

10

Recommendations

These quotes from the Office of the State Engineer and Interstate Stream Commission's strategic plan articulate key constraints to this plan's recommendations.

The flows of New Mexico's two major rivers—the Rio Grande and the Pecos River—are barely adequate to meet both New Mexico's existing needs and its interstate stream compact delivery obligations. The state's continuing ability to meet those compact obligations is a delicate balance. (OSE/ISC 2003)

Management - New Mexico must efficiently and effectively manage its rivers and groundwater to maximize the use of the state's water supply to meet existing water rights, to meet any required environmental demands, and to meet its interstate stream compact obligations. (OSE/ISC 2001)

In accordance with the mission of the Middle Rio Grande Region's (MRG Region) water plan to balance use with renewable supply, and keeping in mind the state's role and mission as well, this chapter contains the recommendations that follow from the Preferred Scenario. The following sections are included:

- Introduction—Presents some basic assumptions relating to the detailed recommendations.
- Detailed Recommendations—The recommendations are generally grouped to match the sequence of topics addressed in the Preferred Scenario description of Section 9.3. The reader should not infer any indication of priority, urgency, or importance from the sequence that the items are listed in this section. In addition, a few recommendations appear that are needed to meet the mission and goals (see Appendix A) but are not directly implied by the Preferred Scenario.
- List of Water Projects
- Statement of Public Welfare for the Region

A table of the benefits and costs with projected timing for all of the recommendations discussed in Section 10.2 will be developed during updates of the plan during 2004. More information relevant to these recommendations can be found in the Fact Sheets prepared by Daniel B. Stephens and Associates and the analysis of 19 alternatives that the Alternatives Working Team prepared (see Supporting Documents Series G and Supporting Document J). For definition of terms, see the glossary in Section 1.8.

10.1 Introduction

The Preferred Scenario of Section 9.3, the alternative actions, the original suggestions that led to the alternative actions, the analysis reports by D. B. Stephens and Associates, and the analyses that are embedded in the Sandia National Laboratory's Middle Rio Grande model (MRG model) of the region and of the alternative actions were used as source data for the recommendations.

10.1.1 Vision and Assumptions

Regional Inflows and Rainfall

Assumptions concerning the inflows and precipitation for the planning period are described more extensively in Section 9.3.1. In summary, two predictions are considered: The "recent historical prediction" is based upon the average inflows and precipitation for the last half of the twentieth century. The "tree ring prediction" average is about 94% of the "recent historical prediction" average. For drought planning, a ten-year period was used with inflows about 89% of the above two prediction levels.

Population Projections

Assumptions concerning population growth for the planning period are described more extensively in Section 9.3.1. In summary, population growth was modeled to match the estimates from the UNM Bureau of Business and Economic Research (BBER 2002).

Imported San Juan-Chama Project Water

Assumptions concerning the use of the imported San Juan–Chama Project water are discussed more extensively in Section 9.3.1. In summary, it was assumed that the entire contracted amounts (after transit losses) will be available, will come into the region, and will be diverted to the contractors starting in 2006. It is understood that even though the plan assumes the full San Juan–Chama Project allotment, there is a possibility that it will not be received every year.

10.1.2 Urgent Shortfall Reality

“The Key Fact About Our Water - Demand Exceeds Supply” (OSE/ISC 2002)

The initial implementation schedule for the Preferred Scenario may leave a Rio Grande Compact delivery shortfall for ten to twenty years. We need to accelerate implementation of the water planning actions. We need to eliminate the predicted short-term deficits in our compliance with the Rio Grande Compact until the other measures in this plan have had time to take effect. All users must share in the substantial contributions to the effort. The state and the region should work openly and cooperatively to address this issue. Specific urgent actions should be identified, studied, evaluated, and implemented that are focused on avoiding defaulting on the Rio Grande Compact. These actions will have urban and rural economic impacts, but such impacts should be temporary. Unless there is a priority call, water-rights holders must be fairly compensated for the temporary loss of use rights when water is reallocated to meet compact delivery requirements.

All necessary actions should be taken to ensure that water necessary to meet the shortfall is acquired. In doing so, the acquisition of water should not be limited to any one primary source or sector.

Considerations in achieving a balanced plan of action should include accelerated Bosque and riparian restoration, a method for performing priority administration in advance of adjudication, a residential conservation program, a municipal and industrial conservation program, an agricultural conservation program, reduction in urban pumping, state leasing of urban water, state leasing of agricultural water, increase in upstream instead of downstream storage of water, and a moratorium on new authorizations of consumptive use.

10.1.3 Need for Balanced Decisions During Water Shortages

With the advent of ground-water pumping, consumptive uses have been temporarily insulated from the effects of water shortage. We now know that surface and ground water are linked, each affecting the other. No one usage should be insulated from water shortages. In balancing decisions during water shortages, additional considerations should include senior rights priorities, and the ability of each individual to absorb additional conservation while recognizing historic uses and community values.

10.2 Detailed Recommendations

The increase in demand for water is an ongoing phenomenon. This section recommends specific actions to meet the region’s future demands. Local governments, water management agencies and water users should implement these in order to align with this plan’s goals and objectives. Table 10-1 identifies how each recommendation supports the mission and goals of the plan. Table 10-2 lists the numeric performance targets that appear explicitly in the Preferred Scenario of Section 9.3.

These recommendations were derived from Chapter 8’s individual alternative actions, Chapter 9’s Preferred Scenario and can be traced back to suggestions from the public as well as experts in their respective fields. The implications of this section have been taken from technical analysis, modeling and the judgment of various participants in the process.

Table 8-1 lists the ratings for these recommendations in terms of feasibility based on technical, physical/hydrological/environmental, social-cultural, legal, and political feasibility. In addition, public preference rankings are included in this table.

10.2.1 Urban and Rural Conservation Activities

In these recommendations, separate policies are needed for residential, industrial, municipal, institutional and commercial uses. Recommendations R1-4, R1-5, and R1-7 within this category serve to protect the aquifers at the cost of making Rio Grande Compact deliveries more problematical.

R1-1—Establish a Domestic Well Policy (A-61)

The region is seen to be significantly increasing its draw upon water resources in many areas due to the installation of new domestic wells and their associated consumptions. The State Engineer should establish a policy to reduce pumping from domestic wells and restrict drilling of domestic wells where surface waters or the aquifer could be impaired.

R1-2—Outdoor Conservation Programs (A-18, A-22)

Most of the urban and suburban consumptive use of water comes from outdoor uses, particularly lawns and trees. This recommendation is for local governments to implement incentive, regulatory, and/or public education policies so as to reduce high-water use landscaping and convert to xeriscaping to the greatest extent possible. It is recommended that existing programs are strengthened and that new programs broaden the geographical coverage so as to meet the target percentages provided in the Preferred Scenario in residential, municipal, industrial, commercial and institutional uses across the region.

R1-3—Rainwater Harvesting (A-44)

Most of the urban and suburban consumptive use of water comes from outdoor uses, particularly lawns and trees. This recommendation is for local governments to implement incentive, public education and/or, if deemed appropriate, regulatory policies to encourage rainwater harvesting to achieve the scenario targets.

R1-4—Conversion to Low Flow Appliances (A-18)

High flow appliances contribute to unnecessary use of water. Local governments should implement incentive, public education and/or, if deemed appropriate, regulatory policies so as to encourage all construction, new and old, to utilize effective low flow appliances such as toilets, clothes washing machines, dishwashing machines, showers, automatic shutoff faucets, and broken sprinkler cutoffs. This recommendation should be converted from the current casual to a highly vigorous campaign in residential, municipal, industrial, commercial and institutional uses across the region.

R1-5—Urban Water Pricing (A-21)

The plan recommends that jurisdictions examine a variety of water pricing mechanisms and adopt those that are most effective at conserving water.

R1-6—Greywater Reuse (A-24)

“Greywater” is water from showers and washing machines for use in outdoor plantings. It does not include toilet water or water from kitchen sinks. Funding technical and educational activities to promote safe and effective greywater reuse should also be considered.

Municipal and industrial (M&I) use of greywater should be encouraged. Installation of dual piping may be appropriate for new M&I construction. Incentives should be provided to retrofit existing M&I to greywater reuse where the quantities are sufficiently large.

R1-7—Treated Effluent Re-use (A-27)

Treated effluent reuse does not necessarily result in less overall system water consumption. However, it does result in less ground-water withdrawal. Because every utility system is different, each reuse option should be studied to correctly analyze reuse potential in terms of technical feasibility, conservation benefits and legal implications.

It is recommended that treated effluent in urban areas be reused where safe and practical, especially in new construction where it can more easily be implemented. Dual piping should be installed where practical in new construction to facilitate this use.

R1-8—Growth of Parks and Golf Courses

It is recommended that technologies be applied to achieve an 80% reduction in the current growth rate of water use in parks and golf courses.

R1-9—Recognize Urban and Economic Vitality in the Region (Goal D)

This planning region is defined in terms of it being the largest urban population center in New Mexico and being a major center of current and future economic development in the State as well. Urban life and vitality has a long and proud history in the state and has grown up alongside our agricultural tradition becoming a successful and vibrant part of the regional and New Mexican lifestyle and experience. For instance, the City of Albuquerque was founded in 1706.

Today the regional and state economy are primarily a function of its urban areas and maintaining and expanding the urban economy contributes to the quality of life in the region and the State. Providing economic opportunities for the existing and future populations is vital to this region and protecting existing and future water supplies for this purpose provides benefits for the region and the State as a whole. It is important to the region and the State to ensure that municipalities have adequate existing and future water supplies. Some of the key realities that shape urban, municipal and industrial water use in the region are:

- Municipalities in our region provide significant economic overall benefit to the region and to the state.
- Urban areas provide employment opportunities for the existing and future populations.
- While municipalities in the region are meeting today's water demands via the aquifer, transitioning to renewable supplies meets the mission of this water plan and maintains the quality of life in the region.

10.2.2 Water Resources Planning and Management

R2-1—Adjudication and Water Rights Settlement (A-71)

Identifying, quantifying and prioritizing water rights is paramount to better water management. Currently, the State Engineer uses the process of adjudication to accomplish this. It is recommended that this process be utilized in the region unless a more expedient, equitable, and less costly process is created. Alternative dispute resolution should be considered as an option. Furthermore, this plan recommends that the legislature appropriate and the State Engineer direct sufficient funds to prepare the necessary information, including hydrographic surveys, to identify, quantify and resolve priority ownership rights.

R2-2—Conjunctive Use Management (A-144)

Ground water and surface water are two parts of the same system in the Middle Rio Grande Region; each interacts with and markedly affects the other. For water resources in such a system to be managed effectively, they must be managed together, that is, "conjunctively." New Mexico is presently unable to conjunctively manage its ground and surface waters effectively because of state laws that are mutually incompatible and that have led to overdrafts that greatly exceed sustainability.

Some of the main impediments to good conjunctive-use management are: junior ground-water rights that intercept and draw the flow of ground water away from nearby rivers, thereby impairing older surface-water rights; uncontrolled domestic well development in some local high density areas; inability to strictly apply the priority system; and woefully inadequate requirements for metering and reporting water diversions.

This plan recommends strengthening conjunctive-use management by encouraging the state legislature to define state water management aims and by directly addressing aspects of New Mexico water law that now prevent conjunctive management of our ground and surface waters. What is needed at the most fundamental level are four things. First, the state should decide the fate of the priority system — including whether and how it should be modified. Second, the state should decide how to make the management of ground water and surface-water rights mutually consistent, and consistent with how water-right priorities are to apply. Third, it should decide what transitional adjustments will be needed to phase in any changes in a fair and equitable manner from our present unbalanced system. Fourth, it should provide clear guidance to its water officers, especially the State Engineer, on the philosophy and principles that are to govern administration of this state's water affairs.

R2-3—Funding Source for Water Activities (A-59, A-58)

In order to have a reliable funding source for water projects, planning and conservation, a dedicated and reliable recurring revenue stream augmented with federal funds needs to be established. The state is seen as the most appropriate level of authority to impose such a revenue source and to manage the proceeds for the benefit of the state and for the region.

R2-4—Elephant Butte Loss Accounting (A-51)

The Office of the State Engineer and Interstate Stream Commission (ISC) should assure that evaporative losses from Elephant Butte Reservoir are apportioned fairly between the two water-planning regions, Socorro-Sierra and Middle Rio Grande. Spring 2004 information from the ISC indicates that the compact has already apportioned the waters of the basin; evaporative losses are considered neither an asset nor a liability. Therefore, this does not seem to be a viable option.

R2-5—Active Administration (A-143)

The plan encourages active administration by ISC. The State Engineer should establish an improved enforcement program to ensure that only the necessary and allowable water is drawn for municipal uses, agriculture, and other uses.

In addition, the region is increasing its draw upon water by transferring the rights from one point to another, and then continuing to consume water at the location from which the water rights were transferred. It is recommended that a program be instituted for enforcing water retirements after transfers (both permanent and temporary). It is particularly important that land whose water rights have been retired, transferred or leased not continue to use part or all wet water for which it had been previously entitled.

R2-6—Water Resource Database (A-73)

A regional water resource database needs to be established and maintained within the region and made accessible to all interested parties. This regional data and information can be available as a basis for historical trend analysis, current conditions profile, and future projections of water supply and demand. Currently, the data applicable to this region is maintained by a number of agencies and may not be suitable for centralized accumulation and storage. It is recommended that a regional compilation of data could be achieved through a cooperative networking process with a directory of source locations and other necessary references for retrieving the data.

Technical studies calculating inflows, consumptive uses, and interaction between ground water and surface water in the region still contain uncertainties. While within reasonable ranges of each other, different studies yield somewhat different numbers. It is also recommended that further studies be conducted to

enhance the credibility of the results and recommendations of this water plan, to help appraise the success in solving the region's water problems, and to guide the region to improve remedial actions.

On an operational basis, most of the larger public water supply, flood control, and irrigation system entities in the planning region already employ a geographic information system (GIS) as part of their overall system management practices. It is further recommended that use of GIS data be expanded and coordinated by establishing an integrated water use and water budget database and be compiled into a regional database organized according to standards that would allow for ready exchange of information. The data should include; but not be limited to; surface water gauging, ground water levels, public water supply, irrigation flows and returns, domestic wells, flood, and water quality data. This data can be available for historical trend analysis, current conditions profile, and future projections of water supply and demand.

All of the databases and GIS should be integrated and be usable by different agencies and in different plans.

R2-7—Watershed Management Plans (A-66, A-33)

The preservation and management of water resources must be conducted on a regional basis of watersheds and geologic basins. It is recommended that specific watershed management plans should be established in the Middle Rio Grande planning region to achieve common objectives such as: increasing water yield; reducing storm water runoff and preventing soil erosion; improving woodland and rangeland health; increasing infiltration and protecting aquifer recharge zones, and ensuring water quality protection from non-point source pollution. However, watersheds should not be managed to increase water yield at the expense of habitat degradation. It is recommended that a basin-wide coordinating function be established.

It is recommended that governmental jurisdictions, water management agencies, and private water system developers should utilize standard best management practices (BMPs) for watershed protection.

R2-8—Comprehensive, Integrated, and Continued Water Planning (A-53)

There must be connection and continuity between water resource planning and other major planning elements in the regional planning process. It is therefore recommended that local government jurisdictions and regional planning agencies work cooperatively to integrate water plans with planning for land use, transportation, economic development, and other planning efforts of regional significance. The scope of regional water resource planning must cover any and all water-related issues.

Regional water planning should continue through an open, inclusive, and deliberative process to ensure diverse stakeholder participation in the decision making process (A-53).

In implementing the regional water plan, the Water Resources Board and the Water Assembly should work together to establish a process for monitoring and measuring progress toward achieving success of the plan.

In addition, it is recommended that continuing efforts be made to enhance the quality and quantity of hydrological data for water budgeting. For instance, while well studied, the inflows, consumptive uses, and interaction between ground water and surface water in the region still contain uncertainties. While within reasonable ranges of each other, different studies yield somewhat different numbers. Further study would enhance the credibility of results and recommendations, would help to appraise our success in solving the region's water problems, and would guide us to improved remedial actions.

R2-9—Storm Water Management Plans (A-34)

Storm water runoff can and should be utilized by the region when practicable. It is recommended that local government storm water plans be enhanced and expanded to control runoff, using swales, terraces and retention structures to minimize erosion, enhance infiltration, and recharge, and prevent pollution of surface and ground water.

It is recommended that flood control authorities include infiltration, seepage, pollution control and aquifer recharge in their mission.

R2-10—Cooperative Regional Water Management (A-67)

Jurisdictions within the region are encouraged to work together to design implementation mechanisms for the plan that are effective, fair, wise, equitable, legal, and appropriate to local community concerns and meet the plan's mission and goals.

This plan recommends that the local jurisdictions explicitly share the task of balancing the regional water use with renewable supply and implement sustainable water resource management to reduce water consumption, minimize impact on water resources, encourage conservation-oriented economic development; ensure adequate water supplies for any proposed development, protect and enhance the environment, and consider the carrying capacity and location of development, integrate with other major plans in the region.

This recommendation could create a mechanism for funding larger projects by pooling resources.

R2-11—Water Banking (A-67A)

Water banking is a term used for several different concepts for leasing water. Only senior water rights that can actually be fulfilled, taking into account the hydrologic system's demands on wet water, may be transferred or "banked". Leasing of water through a water-banking system or entity can only be workable if clearly defined policy is developed. Legislation is recommended that will provide individual and other vested water right holders with a range of options for short-term leasing of water (less than five years) for purposes such as aquifer recharge, Compact deliveries, environmental needs, and meeting demands of other senior users in times of shortage, thereby increasing water management flexibility.

Agricultural forbearance should be investigated and, encouraged if feasible, to facilitate the leasing of agricultural water on a voluntary basis from farmers willing to enter into such leases.

The scenario permits the emergency leasing of agricultural water to meet Rio Grande Compact obligations and environmental needs. It also proposes protective mechanisms to support the overall value of agricultural lands, including:

- benefits to ecosystem health
- potential in terms of recharge, compact delivery, food security and economics
- cultural and historic value
- contribution to the regional air quality and regional vistas
- agricultural economy

R2-12—Land Use Management and Planning (A-52, A-30, A-28, A-144)

Encourage local jurisdictions to integrate the land use, transportation, economic development, and water components of each of their comprehensive plans; and to integrate their comprehensive plans with the regional water plan.

Local jurisdictions should:

- Increase urban building densities and infill development through adoption of local government land use policies, incentives, and regulations. Higher-density development would reduce the relative footage of landscaping and associated water use.

The following Items were approved by the Water Assembly, but the Water Resources Board wants to be on record as opposing their inclusion:

- Prepare and adopt water budgets which provide specific annual targets/limits for new development based on known available water resources. Water budgets should be reviewed annually and revised as necessary.
- Adopt policies to integrate land use and transportation planning and water resource management in all government jurisdictions in the Middle Rio Grande water planning region; and take water supply

availability into account when making land use development decisions. Adopt policies that coordinate water impact considerations with all land development and other uses of water.

- Develop a sustainable and coordinated growth management plan for adoption and implementation by local governments in the middle Rio Grande region in order to: 1) reduce water consumption; 2) minimize impact on water resources; 3) encourage conservation-oriented economic development and 4) ensure adequate water supplies for any proposed development. Local governments and/or the state Legislature should establish a review process so that each new industrial, commercial, residential and municipal development be reviewed to ensure ongoing availability of adequate water supplies, including recognition of cumulative impacts on water.
- Establish, assess and collect development impact fees that include the marginal full cost of extending the water service area and the marginal full cost to purchase and transfer associated water rights.

10.2.3 Water Monitoring and Measurement

R3-1—Measure All Water Uses (A-7, A-8, A-73)

Unmeasured water is seen to be a major encouragement to casual or excessive water use. The recommendation is that all uses of water in the region be measured and reported at the single user level. Measuring only particular types of users or particular individual users is publicly seen to be unfair. The recommendation is to establish the measuring program immediately for all new uses, and as a gradual retrofit to existing uses, as soon as possible. This recommendation is for local and state governments to implement incentive, regulatory, and/or public education policies so as to stimulate the prompt installation of appropriate retrofit measurement devices. Besides the direct benefit of water savings, this recommendation will enable much more incisive and efficient management of our surface-water and ground-water supplies. This will entail costs, and the appropriate bodies should consider how these costs would most fairly be borne.

10.2.4 Agriculture

R4-1—Upgrade Agricultural Conveyance Systems (A-9)

The recommendation is to line or pipe a limited number of Middle Rio Grande Conservancy District and on-farm ditches so as to obtain a greater efficiency in delivering water to fields. Areas to be lined should be selected after consideration of the impact on water quality, domestic wells, riparian vegetation, wildlife habitat, and so as not lose vital shallow aquifer recharge. New turnouts and improved irrigation water management could also allow for a decrease in diversions while meeting crop needs.

This savings in diversions would allow, when possible, stored water in upstream reservoirs to last longer in dry years, which would both help farmers and keep water in the river later in the irrigation season, and thus relieve some of the pressure for helping species and other environmental concerns. It is recommended that upstream reservoirs should be utilized to store saved water due to reduced diversion. This recommendation is seen to require some major funding and construction effort. Federal funding should be sought immediately. Work should commence as soon as funds are available. Because of existing and increasing Endangered Species Act pressure, progress on this recommendation is seen to be urgent.

Irrigation efficiencies, studies, and programs as implemented in California should be studied as well.

R4-2—Level Irrigated Fields (A-10)

Many farm fields in the region have been laser-leveled. This recommendation is to encourage farmers through incentive programs to laser level those fields that have not been leveled or that may require a change in grade to facilitate an improved delivery system. This recommendation is for local and state governments (or federal if possible) to implement incentive, regulatory, and/or public education policies to facilitate more efficient delivery of water to those fields. Lobbying of all agencies to broaden the incentive program should commence immediately.

R4-3—Establish a Local Marketing Infrastructure (A-11)

A marketing infrastructure should be developed for locally-grown produce, value added products and low-water use alternative crops. In particular, increasing production of low-water alternative crops would reduce overall dependence on water. Research is required to identify the crops and the markets, and a plan for the transition.

R4-4—Acequia Efficiency Programs (A-60)

Acequia culture and rights can be at risk in the environment of increased marketability of water and water rights. It is recommended that special measures be taken to help preserve traditional acequia culture and rights. Traditional community acequias in this region typically require assistance to improve the efficiency of their irrigation networks. The recommendation is that funding for traditional acequias should be made available for purposes of increasing water efficiency within the local acequia system.

Recommendations further include providing education to farmers, ranchers, newcomers, and delivery system operators about available support programs and ways to operate more efficient water conveyance systems.

R4-5—Recognize Agricultural Traditions in the Region (Goal C)

Preservation of the region's agricultural base will support the goals of maintaining quality of life present in the region, rural and suburban economies, and the culture and tradition that we value so highly. It should be recognized that the conversion of agricultural land to other uses alters the landscape irrevocably. It is recommended that value based decisions recognize the strong cultural and historical of agriculture in the region, and the overall benefits that agriculture provides to the MRG Region, and to the state as a whole.

- Agriculture represents an important economic sector in New Mexico, and has for centuries.
- Agriculture benefits ecosystem health.
- Agricultural lands have significant potential in terms of aquifer recharge, flood control, compact delivery, food security and economics.
- Agriculture is integral to overall ecosystem health, providing greenbelt, open space, and wildlife habitat, and contributing to the quality of the airshed and viewshed.
- Agriculture has cultural and historic value.
- More than 95% of irrigation is supplied by recycled and non-potable surface water which also provides aquifer recharge.
- Agriculture improves water quality through percolation and infiltration.

While some reduction is likely, the Preferred Scenario does not recommend a reduction in crop acreage. Decisions as to crop-type distribution will be left to individual farmers. The state should support the goals of the Federal Farmland Protection Policy Act, as well as any programs that preserve the region's agricultural heritage. It is also recommended that the state share in funding these programs. It is further recommended that the state administer water rights according to the priority system, while considering agricultural use of junior rights equally with other junior uses of water.

10.2.5 Water Quality

R5-1—Mitigate Septic Tank Impacts (A-26, A-47)

In some areas there is a potential health risk to water users or a contamination risk to the ground water resulting from conventional septic systems. It is recommended that, where such a potential health risk exists, conventional septic systems be replaced by the construction of new or expanded centralized or distributed wastewater treatment systems, including wetlands, or by the use of advanced technology or re-siting for on-site wastewater treatment.

R5-2—Improved Water Quality Sampling and Testing (A-47)

It is recommended that the water testing and sampling capabilities be significantly upgraded. The additional testing capabilities should include all of the biological, chemical and radiological threats to public and environmental health that are described in existing state and national water quality guides. In addition, special sampling and testing programs are needed to identify any contaminants that may be introduced into the water supply system. In addition to upgrading the quality of testing of potable water, it is important to improve the quality of testing of wastewater, storm water, and large-scale greywater. Many of these may be continuous automatic testing programs and they may require advanced techniques, which might be developed in cooperation with the national laboratories, state universities and private industry.

R5-3—Protect Water from Contamination (A-47, A-50)

It is recommended that programs be established to protect the region's water from contamination and to ensure compliance with federal, tribal, state and local standards for water quality pertaining to surface waters, drinking water, storm water, and wastewater. It is also recommended that programs be established to enforce and protect wellheads from contamination on all public water supply wells within local government jurisdictions.

10.2.6 Bosque and Other Riparian Habitats

R6-1—Riparian Habitat Restoration (A-1, A-2)

This Regional Water Plan recommends that a program of restoration of the Bosque and other key riparian areas throughout the region be instituted. Restore and manage the Bosque and other riparian habitat to reduce evapotranspiration and improve habitat by selectively removing non-native vegetation and promoting native plants.

Non-native species in the Bosque and other riparian areas consume large quantities of water. Provided replacement vegetation is appropriately chosen, removal of non-native species is seen to present an opportunity to substantially reduce consumption in the region. The major effect would be to provide more water in the river to meet Compact obligations and to meet environmental obligations. This would reduce the pressure from various sources to divert water from other consumptive uses for Compact and environmental purposes.

R6-2—Constructed Wetlands (A-36)

This recommendation calls for considering the creation of constructed wetlands for ground-water recharge, storm water capturing, habitat improvement, and hydrological management of riparian areas.

R6-3—River Restoration (A-63)

In meeting the water needs of the state, the needs of the region's rivers should not be neglected. River restoration will provide for the needs of wildlife, provide residents of the region with opportunities for outdoor recreation, and assure that the state is in compliance with endangered species requirements. It is recommended that the state provide the required cost share, if any, of federal restoration programs. The state should also engage in and collaborate with programs designed with the goal of restoring the ecological functioning of the region's rivers and floodplains, including replication of the natural hydrograph of the rivers within the levees. The state should seek to assure that an appropriate quantity of water is available for endangered species and river needs without depriving priority water rights holders or San Juan-Chama Project water contractors of their water except from willing sellers or lessors.

To allow support of the river and its riparian environment, the scenario includes recognizing instream flow as a beneficial use.

R6-4—Recognize the Importance of Healthy Native Ecosystems of the Rio Grande and its Tributaries (Goal B)

Healthy native riparian ecosystems mean a river and floodplain habitat adequate to support viable population of a diverse array of plants and animals native to the region. Healthy native riparian ecosystems are important for their own sake, for the ways in which they enhance our quality of life, and for the services that they provide to us.

The Rio Grande is important for what it symbolizes and means to the people of the region. The Rio Grande is a mythic river in the history of the region, the state, and America. A living Rio Grande embodies the spirit of our region. It is independent, free, tough, hard-working, and enduring.

Riparian ecosystems support a myriad of plant and animal species, from magnificent cottonwoods and sandhill cranes to unnoticed minnows. They support that portion of creation of which we are stewards. Rivers and bosques provide refuges where human inhabitants of the region can relax, enjoy the scenery and the water, hike, fish, raft, watch birds, and otherwise enjoy nature and the outdoors.

The Rio Grande and its tributaries provided the water that made human habitation possible in the region. A clean and healthy Rio Grande is essential to the agricultural traditions of the middle valley, as well as to urban populations that will increasingly depend on the river for domestic and other uses now and in the future. The bosque protects the levees from flood waters and therefore protects our property. It filters and cleanses water entering and leaving the river. Finally, though not least important, a clean and healthy Rio Grande is important to the spiritual and cultural traditions of our region.

10.2.7 Water Storage to Reduce Evaporative Losses

R7-1—Implement Upstream Surface Water Storage (A-45)

An average of 140,000 afpy evaporates from Elephant Butte Reservoir (EBR) due to the large surface area and the hot, dry, windy conditions. EBR could be used to store water up to the top of the narrows (i.e., the deep water portion of the reservoir), thereby greatly reducing surface area, and still be used to make downstream deliveries. The recommendation is to obtain the necessary permissions to store water in upstream reservoirs with lower evaporation rates if this can be done without significant harm to the riparian environment. So as to minimize impact to the local economy of Elephant Butte, it would be desirable to manage flows to keep Elephant Butte Reservoir storing steady but minimal quantities of water e.g., 400,000 acre-feet of usable water to allow storage of water in upstream reservoirs constructed after 1929 per Rio Grande Compact requirements. Usable water is that water legally available for release for downstream use and is defined as the combined content of Elephant Butte and Caballo Reservoirs less any New Mexico or Colorado credit water and less any San Juan/Chama project water in Elephant Butte Reservoir. The OSE should pursue necessary agreements and authorizations to permit this upstream storage.

R7-2—Implement Upstream Aquifer Water Storage (A-46)

Pump surplus water into the aquifer so as to supplant the requirements to store large quantities in Elephant Butte Reservoir. Technology assessment and engineering feasibility for this recommendation should be started so as to determine whether the option is really practical within this region.

R7-3—Implement Aquifer Storage and Recovery for Drought (A-46)

Subject to water rights and environmental issues, in order to ameliorate the short term fluctuations in regional supply, it is recommended that surplus water be pumped into the depleted aquifers during wet years, and be retrieved for use during dry years. This system would be smaller than one used to supplant EBR evaporation. Technology assessment and engineering feasibility for these recommendations should be started so as to determine whether these options are really practical within this region.

R7-4—Water Modeling (A-38, A-143, A-144)

The state and appropriate federal agencies should improve and increase monitoring and modeling of the surface water system, improve water management at the watershed level, and retain excess water flow from EBR during wet cycles. It is recommended that the state use the modeling data to anticipate and manage EBR spills and to better administer upstream retention and aquifer recharge.

10.2.8 Desalination and Transfer of Water

The *Regional Water Planning Handbook* states that “all future water needs must be met by management of the water supply currently available to the region. If that is not feasible, as supported by analysis in the planning report, other sources of supply may be proposed if feasible in economic and engineering analysis.” (OSE/ISC 1994) Refer to Supporting Document H-1. The following recommendations are proposed to augment the supply from sources outside the region as indicated in the analyses of substantial regional shortfall.

R8-1—Develop New Water Supplies through Desalination (A-39)

Substantial supplies of brackish and saline water exist in New Mexico. It is estimated that increases in the price of water, project development time, and technological improvements will make the desalination and importation of brackish water practical within twenty years. The recommendation is for the region to explore the possibility of developing brackish and saline water supplies, both from sources within and outside of the region. The region should track technological advances that would make desalination cost effective. It is further recommended that the region implement projects that will make such water available for use within the region or provide the region with appropriate Rio Grande Compact credits.

R8-2—Investigate the Potential for Importing Water (A-69)

Examine the potential of securing and importing large volumes of water from currently unused sources. This option should be interpreted broadly to include the availability of water from sources such as abandoned mines, and desalinated seawater. Water should not be imported where it would cause environmental harm or economic hardship to communities in the watershed from which water is being imported, or where projects rely upon large federal subsidies provide limited economic benefits.

R8-3—Undeclared Water (A-39, A-69, A-143)

The State Engineer should declare all waters in the state, regardless of depth and quality, so as to enable proper administration and protection of all of the waters in the state.

10.2.9 Public Education

R9-1—Develop a Water Education Curriculum for Schools (A-56)

This plan recommends that school curricula and projects be developed to teach children the importance and value of water in the region. Especially important are issues of water conservation, where water comes from, and cultural values associated with water.

R9-2—Implement Adult Public Education Programs

Establish region-wide and local public education programs to encourage a more complete awareness of the full range of water related subjects among the citizenry, and to enhance voluntary water conservation programs recommended elsewhere in this section.

10.3 List of Water Projects

10.3.1 Explanation

This section lists ongoing and proposed projects to enhance infrastructure, develop supplies, or to improve water quality by local, state and federal justifications. The items on the list change on a regular basis and are not meant to be final. As discussed in Chapter 11, the development of a single, coordinated listing of regional water projects would improve the effectiveness of the process.

A list of capital projects in the region is presented in Supporting Document Q. A similar list for the Rio Puerco and Rio Jemez subregions can be found in Chapter 12. These projects are funded by local governments, land use agencies, collaboratives, private donations, and other groups, utilizing local, federal or state funding sources, typical through revenue or general obligation bonds or grants to improve infrastructure and water quality.

10.4 Statement of Public Welfare for the Region

10.4.1 Introduction

This public welfare statement is part of the regional water plan and is presented to provide guidance to the State Engineer in decisions concerning applications for transfer and new appropriations of water rights that affect the Middle Rio Grande Region as required in the Regional Water Planning Handbook (OSE/ISC 1994) located in Supporting Document H-1. This public welfare statement will accomplish its purpose if conflicts are reduced in the region, and if decisions reflect the long-term future needs of the region, rather than merely responding to immediate demands. This must not be a static, final statement, but an iterative and evolving declaration which is continuously monitored by the public to ensure that it accurately reflects the welfare of the public, always remembering that there are unknown users and perspectives concerning our water resources that will need to be given a voice in the future.

10.4.2 General Statement

Water has many important values to the people in our region which need to be appreciated and fairly balanced to ensure the overall safety, security and well-being for the region. Such values include cultural, economic, environmental and hydrologic viability for the region. In times of scarcity, everyone must share the responsibility for living within the shortage. We recognize the current deficit situation and have a duty to balance water use with renewable supply, starting now and in the future. Decisions should be made so as to keep as many options as possible open for future generations.

10.4.3 Water Transfer Process

We believe the “public welfare” must be safeguarded by the State Engineer through active management of our limited water resources in the decision-making process used to evaluate new appropriations and transfer of water rights. A strong decision-making process supports “public welfare”. Public welfare is equal in importance to the other two statutory criteria (impairment and conservation). Transfers of water rights must be open to all affected stakeholders and use the best available science. The public will be better served: if the process encourages negotiation, not litigation. The process must provide reasonable and timely notice to and allow participation by all parties. Public review must be a part of the State Engineer’s decision-making process. The evaluation of transfer must consider both the positive and negative impacts of the transfer of water rights on both the area of origin as well as the area receiving the water rights. Bona fide reduction in wet water use at the source site must match the transferred water right. When considering water rights, the State Engineer should respect an individual’s right to use, lease, sell or transfer that right, to the extent consistent with Public Welfare as defined herein.

10.4.4 Principles and Considerations

The “public welfare” requires that our use of the water resources be consistent with three guiding principles:

1. Maintain, improve, and where possible, increase the quality and quantity of the region’s water resources.
2. Promote conservation and reuse of the region’s water resources.
3. Encourage efficient use of the region’s water resources.

The State Engineer should consider the diversity of water demands and factors when evaluating new appropriations and transfers of water rights: including but not limited to health and safety concerns, economic interests, agricultural interests, environmental interests, social and cultural interests, aesthetic interests, recreational interests, and municipal and domestic needs.

- When considering health and safety concerns, the State Engineer should strive to maintain and improve the quality of our water resources as a basic human right to safe drinking water.
- When considering economic interests, the State Engineer should recognize that the Middle Rio Grande Region is a vital part of the New Mexico economy. Agreements and transfers of water rights should result in long-term economic benefit to the region and the state as a whole.
- When considering agricultural interests, the State Engineer should strive to sustain a vibrant and efficient agricultural system, recognizing that agriculture has economic, ecological, historic, and cultural values.
- When considering environmental interests, the State Engineer should maintain and improve ecosystem biodiversity. The State Engineer should also consider instream flows as being essential for the region.¹
- When considering social and cultural interests, the State Engineer should protect water uses which support the diversity of cultures and traditions existing in our region. In particular, the sovereignty of tribal nations and pueblos must continue to be recognized. In addition, the promises contained in the Treaty of Guadalupe Hidalgo should be acknowledged and honored.²
- When considering aesthetic interests, the State Engineer should strive to maintain and improve the agricultural and riparian greenbelts along the flowing waters and ditches in our communities.
- When considering recreational interests, encourage low consumptive rather than new consumptive recreational uses.
- When considering municipal and domestic needs, the State Engineer should strive to sustain an adequate water supply to meet these needs. The State Engineer should consider local land use plans and decisions.

¹ *Consensus on this sentence except for Simon and Brock who recommend deletion of the sentence because it represents a red flag unless a definition of “instream flows” can be agreed upon.*

² *Consensus on this sentence except for Simon who recommends adding the following words after “honored” at the end of the sentence, “by recognizing the rights granted to land grants under Spanish and Mexican law for those entities that can trace their existence back to their Spanish and Mexican origins”. Simon also independently recommends replacing “protect” with “consider”.*

Table 10-1 Recommendations Relationship to the Mission and Goals of the Regional Water Plan (Source: The Middle Rio Grande Water Assembly)

Recommendation	Balance Water Use with Renewable Supply	A. Ensure that the Mission is fulfilled through fair, open and inclusive public planning and implementation processes	B. Preserve Water for a Healthy Native Río Grande Ecosystem	C. Preserve Water for the Region's Agricultural, Cultural, and Historical Values	D. Preserve Water for Economic and Urban Vitality	E. Preserve Water for the Qualities of Life Valued by Residents in the Region	F. Develop Broad Public and Official Awareness of Water Facts and Issues, Especially the Limited Nature of Water Resources	G. Conserve Water	H. Promote a System of Water Laws and Processes that Support the Regional Water Plan and its Implementation	I. Provide Appropriate Water Quality for Each Use	J. Manage Water Demand Consistent with the Stated Mission	K. Balance Growth with Renewable Supply (SEE FOOTNOTE)*
10.2.1 Urban and Rural Conservation Activities												
R1-1 Establish a Domestic Well Policy	X		X	X	X	X	X		X		X	X
R1-2 Outdoor Conservation Programs [A-18, A-22]	X		X	X	X	X		X			X	
R1-3 Rainwater Harvesting [A-44]	X		X	X	X	X				X		
R1-4 Conversion to Low Flow Appliances [A-18]	X		X	X	X	X		X			X	
R1-5 Urban Water Pricing [A-21]	X		X	X	X	X		X			X	X
R1-6 Greywater Reuse [A-24]	X		X	X	X	X				X		
R1-7 Treated Effluent Re-use [A-27]	X		X	X	X	X				X		
R1-8 Growth of Parks and Golf Courses [A-18, A-22, A-24]	X		X	X	X	X		X			X	X

Recommendation	Balance Water Use with Renewable Supply	A. Ensure that the Mission is fulfilled through fair, open and inclusive public planning and implementation processes	B. Preserve Water for a Healthy Native Rio Grande Ecosystem	C. Preserve Water for the Region's Agricultural, Cultural, and Historical Values	D. Preserve Water for Economic and Urban Vitality	E. Preserve Water for the Qualities of Life Valued by Residents in the Region	F. Develop Broad Public and Official Awareness of Water Facts and Issues, Especially the Limited Nature of Water Resources	G. Conserve Water	H. Promote a System of Water Laws and Processes that Support the Regional Water Plan and its Implementation	I. Provide Appropriate Water Quality for Each Use	J. Manage Water Demand Consistent with the Stated Mission	K. Balance Growth with Renewable Supply (SEE FOOTNOTE)*
R1-9 Recognize Urban and Economic Vitality in the Region [Goal D]					X	X	X					
10.2.2 Water Resources Planning and Management												
R2-1 Adjudication and Water Rights Settlement [A-71]									X			
R2-2 Conjunctive Use Management [A-144]	X						X		X		X	
R2-3 Funding Source for Water Activities [A-59, A-58]	X	X					X		X		X	
R2-4 Elephant Butte Loss Accounting [A-51]		X							X			
R2-5 Active Administration [A-143]	X	X							X		X	
R2-6 Water Resource Database [A-73]	X	X					X				X	
R2-7 Watershed Management Plans [A-66, A-33]	X	X	X	X	X	X					X	
R2-8 Comprehensive, Integrated, and Continued Water Planning [A-53]		X										

Recommendation	Balance Water Use with Renewable Supply	A. Ensure that the Mission is fulfilled through fair, open and inclusive public planning and implementation processes	B. Preserve Water for a Healthy Native Rio Grande Ecosystem	C. Preserve Water for the Region's Agricultural, Cultural, and Historical Values	D. Preserve Water for Economic and Urban Vitality	E. Preserve Water for the Qualities of Life Valued by Residents in the Region	F. Develop Broad Public and Official Awareness of Water Facts and Issues, Especially the Limited Nature of Water Resources	G. Conserve Water	H. Promote a System of Water Laws and Processes that Support the Regional Water Plan and its Implementation	I. Provide Appropriate Water Quality for Each Use	J. Manage Water Demand Consistent with the Stated Mission	K. Balance Growth with Renewable Supply (SEE FOOTNOTE)*
R2-9 Storm Water Management Plans [A-34]		X							X			
R2-10 Cooperative Regional Water Management [A-67]	X	X	X	X	X	X	X	X			X	X
R2-11 Water banking [A-67A]								X			X	
R2-12 Land Use Management and Planning [A-52, A-30, A-28, A-144]	X	X	X	X	X	X						X
10.2.3 Water Monitoring and Measurement												
R3-1 Measure All Water Uses [A-7, A-8, A-73]		X	X	X	X	X					X	
10.2.4 Agriculture												
R4-1 Upgrade Agricultural Conveyance Systems [A-9]	X		X	X	X	X		X			X	
R4-2 Level Irrigated Fields [A-10]	X		X	X	X	X		X			X	
R4-3 Establish a Local Marketing Infrastructure [A-11]	X		X	X	X	X		X			X	
R4-4 Acequia Efficiency Programs [A-60]				X			X					
R4-5 Recognize Agricultural Traditions in the Region [Goal C]				X		X	X					

Recommendation	Balance Water Use with Renewable Supply	A. Ensure that the Mission is fulfilled through fair, open and inclusive public planning and implementation processes	B. Preserve Water for a Healthy Native Rio Grande Ecosystem	C. Preserve Water for the Region's Agricultural, Cultural, and Historical Values	D. Preserve Water for Economic and Urban Vitality	E. Preserve Water for the Qualities of Life Valued by Residents in the Region	F. Develop Broad Public and Official Awareness of Water Facts and Issues, Especially the Limited Nature of Water Resources	G. Conserve Water	H. Promote a System of Water Laws and Processes that Support the Regional Water Plan and its Implementation	I. Provide Appropriate Water Quality for Each Use	J. Manage Water Demand Consistent with the Stated Mission	K. Balance Growth with Renewable Supply (SEE FOOTNOTE)*
10.2.5 Water Quality												
R5-1 Mitigate Septic Tank Impacts [A-26, A-47]									X			
R8-2 Improved Water Quality Sampling and Testing [A-47]									X			
R5-3 Protect Water from Contamination [A-47, A-50]	X		X	X	X	X				X		
10.2.6 Bosque and Other Riparian Habitat												
R6-1 Riparian Habitat Restoration [A-1, A-2]	X		X	X	X	X		X			X	
R6-2 Constructed Wetlands [A-36]			X						X			
R6-3 River Restoration [A-63]	X		X	X	X	X					X	
R6-4 Recognize the Importance of Healthy Native Ecosystems of the Rio Grande & its Tributaries [Goal B]			X			X	X					
10.2.7 Water Storage to Reduce Evaporative Losses												

Recommendation	Balance Water Use with Renewable Supply	A. Ensure that the Mission is fulfilled through fair, open and inclusive public planning and implementation processes	B. Preserve Water for a Healthy Native Rio Grande Ecosystem	C. Preserve Water for the Region's Agricultural, Cultural, and Historical Values	D. Preserve Water for Economic and Urban Vitality	E. Preserve Water for the Qualities of Life Valued by Residents in the Region	F. Develop Broad Public and Official Awareness of Water Facts and Issues, Especially the Limited Nature of Water Resources	G. Conserve Water	H. Promote a System of Water Laws and Processes that Support the Regional Water Plan and its Implementation	I. Provide Appropriate Water Quality for Each Use	J. Manage Water Demand Consistent with the Stated Mission	K. Balance Growth with Renewable Supply (SEE FOOTNOTE)*
R7-1 Implement Upstream Surface Water Storage [A-45]	X		X	X	X	X		X			X	
R7-2 Implement Upstream Aquifer Water Storage [A-46]	X		X	X	X	X		X			X	
R7-3 Implement Aquifer Storage and Recovery for Drought [A-46]			X	X	X	X						
R7-4 Water Modeling [A-38, A143, A-144]	X		X	X	X	X		X			X	
10.2.8 Desalination and Transfer of Water												
R8-1 Develop New Water Supplies through Desalination [A-39]			X	X	X	X						
R8-2 Investigate the Potential for Importing Water [A-69]	X		X	X	X	X					X	
R8-3 Undeclared Water [A-39, A-69, A-143]									X			
10.2.9 Public Education												

Recommendation	Balance Water Use with Renewable Supply	A. Ensure that the Mission is fulfilled through fair, open and inclusive public planning and implementation processes	B. Preserve Water for a Healthy Native Rio Grande Ecosystem	C. Preserve Water for the Region's Agricultural, Cultural, and Historical Values	D. Preserve Water for Economic and Urban Vitality	E. Preserve Water for the Qualities of Life Valued by Residents in the Region	F. Develop Broad Public and Official Awareness of Water Facts and Issues, Especially the Limited Nature of Water Resources	G. Conserve Water	H. Promote a System of Water Laws and Processes that Support the Regional Water Plan and its Implementation	I. Provide Appropriate Water Quality for Each Use	J. Manage Water Demand Consistent with the Stated Mission	K. Balance Growth with Renewable Supply (SEE FOOTNOTE)*
R9-1 Develop a Water Education Curriculum for Schools [A-56]	X		X	X	X	X	X	X			X	
R9-2 Implement Adult Public Education Programs	X		X	X	X	X	X	X			X	

*Adopted by the Water Assembly and not by the WRB

Table 10-2 Numeric Performance Targets from the Preferred Scenario (Source: The Middle Rio Grande Water Assembly)

These numbers sometimes represent trends if nothing changes, such as population growth or reduction of agricultural acreage; some may be impractical, such as the 80% conversion to low-flow appliances for existing homes when studies show it's more in the 15% range (when consider all appropriate appliances); and, some may be counterproductive if overdone, such as lining ditches; and some are controversial. In order to run the model, numbers had to be used.

Preferred Scenario	Assumption / Number	Recommendation Number
9.3.1 Vision and Assumptions		10.1.1
Vision	To meet mission by achieving balance, need to reduce use and/or increase supply now	10.1.2
Inflows/Rainfall Assumptions	= prediction of the level of surface inflows and within-Region rainfall	10.1.1
Recent Historical Prediction	* recorded data from 1950 through 1998 averaged 9 inches per year in MRG	10.1.1
Tree Ring Prediction	* 8 inches precipitation, being 94% of the Recent Historical Prediction	10.1.1
Drought Planning	* drought = ten years with inflows and precipitation being 8 and 7 inches, respectively, being 89% of the above two prediction patterns. Model begins drought in 2002.	10.1.1 10.1.3 Model
Population Assumptions	* population increases from ~ 710,000 in 2000 to ~ 1.27 million in 2050	10.1.1
Imported San Juan/Chama Water Assumptions	* Middle Rio Grande users have contracts for ~ 70,400 af. Model assumes 60,000 af. Albuquerque will begin to use its share, 48,000 less transit losses, in 2006.	10.1.1 Model
9.3.2 Urgent Shortfall Reality	Rio Grande Compact shortfall for ten to twenty years. To eliminate the predicted short term deficits in our compliance with the Rio Grande Compact, must accelerate the implementation of our water planning actions. All users must share in the substantial contributions to the effort. Specific urgent actions should be identified, studied, evaluated and implemented that are focused on increasing river flow to avoid defaulting on the Rio Grande Compact.	10.1.2 10.1.3
	Need for Balanced Decisions During Water Shortages	10.1.3
9.3.3 Residential and 9.3.4 Non-Residential	Residential = Urban Single Family, Urban Multi-Family & Rural Non-Residential = Commercial, Industrial, Institutional & Municipal	10.2.1
conservation actions	[A-18, A-21, A-22, A-56, A-24, A-27, A-44, A-61]	

Preferred Scenario	Assumption / Number	Recommendation Number
	Establish a Domestic Well Policy - reduce amount pumped and number of wells [A-61]	R1-1
	Outdoor Conservation Programs = convert 30 percent of existing landscaping to xeriscape; require xeriscaping for all new construction. [A-18, A-22]	R1-2 Model
	Model - <ul style="list-style-type: none"> • reduce size of yards in new homes by 40% • 40% reduction in current water use (default is 50%) 	Model
	Growth of Parks and Golf Courses = 80 percent reduction in the future growth rate of water use in parks and golf courses	R1-8 Model
	<ul style="list-style-type: none"> • 5 percent reduction in landscaped acreage in commercial properties 	Model
	Rainwater Harvesting = 25% of existing homes will collect water through rooftop rain harvesting; require all new homes to have rooftop rain harvesting systems [A-44]	R1-3 Model
	Conversion to Low Flow Appliances = install low flow appliances in 80 percent of existing properties; require low-flow appliances installed in all new properties [A-18]	R1-4 Model
	Urban Water Pricing = jurisdictions should examine a variety of water pricing mechanisms and adopt those that are most effective at conserving water [A-21]	R1-5 Model
	Greywater Reuse = 5 percent of existing homes will convert to on-site greywater reuse; greywater reuse will be standard in all new homes [A-24]	R1-6 Model
	Treated Effluent Re-use - reduces ground-water withdrawal; study technical feasibility, conservation benefits and legal implications. Apply where safe and practical, especially in new construction where it can more easily be implemented. Dual piping should be installed where practical in new construction to facilitate this use.[A-27]	R1-7
	<ul style="list-style-type: none"> • non-residential users will apply COA water reuse plan 	Model
	<i>Water conservation should be the first item considered among feasible water supply alternatives in the management of water to meet current and future water demands.</i>	Handbook
	<i>Regional water plans should demonstrate what portion of the future water demand could be met from projections of conserved water. Regional water plans should outline the responsibilities and authorities of each local governing body.</i>	Handbook

Preferred Scenario	Assumption / Number	Recommendation Number
	Governments in the region should develop, adopt and implement sustainable water resource management plans to: • reduce water consumption; • minimize impact on water resources; • encourage conservation-oriented economic development; • ensure adequate water supplies for any proposed development, and consider the carrying capacity and location of development; and • integrate with other major plans in the Region	10.1.3 10.2.1 10.2.2
9.3.4 Management/Planning		10.2.2
<i>actions</i>	Several initiatives and management requirements that will need to be undertaken and implemented at various management levels from local through federal. [A-58]	
	Adjudication and Water Rights Settlement = Identify, quantify, and adjudicate all water rights and all wet water quantities in the water planning region within 25 years, via negotiation if possible. [A-71]	R2-1
	Water Banking = Water banking would be implemented within the Region to maximize beneficial use and to permit the water right to stay with the owner while the water is leased for a period of time. Develop defined policy for leasing senior water rights, together with a range of options for short-term leasing, and a protective mechanism to support the value of agricultural lands. An education component is necessary. [A-67A]	R2-11
	Conjunctive Use Management = State should address groundwater/surface water interactions in the statutes for administering water rights (conjunctive management) by (1) decide the fate of the priority system — and how it should be modified; (2) decide how to make the management of ground water and surface-water rights mutually consistent, and consistent with how water-right priorities are to apply; (3) decide what transitional adjustments will be needed to phase in any changes in a fair and equitable manner from our present unbalanced system; and (4) provide clear guidance to its water officers, especially the State Engineer, on the philosophy and principles that are to govern administration of this state’s water affairs. [A-144]	R2-2 R4-5
	Funding Source for Water Activities = Establish a state-based and managed dedicated recurring revenue stream (e.g., user fees, property tax, etc.) for water projects, planning and conservation, augmented with federal money. [A-59, A-58]	R2-3
	Elephant Butte Loss Accounting = OSE/ISC should assure evaporative losses from EB Reservoir are apportioned fairly between the MRG and S/S RWP regions. [A-51]	R2-4
	Active Administration = Encourage such by the OSE/ISC, improving enforcement so that only the necessary and allowable water is drawn and enforcing water retirements after transfers. [A-143]	R2-5

Preferred Scenario	Assumption / Number	Recommendation Number
	Water Resource Database = Establish and integrate a regional database, including Geographical Information System (GIS) of all relevant water-related data. Continue studies to gauge success and actions. [A-73]	R2-6
	Watershed Management Plans = Implement local and regional watershed management plans through all land and water agencies in the area to achieve common objectives such as increase water yield, prevent erosion, protect and improve forest health, protect recharge zones and protect water quality. Use best management practices (BMPs). [A-66, A-33, A-58]	R2-7
	<ul style="list-style-type: none"> Establish erosion prevention measures and use soil and vegetation management techniques to reduce runoff and increase infiltration throughout the watershed, including forested mountains and uplands. [A-33] 	
	Storm Water Management Plans = Create, enhance and expand local government storm water management plans and programs on a region-wide basis to minimize erosion, control runoff, enhance infiltration and recharge, and prevent pollution of surface and ground water. [A-34]	R2-9
	Comprehensive, Integrated, and Continued Water Planning = <ul style="list-style-type: none"> Local jurisdictions should integrate water plans with planning for land use, transportation, economic development, and other planning efforts of regional significance. Regional water planning should continue through an open, inclusive, and deliberative process to ensure diverse stakeholder participation in the decision making process. In implementing the regional water plan, the Water Resources Board and the Water Assembly should work together to establish a process for monitoring and measuring progress toward achieving success of the plan. Update as necessary the provisions of this. Enhance the quality and quantity of hydrological data for water budgeting. Continue studies to gauge success and actions. [A-53] 	R2-8
	<ul style="list-style-type: none"> Establish performance measures to gauge the ability of local governments to implement this plan and regularly report back to the public. [A-60] 	
	Cooperative Regional Water Management = <ul style="list-style-type: none"> Jurisdictions are encouraged to work together to design implementation mechanisms for the plan that are effective, fair, wise, equitable, legal, and appropriate to local community concerns and meet the plan’s mission and goals. Local jurisdictions should explicitly share the task of balancing the regional water use with renewable supply and implement sustainable water resource management to reduce water consumption, minimize impact on water resources, encourage conservation-oriented economic development; ensure adequate water supplies for any proposed development, protect and enhance the environment, and consider the carrying capacity and location of development, integrate with other major plans in the region. This recommendation could create a mechanism for funding larger projects by pooling resources. [A-67] 	R2-10 10.1.3

Preferred Scenario	Assumption / Number	Recommendation Number
<p>st P is duplicative of R2-8</p>	<p>Land Use Management and Planning = • Encourage local jurisdictions to integrate the land use, transportation, economic development, and water components of each of their comprehensive plans; and to integrate their comprehensive plans with the regional water plan.</p> <p>Local jurisdictions should: • Increase urban building densities and infill development through adoption of local government land use policies, incentives, and regulations. Higher-density development would reduce the relative footage of landscaping and associated water use.</p> <p>Approved by the Water Assembly, but the Water Resources Board wants to be on record as opposing the following:</p> <p>• Prepare and adopt water budgets which provide specific annual targets/limits for new development based on known available water resources. Water budgets should be reviewed annually and revised as necessary. • Adopt policies to integrate land use and transportation planning and water resource management in all government jurisdictions in the Middle Rio Grande water planning region; and take water supply availability into account when making land use development decisions. Adopt policies that coordinate water impact considerations with all land development and other uses of water. • Develop a sustainable and coordinated growth management plan for adoption and implementation by local governments in the middle Rio Grande region in order to: 1) reduce water consumption; 2) minimize impact on water resources; 3) encourage conservation-oriented economic development and 4) ensure adequate water supplies for any proposed development. Local governments and/or the state Legislature should establish a review process so that each new industrial, commercial, residential and municipal development be reviewed to ensure ongoing availability of adequate water supplies, including recognition of cumulative impacts on water. • Establish, assess and collect development impact fees that include the marginal full cost of extending the water service area and the marginal full cost to purchase and transfer associated water rights. [A-52, A-30, A-28, A-144]</p>	<p>R2-12</p>
<p>9.3.5 Measurement</p>	<p>Water Monitoring and Measurement</p>	<p>10.2.3</p>
	<p>Measure All Water Uses = measure all uses of water in the MRG and report at the single user level, beginning with new uses and retrofit as soon as possible. [A-7, A-8, A-73]</p>	<p>R3-1</p>
<p>9.3.6 Agriculture</p>		<p>10.2.4</p>

Preferred Scenario	Assumption / Number	Recommendation Number
<p><i>Actions</i></p>	<p>Upgrade Agricultural Conveyance Systems [A-9]</p> <ul style="list-style-type: none"> • Model = line 150 of the 750 miles of MRGCD irrigation conveyances, chosen after consideration of extent of leakage, impact on the recharge to the underground reservoir, water preservation vs. riparian users, impact on water quality, impact on domestic wells, and impact on habitat • Model = line 7,500 acres of on-farm irrigation canals • develop drip irrigation on 2,500 of the 50,000 irrigated acres under cultivation. 	<p>R4-1 Model (numbers not included in R4-1)</p>
	<p>Level Irrigated Fields = laser level fields [A-10]</p> <ul style="list-style-type: none"> • Model = 22,000 acres 	<p>R4-2 Model (numbers not included in R4-2)</p>
	<p>Establish a Local Marketing Infrastructure = Develop for locally-grown produce, value added products and low-water use alternative crops. In particular, increasing production of low-water alternative crops would reduce overall dependence on water. Research is required to identify the crops and the markets, and a plan for the transition. [A-11]</p>	<p>R4-3 Model</p>
	<p>Acequia Efficiency Programs = Protect culture and rights. Encourage funding for acequia conservation programs [A-60]</p>	<p>R4-4</p>
	<ul style="list-style-type: none"> • Provide education for farmers, ranchers, newcomers, and delivery system operators on available supports and ways of operating efficient water conveyance system. 	<p>R4-4</p>
	<p>Recognize Agricultural Traditions in the Region (Goal C)</p>	<p>R4-5</p>
	<p>Neither total crop acreage nor crop type distribution is recommended. With no policy changes there is likely to be a 25-30% reduction in irrigated acreage by 2050. [FWUP] Model assumes reduction in the alfalfa & pasture acreage.</p>	<p>Model</p>
<p>9.3.7 Water Quality</p>		<p>10.2.5</p>
<p><i>Actions</i></p>	<p>Mitigate Septic Tank Impacts = Where a potential health risk exists, conventional septic systems be replaced by the construction of new or expanded centralized or distributed wastewater treatment systems, including wetlands, or by the use of advanced technology or re-siting for on-site wastewater treatment. [A-26, A-47]</p>	<p>R5-1</p>
	<p>Improved Water Quality Sampling and Testing = Improve water quality monitoring and testing for ground and surface waters throughout the region. [A-47]</p>	<p>R5-2</p>

Preferred Scenario	Assumption / Number	Recommendation Number
	Protect Water from Contamination = • Ensure compliance with federal, tribal, state and local standards for water quality pertaining to surface waters, drinking water, storm water, and wastewater. • Enforce wellhead protection programs on all public water supply wells within local government jurisdictions. [A-47, A-50]	R5-3
	• Preserve the highest quality waters in the region for drinking purposes.	
	• Join with efforts to mitigate point source pollution impacting the region.	
	• Establish programs to address non-point source pollution in the region.	
9.3.8 Bosque & Other Habitats		10.2.6
<i>Actions</i>	Riparian Habitat Restoration = • removal of exotic vegetation from all 17,000 acres of bosque within the levees and replanting with native plants. [A-1, A-2]	R7-1 Model
	• continued studies on evapotranspiration to apply findings to vegetation management programs	
	• develop the economic potential of non-native species removal, harvesting, and output of products by local industries [A-40, A-2]	
	Constructed Wetlands = creating constructed wetlands for groundwater recharge, water harvesting, habitat improvement, hydrological management of the riparian areas [A-36]	R6-2
9.3.9 Reservoirs	Water Storage to Reduce Evaporative Losses	10.2.7
<i>Actions</i>	Implement Upstream Surface Water Storage = • maintain the pool at Elephant Butte Reservoir at Compact threshold of 400,000 af. • explore options for upstream storage [A-45]	R7-1
	Model assumes that the Abiquiu Shared Pool Authorization will be enacted.	Model

Preferred Scenario	Assumption / Number	Recommendation Number
	Implement Upstream Aquifer Water Storage = initiate studies as to artificial recharge capabilities in the region [A-46] Model assumes will occur in 2010	R7-2 Model
	Implement Aquifer Storage and Recovery for Drought = To ameliorate the short term fluctuations in regional supply, surplus water would be pumped into the depleted aquifers during wet years, and be retrieved for use during dry years. Technology assessment and engineering feasibility for these recommendations should be started so as to determine practicality. [A-46]	R7-3
	Water Modeling = The state and appropriate federal agencies should improve and increase monitoring and modeling of the surface water system, improve water management at the watershed level, and retain excess water flow from EBR during wet cycles. It is recommended that the state use the modeling data to anticipate and manage EBR spills and to better administer upstream retention and aquifer recharge. [A-38, A-143, A-144]	R7-4
9.3.10 Desalination & Other Technology	Desalination and Transfer of Water	10.2.8
	Recognizes caveat that all future water needs are to be met by supplies within region	Handbook
<i>technological approaches</i>	Develop New Water Supplies through Desalination = • treating saline and brackish water for potable or non-potable use in the region. • fund technical and feasibility studies. [A-39] • Model assumes 22,500 acre feet per year will be available within 30 years from Tularosa and some beginning in 2020	R8-1 Model
	Investigate the Potential for Importing Water = Examine the potential of securing and importing large volumes of water from currently unused sources. Water should not be imported where it would cause environmental harm or economic hardship to communities in the watershed from which water is being imported, or where projects rely upon large federal subsidies provide limited economic benefits. [A-69]	R8-2
	Undeclared Water = The State Engineer should declare all waters in the state, regardless of depth and quality, so as to enable proper administration and protection of all of the waters in the state. [A-39, A-69, A-143]	R8-3
9.3.12 Transfers from Socorro and Sierra Counties	• phreatophyte species will be removed from all 17,500 bosque acres in Socorro and Sierra counties and will be revegetated with native species (leaving saved water in the river).	Model
<i>Actions</i>	• surface water rights will be bought from the agricultural users at a cost of \$20,000 per acre, reducing agricultural acreage from about 17,500 acres to 12,500 acres (for use in MRG Region) [A-69]	Model

Preferred Scenario	Assumption / Number	Recommendation Number
	<ul style="list-style-type: none"> • As a baseline, we need to make sure the current/historical flows to MRG from Jemez y Sangre are consistent between the two Regions. 	
	<ul style="list-style-type: none"> • As a baseline, we need to make sure the current/historical flows to Socorro/Sierra from MRG are consistent between the two Regions. 	
9.3.4	Public Education	10.2.9
<i>Actions</i>	Develop a Water Education Curriculum for Schools = School curricula and projects be developed to teach children the importance and value of water in the region. Especially important are issues of water conservation, where water comes from, and cultural values associated with water. [A-56]	R9-1
	Implement Adult Public Education Programs = Establish region-wide and local public education programs to encourage a more complete awareness of the full range of water related subjects among the citizenry, and to enhance voluntary water conservation programs recommended elsewhere in this section.	R9-2

Chapter 10 References

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