 2010, differences in the water use components that are included or excluded from individual entities' per capita estimates clearly affected the resulting values.

Per capita water use rates are in large part a function of:

- Number of households
- Persons per household
- Median household income
- Mean maximum temperature
- Total precipitation
- Total employment
- Ratio of irrigated public land areas (e.g., parks) to population in service area
- Mix of residential and commercial water use and types of commercial use
- Level of tourism and/or second homes
- Ratio of employment by sector (e.g., agriculture, commercial, industrial)
- Urban/rural nature of county

Provider water use and service population data were gathered from various sources and organized to create a database. The database built upon existing information from 254 water providers gathered for SWSI 1. Efforts were made to update the data for these providers as part of analyses completed in 2009 and 2010. The CWCB also worked with water providers and basin roundtables across the state through the first part of 2010 to collect additional data. Based on these efforts, updated per capita estimates were collected for 214 water providers covering 87 percent of the population in Colorado. A systemwide gpcd estimate was calculated for each participating local water provider by dividing the total water deliveries by the service area population.

The CWCB worked with water providers and basin roundtables across the state through the first part of 2010 to collect provider water use and service population data.

Because 2050 population projects were developed at the county level, the systemwide gpcd values needed to be aggregated from the water provider level to the county level. A weighting process was applied to develop a county average systemwide gpcd based upon the portion of the county population serviced by each water provider. Once the county level M&I demand forecast was developed, basin level M&I water use rates were calculated for the nine basin roundtable areas. Basin M&I demands were aggregated from the county demands based on the portion of the county within the basin. For four counties (Cheyenne, Lake, Saguache, and San Juan), no provider-level data were obtained. For these counties, the weighted basin average was assigned.

The population estimates developed for this update and the gpcd values determined through data collection are multiplied to estimate county demands. The population estimates represent permanent populations of each county; thus the water use rates are based on total water use divided by the permanent population. The resulting gpcd water use rates incorporate water used by tourists, students, and other transient populations in that the water used by the transient population is indexed to the permanent population along with the water use of the permanent population. The resulting gpcd also incorporates commercial and light industrial water use supplied by the water provider. For statewide planning purposes, this is a consistent approach to account for water use by transient populations, commercial, and light industry. Comparisons of gpcds between counties and basins should not be made directly, since differences in the amount of industry, tourism, and outdoor water use varies significantly between geographic regions.

Passive Water Conservation Savings

The methodology for the M&I water demands projections outlined above develops baseline water demand estimates. In addition, CWCB has updated the passive conservation analysis, and these water savings are subtracted from the baseline estimates. This section provides an overview of passive water conservation savings, which chiefly relate to the water demand reductions associated with the impacts of state and federal policy measures and do not include active conservation measures and programs sponsored by water providers. A detailed description of this analysis is provided in the *SWSI Conservation Levels Analysis Report*.

Several pieces of key federal and state legislation were considered in the development of the passive conservation savings estimates, including the 1992 National Energy Policy Act, the 2002 California Energy Commission Water Efficiency Standards, and the 2007 California Assembly Bill 715.

High efficiency front load washer/dryer

For this analysis, passive water savings were calculated to occur as a result of retrofitting housing stock and businesses that exist prior to 2016 through the replacement of washing machines, toilets, and dishwashers. Future water demand reductions associated with passive savings were calculated for each year beginning in 1996, which was when benchmark toilet flushing volume data from Denver was available. The calculations used to estimate future demand reductions from passive conservation were developed for minimum and maximum scenarios based on the assumptions related to the retrofit of existing housing and commercial construction with high-efficiency toilets, clothes washers, and dishwashers.

The calculations based on these assumptions were used to estimate a range of future passive water savings in each county for each year starting in 2000 and continuing until 2050. The total range of savings expected from passive conservation through 2050 is 19 to 33 gpcd. The upper range of these savings were applied to the county level baseline estimates described above to assess what the 2050 demands would be on a low, medium, and high basis with passive conservation. As stated in the *SWSI Conservation Levels Analysis Report* there are three major reasons for applying the high passive conservation savings:

1. Water and energy savings will become increasingly important to water customers as water and fuel costs rise. As water customers seek more efficiency in their homes and businesses, high efficiency fixtures and appliances will become increasingly efficient as technology improves and customers strive to reduce their variable costs related to water and energy.
2. The potential exists to realize substantial permanent water demand reductions in the future if appropriate regulations and ordinances are developed to address water use in existing and new construction.
3. The impact of commercial retrofits (e.g., restaurants, motels, ski area condominiums, centralized laundries, commercial laundries, bars, etc.), is not well captured in the passive savings analyses since information regarding numbers of and ages of individual types of commercial properties were not available.

4.2.2.2 2050 M&I Water Demands Results

Colorado's population is projected to nearly double by the year 2050. Because the major driver for water use is population growth, M&I water usage is also expected to nearly double, even with savings from passive conservation. Statewide municipal water demands are estimated to increase from 975,000 acre-feet per year (AFY) to 1.36 million AFY by 2035 requiring an additional 383,000 AFY of water to meet Colorado's municipal water needs in 2035.

Based on the population projections discussed in Section 4.2.1, total statewide 2050 M&I water demands with passive conservation could range from 1.5 to 1.8 million AFY. By 2050, Colorado will need between 538,000 and 812,000 AFY of additional water to meet M&I demands. Passive conservation savings will result in approximately 154,000 AFY reduction statewide or just over 8 percent decrease in M&I water demands by 2050 for the medium demand scenario. The M&I demands in the Southwest Basin are expected to be between 40,000 and 50,000 AFY by 2050.

Table 4-3 on the following page and **Figure 4-2** illustrates the M&I water demand projections with passive conservation savings for each of the counties in the Southwest Basin.

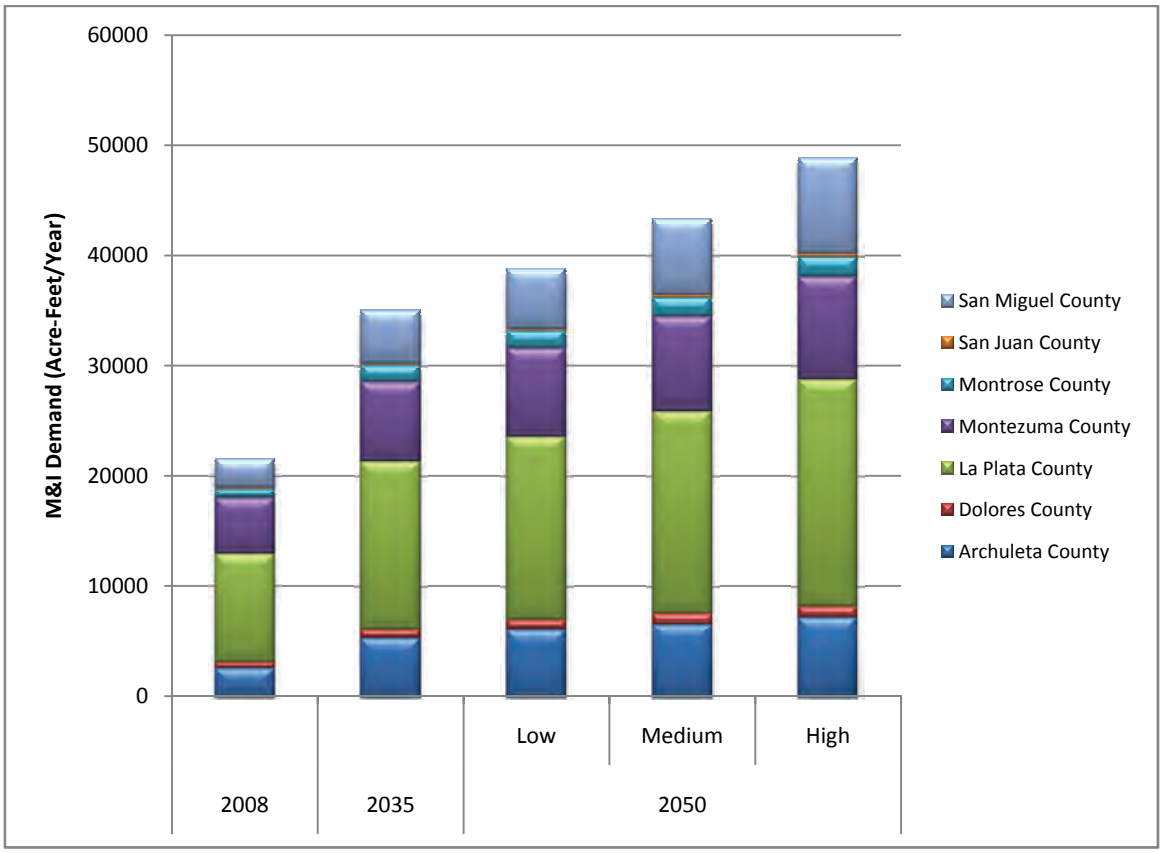


Figure 4-2 Southwest Basin M&I Water Demands

Table 4-3 M&I Forecast by River Basin

County	Water Demand (AF)	Baseline Water Demands (AFY)				Water Demands with Passive Conservation (AFY)			
	2008	2035	2050 Low	2050 Medium	2050 High	2035	2050 Low	2050 Medium	2050 High
Archuleta County	2,600	5,800	6,600	7,100	7,700	5,400	6,100	6,600	7,200
Dolores County	540	850	940	1,000	1,100	790	880	940	1,000
La Plata County	9,800	17,000	18,000	20,000	22,000	15,000	17,000	18,000	21,000
Montezuma County	5,000	8,000	8,800	9,400	10,000	7,300	8,000	8,600	9,300
Montrose County - Southwest Basin Portion	870	1,600	1,800	1,900	2,000	1,500	1,700	1,800	1,900
San Juan County	120	140	170	220	280	120	150	210	270
San Miguel County	2,600	5,000	5,700	7,100	8,900	4,800	5,400	6,900	8,600
Total	**22,000**	**38,390**	**42,010**	**46,720**	**51,980**	**34,910**	**39,230**	**43,050**	**49,270**

4.2.3 SSI Water Demands

Standard methods were adapted for use in SWSI 1 for estimating future SSI water demands throughout Colorado. SSI water demands include water use by self-supplied and municipal provided large industries. The subsectors that are included in SSI are:

- Large industries, including mining, manufacturing, brewing, and food processing
- Water needed for snowmaking
- Thermoelectric power generation at coal- and natural gas-fired facilities
- Energy development, including the extraction and production of natural gas, coal, uranium, and oil shale

These industries represent economic growth within the state and the availability of water resources is imperative to their growth. Because of the diversity of the SSI subsectors, this section is organized to summarize each subsector separately, including data collection efforts and results. Detailed discussions of data sources, methodologies, and results are provided in Appendix H of the SWSI 2010 Report.

4.2.3.1 Snowmaking

The ski industry in Colorado is the cornerstone of tourism and economic activity for a large region of the state. While the water used by the ski resorts does not have a high consumption rate, it is water removed from the stream system and thus important to estimate. The forecast methodology employed in this update differs from the SWSI 1 forecast methodology. Additional data were identified that proved useful in developing water use demands for snowmaking.

Snowmaking in Telluride, CO

For this effort, several pieces of information were obtained—current snowmaking acres for each ski resort, current amount of water used for snowmaking, and expected future water use for snowmaking. Water use information was not available for all ski resorts. For these resorts, the known water use data were used to estimate current and future snowmaking demand. To stay within the bounds of the known data, water use was held constant for resorts with no known future expansions. Also, for resorts with known expansions, build out was assumed to be 2050. Results of the forecast for the snowmaking industry are shown in **Table 4-4**. At this time, no low, medium, or high growth scenario is considered for 2050.

Table 4-4 Estimated Snowmaking Water Demands (AFY)

County	2008	2050
La Plata	230	230
San Miguel	180	180

4.2.3.2 Thermoelectric Power Generation

Water use at coal-fired and natural gas power facilities is included in the SSI water demands estimates. In 2006, nearly 95 percent of Colorado's electricity was produced from coal (71 percent) and natural gas (23 percent). Although Colorado's General Assembly has adopted a state renewable electricity standard that requires 20 percent of the state's electric portfolio to be from renewable resources of energy by 2020, demand for coal-fired and natural gas energy production will remain significant into the future. Generation facilities using fossil fuels require cooling systems to condense steam turbine exhaust. Cooling water is the most economical method to condense steam.

For SWSI 1, estimates of current and future water use at various power generation facilities in Colorado were obtained from power producers. For this update, SWSI 1 baseline estimates were assumed to stay constant until 2035. To extend 2035 projections to 2050, percent increases were assumed for the low, medium, and high scenarios, respectively, as follows—5 percent, 25 percent, and 50 percent. These percentages were based on expected population increases throughout the state. **Table 4-5** provides the estimates of thermoelectric water demands with 2050 low, medium, and high scenarios.

Table 4-5 Estimated Thermoelectric Power Generation Water Demands (AFY)

County	2008	2035	2050		
			Low	Med	High
Montrose	1,900	3,900	4,100	4,900	5,900

4.2.3.3 Southwest Basin SSI Summary

The Southwest Basin SSI summary is summarized in **Figure 4-3**. SSI demands in the Southwest Basin are expected to nearly double by 2050.

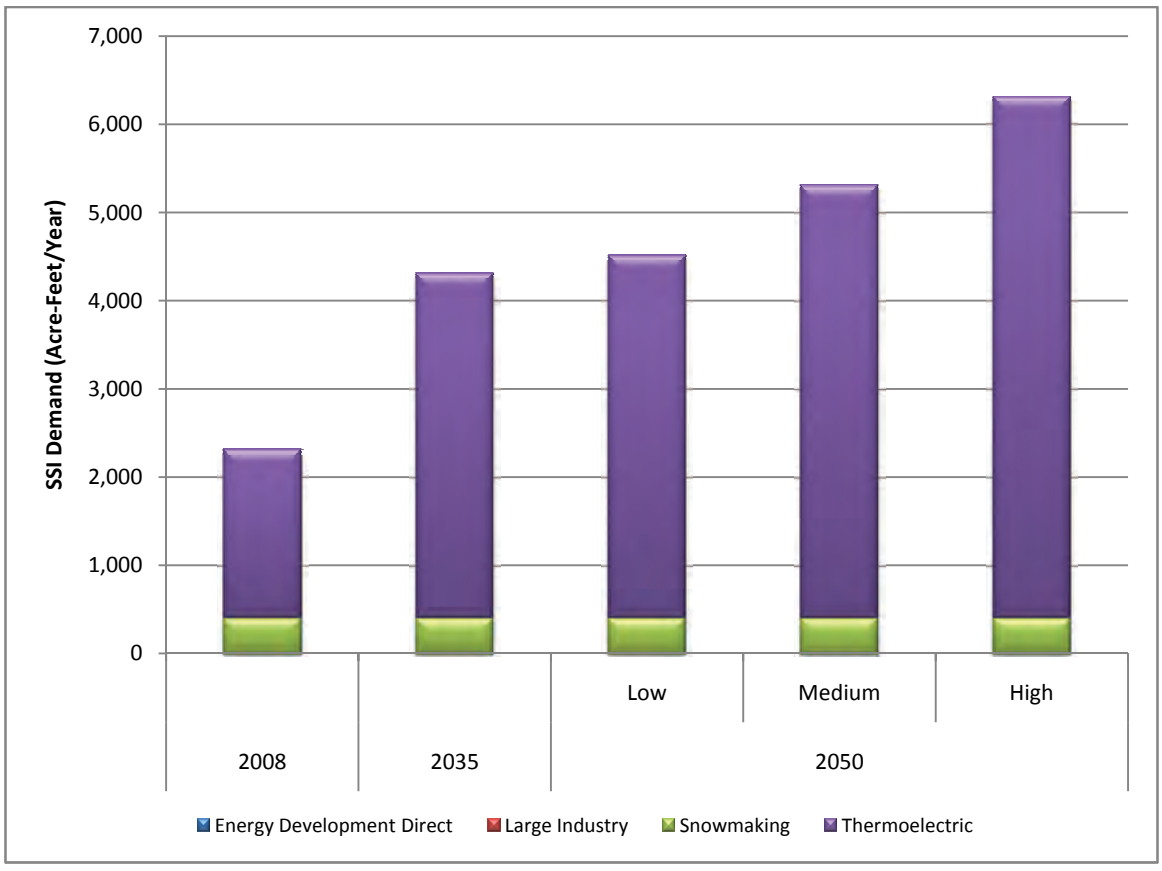


Figure 4-3 Southwest Basin SSI Water Demands

4.2.4 Statewide and Southwest 2050 M&I and SSI Consumptive Needs Summary

Of the many factors affecting M&I water use, the projected increases in population clearly drive the increases in M&I use from 2000 to 2050. **Table 4-6** and **Figure 4-4** summarize the Southwest Basin's M&I and SSI water use for 2008 and projections including reductions as a result of passive conservation measures for 2035 and the 2050 low, medium, and high scenarios. Total statewide 2035 water demands

are projected to be nearly 1.6 million AFY. 2050 water demands are projected to range from approximately 1.75 million AFY to nearly 2.1 million AFY. Figure 4-4 shows that the Southwest Basin M&I water demands are estimated to exceed SSI demands for all of the future projections. Total demands in the Southwest Basin are expected to be between 43,510 AFY and 55,000 AFY by 2050.

Table 4-6 Summary of M&I and SSI Demands for Southwest Basin (AFY)

Basin	Demand Type[1,2]	2008	2035	2050 Low	2050 Med	2050 High
Southwest	M&I	22,000	35,000	39,000	43,000	49,000
	SSI	2,310	4,310	4,510	5,310	6,310
	Total	**24,310**	**39,310**	**43,510**	**48,310**	**55,310**
Statewide	M&I	974,500	1,357,600	1,512,700	1,607,700	1,786,800
	SSI	187,760	235,990	235,890	261,490	322,090
	Total	**1,162,260**	**1,593,590**	**1,748,590**	**1,869,190**	**2,108,890**

1 M&I demands for 2035 and 2050 include passive conservation savings.
2 SSI demands include energy development, large industry, snowmaking, and thermoelectric.

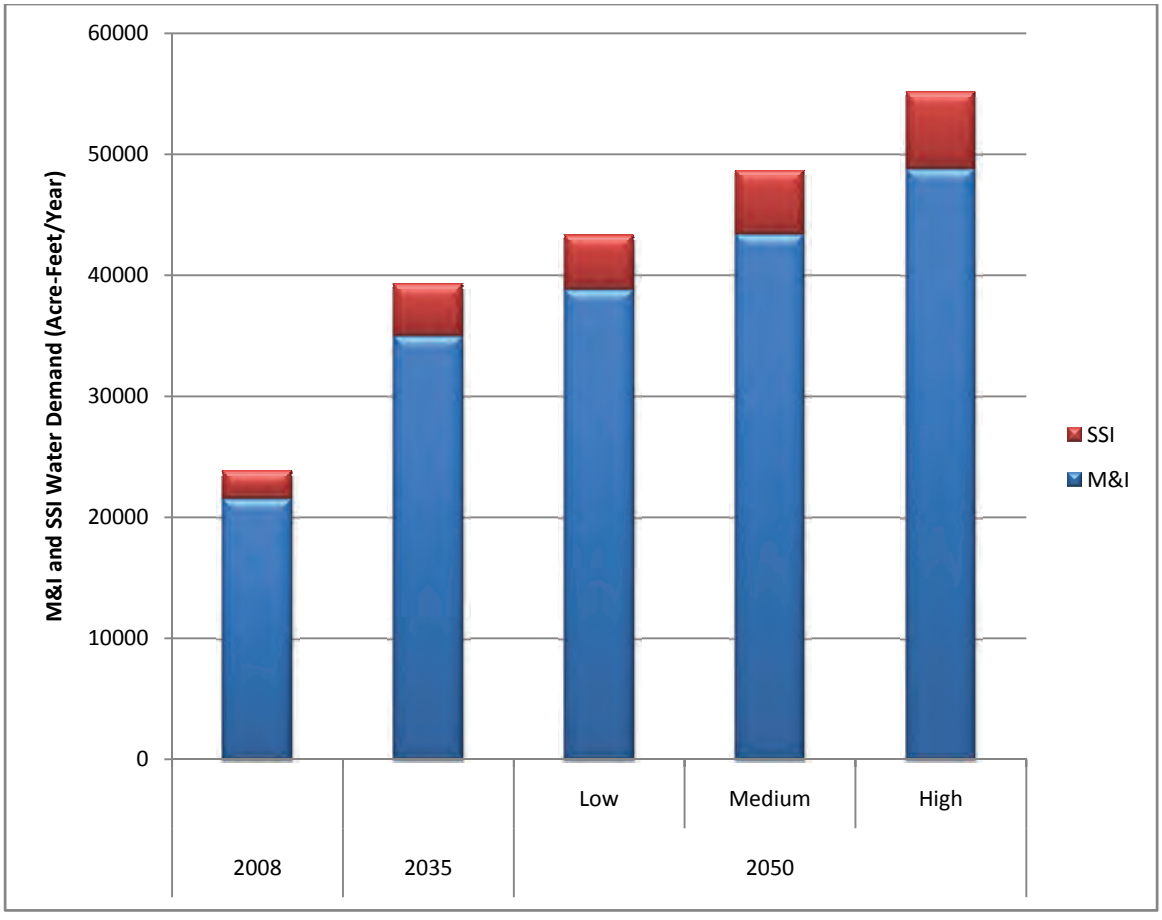


Figure 4-4. Southwest Basin M&I and SSI Water Demands

4.3 Agricultural Consumptive Needs

This section provides information about the methodologies utilized to develop a current tally of irrigated acres and summarizes how 2050 irrigated acres were estimated. In addition, this section provides an overview of existing and 2050 agricultural demands.

4.3.1 Agricultural Demand Methodology

This section describes the methods used to estimate the water needed to support Colorado's agriculture, both currently and in 2050. The estimates include consumptive use (CU) water only—rather than the generally larger volumes of water pumped or diverted—both for the irrigation of crops and for livestock production. CU includes the amount of diverted water that is used by plants through evapotranspiration processes, as well as water that is "lost" to soil evaporation or deep percolation into the groundwater aquifer. A portion of the total diverted amount returns to the stream through surface runoff or lagged groundwater return flows and therefore is not consumptively used.

Cattle ranch in Cortez, CO

Colorado's water needs for irrigation are characterized in this analysis by the Irrigation Water Requirement (IWR), Water Supply Limited Consumptive Use (WSL CU), and the difference between these two numbers. CU modeling was executed using a recent decade of climate and water supply information. The objective was not to simulate what occurred over the past 10 years, but to estimate IWR and WSL CU for today's agricultural conditions and a plausible sample of climate and hydrology, exemplified by the recent decade. Future irrigation demand was examined by assuming that historical climate conditions will continue. The analysis assumed that agricultural demand is directly and linearly related to the number of acres irrigated.

In addition to the crop consumption described above, Colorado's agricultural demand includes three other types of CU that are associated with agricultural activity:

- Livestock CU
- Stockpond evaporation
- Losses incidental to delivering irrigation water

In the Southwest Basin, where a Colorado Decision Support System (CDSS) program does exist, CDSS procedures were applied. The following subsections provide an overview of the methodologies used to estimate current and future irrigated acres and agricultural water demands and the results. A detailed description of these methodologies and results is in Appendix I of the SWSI 2010 Report.

4.3.1.1 Current Irrigated Acres Methodology

The CDSS program has produced irrigated lands mapping and crop CU models in the Southwest Basin. The maps are available as spatial databases, and include crop types, irrigation practices, and association with diversion structures or wells. The structure identifier associated with the irrigated land indicates the location of the headgate that serves the land. Irrigated acres are assigned to the water district where the diversion is located, which may not be where the irrigated acreage lies. Dates of the irrigated lands information varied with the basins including the number of years information as collected.

4.3.1.2 2050 Irrigated Acres Methodology

Using the most current irrigated acres for each basin as defined in the previous section as a baseline, estimates of 2050 irrigated acres were based on the following factors:

- Urbanization of existing irrigated lands
- Agricultural to municipal water transfers
- Water management decisions
- Demographic factors
- Biofuels production
- Climate change
- Farm programs
- Subdivision of agricultural lands and lifestyle farms
- Yield and productivity
- Open space and conservation easements
- Economics of agriculture

The first three factors (urbanization of existing irrigated lands, agricultural to municipal water transfers, and water management decisions) were quantified based on future growth estimates, municipal water demand gaps that will be met by 2050, and interviews with water management agencies across the state. The remaining factors were qualitatively addressed based on information provided by the CWCB and the Colorado Department of Agriculture.

The urbanization of existing irrigated lands was established using 2050 population projections, estimation of future urban area size, and the current irrigated acres as described in the previous section. As discussed above, current irrigated acres in each administrative water district were determined from GIS data sources. However, certain types of data (e.g., future population forecasts) were only available on a county basis. Therefore, future losses of irrigated acres were calculated first for each county, and then re-distributed by water district. The methodology is described in detail in Appendix I of the SWSI 2010 Report.

The M&I gap analysis (described in Section 5) was used as the basis for the analysis of irrigated acreage changes associated with agricultural to municipal water transfers. For each of Colorado's major river basins the amount of the M&I gap was summarized in AFY on a low, medium, and high basis. For the purposes of predicting future irrigated acres it was assumed that 70 percent of M&I gap would be met from agricultural to municipal transfers. This percentage is a conservative estimate based on the assumption of 100 percent yield success rate for IPPs (see Section 5). Therefore, it does not take into account the projects or methods that may not be successful in meeting Colorado's future M&I demands; if IPPs are unsuccessful, it is likely that M&I water providers will turn to increased agricultural transfers to meet future demands. The following equation was used to estimate irrigated acres that would be needed for agricultural to municipal transfers to address M&I gaps:

Irrigated Acres Transferred = M&I Gap ÷ Transferrable Consumptive Use x (1 – Safety Factor)

A safety factor of 25 percent was applied to account for the additional amount of irrigated acres that may be needed to provide the transferred water on a firm yield basis.

For the remaining factors (demographic factors, biofuels production, climate change, farm programs, subdivision of agricultural lands and lifestyle farms, yield and productivity, open space and conservation easements, economics of agriculture), CWCB identified trends that are expected to occur within each area over the next 40 years and then developed a qualitative assessment on whether each factor would cause a negative or positive impact on irrigated agriculture by 2050. A detailed description of this qualitative assessment is available in Appendix I of the SWSI 2010 Report.

4.3.1.3 Current Agricultural Demand Methodology

Current irrigation demand for water in Colorado can be defined as the average amount of water consumptively used by crops on land currently under irrigation. Typically, water supply is plentiful early in the irrigation year, crop CU is not limited and is equal to the crop IWR. As the irrigation season continues, the available water supply generally decreases, becoming less than the crops' uptake capacity, and CU is limited by supply. In order to quantify crop CU, one must have credible estimates or measurements of the crops' average capacity to use irrigation water, referred to as IWR, as well as the average water supply. The minima of these two values over a series of time increments (typically months) is the WSL CU.

For this analysis, both average IWR and average WSL CU are reported. The latter may be considered to be the current agricultural demand; that is, the water required to sustain current levels of farming. IWR provides perspective on the amount of water that would be used, if it was physically and legally available. It is an upper limit on consumption by current agriculture, and a reminder that Colorado is a dry state with over-appropriated streams.

IWR estimation requires time series of climate information, particularly precipitation and temperature, over the study period; WSL CU estimation requires information about the time-varying water supply available to the crop. For this analysis, a recent 10-year study period was used in each basin, although the exact decade differed from basin to basin depending on available data. The 10-year period allowed for estimation of average conditions with respect to both climate and hydrology. IWR and WSL CU were calculated assuming that the most current estimate of number of irrigated acres, and most recent information on crop types, prevailed during each year of the study period. The results show demand for "today's" agricultural conditions in Colorado, based on a 10-year sample of climate and hydrology.

Where applicable, CDSS methodologies were applied to estimate non-irrigation agricultural consumptive demands (e.g., livestock and stockpond evaporation) as well. Livestock CU is estimated by multiplying the number of cattle, sheep, and hogs located within a basin by their corresponding per capita use. Stockpond evaporation is based on net evaporation rates and stock pond surface area estimates. Details differ among the basins, but in general, the method estimates net reservoir evaporation by subtracting average monthly effective precipitation from the estimated gross monthly free water surface evaporation.

Lastly, incidental losses may include, but are not limited to, vegetative CU that occurs along canals and in tailwater areas. The CDSS program, in preparing Consumptive Uses and Losses (CU&L) Reports for the state, has adopted 10 percent as the factor for computing incidental losses associated with irrigation CU. The value is in the middle of the range of factors (5 percent to 29 percent) used by the Bureau of Reclamation in their parallel CU&L accounting throughout the upper basin states.

4.3.1.4 2050 Agricultural Demand Methodology

Following the techniques described in Section 4.3.1.2, changes in numbers of acres irrigated have been developed for each water district. Since this study intentionally avoids identifying specific water rights or ditches for change of use, there is no basis for calculating the structure-specific CU by which a water district's irrigation demand will change. CU per irrigated acre varies from structure to structure, and depends on available supply, seniority of a water right, and system efficiency. The variability of these factors makes it impossible to predict future losses of irrigated land on a structure-by-structure basis. Consequently, simplifying assumptions were made such that irrigation demand was considered directly proportional to number of acres irrigated. To derive future irrigation demand, current irrigation demand for each water district was scaled by the ratio of future irrigated acreage to current irrigated acreage.

Similarly, non-irrigation demand was estimated as being in proportion to irrigated acres. The relationship between losses incidental to irrigation and number of acres irrigated is proportional. With respect to stockponds and stock watering, it is assumed that predicted changes in irrigated acreage will be

accompanied by similar changes in stock raising activities. To derive future non-irrigation demand, current non-irrigation demand was scaled by the ratio of future irrigated acreage to current irrigated acreage.

4.3.2 Agricultural Demand Results

The following sections describe the results of the current and future agricultural demand analyses, which were performed based on the methodologies described above. These analyses included assessments of both irrigated acreage and associated agricultural consumptive water demands. Maps are included to identify the locations of existing irrigated lands across the state, as well as to show the range of irrigated acreage losses anticipated in each basin by 2050.

4.3.2.1 Current Irrigated Acres Results

Information developed for this effort was generated at the water district level. **Figure 4-5** shows the locations of Colorado's water districts and the spatial distribution of current irrigated acres in Colorado based on the methods presented previously. Note that spatial information was not available for the irrigated lands in the Republican River water districts.

Table 4-7 presents the number of irrigated acres in each river basin and the percentage of total that each basin represents. Colorado currently has 3,466,000 acres of irrigated farmland across the state. The South Platte River Basin has the highest percentage of irrigated acres followed by the Rio Grande Basin and the Republican River Basin. The Southwest Basin has the third highest percentage of irrigated acres for Colorado's West Slope basins.

Table 4-7 Current Irrigated Acres by River Basin

Basin	Irrigated Acres	Percentage of Colorado's Irrigated Acres
Arkansas	428,000	12%
Colorado	268,000	8%
Gunnison	272,000	8%
North Platte	117,000	3%
Republican	550,000	16%
Rio Grande	622,000	18%
South Platte	831,000	24%
Southwest	**259,000**	**7%**
Yampa-White	119,000	3%
Statewide Total	**3,466,000**	**100%**

4.3.2.2 Future Irrigated Acres Results

Table 4-8 shows the results of future irrigated acres analysis. Future irrigated acres in Colorado may decrease by 115,000 to 155,000 acres due to urbanization alone, under low and high population growth scenarios, respectively. The basins with largest expected loss of irrigated acres due to urbanization are the South Platte, Colorado, and Gunnison Basins. The Southwest Basin may lose between 4,000 and 6,000 acres by 2050 due to urbanization.

Overall, the future irrigation analysis shows that Colorado may lose about 500,000 to 700,000 acres of its irrigated lands by 2050 due to all factors combined. These acreages represent 15 to 20 percent of the current total irrigated lands. **Figure 4-6** shows the range of potential changes by basin. **Figure 4-7** shows the comparison between current irrigated acres and 2050 irrigated acres as both numbers of acres and percent change. Note that the basin with the highest percent change (Yampa-White, 34,000 acres, 29 percent) is not the same as the basin with the highest change in total acres (South Platte, 224,000 acres, 27 percent).

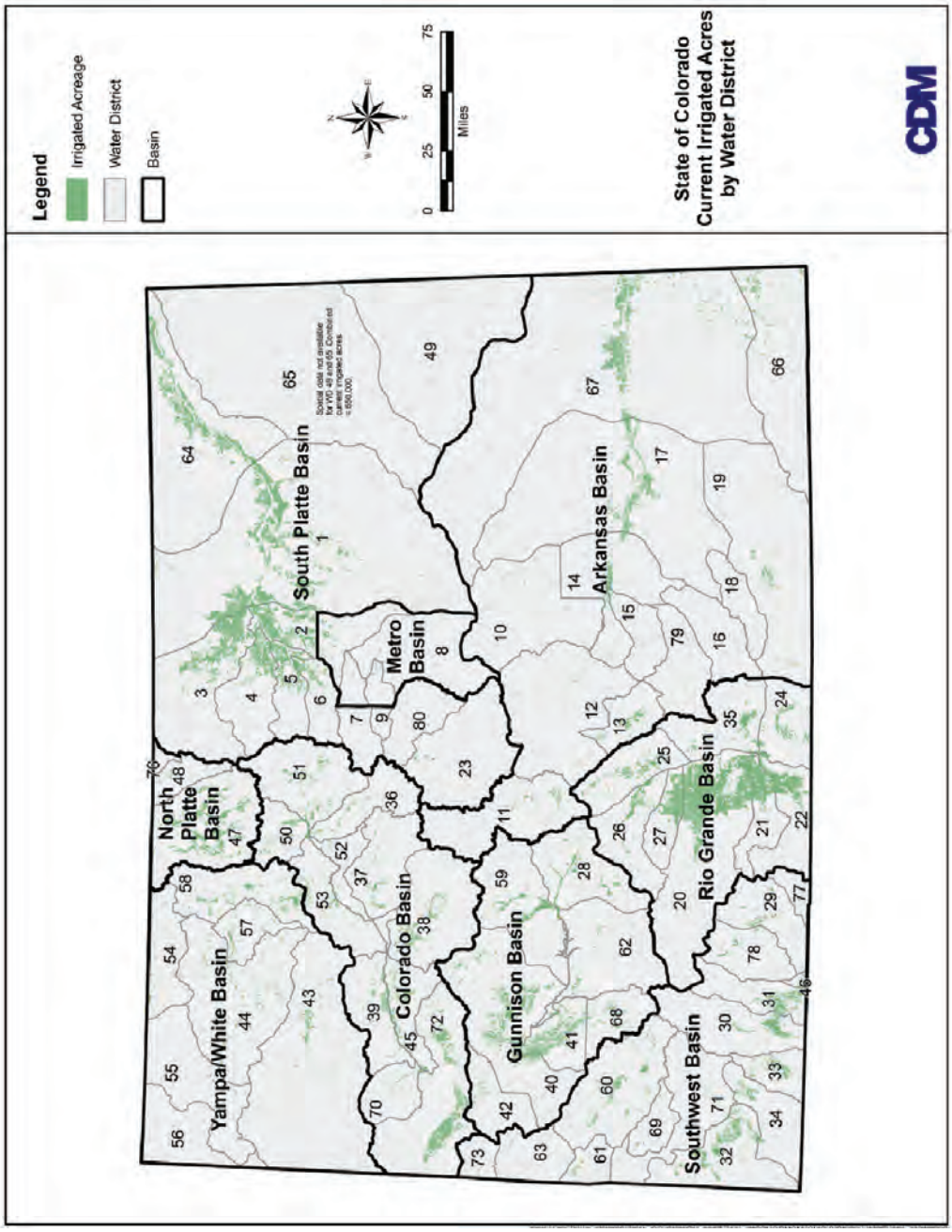


Figure 4-5 State of Colorado Current Irrigated Acres by Water District

Table 4-8 Future Irrigated Acres by River Basin

Basin	Current Irrigated Acres	Decrease in Irrigated Acres Due to Urbanization		Decreases in Irrigated Acres Due to Other Reasons	Decreases in Irrigated Acres from Planned Agricultural to Municipal Transfers	Decreases in Irrigated Acres from Agricultural to Municipal Transfers to Address M&I Gap		Estimated 2050 Irrigated Acres	
		Low	High			Low	High	Low	High
Arkansas	428,000	2,000	3,000	—	7,000	26,000	63,000	355,000	393,000
Colorado	268,000	40,000	58,000	—	200	11,000	19,000	190,800	216,800
Gunnison	272,000	20,000	26,000	—	—	1,000	2,000	244,000	251,000
North Platte	117,000	—	—	—	—	—	—	117,000	117,000
Republican	550,000	300	600	109,000	—	—	—	440,400	440,700
Rio Grande	622,000	800	1,000	80,000	—	2,000	3,000	538,000	539,200
South Platte	831,000	47,000	58,000	14,000	19,000	100,000	176,000	564,000	651,000
Southwest	**259,000**	**4,000**	**6,000**	**—**	**—**	**3,000**	**7,000**	**246,000**	**252,000**
Yampa-White	119,000	1,000	2,000	—	—	3,000	64,000	53,000	115,000
Statewide Total	**3,466,000**	**115,100**	**154,600**	**203,000**	**26,200**	**146,000**	**334,000**	**2,748,200**	**2,975,700**

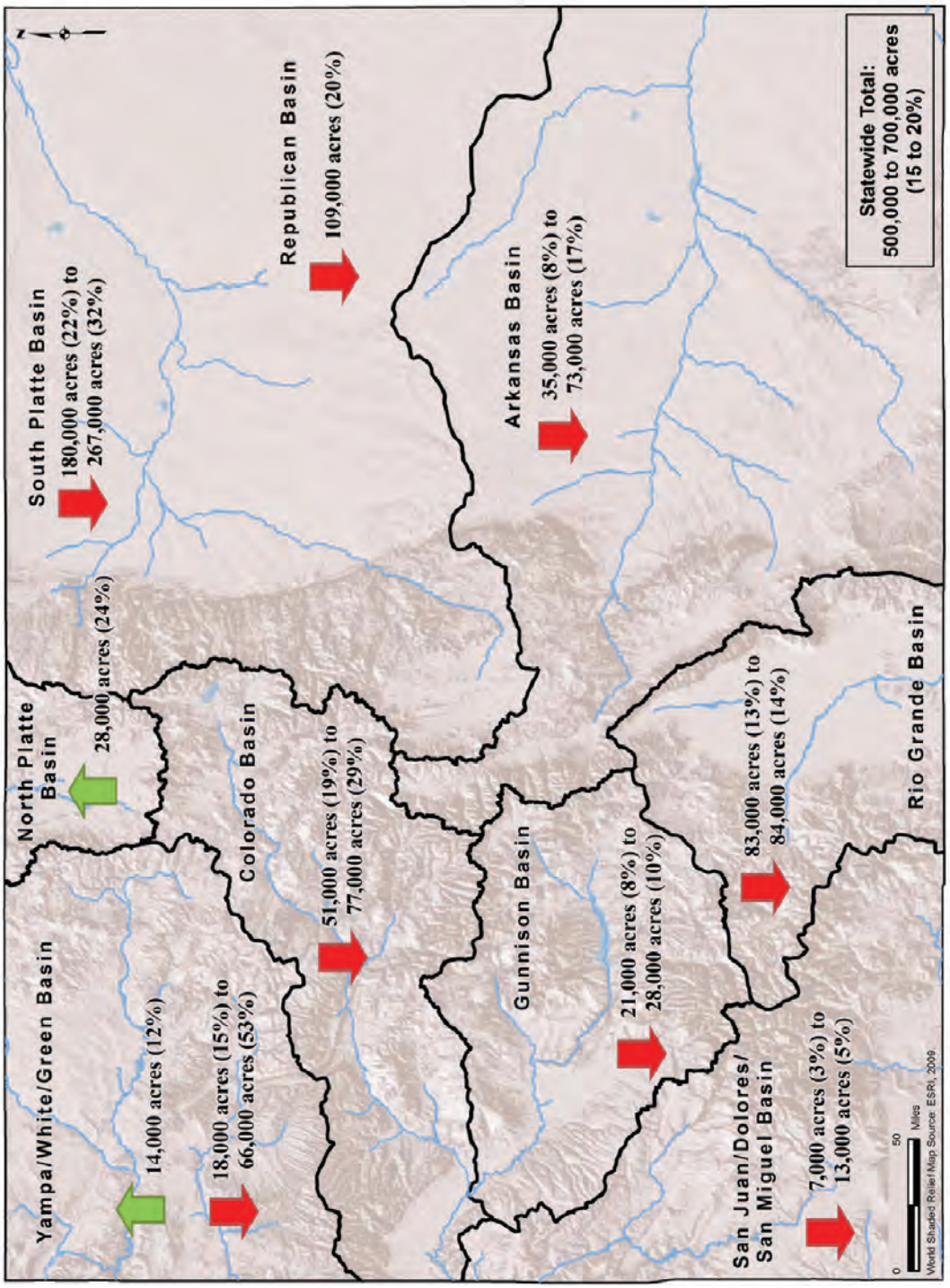


Figure 4-6 Potential Changes in Irrigated Acres by 2050

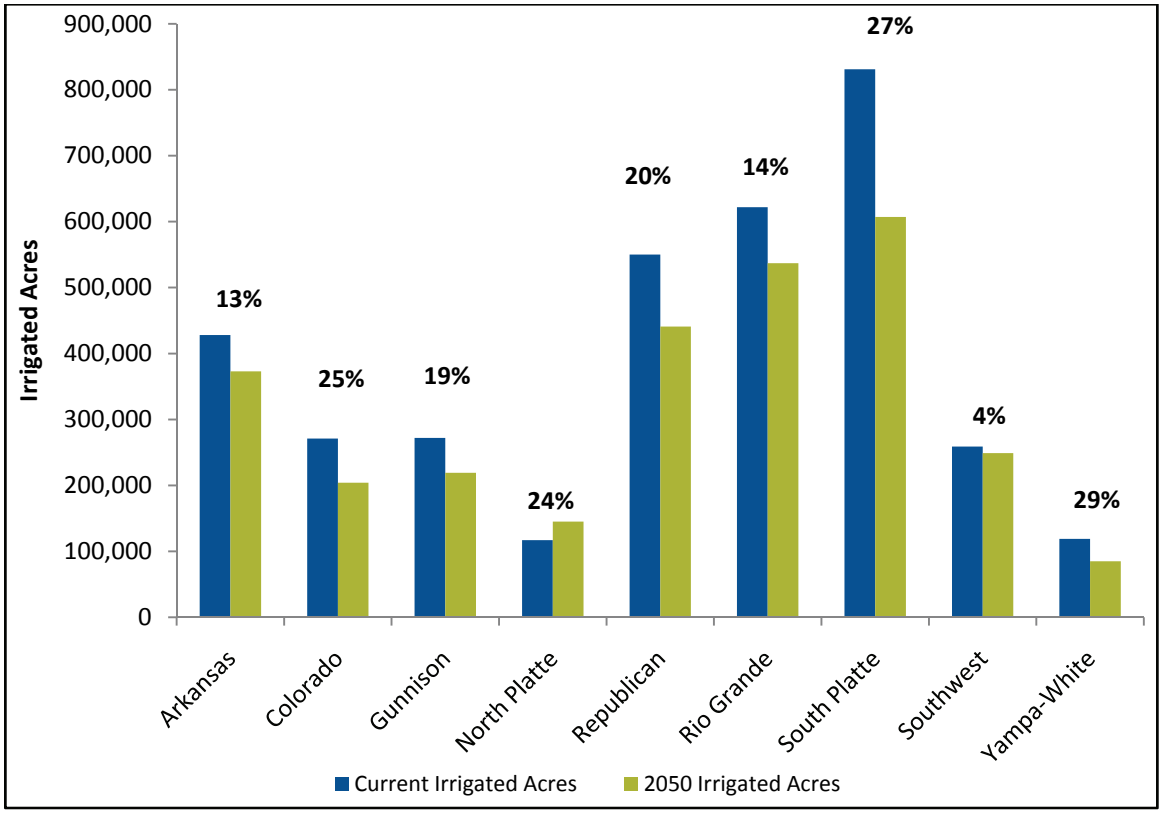


Figure 4-7 Comparison of Current and 2050 Irrigated Acres

4.3.2.3 Current Agricultural Demand Results

Table 4-9 summarizes results of the average annual current agricultural demand by basin. It shows irrigated acres, IWR, WSL CU, and shortage (difference between IWR and WSL CU). Non-irrigation demand is also shown by basin. **Figures 4-8** and **4-9** show the current WSL CU and shortage amounts by basin. Basins with the highest agricultural water demand include the South Platte, Rio Grande, and Republican.

Table 4-9 Estimated Current Agricultural Demand by Basin

Basin	Irrigated Acres	Irrigation Water Requirement (AFY)	Water Supply-Limited Consumptive Use (AFY)	Shortage (AFY)	Non-Irrigation Demand (AFY)
Arkansas	428,000	995,000	542,000	453,000	56,000
Colorado	268,000	584,000	485,000	100,000	51,000
Gunnison	272,000	633,000	505,000	128,000	54,000
North Platte	117,000	202,000	113,000	89,000	12,000
Republican	550,000	802,000	602,000	200,000	67,000
Rio Grande	622,000	1,283,000	855,000	428,000	45,000
South Platte	831,000	1,496,000	1,117,000	379,000	115,000
Southwest	**259,000**	**580,000**	**382,000**	**198,000**	**46,000**
Yampa-White	119,000	235,000	181,000	54,000	24,000
Statewide Total	**3,466,000**	**6,819,000**	**4,791,000**	**2,028,000**	**470,000**

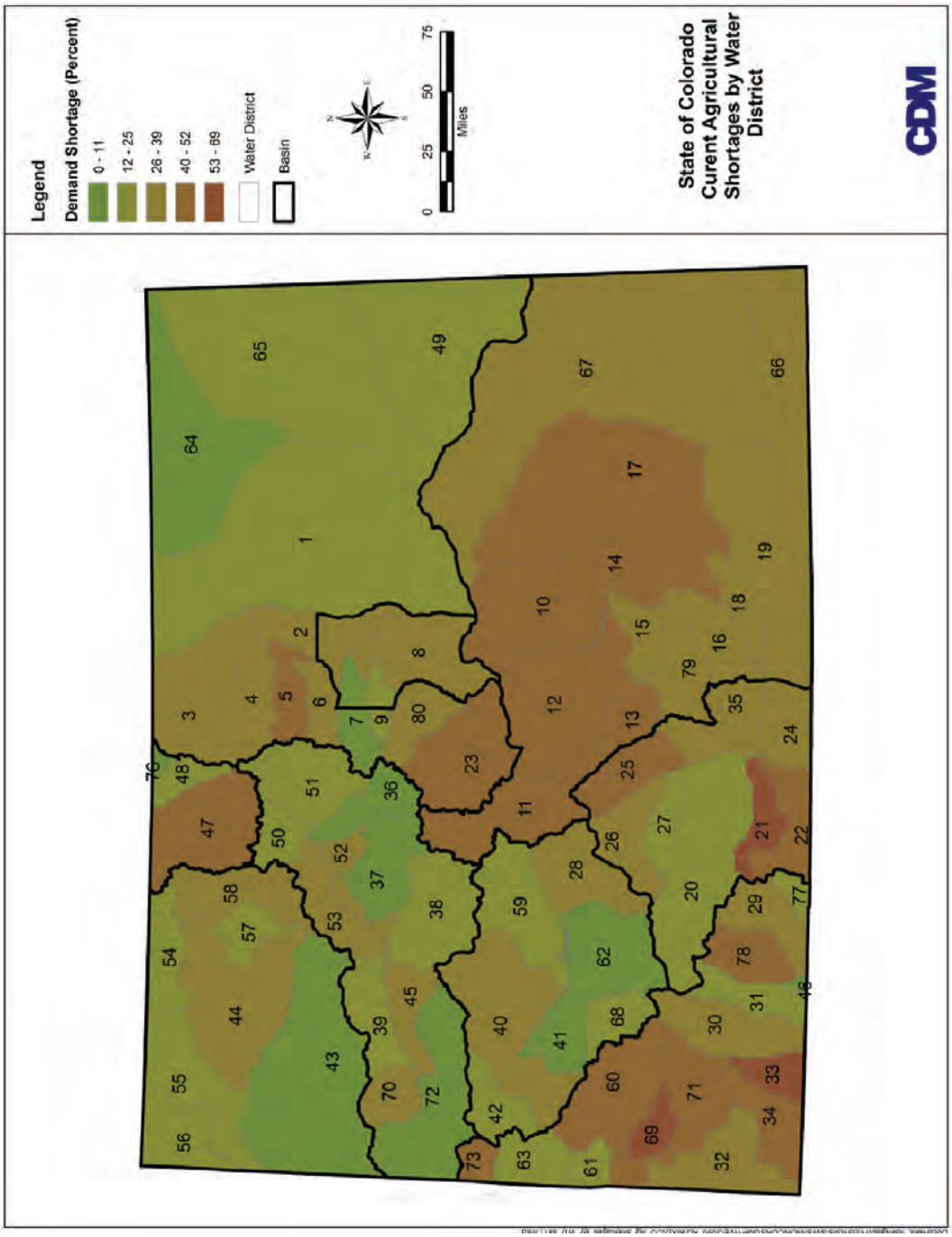


Figure 4-8 State of Colorado Current Agricultural Shortages by Water District

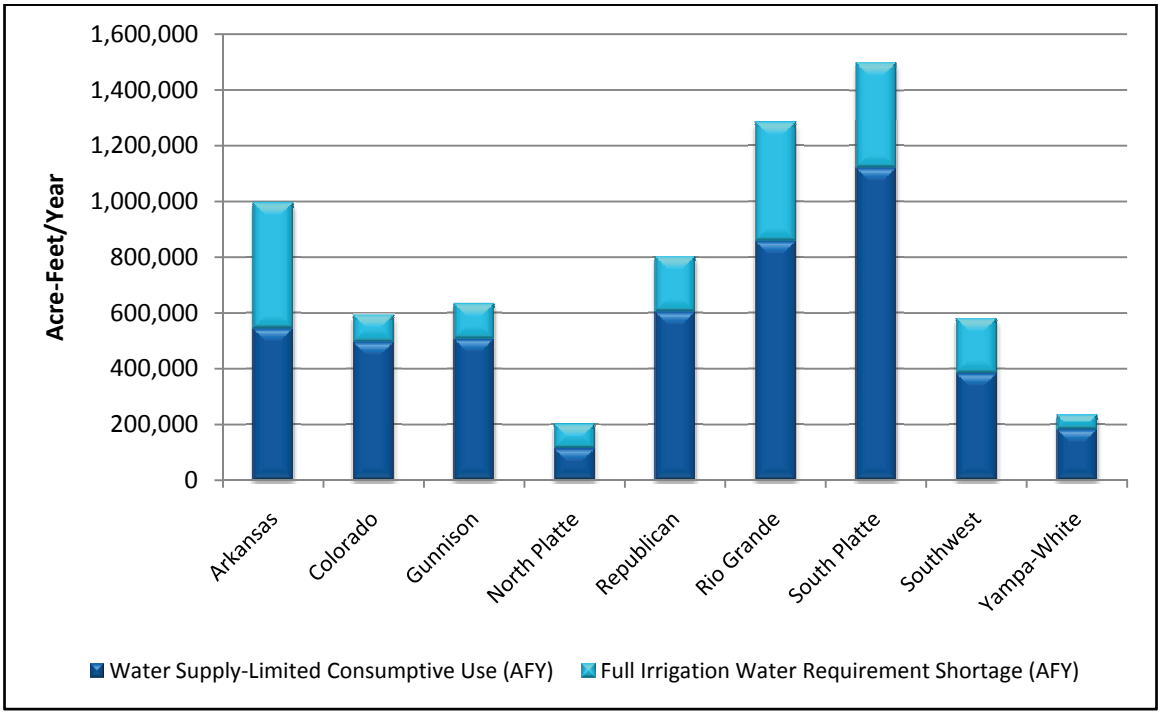


Figure 4-9 Current Agricultural Demands and Shortages

4.3.2.4 Future Agricultural Demand Results

Table 4-10 summarizes the estimated average annual agricultural demand by basin for the year 2050, assuming that historical climate and hydrology continues into the future. It shows irrigated acres, IWR, WSL CU, shortage, and non-irrigation demand. **Figure 4-10** shows the WSL CU and shortages by basin for the 2050 irrigated acres. Consistent with the projected decline in irrigated acres, declines in both irrigation and non-irrigation agricultural water demands are anticipated to occur in all basins except for the North Platte.

Table 4-10 Estimated 2050 Agricultural Demand by Basin

Basin	Irrigated Acres	Irrigation Water Requirement (AFY)	Water Supply-Limited Consumptive Use (AFY)	Shortage (AFY)	Non-Irrigation Demand (AFY)
Arkansas	373,000	862,000	476,000	386,000	49,000
Colorado	204,000	443,000	366,000	77,000	38,000
Gunnison	219,000	573,000	457,000	116,000	48,000
North Platte	145,000	250,000	140,000	110,000	14,000
Republican	441,000	640,000	480,000	160,000	5,000
Rio Grande	537,000	1,108,000	739,000	369,000	38,000
South Platte	607,000	1,094,000	820,000	274,000	84,000
Southwest	**249,000**	**558,000**	**367,000**	**191,000**	**44,000**
Yampa-White	85,000	209,000	170,000	39,000	17,000
Statewide Total	**2,860,000**	**5,737,000**	**4,015,000**	**1,722,000**	**337,000**

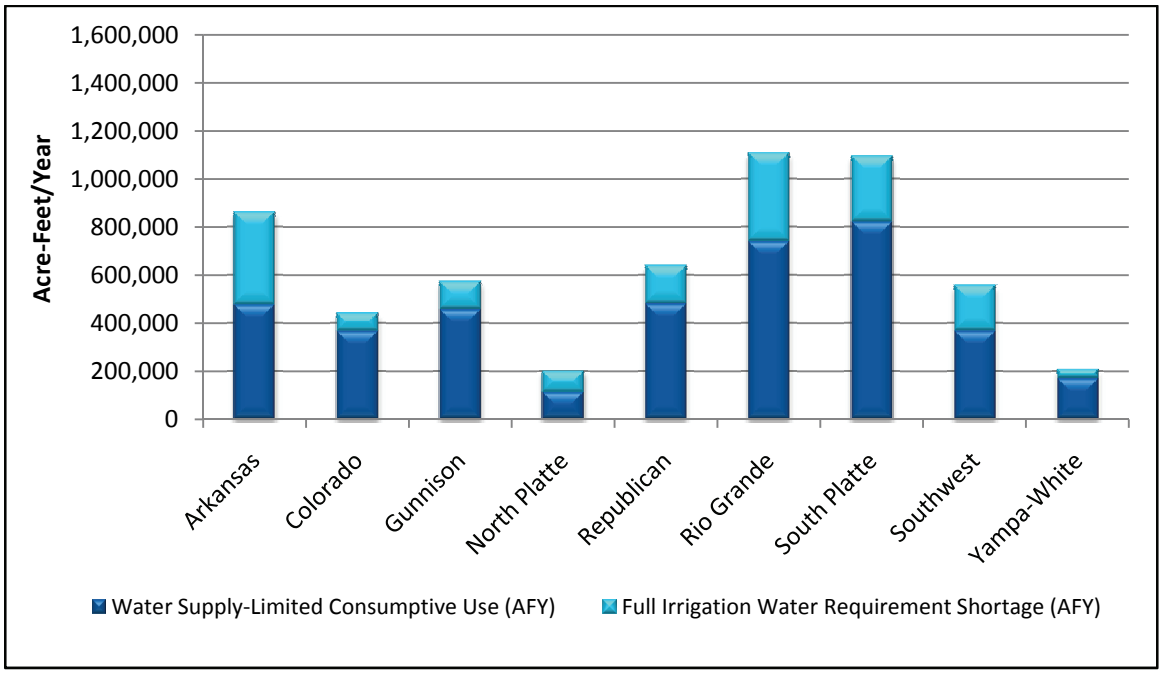


Figure 4-10 2050 Agricultural Demands and Shortages

THIS PAGE INTENTIONALLY LEFT BLANK

Section 5
Southwest Basin Consumptive Projects and Methods and the M&I Gap

5.1 Southwest Basin Consumptive Use Projects and Methods Overview

The Southwestern Basin Roundtable is made up of a diverse group of individuals that have learned to work together as a group in addressing the water resource needs for consumptive and nonconsumptive uses in southwest Colorado. Even though there are differing opinions, the members have come to recognize that through collaborative efforts and management that many of these competing needs can be addressed. As the area continues to grow, more pressures will be put on these leaders to look for creative solutions to address the gap in water supply that has been identified in the Statewide Water Supply Initiative (SWSI) and achieves a balance that preserves the natural beauty of the area.

It is recognized that agriculture is a critical part of the history and economy of the area, and provides protection of open space and wildlife habitat. Reservoirs and the ability to store water during spring runoff has been a key component of managing the generous water supplies of this part of the state, and will continue to play a role in meeting the demands in the future. Without releases from storage later in the summer and fall, many of the rivers would flow at extremely low levels and limit other nonconsumptive uses such as recreation. The Southwest Basin is also home to the only two Indian Reservations in Colorado—the Ute Mountain Ute Tribe and the Southern Ute Indian Tribe (SUIT).

The Southwest Basin is somewhat unique with individual watersheds that flow to the south and are tributary to the San Juan River near or below the Colorado-New Mexico stateline. The one exception to this is the Dolores River that flows to the southwest and then turns north as a major tributary to the Colorado River. The San Miguel River is a major tributary to the Dolores, with the headwaters above Telluride and flowing west to the confluence with the Dolores River above the Colorado-Utah border. The San Juan Mountains capture abundant snowpack from the winter storms that move in from the south and west. Multiple large-scale reservoirs have been developed to capture this snowmelt for use later in the season by the Bureau of Reclamation (BOR) in cooperation with water conservation, conservancy, and irrigation districts.

Even though many of the reservoirs were constructed to fulfill late season irrigation demands, most of them also have a domestic or municipal component as well that will assist in providing water to bridge the municipal and industrial (M&I) gap identified in SWSI. These projects, or components of them, have all been identified as consumptive use Identified Projects and Processes (IPPs) by the Southwest Basin Roundtable. These existing projects include the Pine River Project (Vallecito Reservoir), Florida Project (Lemon Reservoir), Animas-La Plata Project (Ridges Basin Reservoir), Mancos Project (Jackson Reservoir), and Dolores Project (McPhee Reservoir).

Other nonfederal projects that are in the development and planning stages include Dry Gulch Reservoir, which is an off-stream reservoir in the Pagosa Springs area using San Juan River water, and Long Hollow Reservoir being developed on the lower end of the La Plata River basin to store water for multiple uses including Interstate Compact compliance.

Vallecito Reservoir

The Pine River Project stores runoff water in Vallecito Reservoir, and supplies supplemental irrigation water to approximately 13,000 acres of land within the Southern Ute Indian Reservation as well as 41,000 acres of non-tribal lands and was completed in 1941. The Pine River Irrigation District (PRID) owns five-sixths of the water stored, and manages the project. The SUIT owns the remaining one-sixth of the project. The reservoir stores about 125,000 acre-feet (AF) and through cooperative agreements can use approximately 4,000 AF to meet existing and future water supply needs by direct delivery or exchange. The Towns of Bayfield and Ignacio rely on storage in Vallecito to meet some of their water demands. These cooperative agreements have minimized impacts to irrigated lands, and agriculture will continue to be a crucial part of the area's economy.

Figure 5-1 is a summary of the Vallecito Reservoir Storage Project as it was represented in the Southwest Basin's Consumptive and Nonconsumptive Geodatabase.

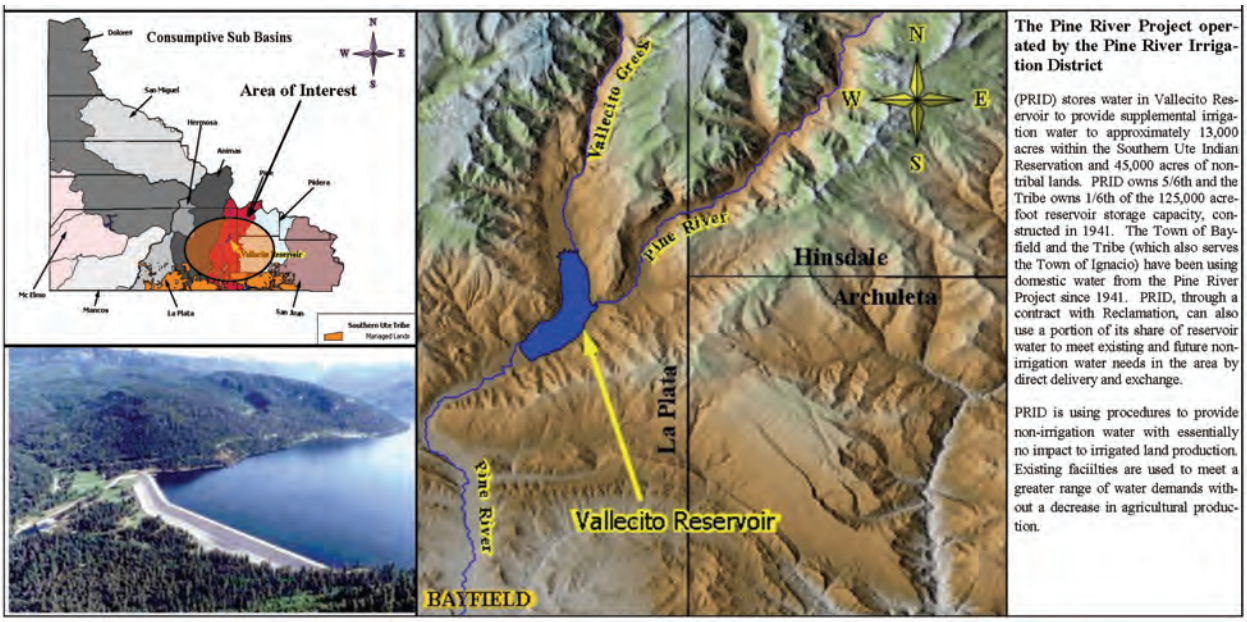


Figure 5-1 Vallecito Reservoir Storage for the Pine River Project.

Lemon Reservoir is the main feature of the Florida Project on the Florida River northeast of Durango. The reservoir was completed in 1963, and the canal rehabilitation was completed in 1965. The reservoir can store about 40,000 AF, and provides supplemental irrigation for approximately 20,000 acres. Through recent agreements, efficiency improvements, and court changes, the storage can also provide domestic and augmentation requirements while continuing to meet the irrigation demand. The Florida Water Conservancy District manages the project, which is identified as a consumptive use IPP.

Lemon Reservoir

The Animas-La Plata Project is expected to be completed sometime in 2012, and was a major component of the Indian Water Rights settlement to address reserved rights claims by the two Colorado tribes in the Animas and La Plata basins. The project water rights date back to 1938, and the project was originally intended to provide supplemental irrigation to 26,000 acres and new irrigation supplies for 60,000 acres in the La Plata River drainage in Colorado and New Mexico, as well as serve as a source of future domestic and municipal supplies. The La Plata River is highly over-appropriated with an Interstate Compact with New Mexico that requires daily deliveries. The basin is water short, and has tens of thousands of acres of land that could be productive with an adequate water supply.

Due to environmental concerns and impacts to the Razorback Sucker and Colorado Pike Minnow in the San Juan River, the Animas-La Plata Project was downscaled in 2000 with a total storage amount at Ridges Basin Reservoir (aka Lake Nighthorse shown in proximity to Durango) of 120,000 AF. This includes an in-active pool of 30,000 AF to address nonconsumptive needs of conservation and recreation. The downscaled project was also limited to M&I uses with nearly two-thirds of the statutory allocation belonging to the Indian Tribes. The 2000 amendment also provided a statutory allocation for the Animas-La Plata Water Conservancy District (LPWCD) and the State of Colorado, which will be used to fill the identified municipal gap under SWSI. Currently, the City of Durango, La Plata West Water Authority, Lake Durango Water Authority, and La Plata-Archuleta Water District have all expressed interest in using some of this allocation to meet their future municipal demands. The project will be operated by the Animas-La Plata Operation, Maintenance, and Replacement Association representing the six project participants, with the possibility of the State of Colorado being the seventh member if it exercises its option to purchase water in the project. The reservoir is approximately one mile from Durango, and will also provide an outstanding recreational opportunity, which has been identified as a nonconsumptive IPP. All funding for recreation was removed from the downscaled project, but the Animas-LPWCD has initiated a public process to develop a recreation plan that protects the water supply and minimizing the risk of invasive species such as the Quagga Mussel.

Lake Nighthorse near Durango

Jackson Reservoir

Jackson Reservoir is the centerpiece of the Mancos Project on the Mancos River. The reservoir is an off-stream reservoir with a canal conveying the water to be stored from the West Mancos River. The project was constructed by the U.S. Bureau of Reclamation (BOR), and is operated by the Mancos Water Conservancy District. The project was completed in 1950 and provides reservoir storage of just under 10,000 AF for supplemental irrigation of about 14,000 acres. The project also provides municipal water for the Town of Mancos, the Mancos Rural Water Co., and Mesa Verde National Park. The facilities also provide recreational opportunities at Jackson Lake State Park, which is managed by the State of Colorado. Agriculture provides an economic base for the Mancos Valley, so the district has initiated studies to evaluate an enlargement of the storage capability to provide for future domestic and municipal supplies (meeting the gap) without impacting the water used for agricultural purposes. This study is being partially funded by the use of basin funds from the Water Supply Reserve Account (WSRA). A nonconsumptive IPP is also moving forward to modify existing diversion structures in the river to provide for efficient diversions while improving the watershed.

McPhee Reservoir

The Dolores Project was constructed by the BOR, and is operated by the Dolores Water Conservancy District. The project consists of a series of canals, laterals, and tunnels that deliver water supplies for multiple purposes in the San Juan River Basin from McPhee Reservoir in the Dolores River Basin. The reservoir has a capacity of about 381,000 AF with 229,000 AF of active capacity, and was completed in the mid-1980s. Water allocated from the project was a key component of the Indian Water Rights Settlement for the Ute Mountain Ute Tribe, and 7,500 acres of land was put into production on the reservation. In addition to this, the project supplies irrigation water for an additional 28,000 acres from the Dove Creek area south, and supplemental irrigation for approximately 26,000 acres for the Montezuma Valley Irrigation Company. Over 36,000 acres of new lands were put into production by the Dolores Project, but the project also provides for a municipal supply that will assist in meeting the future needs in the region. About half of the 8,700 AF of water allocated for M&I use remains unallocated at this point in time, and therefore is a significant consumptive use IPP for the Southwest Basin.

There are significant nonconsumptive needs that are met by the Dolores Project as well, which include recreation, fish, and wildlife, and produces clean hydroelectric power from power plants on the outlet for McPhee Reservoir and the Towaoc Canal. The second largest allocation in the project is for downstream fisheries and environmental needs, with about 32,000 AF being released for these purposes. How to meet downstream environmental needs with the available fishery pool, spill management, and the possible lease of additional water is the focus of a collaborative effort with diverse membership to address these nonconsumptive needs through the Dolores River dialogue process. This effort has also been identified as a non-consumptive IPP for the Southwest Basin Roundtable.

Development of storage facilities has played a major role in meeting consumptive needs in the Southwest Basin, and has made it possible to add to the economic base by meeting existing and future municipal supplies and strengthening agriculture by bringing new lands into production. The basin is the only region in the state that has seen an increase in irrigated agriculture, and has not suffered from the dry-up of lands to meet municipal supplies as has been experienced in other areas. Two future storage projects have been identified as consumptive IPPs in the area to meet increasing demands.

Dry Gulch Reservoir has been proposed in the Pagosa Springs area by the San Juan Water Conservancy District (SJWCD) and Pagosa Area Water and Sanitation District (PAWSD). The current configuration is an off-channel reservoir of approximately 12,000 AF with the primary purpose of meeting future domestic and municipal needs in the area. The project is not without controversy, but most of the land has been acquired with assistance from a grant from the statewide WSRA, and a loan from the Colorado Water Conservation Board (CWCB).

Long Hollow Reservoir is moving forward in the La Plata drainage, and will provide approximately 5,400 AF of storage on Long Hollow approximately 5 miles above the Colorado-New Mexico stateline. The project will be constructed utilizing funding assistance from the Colorado Water Resource and Power Development Authority, and will be managed by the LPWCD. The project will assist in meeting compact requirements on the La Plata River, and will provide a supplemental irrigation supply by exchange for users in Colorado. The project also has exchange and augmentation potential for domestic well users in the area. A management criterion has been established to provide flows below the confluence with the La Plata River for preservation of the Roundtail Chub, which has been identified as a sensitive species. It is anticipated that construction of the reservoir will begin in the late summer or fall of 2011.

It should also be noted that a number of water rights applications were filed in 2010 to meet future consumptive needs in the San Miguel Basin. These water rights applications were for both direct flow and storage rights, and were filed in response to an anticipated filing for an instream flow (ISF) water right by the CWCB. The ISF has been listed as a nonconsumptive IPP, and many of the consumptive uses identified by the water court applications will be included as IPPs as well.

In the southwest part of the state, history has shown that storage and management of spring runoff has provided certainty in supplies for consumptive needs including domestic, municipal, and irrigation supplies for a thriving agricultural community. Many of these projects have been, or will be, a critical component of meeting nonconsumptive IPPs identified by the Southwest Basin Roundtable. The roundtable has learned to work together to achieve goals that help in meeting both consumptive and nonconsumptive needs in the basin, by striving to understand the individual concerns of all of its' members.

Table 5-1 summarizes the Southwest Basin Roundtables IPPs. This table includes the county and subbasin where the IPP is located, as well as the provider responsible for the IPP.

Table 5-1 Southwest Basin Identified Projects and Processes

ID	County	HUC	Subbasin	Major Provider	Notes	Remaining Gap AF	Supplies Beyond 2050	Source
1	Archuleta	14080101	San Juan	PAWSD	Dry Gulch Reservoir Project. The project would provide raw water to PAWSD and most of the population and commercial development in Archuleta County. Necessary to meet PAWSD demands through 2055. Storage capacity up to 35,000 AF. A one-year safety supply margin will be included in the storage capacity to address hydrologic uncertainty (e.g., global warming).	13,610 AF of total demand in 2055, Dry Gulch is necessary to provide that supply	Yes	PAWSD and SJWCD (updated from SWSI 1)
2	Archuleta	14080101	San Juan	SJWCD	Partner with PAWSD to build Dry Gulch Reservoir.	See Above	Yes	PAWSD and SJWCD (updated from SWSI 1)
3	Archuleta	14080101	San Juan	PAWSD	Snowball Pipeline Upgrade. The upgrade and enlargement of the existing Snowball Pipeline is necessary to meet PAWSD demands prior to construction of Dry Gulch Reservoir. This facility will provide water to meet approximately 2020 demands except in a 2002 type drought, and depending upon rate of growth in the 2010s. Dry Gulch Reservoir is necessary to supply water in a drought and to meet demands beyond about 2020.	Necessary to meet demand prior to construction of Dry Gulch Reservoir	No	PAWSD (new IPP)
4	Archuleta	14080101	San Juan	PAWSD	San Juan Pump and Pipeline Enlargement. The installation of second pipeline parallel to the existing San Juan Pump and Pipeline is necessary to meet PAWSD water demands prior to construction of Dry Gulch Reservoir. This facility will provide water to me	Necessary to meet demand prior to construction of Dry Gulch Reservoir.	NO	PAWSD (new IPP)
5	Archuleta	14080102	Piedra	Aspen Springs Metro District	The Metro District needs a water hauling station to reduce the travel time for existing residents.	NA	Yes	Harris (new IPP)
6	Archuleta	14080102	Piedra	Aspen Springs Metro District	The Metro District includes over 2,000 lots most of which are currently undeveloped. Eventually a pipe distribution system will be necessary to supply water.	TBD	No	Harris (new IPP)
7	Archuleta	14080101	San Juan	Unincorporated Archuleta County not covered by a water district	Have assumed 5 to 10 percent of future demand in Archuleta County will be in rural area not covered by PAWSD and groundwater or hauling water may be the only options and alternatives will not be developed.	366.00	No	Basin roundtable feedback

Table 5-1 Southwest Basin Identified Projects and Processes

ID	County	HUC	Subbasin	Major Provider	Notes	Remaining Gap AF	Supplies Beyond 2050	Source
8	Dolores	14030002	Dolores	Dolores Water Conservancy District (DWCD)	CWCB ISF may limit the ability to provide augmentation above McPhee Reservoir in the future. Alternatives include small storage (10 to 20 AF) or alluvial storage.	0	Yes	DWCD (updated from SWSI 1)
9	Dolores	14030002	Dolores	RICO	Rico Alluvial Pipeline Water Supply Project. The project would provide a new more reliable water source for Rico. A Preliminary Engineering Report has been prepared describing the new well and 2 mile pipeline. An agreement with CWCB to address Instream flow right is imminent. Rico is now within the DWCD. The Project may provide adequate water through 2050 depending on growth in Rico.	0	Maybe	Town of Rico Preliminary Engineering Report by Harris Water Engineering. (updated from SWSI 1)
10	Dolores	14080201	Monument Creek/San Juan	Dove Creek	Have right to water from Dolores Water Conservancy District. A lawn and garden raw water system has been completed in Dove Creek.	0	Yes	DWCD (updated from SWSI 1)
11	Dolores	14080203	Mancos/ McElmo	Montezuma Water Company	Supplies potable water to rural Dolores and Montezuma Counties.	0	Yes	Steve Harris, Janice Sheftel and John Porter
12	Dolores	14030002	Dolores	Unincorporated Dolores County not covered by a water district	Have assumed 5 to 10 percent of future demand in each county will be in rural area not served by Rico or Dove Creek and groundwater or hauling water will be the only options and alternatives will not be developed.		No	Basin roundtable feedback
13	La Plata	14080104	Animas	Southwestern Water Conservation District (SWCD)	CWCB has an option to obtain approximately 10,400 AF of water from the Animas La Plata Project. SWCD has sent a letter to CWCB recommending the water be purchased and maintained for use in Colorado. CWCB is currently studying the potential needs for the water.	10,400 AF	Y	SWCD (new IPP)
14	La Plata	14080101	Piedra, Pine and Florida and Animas	La Plata Archuleta Water District (LAPLAWD)	LAPLAWD was formed in August of 2008. A Board of Directors is currently seated and making plans for a mill levy election needed to finance a water distribution system for southeast La Plata County. A Master Plan has been prepared to describe the facilities and water sources.	2,300 AF through 2060	Y	LAPLAWD (updated from SWSI 1)
15	La Plata	14080104	Animas	LAPLAWD	LAPLAWD has sent a letter to CWCB requesting a portion of the ALP water described for SWCD above. Obtaining a portion of this water is critical to serve LAPLAWD.	At least 1,150 AF and Up to 2,300 AF	Y	LAPLAWD (new IPP)

Table 5-1 Southwest Basin Identified Projects and Processes

ID	County	HUC	Subbasin	Major Provider	Notes	Remaining Gap AF	Supplies Beyond 2050	Source
16	La Plata	14080101	Pine	LAPLAWD	LAPLAWD master plan recommends two raw water sources, one is ALP in the above IPP and the second is a joint treatment plant with Bayfield using water from PRID through Vallecito Reservoir.	1,150 AF to 2,300 AF	Y	LAPLAWD (new IPP)
17	La Plata	14080101	Pine/San Juan	Unincorporated La Plata County upstream of Vallecito Dam	There is a large number of homes upstream of Vallecito Reservoir that are currently served by wells. LAPLAWD will not serve this area. Augmentation water, primarily from Vallecito is necessary for these wells to utilize water in priority.	0	N	Harris (updated from SWSI 1)
18	La Plata	14080101	Pine	PRID, SUIT, CWCB	The three entities have filed for a new water right in Vallecito Reservoir to allow a donation to the ISF program in the Pine River and for other purposes.	N/a	N/a	PRID (updated from SWSI 1)
19	La Plata	14080101	Pine, Piedra, Florida	PRID	Currently nearly all of the irrigation system to deliver Vallecito Reservoir water is old open ditch. There is the potential to upgrade these ditches (lining and piping) to conserve water in Vallecito for decreed purposes.	TBD	TBD	PRID (new IPP)
20	La Plata	14080101	Pine	PRID	Reconstruct Emerald Lake Dam. Emerald Lake is a natural lake in the Weeminuche Wilderness Area which has had up to an 8 foot dam in the past. The concept is to reconstruct up the dam which would provide up to 1,000 AF of storage. A Federal Court ruling has likely ended this option.	TBD	TBD	PRID (updated from SWSI 1)
21	La Plata	14080104	Animas/San Juan	Durango West Metro District #1	Potential joint project to construct raw water pump and pipeline among Durango West Metro Districts and Lake Durango Water Company. Other options include the future Animas La-Plata/ Western La Plata rural domestic system or to purchase treated water from City of Durango.	40	N	Steve Harris, Janice Sheftel and John
22	La Plata	14080104	Animas/San Juan	Durango West Metro District #2	Potential joint project to construct raw water pump and pipeline among Durango West Metro Districts and Lake Durango Water Company. Other options include the future Animas La-Plata/ Western La Plata rural domestic system or to purchase treated water from the City of Durango.	40	N	Steve Harris, Janice Sheftel and John Porter
23	La Plata	14080104	Animas/San Juan	Durango	Have adequate water rights and negotiating for Animas-La Plata Project Water to increase overall storage.	0	Y	Jack Rogers, City of Durango

Table 5-1 Southwest Basin Identified Projects and Processes

ID	County	HUC	Subbasin	Major Provider	Notes	Remaining Gap AF	Supplies Beyond 2050	Source
24	La Plata	14080104	Animas	Edgemont Ranch Metro District	May need storage for firming.	0	U	Steve Harris
25	La Plata	14080104	Animas	El Rancho Florida Metropolitan	Built out.	0	N	Steve Harris
26	La Plata	14080104	Animas/La Plata/ San Juan	Lake Durango Water Company	Potential joint project to construct raw water pump and pipeline with Durango West Metro Districts and Lake Durango Water Company. Other options include the future Animas La-Plata/ Western La Plata rural domestic system.	300	N	Steve Harris, Janice Sheftel and John Porter
27	La Plata	14080104	Animas/San Juan	Purgatory Metropolitan District	District has sufficient water now, but is anticipating huge growth, especially at Durango Mountain Resort. The District is looking for more water. Water rights must be deeded to District with inclusion of property within the District. District is looking	100	N	Janice Sheftel
28	La Plata	14080101	Pine/San Juan	Bayfield	Need storage to firm existing water rights. Only other option is to lease water from Vallecito Reservoir.	0	U	Steve Harris, Janice Sheftel and John Porter
29	La Plata	14080104	Florida/San Juan	Florida Water Conservancy District (FWCD)	Need for industrial, municipal, domestic, commercial, wildlife, wetlands, exchange, augmentation, hydropower, irrigation, and fire protection water within the Florida River basin. The district has initiated institutional changes by entering into a water service contract with the BOR to use decreed 114 AF water right for augmentation purposes and has obtained a 2,500 AF water right to address the aforementioned uses. Utilization of the 2,500 AF will require another water service contract with the BOR, voluntary water turn in by users, and irrigation system efficiency improvements by the Florida Mesa Ditch Companies that would firm up agricultural delivery and provide additional water supply for those other uses in Lemon Reservoir through the reduction of losses in the delivery system.	2,614 AF	Yes to 2057	FWCD
30	La Plata	14080101	Pine/San Juan	Forest Lakes Metro District	Future issue is cost of contract water from Vallecito Reservoir.	0	Y	Steve Harris, Janice Sheftel and John Porter

Table 5-1 Southwest Basin Identified Projects and Processes

ID	County	HUC	Subbasin	Major Provider	Notes	Remaining Gap AF	Supplies Beyond 2050	Source
31	La Plata	14080104	Animas/San Juan	SUIT and Ignacio	Source of water and treatment is SUIT water rights. Tribe treats water, but each has own distribution systems.	0	Y	Steve Harris, Janice Sheftel and John Porter
32	La Plata	14080104	Animas/San Juan	Unincorporated La Plata County in Florida Drainage	Need for augmentation water. Water could be stored on Edgemont Ranch or institutional changes to Florida Project to allow domestic and augmentation uses.	100	N	Janice Sheftel
33	La Plata	14080104	Animas/San Juan	Unincorporated Northern La Plata County not covered by a water system	North of Durango in Animas River Basin. No single entity that can serve and operating on individual augmentation plans. Durango proposed recreational in-channel diversion (RICD) could impact future water development. Electra Lake is available as a source of augmentation and physical source, but is costly. May be small amounts of ag available to change, but will be expensive.	348	N	Steve Harris, Janice Sheftel and John Porter
34	La Plata	14080105	La Plata/San Juan	Unincorporated Western La Plata County not covered by a water system	Have assumed 5 to 10 percent of future demand in each county will be in rural area not served by a water district and groundwater or hauling water from Marvel Springs or a municipal system will be the only options and alternatives will not be developed.	50	N	Steve Harris, Janice Sheftel and John Porter
35	La Plata	14080105	La Plata/ Animas/San Juan	Western La Plata County Water System	Up to 700 AF of Animas-La Plata water that requires treatment and distribution to deliver the water. Wells are not an option, would require water hauling.	0	N	Steve Harris, Janice Sheftel and John Porter
36	La Plata	14080105	La Plata/Long Hollow	LPWCD	Long Hollow Reservoir. LPWCD developing reservoir site with 5400 AF storage in Long Hollow. Used for Compact compliance, and irrigation supply by exchange. Potential use for augmentation and exchange for domestic wells.	TBD	N	

Table 5-1 Southwest Basin Identified Projects and Processes

ID	County	HUC	Subbasin	Major Provider	Notes	Remaining Gap AF	Supplies Beyond 2050	Source
37	La Plata	14080105	La Plata/Hay Gulch	Red Mesa Reservoir Co, LPWCD	Red Mesa Ward Reservoir. Existing storage and rights for 1176 AF storage owned by Red Mesa Reservoir Co, primary use irrigation with other uses including industrial and existing domestic augmentation plans. Needs include spillway and/or outlet updates to maintain existing capacity. Enlargement-refill water rights of 4074 AF held by LPWCD to meet existing and future demands including domestic, augmentation, irrigation, etc. Studies of enlargement potential in place and feasibility ongoing.	TBD	N	SWCD
38	Montezuma	14080107	McElmo	DWCD	Totten Reservoir. The existing 3,300 AF reservoir was acquired by DWCD. With no new facilities the reservoir can be used for direct service and augmentation in the McElmo Creek basin. With a pump and pipeline to Towaoc-Highline Canal can provide additional water for use within Dolores Project area. There are several potential water sources. The yield is variable based on type of use (M&I or irrigation) and sources.	Minimum 500 AF for M&I	Maybe	DWCD (updated from SWSI 1)
39	Montezuma	14080107	McElmo and San Juan	DWCD	Class B Shares. DWCD acquired 1,500 Class B shares from MVIC that provide 6,000 AF per year for irrigation. The lands to be irrigated are being evaluated.	6,000 AF for irrigation	Y	DWCD (updated from SWSI 1)
40	Montezuma	14080107	McElmo and San Juan	DWCD and Ute Mountain Ute Tribe (UMUT)	DWCD and the UMUT are conducting a reconnaissance water study, with partial CWCB funding, to evaluate potential water supplies and alternative facilities to serve the water needs of DWCD and UMUT now and into the future. The study is approximately half completed and will recommend IPPs to be implemented.	TBD	Y	DWCD and UMUT Study (new IPP)
41	Montezuma	14080107	San Juan	UMUT	As part of the joint study between DWCD and UMUT, UMUT has identified the possible need for an additional 200 to 300 AF of M&I water to add to the existing 1,000 AF supply.	200 - 300 AF	Y	DWCD and UMUT Study (new IPP)
42	Montezuma	14080107	San Juan	UMUT	As part of the joint study between DWCD and UMUT, UMUT has identified the need for an additional 4,000 to 6,000 AF of irrigation water for the 7,800 acre Tribal Farm.	N/A	N/A	DWCD and UMUT Study (new IPP)

Table 5-1 Southwest Basin Identified Projects and Processes

ID	County	HUC	Subbasin	Major Provider	Notes	Remaining Gap AF	Supplies Beyond 2050	Source
43	Montezuma	14030002	Dolores	DWCD	Plateau Reservoir. This is a new, up to 20,000 AF reservoir proposed by DWCD as a method to increase the water supply from the Dolores River. The water could be used for fishery flows below McPhee and/or M&I.	TBD	Y	DWCD (updated from SWSI 1)
44	Montezuma	14080107	McElmo	DWCD	Lawn and Garden Water. There is a demand for lawn and garden water within DWCD for small tracts of land that do not currently have a water source. Raw water distribution facilities have been constructed in some locations but additional facilities are needed.	TBD	Y	DWCD (updated from SWSI 1)
45	Montezuma	14030002	Dolores	DWCD	Groundhog Reservoir Expansion. The reservoir could potentially be expanded by decreasing the freeboard in the spillway, thus, raising the water level by about 1,000 AF. Studies have not been completed to fully evaluate this option.	TBD	Y	DWCD (updated from SWSI 1)
46	Montezuma	14080107	San Juan	DWCD	DWCD has had discussions with San Juan County, Utah to provide water to Monticello and Blanding. There is currently no activity.	N/A	N/A	DWCD (updated from SWSI 1)
47	Montezuma	14080105	Mancos	Mancos, Town	Source is Jackson Reservoir and direct flow rights.	0	Y	John Porter & Raymond Keith (updated from SWSI 1)
48	Montezuma	14080105	Mancos	Mancos Rural Water Company	Negotiated added supplies thru 2020 from Jackson Project (300 AF). Assume more available thru 2030.	0	N	Raymond Keith (updated from SWSI 1)
49	Montezuma	14080107	San Juan	Montezuma Water Company	Supplies potable water to rural Dolores and Montezuma Counties. Continually expanding to serve new areas presently on wells on hauling.	0	Y	John Porter (updated from SWSI 1)
50	Montezuma	14030002	Dolores	Dolores, Town	Have water rights and could purchase water from Dolores Project if needed.	0	Y	John Porter
51	Montezuma	14030002	Dolores	Cortez, City	Have direct flow rights and Dolores Project Water available.	0	Y	Response to CDM survey
52	Montezuma	14080107	McElmo	Summit Water District	Montezuma Water Company is now providing water to the District. Completed IPP.	0	N	Harris
53	Montezuma	14030002	Dolores	Montezuma County Water District	Serves rural area south Cortez. Could purchase water from Dolores Project Water or Montezuma Water Company.	0	Y	John Porter

Table 5-1 Southwest Basin Identified Projects and Processes

ID	County	HUC	Subbasin	Major Provider	Notes	Remaining Gap AF	Supplies Beyond 2050	Source
54	Montezuma	14080105	All subbasins Mancos/ McElmo/ Dolores	Unincorporated Montezuma County not covered by a water district	Have assumed 5 to 10 percent of future demand in each county will be in rural area not served by a water district and groundwater or hauling water may be the only options and alternatives will not be developed.	168	N	Basin Roundtable feedback
55	Montrose	14030003	San Miguel	SWCD and Montrose County	Montrose County, with assistance from SWCD, is evaluating the future water needs in the San Miguel basin in the County and the IPPs to meet the needs. A report and water rights application are planned to be prepared. IPPs will be identified and recommended for inclusion.	TBD	Y	SWCD (new IPP)
56	Montrose	14030003	San Miguel	CC Ditch	Modification of the headgate of the CC Ditch on the San Miguel River is being considered to improve the ability of kayaks and other boats to pass through the diversion.	N	N	SWCD (new IPP)
57	Montrose	14030003	San Miguel	Nucla	Mustang Water Authority formed to provide water.	0	U	Buckhorn Geotech Report on Mustang Water Authority
58	Montrose	14030003	San Miguel	Naturita	Mustang Water Authority formed to provide water.	0	U	Buckhorn Geotech Report on Mustang Water Authority
59	Montrose	14030003	San Miguel	Tri-State Power Facility	Have adequate water rights for future demands but would need storage to firm the yield if plant is expanded. Need storage options.	2000	N	Bill Haffner, Tri-State Generating
60	Montrose	14030003	San Miguel	Unincorporated Montrose County not covered by a water system	Have assumed 5 to 10 percent of future demand in each county will be in rural area not served by a water district and groundwater or hauling water will be the only options and alternatives will not be developed.	135	N	Basin Roundtable feedback
61	Montrose	14030003	San Miguel	SWCD, CWCB, Montrose County, Naturita, Nucla	UMETCO (Uravan) water rights transfer. Joint study 2008 by SWCD and CWCB determine best use of UMETCO water rights. Uravan water trust 1987, MOU CWCB local governments 1991, Historic use (Armbruster Report) 2005.	TBD	N	Basin Roundtable feedback
62	San Miguel	14030003	San Miguel	SWCD and San Miguel County	San Miguel County with assistance from SWCD is evaluating the future water needs in the San Miguel basin in the County and the IPPs to meet the needs. A report and water rights application are planned. IPPs will be identified	TBD	Y	SWCD (new IPP)

Table 5-1 Southwest Basin Identified Projects and Processes

ID	County	HUC	Subbasin	Major Provider	Notes	Remaining Gap AF	Supplies Beyond 2050	Source
63	San Miguel	14030003	San Miguel	San Miguel Water Conservancy District (SMWCD)	Straw Dam. The dam is located immediately downstream of the existing Gurley Reservoir and could provide additional storage for M&I uses on Wrights Mesa. Designs have been prepared.	TBD	TBD	Harris (updated from SWSI 1)
64	San Miguel	14030003	San Miguel	SMWCD	Marie Scott Reservoir. The reservoir project is described in a CWCB feasibility study and would supply supplemental irrigation water and M&I water.	TBD	Y	Harris (updated from SWSI 1)
65	San Miguel	14030003	San Miguel	Farmers Reservoir and Ditch Company	Enlargement of Gurley Reservoir. Designs have been prepared to enlarge the existing Gurley Reservoir.	TBD	TBD	Harris (updated from SWSI 1)
66	San Miguel	14030003	San Miguel	Lone Cone Reservoir and Ditch Company	Enlargement of Lone Cone Reservoir.	TBD	TBD	Montgomery (new IPP)
67	San Miguel	14030003	San Miguel	EXCEL Energy	Rehabilitation of Priest Lake. The Priest Lake dam owned by USFS was breeched under order of DWR. EXCEL Energy is assuming responsibility to rebuild the dam as part of a FERC re-licensing agreement. The lake is an important facility for trout habitat and augmentation of USFS facilities.	TBD	N	Harris (new IPP)
68	San Miguel	14030003	San Miguel	Town of Ophir	The Town of Ophir is investigating methods to provide for the long term water supply possibly including diversion and storage facilities.	TBD	TBD	Montgomery (new IPP)
69	San Miguel	14030003	San Miguel	Town of Norwood	The Town of Norwood holds water rights on the San Miguel River to provide for future water needs. Use of the water rights would involve a diversion from the river and a small storage facility.	TBD	Y	Montgomery (new IPP)
70	San Miguel	14030003	San Miguel	SMWCD	San Miguel Project. The project was authorized as a participating project in the Colorado River Storage Project (CRSP) and includes a large storage and diversion water right on the San Miguel River. Though the project as authorized is not likely to be constructed, the water right could be changed to meet future water needs in the San Miguel Basin. As a participant in CRSP, power revenues are being accumulated in the name of the project and legislation might allow funds to construct a locally approved alternative to the authorized project.	TBD	Y	Harris (new IPP)

Table 5-1 Southwest Basin Identified Projects and Processes

ID	County	HUC	Subbasin	Major Provider	Notes	Remaining Gap AF	Supplies Beyond 2050	Source
71	San Miguel	14030003	San Miguel	Aldaroso Ranch & Homeowners Co	Have water rights and groundwater.	0	N	Helton & Williamsen
72	San Miguel	14030003	San Miguel	Norwood Water Commission	Could also serve some of unincorporated Montrose County in addition to Town of Norwood.	1000	N	John Porter
73	San Miguel	14030003	San Miguel	Telluride Ski Area	Assumed to have sufficient supplies (per Town of Telluride).	0	Y	John Porter
74	San Miguel	14030003	San Miguel	Telluride	Existing water rights.	0	Y	John Porter
75	San Miguel	14030003	San Miguel	Unincorporated San Miguel County not covered by a water system	Have assumed 5 to 10 percent of future demand in each county will be in rural area not served by a water district and groundwater or hauling water will be the only options and alternatives will not be developed.	195	N	Basin Roundtable feedback
76	San Juan	14080104	Animas	SWCD and San Juan County	San Juan County with assistance from SWCD has applied for a water right to provide for the future water needs in the Animas River basin in the County. The application is pending with negotiations with opposers. Implementation of the eventual decree will result in recommended IPPs.	TBD	Y	SWCD (new IPP)
77	San Juan	14080104	Animas	SWCD and Town of Silverton	The Town of Silverton with assistance from SWCD has applied for a water right to provide for the future water needs of the Town. The application is pending with negotiations with opposers. Implementation of the eventual decree will result in recommended IPPs.	TBD	Y	SWCD (new IPP)
78	San Juan	14080104	Animas/San Juan	Silverton	Physical water supply is presently adequate, but the Town is applying for an augmentation plan to firm up supply from a potential senior call on the Animas River. The augmentation plan would utilize existing and enlarged capacity of Molas Lake as storage for augmentation water. If necessary, alternative storage sites may be reviewed to replace and/or supplement Molas Lake	0	N	Town of Silverton (updated from SWSI 1)
79	San Juan	14080104	Animas/ San Juan	Cascade Village	North of Purgatory and supplies water to condominium development. Option is to develop wells. Durango proposed RICD could impact future water development.	0	N	Steve Harris
80	San Juan	14080104	Animas/ San Juan	Unincorporated San Juan County	Minor projected increase in demands.	0	N	Steve Harris

5.2 Summary of Southwest Basin Consumptive Water Supply Reserve Account Projects

Following is a summary of WSRA Grants that have been funded in the Southwest Basin.

Aspen Springs Water Filing Station
$30,000 Basin
September 2010
Purpose: Provide potable water source for Aspen Springs Subdivision and surrounding area. Aspen Springs established in 1980 includes 2,100 lots accessed by 67 miles of roads. Most of the current 850 residents have been hauling water by truck from the Town of Pagosa Springs.

Bauer Lake Dam Outlet Structure Upgrade
$40,000 Basin
March 2008
Purpose: Rehab outlet pipe and connect to NCRS pipeline to add lake pressure to pipeline to improve the efficiency of irrigation deliveries.

DWCD-Totten Reservoir Hydrographic Survey
$29,500 Basin
September 2010
Purpose: Bring existing reservoir into compliance with CDWR requirements to provide M&I and supplemental irrigation uses.

Florida Mesa Canal Companies-Ditch Loss, Hydro and Monitoring Improvement
$100,000 Basin
March 2009
Purpose: Increase efficiency of Florida Mesa Canal conveyance system.

Florida Mesa Canal Companies – Canal Seepage Reduction Project
$775,000 State
December 2010
Purpose: Construct ditch lining to improve the efficiency of the canal conveyance system and reduce ditch loss thus firming agricultural water supplies through increased efficiency as opposed to developing additional water supplies, provide irrigation water at reduced operational expense to promote continued commercial agricultural uses, and develop additional sources of water for other beneficial uses in the basin.

Goodman Point Water Assoc. – Pipeline Environmental Assessment
$7,700 Basin
March 20007
Purpose: Conduct Environmental Assessment for pipeline to be used to provide domestic water to Goodman Point residents.

Goodman Point Water Assoc. – Goodman Point Phase 2
$20,000 Basin and $240,000 State
September 2007
Purpose: For part of construction costs to build a pipeline that will provide domestic water to the residents of Goodman Point (an 11 square area).

Happy Scenes Water System – Domestic Supply Upgrade
$50,000 Basin
November 2008
Purpose: For rehabilitation of a domestic supply system that includes a new well, treatment building and storage, engineering costs, legal and surveyors' fees and new buried water lines. The rehabilitation was necessary as a result of damage done to the supply system as a result of the catastrophic 2002 Missionary Ridge Fire.

La Plata –Archuleta Water District – Water System Master Planning
$100,000 Basin
November 2008
Purpose: To develop Master Plan for construction of water treatment plant and water distribution system for potable public water & fire protection facilities in newly formed water district that will have no revenue until 2011.

La Plata – Archuleta Water District – District Permitting
$400,000 State
September 2009
Purpose: To cover expenses of district permitting.

La Plata River – Cherry Creek Ditch – Diversion Project
$25,000 Basin
September 2010
Purpose: Diversion project to improve efficiency and effectiveness of the La Plata River, especially during low flow, and to help reduce water loss for the La Plata River – New Mexico Compact.

La Plata West Water Authority – Rural Water Supply System
$10,000 Basin $1,000,000 State
March 2008
Purpose: To fund development of the water supply structure for the La Plata West Rural Domestic Water Supply System, including engineering, permitting, and planning fees.

Lake Durango – Source Water Infrastructure
$1,000,000 State
Pending
Purpose: to develop a raw water supply infrastructure to deliver water from Lake Nighthorse to Lake Durango and purchase ALP Project water, including engineering and design, permitting, water acquisition, and construction.

Mancos Water Conservancy District – Jackson Gulch Expansion Project
$61,735 Basin, July 2007
Purpose: To increase the storage capacity behind Jackson Gulch Dam in order to meet the increasing demands for M&I water in area without diminishing agricultural supplies by an increase in storage capacity of approximately 2,000 AF.

Montezuma Valley Irrigation District – Groundhog Reservoir Bathymetric Study
$35,000 Basin
January 2011
Purpose: To conduct a reservoir bathymetric study to develop current and accurate elevation-storage curve and volume calculation on the modeled surface.

Park Ditch Company – Park Ditch Improvements
$85,000 Basin
July 2009
Purpose: To rehabilitate the Park Ditch to include replacement of the head gates and encase a previously open irrigation ditch that has experienced landslide blowout activity in proximity to a State Highway.

Red Mesa Dam & Reservoir Co. – Damage Analysis & Emergency Action Plan
$29,000 Basin
May 2009
Purpose: To perform Incremental Damage Analysis and develop an emergency action plan for the construction of a complaint spillway. This is necessary for the continued safe operation of the Red Mesa Dam at the current fully-decreed storage capacity.

San Juan Water Conservancy District – Dry Gulch Reservoir Land Acquisition
$1,000,000 State
March 2007
Purpose: To purchase property for the proposed Dry Gulch Reservoir that will be used to provide raw water storage capacity for a long term, reliable drinking water supply.

Summit Reservoir and Irrigation Co. – Summit/Montezuma Valley Irrigation Company Feasibility Study
$39,300 Basin
September 2008
Purpose: To study the possibility and feasibility of combining the operations of two private irrigation companies (Summit Irrigation Company and the Montezuma Valley Irrigation Company) to improve the efficiency of Summit Reservoir and Irrigation Company and maintain beneficial use of senior water rights.

Town of Rico – Alluvium Pipeline Water Supply Project
$20,000 Basin and $68,000 State
November 2010
Purpose: To develop an additional water supply to improve the current water source (Silver Creek). The new source will improve overall water quality, creating a dependable and stable source of water for the Town of Rico.

Town of Sawpit – Engineering/Planning Domestic Water System
$25,000 Basin
March 2008
Purpose: To fund engineering and planning necessary to replace the current inadequate water distribution system and storage tank.

Town of Sawpit – Domestic Water Supply Construction
$25,000 Basin
July 2009
Purpose: For construction to replace the current inadequate water distribution system and storage tank.

Town of Silverton – Molas Lake Ditch and Diversion Rehab
$95,000 Basin
January 2009
Purpose: To improve the existing earthen dam located at Molas Lake to bring it up to State Dam regulations, and to improve the ditch that feeds the lake, including maintenance and installation of measuring and water flow control structures.

Town of Norwood – Raw Water System Update and Future Needs Study
$58,458 Basin
January 2010
Purpose: To develop a long-term water supply evaluation for the Town of Norwood and Norwood Water Commission, including evaluating sustainability of current water supplies.

5.3 CWCB Projects and Methods M&I Gap Analysis Overview

Section 4 of this report summarizes the consumptive water needs across the State of Colorado and the Southwest Basin. As discussed in Section 1, the Colorado Water for the 21st Century Act requires the basin roundtables to identify projects and methods to meet their consumptive needs. Section 5.1 above summarizes the Southwest Basin IPPs.

Section 5.4 summarizes the major projects and methods and Section 5.5 documents the resulting assessment of M&I gaps.

In order to identify M&I projects and methods, the CWCB worked with water providers and the basin roundtables to update the SWSI 1 IPPs. This information was used to estimate a low, medium, and high 2050 M&I gap corresponding to the M&I demand projections summarized in Section 4 and different IPP success rates. To be clear, an M&I "gap" in the context of this study is not indicative of a future water supply shortfall; rather, it is a future water supply need for which a project or method to meet that need is not presently identified.

It is important for the reader to recognize that the analyses documented in this section are intended for the purpose of "big picture" statewide planning. While data and other information were collected from individual water providers, the results presented herein are for the purpose of general statewide and basinwide planning and are not intended to be used for individual provider planning, site-specific analysis, or project-specific purposes.

5.4 Projects and Methods to Meet M&I Consumptive Needs

Water providers throughout Colorado are pursuing water supply projects and planning processes to help meet future water demands. These IPPs, if successfully implemented, have the ability to meet some, but not all of Colorado's 2050 M&I water needs. IPPs are defined as projects and methods local water providers are counting on to meet future water supply needs. Future M&I water supply needs that are not met by an IPP are considered an M&I water supply gap. The estimation of future M&I water supply gaps is dependent upon several factors, including current water use, forecasted future water use, and water provider predictions of new water supply that will be developed through IPPs.

Statewide, these analyses were performed on a countywide basis and aggregated by basin roundtable area. For the Front Range counties in the Arkansas, Metro, and South Platte Basins, the county results were aggregated to a regional subbasin level for presentation in this report and consistency with SWSI 1. The majority of population growth over the next 40 years is expected to occur in these basins.

5.4.1 Identified Projects and Processes Methodology

The first part of the M&I gap analysis is to calculate 2050 total new M&I water needs, which is described in Section 4. The second part of the 2050 M&I and SSI gap analysis is to calculate the anticipated yield from the water providers' 2050 IPPs, assuming 100 percent success rate. For counties with more than one surveyed water provider, all relevant information was compiled to create the most complete picture of projected water supplies in the county. This IPP yield is then subtracted from the 2050 net new water needs (i.e., demand increases above existing supplies) at the county level. Where the total water provider IPP yield in a county exceeded the projected county demand for the low, medium, or high scenarios, the extra water was assumed to not be available for redistribution to other counties unless otherwise noted.

Information on water providers' IPPs was obtained from the following sources:

- CWCB interviews and data collected from water providers throughout the state in 2009–2010
- Section 6 of the SWSI 1 report (published 2004, data based on projections to 2030)
- Basin roundtable updates (e.g., Southwest 2008 report, June 2010 presentation by Applegate)

CWCB staff conducted outreach interviews in 2010 with most municipal water providers delivering 2,000 acre-feet per year (AFY) or more, including the top three water providers in each basin, where possible. Not every water provider responded; however, with significant basin roundtable assistance, many water providers submitted data in addition to the original list. This outreach was used to determine what projects and methods water providers are pursuing to meet their future needs along with confirmation of water demand data. In an effort to obtain more detailed data on providers' IPPs than was available for SWSI 1, interviewed entities were asked to delineate IPPs into the following categories:

- Agricultural water transfers
- Reuse of existing fully consumable supplies
- Growth into existing supplies
- Regional in-basin projects
- New transbasin projects
- Firming in-basin water rights
- Firming transbasin water rights

Passive and active conservation measures are not included in the categorized IPPs. Passive conservation is already factored into the 2050 M&I demand forecasts presented in Section 4. As requested by the

Conservation Technical Advisory Committee and for the purposes of this analysis, active conservation is considered a strategy for meeting the M&I gap and is described in Section 7.

The categorized IPP data presented in this section is based on information provided by the interviewed water providers on what their firm treated water deliveries will be for each category of IPP. While some IPPs include features that could be applied across more than one category, CWCB relied upon the water providers' data to assign the various projects and methods to the single most appropriate category. For example, although not explicitly quantified herein, it is likely that the true yield anticipated from agricultural water transfers is higher, but many water providers have captured agricultural transfers in IPPs falling in other categories such as regional in-basin projects or firming in-basin water rights. Some entities may also own agricultural water rights that are presently being leased back to agricultural water users; future M&I use of these supplies may be considered by some water providers to be growth into existing supplies. Based on these efforts IPP data were updated for 75 providers covering approximately 80 percent of the population in Colorado. Many of the quantified IPPs specified by the interviewed M&I water providers are identified in Appendix J of the SWSI 2010 Report.

The interview summary provided by CWCB identified and quantified many of the water providers' IPPs associated with each category. Where IPP information was derived from other sources, professional judgment was used to assign predicted yield to the most appropriate category. This approach was primarily applied to IPP data from the SWSI 1 report, which tallied IPPs by county or subbasin, but generally did not categorize yields from specified types of IPPs.

Because of the need for flexibility, reliability, and future uncertainty, many water providers design projects to meet needs based on planning numbers, which are often greater than current per capita water usage rates. Some specific reasons include—1) ensuring water supply if another system fails, 2) planning for drought or climate change, 3) an expected increase in commercial water use, or 4) concerns that one or more planned project will not be successfully implemented. Furthermore, many water rights limit the use of water to the specific water right holder, causing legal barriers to sharing water supplies. For these reasons, where the total potential volume of IPPs exceeded either the 2050 total water needs or the 2050 total water needs minus any provider-specified gaps, a pro-rata share reduction was applied to each IPP category relevant to that county or subbasin. For example, total quantified IPPs for the interviewed providers in a particular county exceed 50,000 AFY, but IPPs required to meet 2050 net new water needs range from 18,000 AFY to 30,000 AFY. A percentage of the total 50,000 AFY yield from IPPs is associated with each of the seven categories of IPPs, but since less IPP yield is actually needed to meet demands, the same category distribution percentages were applied to the lesser need. In other words, the amount of yield from each IPP category is reduced such that only the amount actually necessary to meet 2050 new water needs is applied.

Note, however, that this methodology and data presentation does not in any way preclude water providers from developing IPPs in excess of their 2050 needs. Rather, it is beyond the scope of this gap analysis to present data for individual water providers whose demand projections, planning horizon, and system reliability may differ from the regional analysis presented here. Any excess IPP volume quantified for a particular county is assumed to not be available to meet water supply gaps in other counties, unless specified otherwise. Likewise, there was no intention of implying intra-county sharing among water providers, unless specifically noted. By proportionally scaling back each entity's 2050 IPP yields when the sum of all entities' IPPs in a particular county exceed the forecasted 2050 net new water needs for that county—and explicitly accounting for provider-specified gaps—it is CWCB's intention to avoid implying that any one provider's excess yield would be used to meet the shortfall (i.e., gap) of another water provider.

5.4.2 Estimation of 2050 IPP Yield by Basin

A broad range of water management solutions with varying levels of supply are planned for each of the basins. The following sections summarize the yields of IPPs statewide and for each county or region in each basin at the 100 percent success rate. As described above, due to the number of counties and distinct areas in the Arkansas, Metro, and South Platte Basins, those basins are summarized by region, whereas each of the other basins is discussed at a county level. Because of the overall volume of demand and the size of the projected gaps in the South Platte and Arkansas Basins, those basins' IPPs lists are more populated than the other basins' lists.

Many water providers are pursuing multiple projects and will need to pursue all of these identified projects to meet their increased demand by the year 2050. This is due to the reality that each of the IPPs has associated risk and may not yield all of the anticipated water supply. Alternate IPP yield success rates (i.e., less than 100 percent) are addressed subsequently in Section 5.5.2. The results of calculations based on the alternate IPP success rates are incorporated into the gap analysis presented in Section 5.5.3. Additionally, many of these IPPs will benefit multiple beneficiaries and therefore address a number of objectives concurrently. However, challenges exist in determining funding sources and acquiring water rights to support the multiple uses. In addition to quantified IPP yields, the tables for each basin also include a general summary of the major projects and other IPPs in each county or region.

5.4.2.1 Statewide

Statewide, the new water supplies needed for M&I and self-supplied industrial (SSI) use by the year 2050—above and beyond all existing supplies—are estimated to range from about 600,000 AFY to nearly 1 million AFY (see Section 4). This range reflects the uncertainty associated with forecasting water demands 40 years into the future, in particular SSI demands associated with energy development and other market-driven commodities. Based on extensive interviews with water providers, input from basin roundtable and Interbasin Compact Committee (IBCC) members, and a thorough review of other pertinent information, IPPs have been identified that will meet a significant portion of these future new demands.

Applying the general methodology for assessing IPPs described in Section 5.2.1, the IPPs were grouped into seven primary categories. **Table 5-2** identifies the anticipated range of yield from each category for each basin. For this and many of the subsequent tables, values are presented as a range, with the low and high yield values shown. Where the yield values do not change from low to high, a single value is shown rather than a range. Although the interviewed water providers generally provided demand and IPP data for a 2050 medium growth scenario, the ranges presented herein derive from the use of low, medium, and high population and demand levels for 2050 for the various analyses associated with SWSI 2010.

Table 5-2 Major Categories of Identified Projects and Processes by Basin (Yields at 100% Success Rate) [1]

Basin	Agricultural Transfer (AFY)	Reuse (AFY)	Growth into Existing Supplies (AFY)	Regional In-Basin Project (AFY)	New Transbasin Project (AFY)	Firming In-Basin Water Rights (AFY)	Firming Transbasin Rights (AFY)	Total IPPs at 100% Success Rate (AFY)
Arkansas	9,200 – 11,000	23,000 – 32,000	2,300 – 2,600	37,000	0	6,100 – 7,300	10,000 – 11,000	88,000 – 100,000
Colorado	2,900 – 8,000	500	14,000 – 28,000	13,000 – 15,000	0	11,000 – 19,000	0	42,000 – 70,000
Gunnison	400 – 500	0	1,100 – 1,700	11,000 – 15,000	0	900	0	14,000 – 18,000
Metro	20,000 – 33,000	14,000 – 21,000	55,000 – 86,000	34,000 – 39,000	13,000 – 23,000	900 – 1,400	3,500 – 4,800	140,000 – 210,000
North Platte	0	0	100 – 300	0	0	0	0	100 – 300
Rio Grande	0	0	2,900 – 4,300	0	0	3,000 – 4,300	0	5,900 – 8,600
South Platte	19,000 – 20,000	5,000 – 7,000	20,000 – 30,000	37,000 – 39,000	0	22,000 – 26,000	18,000 – 21,000	120,000 – 140,000
Southwest	**0**	**0**	**5,200 – 7,300**	**9,000 – 13,000**	**0**	**0**	**0**	**14,000 – 21,000**
Yampa-White	0	0	3,500 – 4,900	6,600 – 9,000	0	0	0	10,000 – 14,000
Total	**51,000 – 73,000**	**43,000 – 61,000**	**100,000 – 160,000**	**150,000 – 170,000**	**13,000 – 23,000**	**44,000 – 58,000**	**32,000 – 37,000**	**430,000 – 580,000**

[1] Aggregated basin total values rounded to two significant digits to reflect increased uncertainty at larger geographic scales.

As shown in Table 5-2, quantified IPPs at 100 percent yield success would provide approximately 430,000 AFY, or about 72 percent of the new demands under the low growth scenario. At the high end, again assuming 100 percent success rate, IPPs would total about 580,000 AFY and represent approximately 58 percent of the high demand increase. The largest categories of IPP yields by volume are projected to be regional in-basin projects (150,000 AFY to 170,000 AFY) and growth into existing supplies (100,000 AFY to 160,000 AFY). **Figure 5-2** depicts the data graphically; for the individual basins that follow, the corresponding figures can be found in Appendix J of the SWSI 2010 Report.

5.4.2.2 Southwest Basin

Numerous IPPs are under construction or planned for development to meet the diverse uses in the counties of the Southwest (Dolores/San Juan/San Miguel) Basin. During SWSI 1, both the Dolores Project (including McPhee Reservoir) and the Animas-La Plata Project were considered critical to meeting the M&I gap by basin roundtable members. The Dolores Project has been constructed and the construction of the Animas-La Plata Project is nearing completion as of late 2010. In recent interviews conducted by CWCB, the City of Durango indicated plans to acquire additional Animas-La Plata water, and the city of Cortez cited plans to purchase more M&I reserves in McPhee Reservoir.

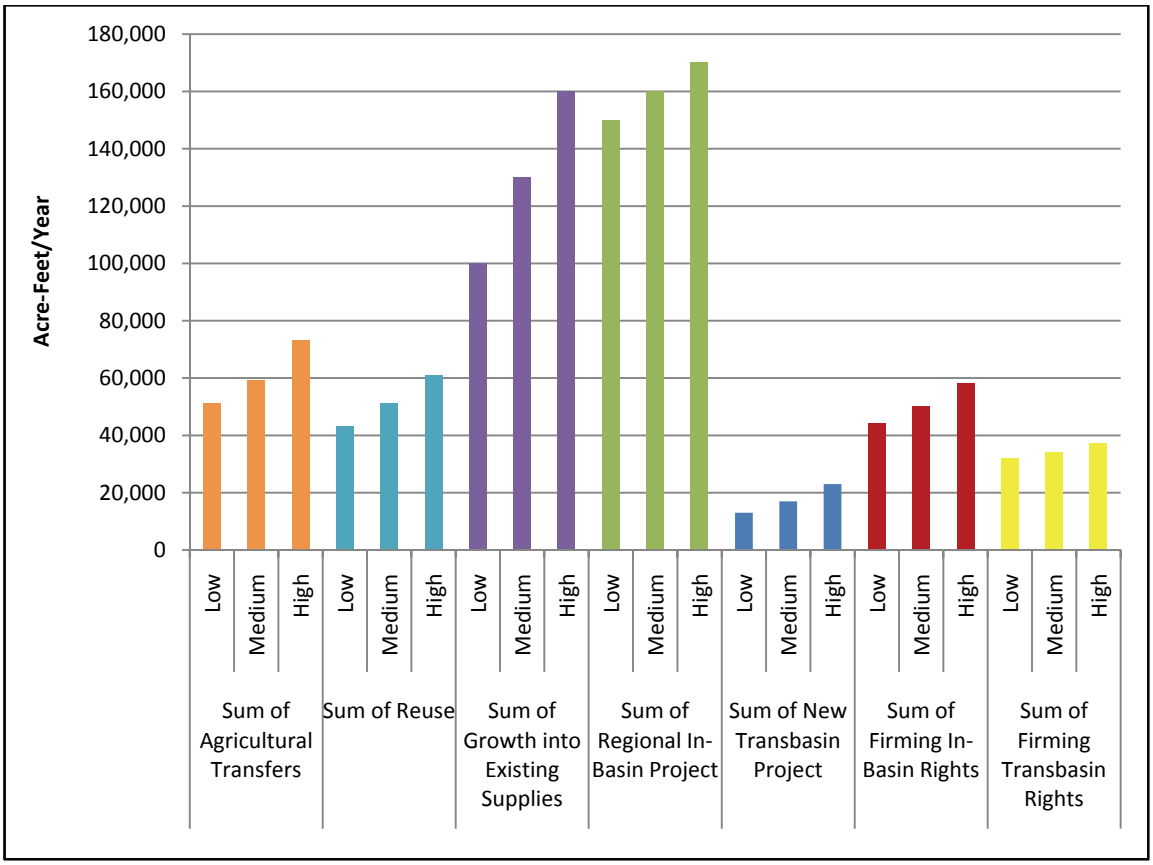


Figure 5-2 Statewide Summary of Yield for IPP Categories at 100% Success Rate

Overall, the M&I allocations in these projects are projected to be adequate to meet M&I water supply needs in most areas of Dolores, La Plata, and Montezuma Counties. However, some of the infrastructure to deliver Dolores and Animas-La Plata Project water to its end users does not currently exist and must be constructed. This includes water system construction planned by the La Plata Archuleta Water District and the La Plata West Water Authority. This water treatment and delivery infrastructure will be very expensive to construct. It will likely not be financially feasible to serve some unincorporated areas not served by water districts and water hauling is anticipated unless financial assistance is provided to develop the supplies and infrastructure.

In addition, the Pagosa Area Water and Sanitation District has plans for two reservoir projects—Dry Gulch Reservoir and the enlargement of Stevens Reservoir. Overall, aggregate IPPs for Archuleta, Dolores, La Plata, and Montezuma County exceed the countywide 2050 net new water needs, but were reduced to account for a 5 percent M&I gap in unincorporated areas. Based on SWSI 1 analyses, existing supplies and water rights are anticipated to be adequate to meet future needs in Montrose, San Juan, and San Miguel Counties.

Anticipated yields from each category of IPPs at 100 percent success rate are summarized for the Southwest Basin in **Table 5-3**.

Table 5-3 Southwest Basin IPP Summary at 100% Success Rate

Region or County	Agricultural Transfer (AFY)	Reuse (AFY)	Growth into Existing Supplies (AFY)	Regional In-Basin Project (AFY)	New Transbasin Project (AFY)	Firming In-Basin Water Rights (AFY)	Firming Transbasin Rights (AFY)	Total IPPs at 100% Success Rate (AFY)
Archuleta County	0	0	0	3,300 – 4,400	0	0	0	3,300 – 4,400
Archuleta County IPPs • Dry Gulch Reservoir Project • Stevens Reservoir enlargement								
Dolores County	0	0	300 – 500	0	0	0	0	300 – 500
Dolores County IPPs • Rico Alluvial Pipeline Water Supply Project • Rights to water from Dolores WCD • Potable supplies from Montezuma Water Company								
La Plata County	0	0	1,000 – 1,700	5,400 – 8,600	0	0	0	6,400 – 10,300
La Plata County IPPs • Existing supplies and water rights • Animas-La Plata Project water • Western La Plata County Domestic Water System • Florida Water Conservancy District Multipurpose Project								
Montezuma County	0	0	2,500 – 3,600	300 – 400	0	0	0	2,800 – 4,000
Montezuma County IPPs • Existing supplies and water rights • McPhee Reservoir water • Totten Reservoir								
Montrose County	0	0	700	0	0	0	0	700
Montrose County IPP • Existing supplies and water rights								
San Juan County	0	0	30 – 100	0	0	0	0	30 - 100
San Juan County IPP • Existing supplies and water rights								
San Miguel County	0	0	700	0	0	0	0	700
San Miguel County IPP • Existing supplies and water rights								
Total[1]	**0**	**0**	**5,200 – 7,300**	**9,000 – 13,000**	**0**	**0**	**0**	**14,000 – 21,000**

[1] Aggregated basin total values rounded to two significant digits to reflect increased uncertainty at larger geographic scales.

5.5 M&I Gap Analysis

The IPPs being pursued by local water providers represent significant quantities of water and the implementation of these local projects and plans is critical to meeting Colorado's future water supply needs. However, even with the implementation of the IPPs, there are still remaining M&I and SSI consumptive water supply gaps that will need to be satisfied. As stated previously, the calculated gaps do not necessarily represent a future water supply shortage, but the gaps do demonstrate where additional work is needed to identify projects and methods to meet those future needs. The following sections summarize the calculations and results of the 2050 M&I and SSI gap analysis. As described previously, this analysis includes 2050 low, medium, and high gap values to account for the inherent uncertainty in long-range population, demand, and water supply forecasting. Future M&I and SSI demands were assessed in Section 4 of this report.

Section 5.5.1 presents the M&I and SSI gap calculation methodology generally, followed by details on the variations that occur within the calculations for each basin. The calculations as described in Section 5.5.1 are based on the assumption of 100 percent success rate for the development of IPP yield. Section 5.5.2 describes alternate (i.e., less than 100 percent) IPP yield success rates for each basin as they are applied to estimate the 2050 medium and high gaps. Section 5.3.3 summarizes the results of the gap analysis at the statewide level and for each of the nine basin roundtable areas.

The results of the gap analysis presented in this report are based on the estimated firm yield of IPPs. Furthermore, the demand values that are integral to the gap calculations are based on water providers' treated water deliveries and do not account for losses during raw water collection, treatment, and distribution, which are highly variable depending on, among other things, water source, types of treatment processes, and age and condition of distribution system. Additionally, there are many future uncertainties such as the potential for climate change, drought, infrastructure failure, and other factors. Therefore, raw water needs are very likely to be greater than the gap values presented in this report.

Note that current and future agricultural consumptive demands and shortages were assessed in Section 4 of this report. Calculated irrigation shortages are based on available water supply being less than the ideal amount required for meeting the consumptive use requirements of a particular crop. Changes in these calculated results for 2050 relative to 2008 are generally driven by the anticipated loss of irrigated land to development and other factors. The discussions that follow apply only to the M&I and SSI consumptive gap analysis.

5.5.1 M&I Gap Analysis Methodology

For the purpose of this study, the M&I and SSI water supply gap is defined as follows:

M&I and SSI Water Supply Gap = 2050 Net New Water Needs – 2050 IPPs

where:

2050 Net New Water Needs = (2050 low/medium/high M&I baseline demands – high passive conservation - current M&I use) + (2050 low/medium/high SSI demands – current SSI use)

2050 IPPs = Water Provider Anticipated Yield from: Agricultural Transfers + Reuse + Growth into Exiting Supplies + Regional In-basin Projects + New Transbasin Projects + Firming In-basin Water Rights + Firming Transbasin Water Rights

If the available IPPs exceeded the 2050 water needs for a particular county, the IPPs were reset equal to the 2050 water needs. As stated previously herein, this calculation effectively scales back the yield of each IPP in a pro-rata fashion in order to present only the amount of yield necessary to meet water supply needs at the 2050 planning horizon. Sometimes this occurs for all three growth scenarios, sometimes for only low or low and medium. It is generally assumed that one county's surplus IPPs would not be reallocated to another county and that one provider's surplus would not be specifically allocated to meet another provider's gap. This approach was applied in all basins, unless specified otherwise.

The 2050 M&I and SSI gap is referred to in the results tables (see Section 5.5.3) as the "information/real" gap. The "real" gap is based on known numerical data from the Demands to 2050 Report, water provider interviews and data, SWSI 1, and other sources. Based on this information, 2050 M&I and SSI demand forecasts exceed the anticipated yields of water providers' IPPs and the result is a real, defined gap. An "information" gap arises due to a lack of numerical data to support more detailed gap quantification for some water providers or even counties and subbasins.

The preceding description represents the general approach to the M&I gap analyses, with the yields of IPPs based on the 100 percent success rate. However, the process was modified as necessary for each county and basin based on the available source data. The following sections outline variations to the methodology in each basin. These are general descriptions and do not necessarily capture every variation for every county; however, additional details about the calculations for each county or region are provided in Appendix J of the SWSI 2010 Report.

5.5.1.1 Southwest Basin

Following are the assumptions used to revise the Southwest Basin's gap calculations:

- The 2050 net new water needs were calculated based on the Demands to 2050 Report as described for the general approach.
- IPPs for the Southwest Basin were characterized as described in Section 5.4.2.2.
- Archuleta, Dolores, La Plata, Montezuma, Montrose, and San Miguel Counties were assumed to have a gap for unincorporated areas equal to 5 percent of 2050 net new M&I water needs. For Archuleta, Dolores, La Plata, and Montezuma Counties, this represents the entirety of the information/real gap.
- The information/real gaps for Montrose County and San Miguel County were calculated as 2050 net new water needs minus IPPs. San Juan County was found to have no gap in SWSI 1. This was assumed to remain accurate.

5.5.2 Gap Analysis with Alternate IPP Yield Scenarios

The assumptions and calculations described in Section 5.5.1 above evaluate the gap based on a 100 percent success rate for IPP yield development. To assess the full range of the 2050 M&I and SSI Gap, CWCB developed three potential scenarios to bracket the range of the M&I and SSI gap for low to high scenarios. Each scenario has a variable IPP yield success rate applied as a percentage of total IPP yield. For the low gap scenario, it was assumed that 100 percent of the IPPs (see Section 5.4.1) could be applied to the 2050 net new water needs.

For the medium and high gap estimates, the yield of the IPPs was assumed to be varied based on discussions from the IBCC, CWCB, and basin roundtables. For the medium gap scenario, it was assumed that the IPP yield would be reduced based on percent success rates discussed by IBCC in their scenario discussions for the alternative portfolio (see Section 7). IPP yield for the high gap scenario is assumed to be reduced based on the percent success rates as defined in the status quo portfolio that has been discussed by the IBCC. The percentage success rates for IPP yields for the medium and high scenarios are presented in **Table 5-4**.

Table 5-4 IPP Success Rates for the Medium and High Gap Scenarios

Basin	IBCC Alternative Portfolio IPP Yield Success Rates	IBCC Status Quo Portfolio IPP Yield Success Rates
Arkansas	90%	75%
Colorado	90%	90%
Gunnison	90%	90%
Metro	60%	50%
North Platte	90%	90%
Rio Grande	90%	90%
South Platte	60%	40%
Southwest	**75%**	**75%**
Yampa-White	90%	90%

The gap calculations based on alternate IPP yield success rates are best demonstrated by example. The Colorado Basin has an existing (2008) demand of 68,000 AFY and a 2050 low growth demand of about 132,000 AFY, representing an increase of nearly 65,000 AFY. IPPs associated with the Colorado Basin low growth scenario are 42,000 AFY (at 100 percent implementation), leaving a 2050 supply gap of 22,000 AFY under the low gap scenario. The Colorado Basin has a 2050 medium growth demand of 150,000 AFY, representing an increase of 82,000 AFY over the existing demand. Medium growth IPPs total 54,000 AFY at 100 percent yield, but based on Table 5-11, only 90 percent (49,000 AFY) of the yield is assumed to be successfully developed under the medium gap scenario. The result is a gap of about 33,000 AFY in 2050. High growth scenario demands are approximately 180,000 AFY, which is an increase of about 110,000 AFY over the existing scenario. High growth IPPs total 70,000 AFY at 100 percent yield, but under the high gap scenario, again only 90 percent (63,000 AFY) success is achieved. Thus, the Colorado Basin high gap is about 48,000 AFY.

A similar process is utilized for the other basins. For the medium and high statewide analyses, the success rates in Table 5-4 are applied to each basin prior to calculating the overall gaps on an aggregate basis.

5.5.3 2050 M&I and SSI Gap Analysis Results

The water supply gaps resulting from the assumptions and calculations defined in Section 5.5.1 and Section 5.5.2 are summarized in the following sections, first statewide, then for each basin by subbasin (region) or county. The full set of gap results implies nine total gap scenarios based on low, medium, and high M&I demands and three IPP yield scenarios (100 percent success rate, an alternative success rate, and a status quo success rate). For the purpose of discussion, however, the results are reduced to three scenarios in the tables presented in the following sections. These three scenarios encapsulate the full range of anticipated M&I and SSI water supply gaps in 2050, from the lowest low gap scenario (lowest demands with 100 percent IPP success rate) to the highest high gap scenario (high demands with status quo IPP success rates).

5.5.3.1 Statewide

Colorado faces a significant M&I water supply gap in 2050. Under the low gap scenario (low demands and 100 percent IPP success rate), the statewide gap is 190,000 AFY. Under the medium gap scenario (medium demands and an alternative IPP success rate), the statewide gap is about 390,000 AFY. Under the high gap scenario (high demands and status quo IPP success rate), the statewide gap is about 630,000 AFY. By 2050, Colorado's M&I gap could be between 32 percent and 66 percent of new M&I demands.

Table 5-5 provides a summary of each basin's increased M&I and SSI demands relative to current conditions (defined for this study as 2008), the amount of that increase met by the IPPs, and the results of the gap calculations. In general, the low IPPs plus the low remaining M&I and SSI gap equal the low increase in M&I and SSI demand, with some minor variability due to rounding at the county or regional level. The same is true for the medium and high values. The Arkansas and Metro Basins are exceptions to this rule due to the inclusion of additional gap volumes associated with the replacement of existing nonrenewable groundwater sources.

Table 5-5 Statewide M&I and SSI Gaps in 2050[1]

Basin	Increase in M&I and SSI Demand (AFY)			Estimated Yield of Identified Projects and Processes (AFY)			Estimated Remaining M&I and SSI Gap after Identified Projects and Processes (AFY)		
				100% IPP Success Rate	Alternative IPP Success Rates	Status Quo IPP Success Rates	Gap at 100% IPP Success Rate	Gap at Alternative IPP Success Rates	Gap at Status Quo IPP Success Rates
	Low	Med	High	Low	Med	High	Low	Med	High
Arkansas[2]	110,000	140,000	170,000	88,000	85,000	76,000	36,000	64,000	110,000
Colorado	65,000	82,000	110,000	42,000	49,000	63,000	22,000	33,000	48,000
Gunnison	16,000	19,000	23,000	14,000	14,000	16,000	2,800	5,100	6,500
Metro[3]	180,000	210,000	280,000	140,000	97,000	100,000	63,000	130,000	190,000
North Platte	100	200	300	100	200	300	0	20	30
Rio Grande	7,700	9,900	13,000	5,900	6,400	7,700	1,800	3,600	5,100
South Platte	160,000	180,000	230,000	120,000	78,000	58,000	36,000	110,000	170,000
Southwest	**20,000**	**25,000**	**31,000**	**14,000**	**13,000**	**15,000**	**5,100**	**12,000**	**16,000**
Yampa-White	34,000	48,000	95,000	10,000	11,000	13,000	23,000	37,000	83,000
Total	**590,000**	**710,000**	**950,000**	**430,000**	**350,000**	**350,000**	**190,000**	**390,000**	**630,000**

[1] Aggregated basin total values rounded to two significant digits to reflect increased uncertainty at larger geographic scales
[2] Arkansas gaps include additional 13,500 AFY for Urban Counties replacement of nonrenewable groundwater supplies.
[3] Metro gaps include additional 20,850 AFY for South Metro replacement of nonrenewable groundwater supplies.

Colorado faces immediate M&I water supply needs. **Figure 5-3** illustrates the timing of the statewide M&I and SSI gap for the medium gap scenario. The statewide existing supply is 1,161,000 AFY and is assumed to remain constant through 2050, except for the replacement of nontributary groundwater in Douglas and El Paso counties. Under the medium gap scenario Colorado's immediate M&I water supply needs are met with the successful implementation of the IPPs. The associated yield of the IPPs increases steadily from 2010 through 2020, then at a higher rate of growth through 2030. Under the medium gap scenario, the IPPs are fully implemented by 2030 and yield about 350,000 AFY. Without the successful implementation of additional IPPs, increases in demand after 2030 are assumed to be gap, leading to a 2050 M&I gap of approximately 390,000 AFY for the medium gap scenario.

Note that while this plot does illustrate the temporal evolution of existing supplies, IPPs, and the gap, it is not intended to serve as a definitive timeline for the development of these parameters. A level of uncertainty remains for most components of this analysis; demand increases may come sooner or later than projected and IPPs may have more or less success than anticipated in these calculations. Thus, the figure functions as a representation of the interrelated nature of IPPs and the gap. At any given point in time, the sum of existing supplies, IPPs, and gap are equal to demands. The figure illustrates that the need for successful implementation of the IPPs is immediate. As long as the development of IPPs keeps pace with demands, the gap will be minimal. However, if demands continue to increase beyond the development of presently identified IPPs or if successful IPP yield development occurs at a lower rate, the gap will continue to grow in magnitude and will appear at an earlier point in time. It is also important to note the spatial variability of the M&I gap. Some areas of the state will have an M&I gap sooner than others. Plots illustrating the low and high gap scenario statewide and the low, medium, and high gap scenarios for all basins are included in Appendix J of the SWSI 2010 Report.

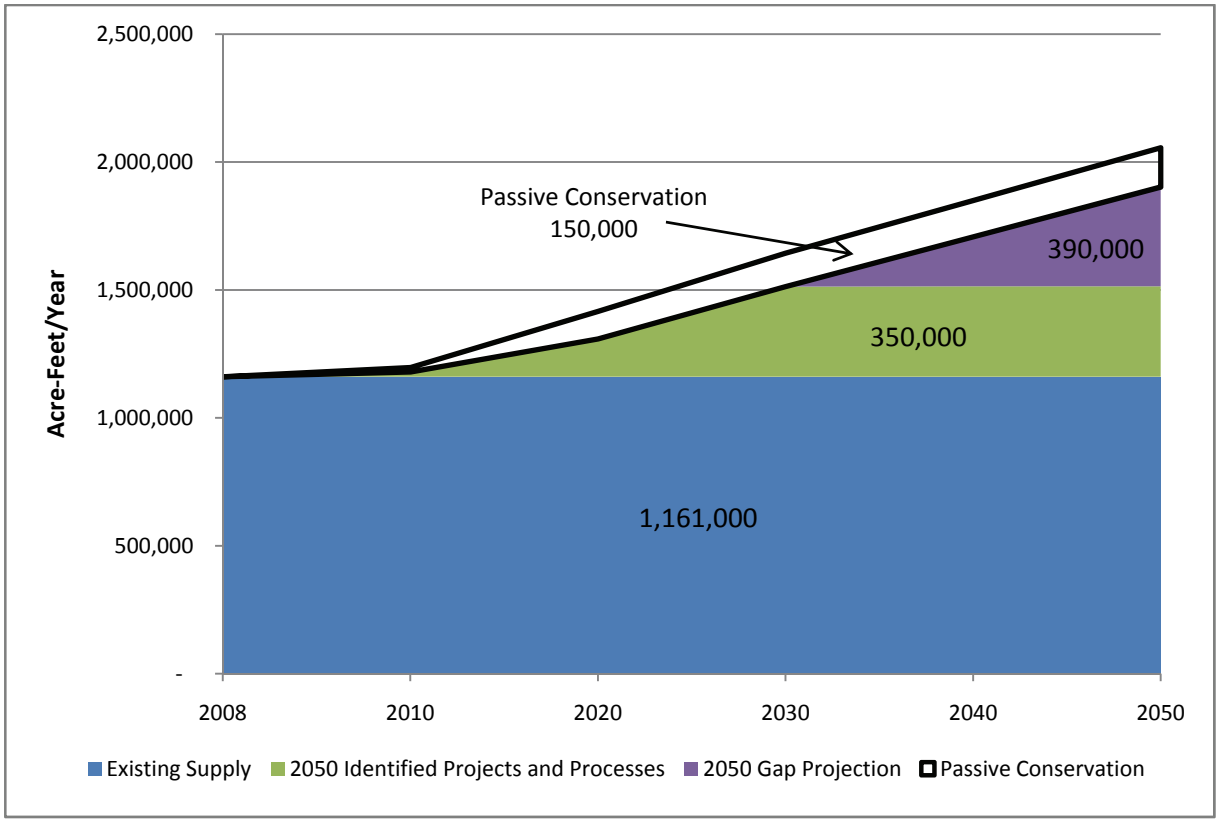


Figure 5-3 Statewide M&I and SSI Gap Summary Medium Scenario (IPPs at 70% Success Rate)

Figure 5-4 illustrates the relative percentages of 2050 net new water needs occupied by IPPs and the gap for each basin for the medium gap scenario. The pie chart shown on the map for each basin is scaled to represent the magnitude of the 2050 medium demand. IPP success rates are defined as shown for the "Alternative Portfolio" in Table 5-3; at the statewide level, the overall IPP success rate is approximately 70 percent for the medium gap scenario.

For the Arkansas, Colorado, Gunnison, North Platte, and Rio Grande Basins, IPPs (illustrated as the blue part of the pie charts) meet 50 percent or more of the 2050 medium demand as a result of 90 percent IPP yield success rate in these basins. Southwest Basin IPPs also exceed 50 percent of 2050 medium demand despite a success rate of only 75 percent. The Yampa-White Basin has a 90 percent IPP yield success rate for the medium gap scenario, but the high yet uncertain demands associated with future SSI uses result in a very large water supply gap (78 percent, illustrated in red) in 2050. Future M&I and SSI water supply gaps for the South Platte and Metro Basins exceed 50 percent due to significantly reduced IPP yield success rates, at 60 percent. For these basins in particular, and also in the Arkansas Basin, a significant reduction in the success of yield development from planned projects and processes identified by Front Range water providers will likely lead to much greater increases in agricultural transfers as a means to meet future demands (see Section 4).

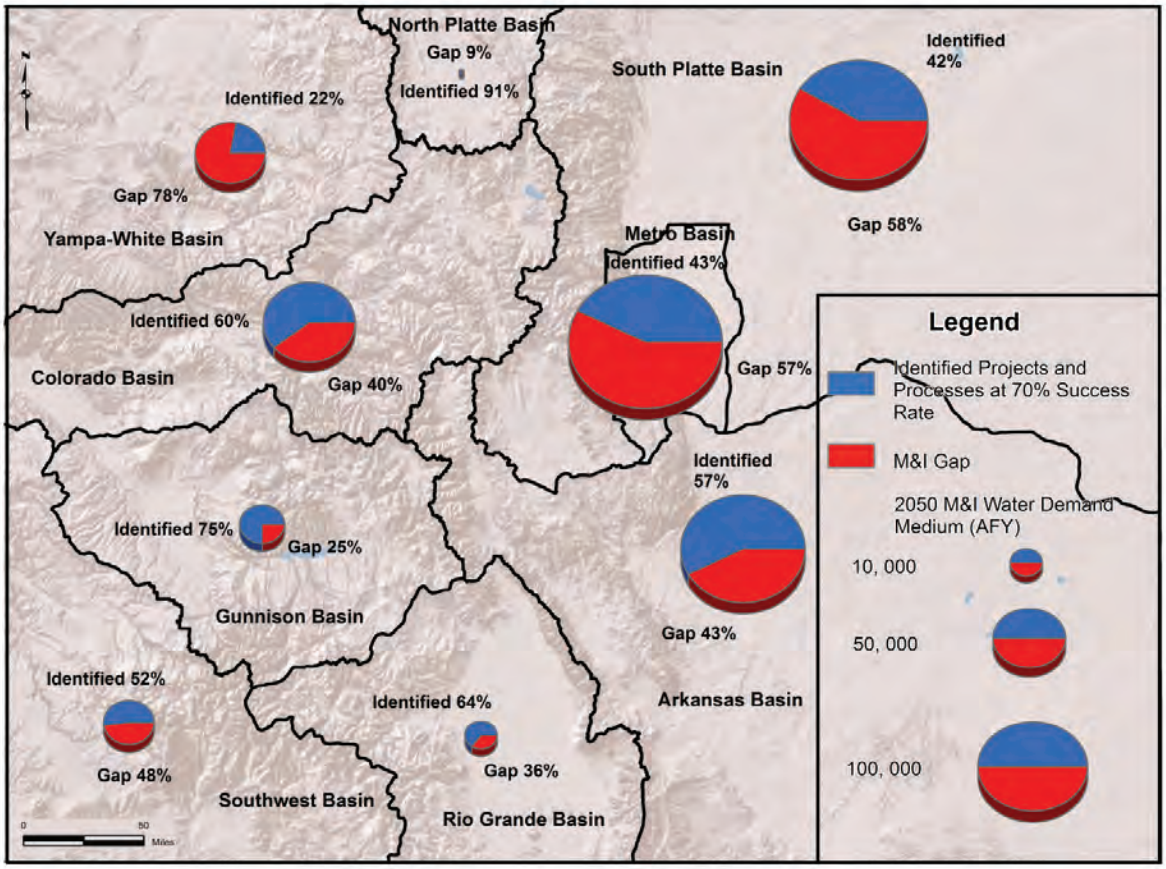


Figure 5-4 2050 M&I and SSI Gap Analysis – Medium Gap Scenario

It must be clearly understood that the low, medium, and high gap scenarios evaluated in this study are based on assumptions about the implementation of IPPs made for the purposes of conducting the analyses. In reality, both demand growth and the development of IPPs will be impacted by various factors that will likely cause them to fall somewhere between the low and high values highlighted above. However, it remains highly probable that there will be some level of gap regardless of the level of IPPs development, and a portfolio of solutions will be needed to meet Colorado's future M&I water needs.

5.5.3.2 Southwest Basin

Table 5-6 and **Figures 5-5 through 5-7** provides a summary of increased M&I and SSI demands, the amount of that increase provided by the IPPs, and the resulting gaps for each county in the Southwest Basin. The existing supply for the Southwest Basin is approximately 24,000 AFY and is anticipated to remain constant through the planning period ending in 2050. All IPPs in the basin are developed through growth into existing supplies or regional in-basin projects. After accounting for varying rates of IPP development success, the estimated gap values for the Southwest Basin are as follows:

- Low gap (100 percent IPP success) = 5,100 AFY
- Medium gap (75 percent IPP success) = 12,000 AFY
- High gap (75 percent IPP success) = 16,000 AFY

Table 5-6 Southwest Basin M&I and SSI Gaps in 2050

Region or County	Increase in M&I and SSI Demand (AFY)			Estimated Yield of Identified Projects and Processes (AFY)			Estimated Remaining M&I and SSI Gap after Identified Projects and Processes (AFY)		
				100% IPP Success Rate	Alternative IPP Success Rate (75%)	Status Quo IPP Success Rate (75%)	Gap at 100% IPP Success Rate	Gap at Alternative IPP Success Rate (75%)	Gap at Status Quo IPP Success Rate (75%)
	Low	Med	High	Low	Med	High	Low	Med	High
Archuleta County	3,500	4,000	4,600	3,300	2,800	3,300	200	1,100	1,300
Dolores County	300	400	500	300	300	300	20	100	100
La Plata County	6,800	8,600	10,800	6,400	6,100	7,700	300	2,500	3,100
Montezuma County	3,000	3,500	4,200	2,800	2,500	3,000	100	1,000	1,200
Montrose County	3,000	3,900	5,000	700	500	500	2,300	3,400	4,500
San Juan County	30	90	100	30	70	100	—	20	40
San Miguel County	2,900	4,300	6,000	700	500	500	2,200	3,800	5,500
Total[1]	**20,000**	**25,000**	**31,000**	**14,000**	**13,000**	**15,000**	**5,100**	**12,000**	**16,000**

[1] Aggregated basin total values rounded to two significant digits to reflect increased uncertainty at larger geographic scales.

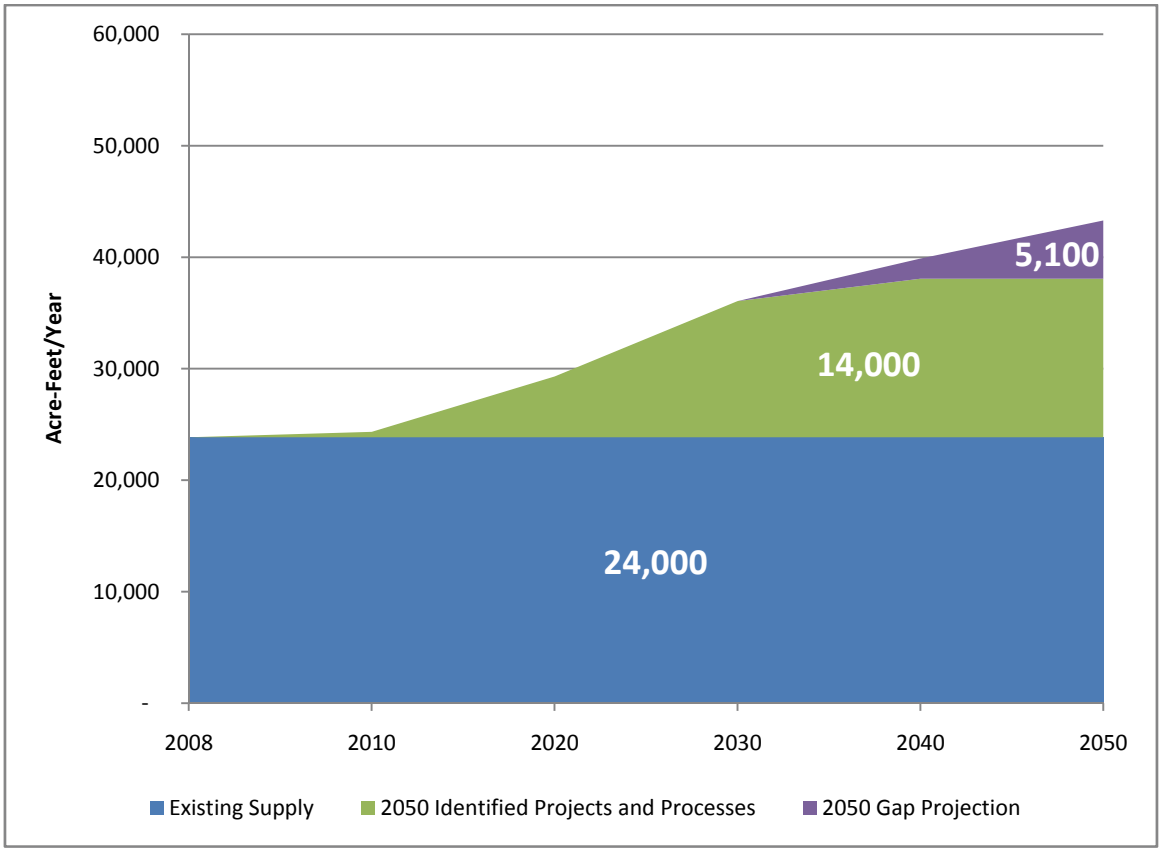


Figure 5-5 Southwest Basin M&I and SSI Gap Summary Low Scenario (IPPs at 100% Success Rate)

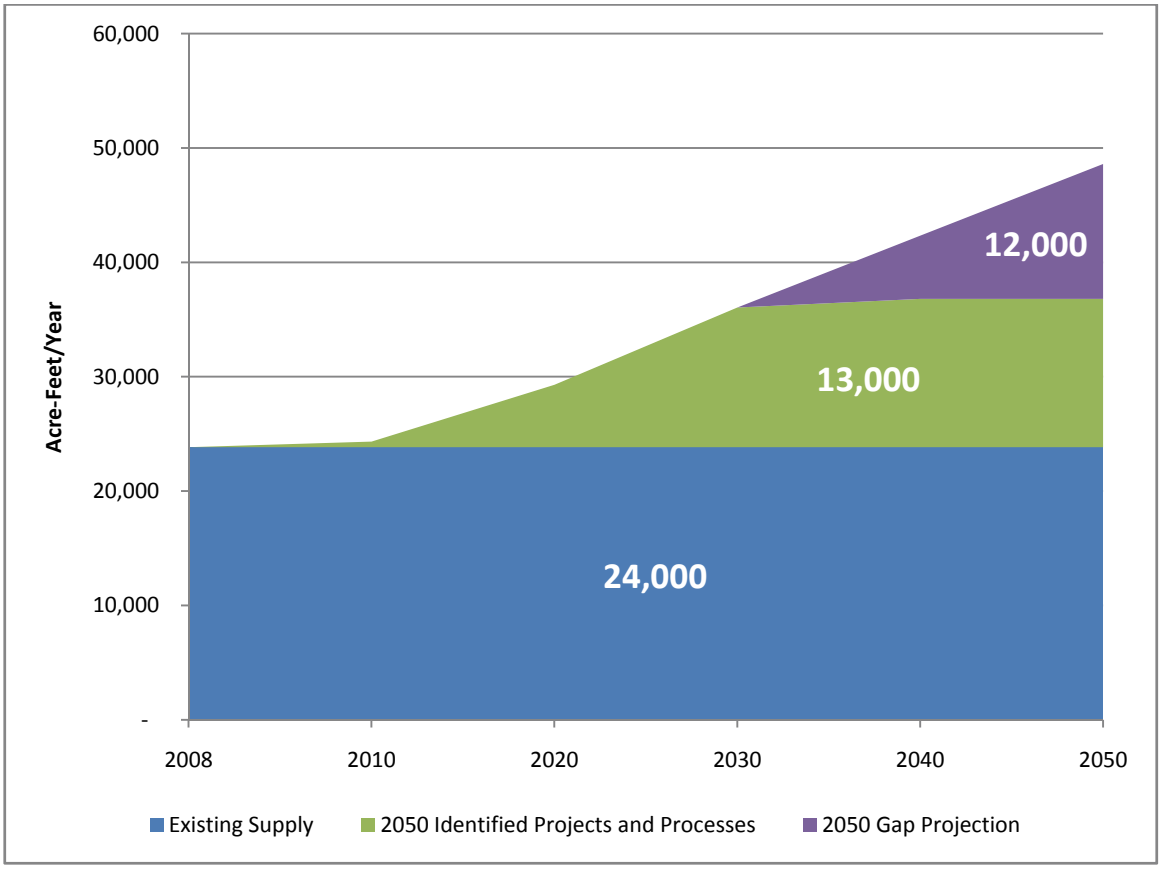


Figure 5-6 Southwest Basin M&I and SSI Gap Summary Medium Scenario (IPPs at 75% Success Rate)

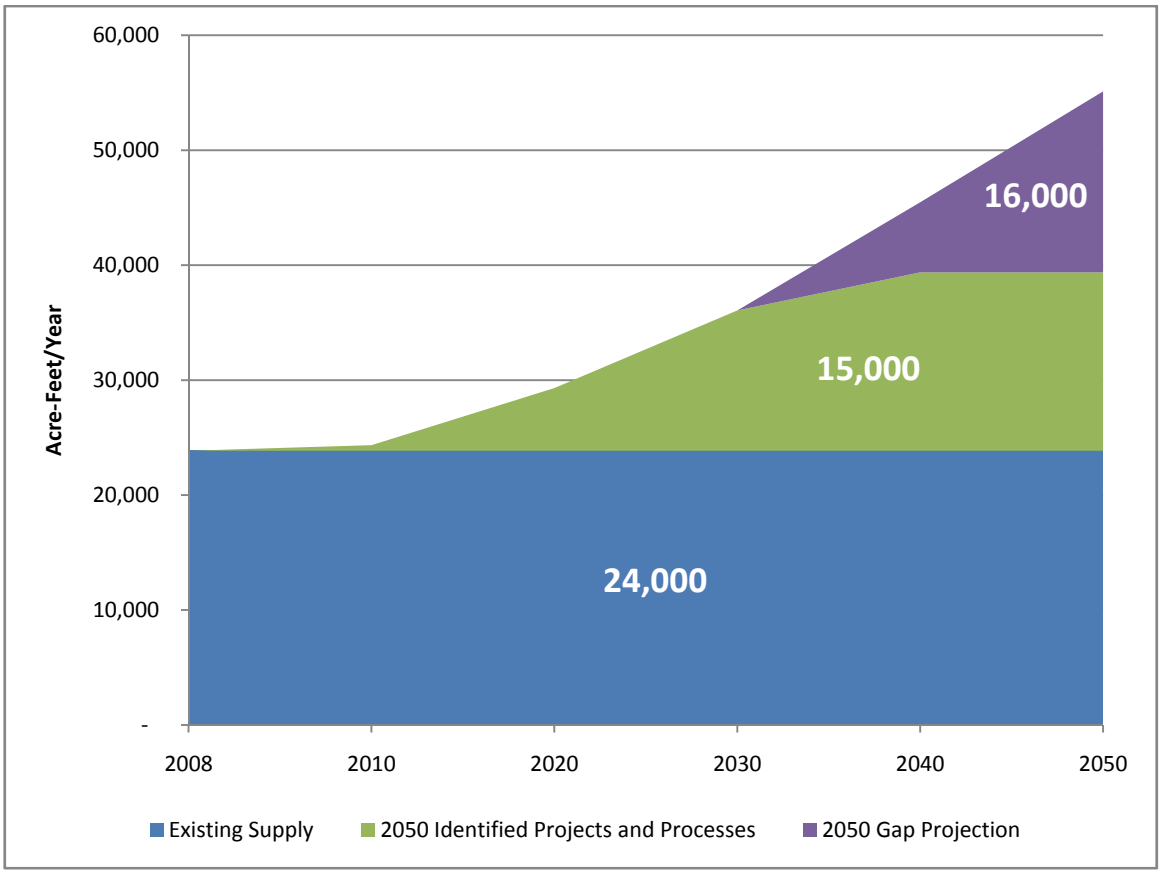


Figure 5-7 Southwest Basin M&I and SSI Gap Summary High Scenario (IPPs at 75% Success Rate)

Section 6
Southwest Basin Water Availability

6.1 Water Availability Overview

Justice Gregory J. Hobbs of the Colorado Supreme Court has stated "The 21st Century is the era of limits made applicable to water decisionmaking. Due to natural western water scarcity, we are no longer developing a resource. Instead, we are learning how to share a developed resource." These words of wisdom should serve as guidance for all parties interested in Colorado water. The amount of water available for use within the state is finite.

The Statewide Water Supply Initiative (SWSI) 2010 analyzes Colorado's water availability based on recent work by the Colorado Water Conservation Board (CWCB) and the basin roundtables. SWSI 2010 finds that unappropriated water in the South Platte, Arkansas, and Rio Grande Basins is extremely limited, and reliance on nonrenewable, nontributary groundwater as a permanent water supply creates reliability and sustainability concerns, particularly along the Front Range. It also finds that Colorado River compact entitlements are not fully utilized and that water in the Colorado River system may be available to meet future needs. However, in order to develop new water supplies in the Colorado River system, projects and methods will be needed to manage the risks of additional development.

6.2 Methodology to Evaluate Surface Water Supply Availability

This section provides a summary of statewide surface water and groundwater availability. This update summarizes work to-date completed by the CWCB and the basin roundtables through the development of their basinwide water needs assessments. A comprehensive analysis of water availability for each basin was completed in SWSI 1 and is only partially updated. Future SWSI updates will provide updated water availability analysis in each basin based on additional Colorado Decision Support System (CDSS) modeling tools.

In addition to the analysis of water availability in SWSI 1, the SWSI 2010 update specifically includes an updated analysis for the basins within the Colorado River system as part of the CWCB's Colorado River Water Availability Study (CRWAS), which is summarized here. Updated information is also included for the South Platte Basin based on results of analysis directly associated with the South Platte Basin Roundtable Task Order.

In another effort related to water availability, statewide drought planning has occurred through the preparation and implementation of the Colorado Drought Mitigation and Response Plan (DMRP). In 2010, the CWCB conducted a comprehensive revision of the DMRP. The updated plan provides a blueprint for how the state will monitor, mitigate, and respond to drought.

The potential effects of climate change are quantified in the CRWAS, and provided at various locations throughout the Colorado River basins. Reliable climate change analyses are not yet available for the other basins and are not included in this update.

6.3 Water Availability

The purpose of this section is to summarize the available data and studies indicating the level of water availability in each basin and the location of opportunities for further new water supply development.

Table 6-1 below summarizes the findings from SWSI 1 related to water supply development potential under interstate compacts and U.S. Supreme Court decrees. Colorado has entered into and is affected by nine interstate compacts, two equitable apportionment decrees, and one international treaty.

Table 6-1 Major Interstate Compacts, Decrees, and Endangered Species Programs by Basin

River Basin	Flows Legally Available under Compact or Decrees for Future Development	Interstate Compacts, Equitable Apportionment Decrees and Endangered Species Recovery Programs	Year of Compact or Decree
Arkansas		Arkansas River Compact	1948
		Kansas vs. Colorado	1995
Colorado	✓	Colorado River Compact	1922
		Upper Colorado River Basin Compact	1948
		Upper Colorado River Endangered Fish Recovery Program	—
		Rio Grande, Colorado, and Tijuana Treaty between United States and Mexico	1945
Dolores/San Juan/ San Miguel (Southwest)	✓	Colorado River Compact	1922
		La Plata River Compact	1922
		Upper Colorado River Basin Compact	1948
		Animas-La Plata Project Compact	1969
		San Juan River Basin Recovery Implementation Program	—
		Rio Grande, Colorado, and Tijuana Treaty between United States and Mexico	1945
Gunnison	✓	Colorado River Compact	1922
		Aspinall Unit Operations	—
		Upper Colorado River Basin Compact	1948
		Upper Colorado River Endangered Fish Recovery Program	—
		Rio Grande, Colorado, and Tijuana Treaty between United States and Mexico	1945
North Platte/ Laramie	✓	Nebraska vs. Wyoming	1945
		Wyoming vs. Colorado	1957
		Platte River Recovery Implementation Program	—

Table 6-1 Major Interstate Compacts, Decrees, and Endangered Species Programs by Basin, continued

River Basin	Flows Legally Available under Compact or Decrees for Future Development	Interstate Compacts, Equitable Apportionment Decrees and Endangered Species Recovery Programs	Year of Compact or Decree
Rio Grande		Rio Grande River Compact	1938
		Costilla Creek Compact (amended)	1963
		Rio Grande, Colorado, and Tijuana Treaty between United States and Mexico	1945
South Platte	✓	South Platte River Compact	1923
		Republican River Compact	1942
		Platte River Recovery Implementation Program	—
Yampa/White/Green	✓	Colorado River Compact	1922
		Upper Colorado River Basin Compact and Yampa River Portion	1948
		Upper Colorado River Endangered Fish Recovery Program	—
		Rio Grande, Colorado, and Tijuana Treaty between United States and Mexico	1945

These agreements establish how water is apportioned between Colorado and downstream states as well as between the United States and Mexico. Each agreement has a significant effect on the development of future water supplies in Colorado. Additional information about the compacts is provided in Section 1.4.

SWSI 1 found there are no reliable additional water supplies that can be developed in the Arkansas and Rio Grande Basins, except in very wet years. The North Platte Basin has the ability to increase both irrigated acres and some additional consumptive uses, consistent with the North Platte Decrees. The South Platte Basin has water that is legally and physically available for development in wet years, although unappropriated water is extremely limited.

Compact entitlements in the Colorado River Basins are not fully utilized and those basins (Colorado, Gunnison, Southwest, and Yampa-White) have water supplies that are legally and physically available for development given current patterns of water use.

CWCB's CRWAS analyzed water availability in the Colorado River Basins (Colorado, Gunnison, Southwest, Yampa, and White River Basins). Upon completion of the CRWAS Phase 1 study, an addendum to the SWSI 2010 report will be developed summarizing the results of the study for these basins.

The CRWAS Phase 1 Study is comprised of four interrelated components or steps:

1. Update and expand the state's water availability computer simulation tools based on input solicited from water users (consumptive and nonconsumptive) through the basin roundtables, the Interbasin Compact Committee, and other public forums.

2. Assess potential water availability using records of historical water supplies.

3. Use scientific analyses and datasets previously developed by others to estimate streamflows over the past several hundred years, which was done using annual growth of trees (especially as an indicator of transitions between wet and dry years and as an indicator of the potential lengths of dry and wet periods). This extended natural flow hydrology was used to assess remaining water availability as if today's water uses existed throughout the extended period.

4. Superimpose the effects of potential changes in precipitation and temperature from previously developed global climate models (GCMs, also known as General Circulation Models) to reflect hydrologic conditions that may exist in 2040 and 2070 if the greenhouse gas emissions occur as postulated in the various scenarios ("storylines") simulated by the GCMs.

CRWAS compared future supply and current demand to determine whether there is enough water to meet either current demands based on the "supply-and-demand equation:"

Future Supply – Current Demand = Water Available for Future Consumptive Use

CRWAS Phase 1 held the demand side of the water availability equation constant at current levels (adjusted for changes in irrigation water requirements) and considered three different conditions for the water supply side of the equation as follows.

6.3.1 Historical Hydrology

Traditionally, water supply agencies use recorded historical information on water supply as an indication of likely future conditions; the premise being that history tends to repeat itself. Many agencies in Colorado used streamflow records dating back to at least 1950 so they could consider the impacts of the 1950s multi-year drought on the reliability of their systems. CWCB developed natural flow hydrology back to 1909 in the Colorado River Basin in Colorado, but this required filling missing records or records for discontinued stream and weather gages with scientifically estimated values. For the purposes of CRWAS, a 56-year study period is used to represent historical hydrology (1950 through 2005). This period includes both very wet and very dry years, contains the most reliable historical data upon which to base comparisons of the effects of climate change, and uses information that Colorado River stakeholders can relate to through their own experiences. Historical hydrologic conditions are characterized by the record of natural flows at hundreds of points throughout the basin; basin-scale record of precipitation, temperature, and wind disaggregated to thousands of cells in a rectangular grid covering the entire Colorado River Basin; and a record of local weather recorded at 54 weather stations within Colorado.

6.3.2 Paleohydrology

This approach extends historical records using information from more than 1,200 years of previously published tree-ring records. The CRWAS reviews alternative methods for correlating annual tree growth with streamflow and concludes that a "re-sequencing" approach best serves the needs of the study. This approach focuses on the probabilities of transitioning back and forth between wet and dry years. The lengths of the wet periods and dry periods have significant effects on water availability for future use, especially when combined with the effects of climate change. Development of 100 equally-probable 56-year-long flow traces test the effects of more severe droughts on water supply and management in Colorado and on the state's amount of water available for future consumptive use (CU) as potentially constrained by the compacts under various assumptions.

6.3.3 Climate-Adjusted Hydrology

This approach assesses the magnitude of future water supply availability considering the effects of climate change scenarios. CRWAS reviews information from the climate projections that are available for the Colorado River Basin. Working with the Front Range Climate Change Vulnerability Study, CRWAS identified five projections for each of the 2040 and 2070 planning horizons (10 total). CWCB utilizes the state's Climate Change Technical Advisory Group, comprised of many federal, state, private scientists, water resource engineers, and managers to conduct a technical peer review of the approach and methods used in handling GCM data.

The Variable Infiltration Capacity model is used to translate changes in temperature and precipitation from the selected GCMs to changes in natural flows throughout the river basin. In Colorado, the potential climate-induced changes have been introduced into two models comprising the state's CDSS. First, "StateCU" is used to estimate CU of water by crops resulting from the generated higher temperatures and longer growing seasons. Second, "StateMod" is used to simulate the water management (for example, diversions, return flows, reservoir operations, and instream flows) that would result from changes in natural flows. Input of the basin roundtables during Phase I significantly enhanced the river operations of the models in the CDSS.

The CWCB is currently in the process of updating CRWAS based on comments received on the draft report. After Phase I of the study is completed, CWCB will issue an addendum to the SWSI 2010 report that summarizes the results of the study.

THIS PAGE INTENTIONALLY LEFT BLANK

Section 7
Southwest Basin Recommendations

7.1 Implementation and Recommendations Overview

The challenge for the Southwest Basin Roundtable going forward is to build upon the relationships, the information, and the projects and processes that have resulted from the experience of the Southwest Basin Roundtable over its first 5+ years. An important step forward has been the convergence of the development of consumptive and nonconsumptive identified projects and processes (IPPs); opportunities provided by the Water Supply Reserve Account (WSRA) to make decisions in support of IPPs; and the growing level of engagement of the roundtable with the statewide programs, studies, and portfolio work originating from the Colorado Water Conservation Board (CWCB), the Interbasin Compact Committee (IBCC), and direct interaction with other basin roundtables.

Looking back at IPPs recommended for WSRA funding provides a foundation for thinking about priorities for the future. A series of priorities emerges from these decisions that are informative in shaping a future water supply portfolio for the Southwest Basin. These priorities are outlined below and related to past WSRA funding recommendations, which are summarized at the end of this section.

1. **The Southwest Basin Roundtable will work towards the continued integration of consumptive and nonconsumptive needs and IPPs.** As a result of the Statewide Water Supply Initiative (SWSI) 2010, the Southwest Basin has an up-to-date inventory of consumptive and nonconsumptive IPPs, which are integrated into a geo-database that can be queried by county and by Hydrologic Unit Code (HUC) 8 Unit. These tools will be brought into play as the roundtable considers future projects and priorities by exploring opportunities that contribute to sustainable consumptive and nonconsumptive benefits.

2. **The Southwest Basin Roundtable will continue to address the in-basin municipal and industrial (M&I) gap with strategies that do not diminish the agricultural productivity of the basin.** Several of the WSRA funded projects summarized at the end of this section meet this intent by expanding or bringing into full use existing storage and increased efficiency of delivery systems to make additional increments of M&I water available without drying up agriculture. Examples include: Jackson Gulch Reservoir Expansion, Florida Mesa Canal Seepage Reduction Program, Montezuma Valley Irrigation Company (MVIC)-Summit Irrigation Company Feasibility Study, as well as Totten and Groundhog Reservoir Bathymetric Surveys. Other funded projects were intended to make water in existing storage facilities available to underserved areas. Examples include Goodman Point Pipeline and Aspen Springs Filling Station. Other projects provided planning and permitting support to small entities whose water supply and fiscal limitations threaten a decline in capacity to serve their customers. Examples include Town of Sawpit Distribution System, Happy Scenes Water System Upgrade, Town of Norwood Raw Water Supply, and Town of Rico Well and Pipeline Project.

3. **The Southwest Basin Roundtable will continue to address the M&I gap by supporting new supplies and new suppliers.** Part of the Southwest Basin's M&I gap can be addressed by growing into existing storage allocated to M&I such as Lake Nighthorse and McPhee Reservoir. Dry Gulch Reservoir in Archuleta County involves building new storage to meet the long-term M&I needs of a growing population. With the help of WSRA funds new water providing entities have been established and planning and development has been supported for distributing M&I water to rapidly growing areas that have relied on depleting groundwater supplies. Examples include the La Plata-Archuleta Water District and the La Plata West Rural Water Supply System.

4. **The Southwest Basin Roundtable will continue to support nonconsumptive IPPs that involve collaborative efforts arising at the sub-basin level.** Several examples are presented as showcase IPPs in Section 4 including the Dolores River Dialogue, the Dolores River Restoration Partnership, the River Protection Workgroup, the Animas Stakeholders Group, and the San Miguel Instream Flow Process. Other examples include the Animas Watershed Assessment, Conserving Farmland Partnership, Mancos River Diversion Improvements, Lake Nighthorse Recreation Master Plan, and the Lower Blanco Restoration.

5. **The Southwest Basin Roundtable will continue to address compact compliance issues.** Most of the rivers in the basin flow south out of state into the San Juan River, or north and west joining the Colorado River in Utah. Meeting compact requirements while putting water to beneficial use in Colorado has been the focus of IPPs such as Long Hollow Reservoir supported by the La Plata and Cherry Creek diversion improvement project. The Lower Blanco Restoration project was undertaken to mitigate depletions resulting from an out of state transbasin diversion by restoring and adapting the Lower Blanco River to the resulting reduction in flows.

6. **The Southwest Basin Roundtable will continue to engage state level and Upper Colorado River system perspectives and processes.** Through interaction with CWCB staff and reports from basin IBCC representatives, the roundtable has been exposed to issues that transcend the primary focus, which has been within the basin. The roundtable has taken an active interest in the Colorado River Water Supply Availability Study, and other studies that have gone into the SWSI 2010 update as well as the visioning and recommendations coming out of the IBCC process. As the roundtable gains confidence in dealing with in-basin issues, more emphasis will be placed on the interface between the basin and the state as a whole.

7. **The Southwest Basin Roundtable will develop both basin-level and statewide portfolios and strategies.** Having established complete lists of consumptive and nonconsumptive IPPs, the roundtable will begin to organize IPPs into a portfolio of strategies to address remaining water supply gaps within the basin. The roundtable will also participate in developing alternative statewide portfolios.

The remainder of this section is a review of Southwest Basin IPPs that have received WSRA funding between March 2007 and March 2011. Beginning in July of 2011, updates on these projects will become a regular roundtable agenda item. Lessons learned from WSRA funded projects coupled with the updated list of IPPs will provide the context for reviewing future applications and strategically addressing water supply gaps. These considerations will need to be increasingly focused in light of anticipated limits in the availability of funds.

7.2 Water Supply Reserve Account Grant Summaries

Dry Gulch /San Juan Reservoir Land Acquisition

APPLICANT: San Juan Water Conservancy District

APPROVED: March 2007

STATUS: In Progress

WSRA FUNDS: $1,100,000 ($1,000,000 - Statewide Account; $100,000 - Basin Account)

MATCHING FUNDS: $8,100,000

DESCRIPTION:

This project seeks WSRA funds to assist the San Juan Water Conservancy District with the initial purchase of the Phase I land acquisition for the San Juan/Dry Gulch Reservoir. The land is necessary for reservoir development to provide an additional 12,000 to 35,000 acre-feet (AF) of storage capacity to accommodate water needs related to growth and drought in the district. Negotiations for the purchase of the property have been ongoing for over 2 years. Project partners include the Town of Pagosa Springs and Archuleta County. WSRA funding allows the district to begin purchase of the property for the reservoir in 2007. Due to rapid growth rates within the district, projected increases in demand necessitate reservoir completion by 2015. However, depending on construction timing, economic conditions, water demands, and costs the reservoir may likely be conducted in two phases with 12,000 AF initially followed by the remaining 23,000 AF in Phase II.

Goodman Point Water Association Pipeline Environmental Assessment

APPLICANT: Goodman Point Water Association

APPROVED: March 2007

STATUS: Complete

WSRA FUNDS: $7,700 (Basin Account)

MATCHING FUNDS: Approximately $23,000

DESCRIPTION:

This project involves the development of an Environmental Report and a Preliminary Engineering Report for the extension of two of Montezuma Water Company's domestic lines into the Goodman Point area. It encompasses approximately 10 miles of water line and covers approximately 12-square-miles in Montezuma County about 10 miles northwest of Cortez. The project will provide the capacity to serve about 100 taps and include a lift pump for the elevation gain along with a water storage tank. The reports are necessary to negate damage to the environmental resources and cultural resources, develop a preliminary "blueprint" of the project engineering aspects, fulfill U.S. Department of Agriculture-Rural Development requirements to qualify for grant/loan funding, and will be a positive factor in future requests for construction funding from the Southwest Roundtable and other potential funding sources. This project will bring domestic water to Goodman Point where residents currently haul water. It will be a challenge to obtain sufficient funds for construction to make the project affordable to the average household of Goodman Point.

Goodman Point Water Association Phase 2

APPLICANT: Goodman Point Water Association

APPROVED: September 2007

STATUS: In Progress

WSRA FUNDS: $260,000 ($20,000 - Basin Account; $240,000 - Statewide Account)

MATCHING FUNDS: $1,772,000

DESCRIPTION:
This application is for the domestic water construction project contemplated by the Goodman Point Water Association (GPWA) Pipeline Environmental Assessment previously funded by the WSRA in the amount of $7,700. The project involves the extension of two of the Montezuma Water Company's domestic lines into the Goodman Point area, encompassing approximately 10 miles of water line and covering approximately 12 square miles in Montezuma County about 10 miles northwest of Cortez. The project will provide the capacity to serve about 100 taps and include a lift pump for the elevation gain along with a water storage tank. Due to the large cost of the project, small number of residents, and low median household income, the success of the project depends largely on grant funding. The GPWA has also received a U.S. Department of Agriculture Rural Development grant of $1,522,580 and loan of $250,000. Even with all funding secured GPWA members are responsible for $13,275 per tap. The project will significantly increase the health and safety of the Goodman Point residents by providing a stable water supply, reducing the contamination risks inherent in water hauling, and providing much greater fire protection.

Jackson Gulch Reservoir Expansion Project

APPLICANT: Mancos Water Conservancy District

APPROVED: July 2007

STATUS: Complete

WSRA FUNDS: $61,735 (Basin Account)

MATCHING FUNDS: $18,000

DESCRIPTION:
This project consists of a feasibility level study by the U.S. Bureau of Reclamation (BOR) for increasing the storage capacity of the Jackson Gulch Reservoir by raising the dam a total of 5 feet. The existing reservoir is an off-stream storage facility at 7,830 feet mean sea level with a capacity of 10,000 AF behind a rock-faced earthen dam with almost 5 miles of inlet/outlet canals. The study defines structural needs for the dam and related features. The study also determines the additional water that can be stored, construction cost estimates, and impacts that must be mitigated. Water stored in the Jackson Gulch Expansion Project will be available for multiple uses, including irrigation, wildlife, M&I, mitigation, environmental, hydropower, recreation, and fire protection. Due to drought and a growing population in the valley additional stored water is in high demand. This project has received broad support from other entities in the valley.

Bauer Lake Water Company Dam Outlet Structure Upgrade

APPLICANT: Bauer Lake Water Company

APPROVED: March 2008

STATUS: In Progress

WSRA FUNDS: $40,000 (Basin Account)

MATCHING FUNDS: $70,000

DESCRIPTION:
The Bauer Lake Water Company is a small reservoir and irrigation company with 24 shareholders. The proposed project involves fixing the old corrugated outlet pipe at Bauer Lake (capacity of 1,532 AF). The new stronger liner would allow the pipe to be pressurized to full lake head pressure (not currently possible) allowing members at the top of the pipe to reliably receive water. The project also includes improvements to the measurement and discharge controls of the structure. The current structure does not allow for accurate deliveries resulting in either failure to deliver or waste overflows down the creek along with potential safety issues. The new self regulating system would eliminate overflow waste (estimated at roughly 20 percent).

La Plata West Rural Water Supply System

APPLICANT: La Plata West Water Authority

APPROVED: March 2008

STATUS: Complete

WSRA FUNDS: $1,100,000 ($100,000 - Basin Account; $1,000,000 - Statewide Account)

MATCHING FUNDS: $510,000

DESCRIPTION:
The La Plata West Water Authority (LPWWA) is managing the design and construction of a critically needed rural domestic water system to serve residents in southwestern La Plata County, and potentially northern San Juan County, New Mexico, and the Ute Indian Tribes. The LPWWA was formed in November 2007 by the Animas La Plata Water Conservancy District and the La Plata Water Conservancy District. The LPWWA is designing a practical and economically viable rural water supply system that will integrate the interests of several entities in the region and provide reliable domestic supply utilizing allocated Animas-La Plata water. Funding from this grant will be used for engineering, permitting, planning, and construction costs for an intake structure in Lake Nighthorse that will eventually serve the water supply system. The growth and development of the southwestern La Plata County is limited by the lack of a reliable water supply, poor quality of groundwater, and a lack of water delivery systems. The proposed water supply will be the Animas La Plata Reservoir via 700 AF purchased from the designated depletions of the Animas La Plata Water Conservancy District. Other potentially invested parties with Animas La Plata water and could also use the intake structure to access their allocated water.

Town of Sawpit Water Distribution Improvement Project

APPLICANT: Town of Sawpit

APPROVED: March 2008

STATUS: Complete

WSRA FUNDS: $25,000 (Basin Account)

MATCHING FUNDS: $6,700

DESCRIPTION:
The Town of Sawpit is pursuing WSRA funds for surveying and engineering to replace its aging domestic water distribution lines. Sawpit is a small town located in San Miguel County, about 10 miles west of the Town of Telluride. Sawpit's water distribution system is 100 years old; as such, water pipes are rusty and prone to leaks. Maintenance on the distribution lines is an issue as lines are not mapped and many of the water mains are located on private property. Although current water quality is in compliance with state standards, water quality and quantity will likely be an issue in the near future as rust induced line leaks increase the likelihood of water quality degradation and supply interruption. The town estimates that they have between 5,000 and 10,000 feet of distribution line that needs to be replaced. The town will work with Buckhorn Geotech, Inc. to complete a survey of existing water lines, design improvements, determine cost estimates, prepare preliminary and final design drawings, and bid documents for the project.

MVIC – Summit Irrigation Company Feasibility Study

APPLICANT: Summit Reservoir and Irrigation Company

APPROVED: September 2008

STATUS: In Progress

WSRA FUNDS: $39,300 (Basin Account)

MATCHING FUNDS: None

DESCRIPTION:
This project Phase 1 of a technical and legal review of the potential for combining the operations of two private irrigation companies, the MVIC and the Summit Reservoir and Irrigation Company. It will analyze the benefits and drawbacks of the merger based on water rights and water planning. It will also provide a platform for shareholders in both companies to evaluate if the concept of merger warrants additional study. This task will include an engineering review of historic diversions and irrigable acreage to determine system efficiency and changing patterns. Interviews with both companies' shareholders will be performed to identify concerns. Results may identify benefits and/or liabilities from a merger or acquisition. It may also identify potential for changes in the decrees that could be used to improve system operations. An engineering report will be produced that summarizes the findings. The resulting review will give a recommendation on a potential merger or acquisition.

Happy Scenes Water System Upgrade

APPLICANT: Happy Scenes Water System Number 1

APPROVED: November 2008

STATUS: Complete

WSRA FUNDS: $50,000 (Basin Account)

MATCHING FUNDS: $87,100

DESCRIPTION:
The Happy Scenes Water System serves potable water to the Happy Scenes Subdivision, located north of Vallecito Reservoir, in La Plata County, Colorado. The system serves 60 taps and an estimated population of 160 people. Currently, the system's water supply consists of two springs that flow into separate collection boxes and pump houses. Historically, the systems were operated independently but were physically tied together to provide redundancy for repairs. Recently, however, the Colorado Department of Public Health and Environment (CDPHE) officially recognized it as one system, since the sources can be jointly used. As one system, the population is great enough to classify the system as a Public Water System, with new criteria for water quality testing and treatment. The treatment and testing of this water will be cost prohibitive. Therefore, the system has drilled a new well, and is in the process of designing a small treatment system, with chlorination as the primary treatment. The overall project consists of designing the system (per CDPHE regulations), and purchase and installation of equipment. The WSRA funds will help with Task 5 consisting of treatment and pump equipment installation.

Water System Master Planning

APPLICANT: La Plata Archuleta Water District

APPROVED: November 2008

STATUS: Complete

WSRA FUNDS: $100,000 (Basin Account)

MATCHING FUNDS: None

DESCRIPTION:
The La Plata Archuleta Water District seeks WSRA funds to develop a Water System Master Plan. The district was formed in August 2008 to finance, construct, operate, and maintain a public water system for a 400-square-mile service area in La Plata and Archuleta Counties. The district will eventually serve approximately 6,000 taps (residential and commercial) with 2,000 AF of water. Due to Tabor restrictions on mill levy elections such funds will not be potentially available to the district until the spring of 2010. The WSRA funds will help the district to begin the pre-construction work that will also provide information to the voters for a mill levy election in November of 2009. The proposed Master Plan will determine the best development plan for the water system that considers alternative water sources and treatment plant locations, alternative pipeline routes, updated financial plan, and construction staging. The plan will address the general order of facility development and the areas to receive water. The Master Plan will also include public involvement and as well as numerous board meetings.

Molas Lake Ditch Rehabilitation and Diversion Structures

APPLICANT: Town of Silverton

APPROVED: January 2009

STATUS: In Progress

WSRA FUNDS: $95,000 (Basin Account)

MATCHING FUNDS: Approximately $1,100,000

DESCRIPTION:
The improvements to the Molas Lake Ditch and diversion structures are part of a broader project to rehabilitate Molas Lake, which provides water storage to Silverton and other entities. The ditch and diversion improvements are required to meet federal and state requirements for the conveyance and measurement of water into and out of Molas Lake. The purpose of the project is to perfect an augmentation water supply for the Town of Silverton, while protecting and enhancing the recreational features of Molas Lake Park. Though not the subject of the current application the other components of the project are complete and include significant improvements to the Molas Lake Dam to increase water storage, meeting state requirements, campground enhancements and re-vegetation at the adjacent park, mitigation of wetlands, and filing for additional water storage rights for Molas Lake to include augmentation uses. Although permitting and engineering for the Molas Ditch is complete, the rise in construction costs, combined with unanticipated permitting and legal expenses has left the ditch and diversion improvements unfunded. Silverton is seeking funds to assist with the construction, inspections, and final permitting submittals of the Molas Lake Ditch rehabilitation and diversion structures.

Lower Blanco River Restoration Project

APPLICANT: Lower Blanco Property Owners Association

APPROVED: March 2009 (Basin Account); September 2009 (Statewide Account)

STATUS: Complete

WSRA FUNDS: $250,000 ($100,000 - Basin Account; $150,000 - Statewide Account)

MATCHING FUNDS: Over $284,000

DESCRIPTION:
The Lower Blanco River Restoration Project seeks to restore the environmental and recreational values that were severely impacted since a major portion of the river's historic flow was diverted in 1971 to New Mexico to meet Upper Colorado River Basin Compact obligations via the San Juan-Chama Diversion Project. In response to these impacts the CWCB procured an instream flow right of 21 cubic feet per second (cfs) on the Lower Blanco River. The CWCB also funded a river restoration demonstration project on the river in 1992. By 2002, the project had successfully restored approximately 2.75 miles of the river. Since then, 2.25 additional miles of river restoration have been accomplished with funding assistance from the Natural Resources Conservation Service (NRCS), the Southwest Conservation District, and the San Juan Water Conservancy Board. This project seeks to continue the successful restoration work on the remaining 4.0 miles of river by leveraging WSRA funds with NRCS funds, CWCB Fish and Wildlife Resources Fund, Archuleta County funds, and applicant contributions. The project will narrow the active channel and shape new point bars and deeper pools for improved aquatic habitat. Rock structures will be built to improve self-scouring pool forms, and to direct the flow of water into existing irrigation diversion headgates. Riparian vegetation plantings will enhance shade and terrestrial habitat conditions. Evaporation loss of water will be reduced, as will summer water temperatures. Terrestrial cover for wildlife will be improved, and the riparian area will provide better habitat for a variety of terrestrial and amphibian species, including the spotted leopard frog, a species of concern.

Ditch Loss, Hydropower, and Monitoring Improvement Program

APPLICANT: Florida Mesa Canal Companies (Florida Canal, Florida Farmers Ditch, Florida Enlargement Ditch, and the Florida Cooperative Ditch Company)

APPROVED: March 2009

STATUS: In Progress

WSRA FUNDS: $100,000 (Basin Account)

MATCHING FUNDS: Approximately $300,000

DESCRIPTION:
This project involves: ditch loss studies; the installation of gauging station telemetry, water measuring devices, and automated gates; and a hydropower feasibility study. The seepage loss studies determine locations of losses below the main inlet canal structures to identify and target high seepage areas for future lining and piping project prioritization and guidance. The ditch and canal companies seek to use the seepage studies to help prioritize lining projects identified in the Florida Water Conservancy District (FWCD) Water Conservation and Management Plan and BOR Study. The second task involves the installation of three water measuring devices, seven real-time telemetry sites, and three automated gates. The new equipment will reduce administrative waste, help identify areas with water losses, and assist with canal and ditch operations during changing water conditions. The third task involves a feasibility study to examine the development of hydropower resources for additional revenue generation to the companies.

Red Mesa Dam Incremental Damage Analysis and Emergency Action Plan

APPLICANT: Red Mesa Dam and Reservoir Company

APPROVED: May 2009

STATUS: In Progress

WSRA FUNDS: $29,000 (Basin Account)

MATCHING FUNDS: $3,000

DESCRIPTION:
The proposed activity consists of both structural (Incremental Damage Analysis [IDA]) and nonstructural (Emergency Action Plan [EAP]) analyses necessary for the continued safe operation of the applicant's Red Mesa Dam at the current fully-decreed storage capacity. The IDA is intended to identify the minimum Inflow Design Flood (IDF) required for sizing a spillway compliant with the "Rules and Regulations for Dam Safety and Dam Construction" issued by the Colorado State Engineer's Office (SEO). The existing spillway has been identified as hydrologically inadequate for a High Hazard dam. Revision and improvement of the Emergency Action Plan is also required by the SEO, as the existing plan is out of date and insufficient for a High Hazard dam. Due to similarities in the IDA and EAP inundation analyses and mapping processes, inclusion of EAP development within the proposed project will also result in overall cost savings to the company.

Park Ditch Improvements

APPLICANT: Park Ditch Company

APPROVED: July 2009

STATUS: Complete

WSRA FUNDS: $85,000 (Basin Account)

MATCHING FUNDS: $132,375

DESCRIPTION:
This project entails three critical improvements to the Park Ditch necessary to ensure a reliable water supply and delivery of full water rights. The improvements include: head gate replacement, repair and piping of the ditch through an area prone to landslides, and piping of the ditch through a section prone to blowouts. During sudden high flows the structure cannot adequately control the intake volume, which contributes to ditch failure in some areas, and lost water and irrigable land. In addition, the structure collects excessive debris that blocks flows and makes maintenance difficult and hazardous. A 500-foot section of the Park Ditch, located on a steep slope above U.S. Highway 160, is vulnerable to landslides. The landslide problem was exacerbated in the 1960s when Colorado Department of Transportation cut into the toe of the slope to widen the highway. The most recent slope failure occurred in the spring of 2008, blocking the ditch and affecting highway operations. A 690-foot section of the Park Ditch has a history of blowouts. In recent years, structures have been built below this section. Piping this section of the ditch eliminates the chances for a blowout event and thus protects the private structures below.

Domestic Water System Construction

APPLICANT: Town of Sawpit

APPROVED: July 2009

STATUS: Contracting

WSRA FUNDS: $25,000 (Basin Account)

MATCHING FUNDS: Approximately $325,000

DESCRIPTION:
The Town of Sawpit needs to replace its water distribution system and storage tank. The town previously received $25,000 from the Southwest Basin Roundtable for surveying and engineering for this project. Sawpit's current water distribution system was constructed in the 1940s without any regulatory oversight using steel pipe salvaged from nearby abandoned mines and mills. It was installed without proper trench preparation and compaction of bedding or backfill material. As a result of the system's inadequate construction and age the town has had increasing problems with line breaks and leakages, along with mounting risks of cross contamination. In addition, Sawpit's storage tank is in disrepair and inadequately sized for state requirements to allow sufficient chlorine contact and system reserve.

La Plata Archuleta Water District Permitting

APPLICANT: La Plata Archuleta Water District

APPROVED: September 2009

STATUS: In Progress

WSRA FUNDS: $400,000 (Statewide Account)

MATCHING FUNDS: None

DESCRIPTION:
The La Plata Archuleta Water District was formed in 2008 to finance, construct, operate, and maintain a public water distribution system for a 400-square-mile service area in La Plata and Archuleta Counties. The district's approved Service Plan includes 4,000 taps, or 9,720 people, by 2030. A previously approved Southwest Basin WSRA grant for $100,000 is being used to develop the Master Plan (Task 3 of pre-construction activities) in conjunction with grant funds from Southwestern Water Conservation District ($40,000) and CDPHE ($10,000). Following development and approval of the Master Plan the permitting required to construct the facilities must begin. Permitting is required to address environmental impacts, cultural resource impacts, water treatment plant design, La Plata County permits, and other issues. Permit applications will be based upon the master plan and designs, and will include numerous federal, state and local permits, such as a LPC Conceptual Development Plan Permits and consecutive Class II Construction Permits, U.S. Army Corps of Engineers 404 Permit (nationwide or individual permit yet to be determined), CDPHE Public Drinking Water permitting activities and others necessary to address environmental and cultural resource compliance.

Animas River Needs Assessment

APPLICANT: San Juan Resource Conservation and Development - Animas Watershed Project

APPROVED: September 2009

STATUS: In Progress

WSRA FUNDS: $57,000 (Basin Account)

MATCHING FUNDS: $11,430

DESCRIPTION:
The proposed study would provide essential information to the ongoing development of a Watershed Management Plan for the Animas River. The study seeks to: collect and analyze chemical, biological, and geomorphic data as well as identifying pollution sources and opportunities for their remediation. Data will be used to address water quality impacts to beneficial and designated uses in the basin including: municipal, agricultural, recreational, and environmental. The study will follow the format of a recent project on the Animas River in New Mexico from the Colorado/New Mexico border to the confluence with the San Juan River. That project was completed in 2006 and involved a synoptic sampling effort to characterize pollution sources, impairment locations, and water quality restoration opportunities. The work resulted in a GIS database that stakeholders use to identify impaired reaches and target remediation efforts. This proposed needs assessment will create a comparable dataset for the Colorado portion of the Animas River.

Mancos River Diversion Project, Phase I

APPLICANT: Mancos Conservation District

APPROVED: November 2009

STATUS: In Progress

WSRA FUNDS: $24,753 (Basin Account)

MATCHING FUNDS: $34,950

DESCRIPTION:
The Mancos Conservation District is preparing a watershed assessment as part of a comprehensive Mancos River Watershed Plan. The plan seeks to work with irrigation companies and landowners to restore the river system. The initial assessment has identified several priorities. The first priority involves ongoing improvements to aging irrigation infrastructure. This infrastructure is causing degradation of the river channel, inefficient and poorly measured water delivery, and ongoing maintenance issues. A major portion of this degradation occurs at ditch diversion sites. The second priority is attaining greater instream flows in the summer due to irrigation diversions. A team of experts including, the local water commissioner, ditch owners, and an ecologist have collaborated to examine various options for irrigation system improvement and river restoration. The proposed project identifies the tasks necessary to reconstruct six of the worst ditch diversion structures. The project involves surveys, structure design, cost estimates, and mapping. In addition, the project includes a decree analysis by the Colorado Water Trust to explore the potential of developing instream flow rights on critical stream reaches of the Mancos River.

Protecting Irrigated Agricultural Lands, and Agricultural Water Rights for Agricultural Production

APPLICANT: Mancos Valley Resources, Inc.

APPROVED: November 2009

STATUS: In Progress

WSRA FUNDS: $31,500 (Basin Account)

MATCHING FUNDS: None

DESCRIPTION:
This project creates a program, or an achievable plan for the creation of a program, that will assist non-profit organizations and local communities in the Southwestern Colorado Basin in conserving irrigated agricultural lands as working agricultural lands, and their associated agricultural water rights. Protection and conservation of the natural environment, including protection of open space, is an important part of conserving southwestern Colorado's water supplies and promoting its economic and agricultural health, but assuring that protected lands remain in active agricultural use is not currently part of such conservation efforts. The goal of a program identified through this grant will be to assure that irrigated agricultural lands are protected as working agricultural lands, rather than simply as open space, and to make such lands more affordable for the next generation of farmers and ranchers. Keeping such lands in working agricultural production will help assure a local food and fiber production and will help assure that agricultural water rights remain in agricultural use.

Canal Seepage Reduction Program

APPLICANT: Florida Mesa Canal Companies (Florida Canal, Florida Farmers Ditch, Florida Enlargement Ditch, and the Florida Cooperative Ditch Company)

APPROVED: November 2009 ($225,000) and September 2010 ($775,000)

STATUS: Contracting

WSRA FUNDS: $1,000,000 (Statewide Account)

MATCHING FUNDS: Approximately $200,000

DESCRIPTION:

A previous phase of the project included: a ditch loss study; the installation of gauging station telemetry, water measuring devices, and automated gates; and a hydropower feasibility study. The current application involves the design and installation of canal lining in strategic sections of the system identified by the recently completed ditch loss study. The conveyance system of the Florida Mesa Canal Companies suffers from heavy seepage and administrative waste. A 1988 BOR Study calculated this waste to be 8,400 acre-feet per year (AFY). Florida Water Conservancy District (FWCD) water monitoring program records indicate that over the last seven years system losses have averaged 24 percent, or 11,600 AFY. This project includes: the engineering design, defining project sections from the ditch loss study, providing for preliminary environmental permitting (wetlands delineations and archeological surveys), preliminary engineering design, final engineering design, preparation of project plans and specifications, and services during bidding, construction of canal and ditch lining and the acquisition of water rights.

Raw Water System Update and Future Needs Study

APPLICANT: Town of Norwood

APPROVED: January 2010

STATUS: In Progress

WSRA FUNDS: $58,458 (Basin Account)

MATCHING FUNDS: $7,000

DESCRIPTION:

The Town of Norwood water supply comes from a system of open ditches, springs, and storage reservoirs. Ongoing problems with water quality over the past several decades, including an incidence of *E. coli* bacteria and resulting boil water orders, as well as problems with disinfectant residuals, have persisted. As a result, Norwood is working on obtaining funding to upgrade the existing water system, an approximately $7.5 million dollar project. This project will help Norwood update its Raw Water Master Plan to guide the critical water system improvements.

A Way Forward: The Dolores River Below McPhee Reservoir

APPLICANT: San Juan Citizens Alliance

APPROVED: November 2010

STATUS: Contracting

WSRA FUNDS: $25,000 (Southwest Basin Account)

MATCHING FUNDS: $55,000

DESCRIPTION:
The grant proposes to study the status of native fish on the Lower Dolores River combined with a multi-stakeholder consensus-building process. The study will result in practical alternatives to improve the status of native fish below McPhee Reservoir while honoring water rights and Dolores Project allocations.

Recreation Plan for Lake Nighthorse

APPLICANT: Animas-La Plata Water Conservancy District

APPROVED: November 2010

STATUS: In Progress

WSRA FUNDS: $25,000 (Southwest Basin Account)

MATCHING FUNDS: $50,000

DESCRIPTION:
The proposed plan will produce design elements for recreation at the lake while ensuring that land and water usage for this purpose is efficient and environmentally sound. The plan will incorporate and structure public stakeholder meetings to gather input in determining the type of recreational opportunities to be included and outline all the infrastructure requirements.

Diversion Improvement Project

APPLICANT: La Plata River and Cherry Creek Ditch Company

APPROVED: November 2010

STATUS: Contracting

WSRA FUNDS: $25,000 (Southwest Basin Account)

MATCHING FUNDS: $119,000

DESCRIPTION:
This project seeks to reconstruct the La Plata Cherry Creek Ditch headgate to provide for more efficient diversions. The point of diversion is located on the La Plata River upstream of the Town of Hesperus. The existing headgate is a gravel berm which diverts water from the La Plata River into a 10-foot wide channel containing a 5-foot Parshall flume, which typically washes out in the spring run-off. The proposal is to construct a more permanent diversion structure, sluiceway and headgates. The existing diversion structure is currently unable to divert water when flows are below 30 cfs. By constructing a new headgate, the water users will be able to divert their legally entitled water when they otherwise would be limited by the physical limitations of the existing structure.

Totten Reservoir Hydrographic Survey

APPLICANT: Dolores Water Conservancy District

APPROVED: November 2010

STATUS: Contracting

WSRA FUNDS: $29,500 (Southwest Basin Account)

MATCHING FUNDS: $5,500 (In-kind)

DESCRIPTION:
The Dolores Water Conservancy District (DWCD) seeks to update the Totten Reservoir area capacity data as required under Colorado Law. To perform the Totten Reservoir Hydrographic Survey, DWCD plans to hire the United States Geological Survey (USGS). The USGS will complete the required Hydrographic Survey Report.

Aspen Springs Metro District Water Filling Station

APPLICANT: Aspen Springs Metro District

APPROVED: November 2010

STATUS: Contracting

WSRA FUNDS: $30,000 (Southwest Basin Account)

MATCHING FUNDS: $65,000

DESCRIPTION:
The Aspen Springs Metro District (ASMD) provides water and road maintenance services to about 1,400 people in the Aspen Springs Subdivision of Archuleta County. This project involves the construction of a water treatment facility and filling station for the ASMD. It is an IPP to meet an identified gap for water needs in an area of rural Archuleta County not covered by the Pagosa Area Water and Sanitation District. The project will serve about 850 homes in a subdivision that is approximately half built-out. Most of these homes are currently hauling water at much greater distances than will be necessary after the completion of this project.

La Plata River Water Resources Operations Model

APPLICANT: La Plata Water Conservancy District

APPROVED: March 2011

STATUS: Contracting

WSRA FUNDS: $148,823 (Statewide Account)

MATCHING FUNDS: $29,765

DESCRIPTION:
This project will provide a means to optimize use of Long Hollow Reservoir both for Compact compliance and for exchange. The publically available La Plata River Water Resources Operations Model will be a robust and accurate baseline model for the La Plata River that will provide an invaluable tool integrating groundwater and surface water modeling. The model will allow water users to optimize water resources planning in the basin.

Groundhog Reservoir Bathymetric Survey

APPLICANT: Montezuma Valley Irrigation Company

APPROVED: March 2011

STATUS: Contracting

WSRA FUNDS: $35,000 (Southwest Basin Account)

MATCHING FUNDS: $122,500

DESCRIPTION:
MVIC is currently engaged in a system–wide analysis to identify needs of accurate measurement of diversions and usage. This project includes a bathymetric survey of MVIC's Groundhog Reservoir. The USGS bathymetric survey process uses an integrated multi-beam and motion sensor sonar to calculate the elevation-storage curve. The final product will also include a map of the modeled surface below water line and a specified flood elevation. The survey will accurately establish the volume of Groundhog Reservoir at any elevation.

Rico Alluvium Pipeline Water Supply Project - Well Drilling and Water Quality Testing

APPLICANT: Town of Rico

APPROVED: March 2011

STATUS: Contracting

WSRA FUNDS: $88,000 ($20,000 - Southwest Basin Account; $68,000 - Statewide Account)

MATCHING FUNDS: $90,000

DESCRIPTION:
In the past decade, Rico has made many system improvements; however, source water quality and quantity continues to be an impediment. In order to reliably serve the existing homes and provide water for future growth, Rico must develop a more reliable water source. As such, Rico has identified an alluvial well near the Dolores River about 2 miles upstream of town as the best alternative source. This project involves the drilling and required water quality testing of the well.