8

Water Plan Alternative Actions and Evaluation

The alternative actions presented in this plan are the products of a long and extensive compilation, selection, and evaluation process designed to maximize input from many sources. Since 1999, the Alternatives Working Team of the Middle Rio Grande Water Assembly's (Water Assembly) Action Committee has been instrumental in formulating and analyzing alternative actions for water management in this region. The Alternatives Working Team established a methodology and decision process for identifying and evaluating feasible alternatives for regional water management to meet anticipated water demand (Alternatives Working Team 2001). A unique aspect of the analysis methodology was applying a two-track evaluation process. One track required a feasibility analysis by a consortium of experts while another track utilized a public participation process to identify public preferences regarding each alternative. Both sets of evaluations were considered in creating the recommendations in this plan.

8.1 Candidate Alternative Actions

The Water Assembly conceived the idea of "alternative actions" to provide specific technical, planning and management actions designed to reduce water consumption and/or to use water resources more efficiently. These alternative actions were intended to eventually form the basis of the Middle Rio Grande Regional Water Plan. At a variety of public meetings and workshops over a two-year period, the Water Assembly asked members of the public, technical experts and water managers to suggest alternative actions that could or should be included in the plan. This process generated 273 ~~alternatives~~suggested alternative actions. The Alternatives Working Team screened this initial set to eliminate duplication and to consolidate ~~alternatives~~ where possible into a smaller number of more composite alternative actions. The result was a list of 44 candidate alternative actions that could then be analyzed for their feasibility and popularity. Supporting Document E-7 provides information on how each alternative action was handled. For organizational purposes the candidate alternative actions were classified into seven broad categories:

- Increase water supply
- Decrease or regulate water demand
- Change water use
- Water rights regulation
- Water quality protection
- Implementation of the water plan
- Funding

Under these categories, the alternative actions were released to the general public in September 2002 and at the Community Conversations Series 5 held that month, attendees were asked to select their most preferred and least preferred alternatives.

In October 2002 the Mid-Region Council of Governments issued a contract to Daniel B. Stephens and Associates Inc. to provide detailed feasibility analyses and prepare fact sheets on 25 of the alternatives. The large number of alternatives combined with limited funding precluded conducting detailed analyses on all 44 alternatives. Consequently, the Alternatives Working Team and the Analysis Team (both of which included technical experts as members) conducted a preliminary review of all 44 alternatives and identified the 25 that were most appropriate for detailed analysis ~~the most complex, in terms of technical, physical,~~

~~hydrological and environmental attributes~~. The contractor subsequently evaluated these. The Alternatives Working Team, through a qualitative approach that was less intensive but sufficient for understanding each alternative ~~in relation to the others~~, evaluated the remaining 19 alternatives and prepared fact sheets. Supporting Documents Series G present the fact sheets that Daniel B. Stephens and Associates developed and Supporting Documents series J provide the fact sheets that the Alternatives Working Team developed.

Sections 8.1.1 to 8.1.7 present the highlights of the analysis of the 44 candidate alternative actions. For each alternative, there is a description and a several key points to provide a sense of the nature and scope of the alternative. The brief analysis looks at issues relating to water, cost, time, tradeoffs, and other considerations. The alternatives are arranged by the seven broad categories identified above. For each alternative, the A-number (e.g. A-66) reflects an original coding system to provide each alternative with a consistent referent throughout the planning process.

8.1.1 Category: Increase Water Supply

Watershed Plans (A-66)

DESCRIPTION: Implement local and regional watershed management plans through all land and water agencies in the planning area. Once a water plan is agreed upon, coordinate the implementation among the numerous agencies at local, state, tribal, and federal level, which have some jurisdiction in the matter.

BRIEF ANALYSIS:

Water:

- Watershed treatments may improve water quality
- For potential changes in supply, thinning was evaluated because it has the largest impact on regional supplies
- Thinning forests increase stream flow where precipitation > 20 in/yr
- Save 5,000 to 15,000 acre-feet per year (afpy) for 30 to 70% of such area

Cost:

- Thinning: $250 to $1,000/acre depending on terrain

Time:

- Immediate to ongoing

Tradeoffs:

- Thinning may increase erosion and add new road construction
- Environmental impacts, if not done properly

Other Considerations:

- Watershed treatment also includes enhanced infiltration, erosion prevention and development controls (A-33)
- Increased streamflow likely to fulfill existing water rights - not result in new water right
- Watershed treatments such as grazing management could result in improved water quality
- Forest management can help to prevent catastrophic forest fires

Bosque Management (A-1)

DESCRIPTION: Restore bosque habitat and manage vegetation in the bosque to reduce evapotranspiration by selectively removing vegetation and promoting native plants. For example, the Russian olive and salt cedar trees are high water consumers and inhibit the growth of other low-water plants. Return the bosque either to cottonwood or a mosaic of grasses, trees and shrubs. Research is underway to determine how much water would be saved.

BRIEF ANALYSIS:

Water:

- Removing high water use plants in bosque (~~17~~13,000 acres) could save 13,900~~17,680~~ afpy

Cost:

- Initial removal cost: $180 to $~~2500~~600/acre
- Minimal maintenance cost~~- in areas with high success rates. Maintenance costs increase in less successful sites where the re-growth must be removed more frequently.~~

Time:

- Immediate to ongoing

Tradeoffs:

- Necessity of increased protection due to increased access

Other Considerations:

- Revegetation not recommended where cottonwood overstory is present
- Endangered species may be affected if projects improperly planned
- Increased streamflow likely to fulfill existing water rights - will not result in new water right

Reservoir Management (A-45)

DESCRIPTION: Reduce open water evaporation in storage reservoirs by retaining water at higher elevations or latitudes, or by reducing surface areas. Under the provisions of the Rio Grande Compact, NM must reserve a certain amount of water in the Elephant Butte reservoir for use by Texas. Both the shape of the reservoir, which has been compared to a champagne glass, and the location, which is in a hot area of the state, contribute to a high percentage of evaporation. Water lost to evaporation is not counted toward the deliverable to Texas. Proposal is to reduce the amount of water lost to evaporation by any of various means, including:

1. Cover Elephant Butte Lake with surfactants, a thin layer of “goop” that would reduce evaporation. Sandia National Laboratories is working to develop a non-hazardous product that would do this.
2. Store some or all of the water in a cooler region. With a better management plan, it might be possible to minimize the water sent to Elephant Butte and keep it in a cooler region of the state. Or, it may be possible to negotiate new agreements with Texas and Colorado within the Compact.
3. Aquifer storage and recovery may solve some of the legal obstacles to alternate storage.

BRIEF ANALYSIS:

Water:

- Save 3,800-7,300 afpy by moving 50,000 to 100,000 acre-feet (af) from Elephant Butte Reservoir to El Vado or Abiquiu Reservoirs

Cost:

- Elephant Butte to Abiquiu = $130/af

Time:

- 5 years to decades

Tradeoffs:

- Impact on recreation
- Inundation of private property

Other Considerations:

- Dredging
- Surfactants
- New Reservoirs
  - ~~Obtaining city of Albuquerque concurrence, which would be dependent upon whether any excess space is available given city storage needs and commitments of storage space to other entities~~
  - ~~Obtaining legal permission from landowners~~
  - ~~Obtaining a permit from the New Mexico State Engineer~~
  - ~~Concurrence of the Rio Grande Compact Commission~~
  - ~~Environmental compliance~~

Surface Modeling (A-38)

DESCRIPTION: Increase monitoring and modeling of surface water system to improve water management at the watershed level, and retain excess water flow from Elephant Butte Reservoir during wet cycles. Under the Rio Grande Compact, NM accrues credits for excess water flow and debits for deficits. A spillover of the Elephant Butte dam wipes out all accumulated debits. Proposal is to improve monitoring of the snow pack so that NM is able to predict how much water to let flow down to Elephant Butte and thereby manage the wet year water excess to NM's best interest.

BRIEF ANALYSIS:

Water:

- No direct water savings from modeling
- Water savings could occur if modeling is used to improve efficiency

Cost:

- Operation and maintenance costs = $1 million on Upper Rio Grande Water Operations Model
- Federally financed

Time:

- Ongoing

Time:

- Ongoing, long term

Tradeoffs:

- Reduced flow to the river
- Potential increase in evapotranspiration

Other Considerations:

- Improved water quality and habitat
- Clean Water Act Urban Storm Water Regulations – Phase II
- Potential for state/federal program funding

Weather Modification (A-42)

DESCRIPTION: Conduct research on innovative water supply enhancement techniques such as weather modification. If a way is found to do this effectively in this region, it could create additional water supply. This is a highly experimental field.

BRIEF ANALYSIS:

Water:

- Cloud seeding program to increase precipitation
- 10 to 20 percent gain in precipitation in experimental target areas

Cost:

- Annual operating costs: $200,000 to $500,000

Time:

- Immediate and ongoing

Tradeoffs:

- Unpredictable results of cloud seeding

Other Considerations:

- Program in partnership with state and federal agencies
- Cloud seeding dependent on moist air mass

8.1.2 Category: Decrease or Regulate Water Demand

Urban Conservation (A-18)

DESCRIPTION: Adopt and implement local water conservation plans and programs in all municipal and county jurisdictions, including drought contingency plans. Many programs are possible; for example, publicity campaigns, pricing schemes, or installation of low-flow devices. Encourage xeriscaping and drip irrigation. For example, bluegrass requires three times as much water as does native gramma or buffalo grass. In urban areas, where half or more of total water use is for landscaping, the substitution of low-water-use plants for high-water use varieties will save significant amounts of water. Note that groundwater pumping supplements river flow when it is returned as waste water. Therefore, reducing pumping will result in less return flow to the river, with its consequences, both to the environment and to the state's ability to meet its Compact obligations.

BRIEF ANALYSIS:

Water:

- Demand reduction: 149,000 to 155,000 af by year 2010
- Demand reduction: 238,000 to 292,000 af by year 2050

Cost:

- Per household: $25 to $950 for indoor plus $500 to $5,400 for landscape conversion

Time:

- Immediate and ongoing

Tradeoffs:

- Reduces return flow

Other Considerations:

- High level of voluntary compliance required

Urban Water Pricing (A-21)

DESCRIPTION: Examine a variety of water pricing mechanisms and adopt those that are most effective at conserving water. The mechanisms to be examined include: a) price water to reflect the true value; b) institute a moderately increasing block price schedule; c) institute a steeply increasing block price schedule; and d) other feasible incentives and subsidies for conserving water. In order to implement and enforce several of these mechanisms, metering and recording are necessary.

BRIEF ANALYSIS:

Water:

- 10% reduction for 100% increase in cost

Cost:

- Assumes doubling of public water supply prices
- $6,300/ af reduction in demand

Time:

- Rate change approval and implementation (1 year)

Tradeoffs:

- Assumes excess revenues reinvested in water related projects
- Equity issues regarding low-income households

Other Considerations:

- ~~Potential legal restrictions facing water utilities. For example, the City of Albuquerque water utility must legally deliver water at the cost it takes to produce it.~~

Conservation Incentives (A-22)

DESCRIPTION: Provide local government programs that offer subsidies for adoption of water efficient technologies and utilization of water saving devices. Promote the transition to water-saving devices and water-efficient technologies through incentives

sponsored at the local level. (This could apply to both municipal and industrial customers.)

BRIEF ANALYSIS:

Water:

- Possible reduction in demand
- Savings are accounted for in A-18

Cost:

- Rebate costs: $140 to $200/af saved

Time:

- Immediate and ongoing

Tradeoffs:

- Reduced wastewater flows and return

Other Considerations:

- Requires very strong conservation commitment to achieve projected savings

Education (A-56)

DESCRIPTION: Establish region-wide educational programs, including public and private school curricula, to encourage voluntary conservation of water. Over the long-term this will raise consciousness and change lifestyle use of water.

BRIEF ANALYSIS:

Water:

- Reduced demand 3 to 15% (5% = 8,700 acre-feet)
- Water savings included in A-18 water savings

Cost:

- $80,000/year
- $9/af water saved/yr

Time:

- Immediate and ongoing

Tradeoffs:

- Reduces return flow

Other Considerations:

- Most successful if integrated with other conservation programs

Agricultural Metering (A-7)

DESCRIPTION: Meter and manage surface water distribution flows through all irrigation systems to conserve water. Allows the accurate measurement and control of permitted water use and associated losses. Metering by itself may encourage conservation.

BRIEF ANALYSIS:

Water:

- 10% estimated improvement in irrigation system efficiency

Cost:

- Estimated Middle Rio Grande Conservancy District cost (Interstate Stream Commission funded) for 2003-04: $160,000
- Proposed program cost: $7 million

Time:

- 5 year implementation

Tradeoffs:

- Increased administrative, operational, and maintenance cost

Other Considerations:

- Legal technicalities regarding "banked" water rights~~Ownership of saved water is an issue~~

Irrigation Efficiency (A-10)

DESCRIPTION: Develop and employ alternatives to maximize irrigation efficiency on all irrigated land in the region. This is a follow-up to alternative A-7. Mechanisms include, but are not limited to:

1. Install drip, sprinkler, surge, or furrow irrigation where feasible. Note that this may not be feasible for some field crops such as alfalfa.
2. Laser-level fields to remove depressions where irrigation water settles.
3. Aggregate the small, strip farm plots so that alternatives become cost-effective.

BRIEF ANALYSIS:

Water:

- 7 to 14% improvement in on-farm irrigation efficiencies through land preparation, on-farm water management, on-farm water metering
- Program would address three farming/irrigation categories of use

Cost:

- $29 million for regional program

Time:

- 5 to10 years

Tradeoffs:

- Reduces recharge to ground water, which could impact ecosystems within the overall Middle Rio Grande Conservancy District irrigated areas

Other Considerations:

- Significant technical and financial assistance components

Conveyance Systems (A-9)

DESCRIPTION: Develop conveyance alternatives for water transportation in agricultural irrigation systems. Most irrigation systems in the Middle Rio Grande (MRG) planning region deliver water and carry some return drainage flow through unlined ditches (canals). Off-farm irrigation water losses exist as riparian evapotranspiration, seepage, illegal

Tradeoffs:

- Social and cultural implications

Other Considerations:

- Increased viability of acequia systems

8.1.3 Category: Change Water Uses to Increase Supply or Decrease Demand

Low-Water Crops (A-11)

DESCRIPTION: Develop markets for locally-grown produce, and low-water alternative crops. Increasing production of low-water alternative crops would reduce overall dependence on water. Research is required to identify the crops and the markets, and plan for the transition. Investigate the associated costs, labor, and time requirements.

BRIEF ANALYSIS:

Water:

- Switching 5,000 acres from alfalfa to sorghum would reduce consumptive use by 4,300 acre-feet ~~or fulfilling this need for alfalfa with hydroponic forage could save 99% of the water traditionally used on alfalfa~~

Cost:

- Variable, depends on market

Time:

- Immediate and ongoing

Tradeoffs:

- Change in crops requires different farming infrastructure
- May require more labor and maintenance

Other Considerations:

- No economic incentive for switching crops
- 90% of MRG acreage in forage crops (high water use)

Land Use (A-30)

DESCRIPTION: Adopt policies to integrate land use and transportation planning and water in resource management in all government jurisdictions in the Middle Rio Grande water planning region. Take water supply limitations into account when making land use development decisions. Develop mechanisms for local governments to adopt policies that coordinate water impact considerations with all land development and other uses of water.

BRIEF ANALYSIS:

Water:

- Change in policy had no immediate effect on demand, see A-18 and A-22

Cost:

- Administration and enforcement costs

Time:

- Immediate and ongoing

Tradeoffs:

- Reduced wastewater return flows
- Reduction in water provider revenues
- Increase in development costs

Other Considerations:

- May require more stringent regulatory controls

In-Fill/Density (A-28)

DESCRIPTION: Increase building densities (as compared to typical suburban density) and infill development through adoption of local government land use policies and regulations. This would be accomplished through local government land use policies, regulations, and incentives. Implementing this would require regulatory changes at the local level, for example, making house lots smaller or building multi-story dwellings. Higher-density development would reduce the relative footage of landscaping and associated water use

BRIEF ANALYSIS:

Water:

- Increased density can reduce outdoor water use
- Increase from 5.7 to 7.4 dwellings per acre for new construction reduces outdoor use by 170 afpy

Cost:

- Administration and enforcement costs

Time:

- Effective when new development takes place

Tradeoffs:

- Congestion due to increased density

Other Considerations:

- Not attractive in rural areas
- Reduces sprawl

Preserve Deep Water for Drinking (A-15)

DESCRIPTION: Preserve, but continue to draw, deep-well water for drinking purposes only. Removing vast quantities of water from the aquifer is lowering the water table and creating various surface water problems. Proposal is to limit consumption of aquifer waters for drinking purposes only and obtain water for other purposes from other sources. The technical issue is how to deliver two grades of water to urban user. Installation of a dual-piping system is quite costly for existing construction. An alternative is to make treated river water available from the taps and provide ground water in bottled form.

BRIEF ANALYSIS:

Water:

- Preservation of high-quality deep well water

Cost:

- Cost undetermined

Time:

- Medium range time to implement

Tradeoffs:

- Restricting and controlling deep well water
- May require new infrastructure

Other Considerations:

- Changes to public drinking water habits
- Distribution of drinking water

8.1.4 Category: Water Rights Regulation

Instream Flow (A-63)

DESCRIPTION: Change state water law to include in-stream flow as a beneficial use. Under current law, to maintain a water right, you must put it to beneficial use. Water flowing in the river, known as "instream flow," has not been declared a beneficial use in New Mexico. However, the health of the river affects state parks and animals that live in the river environment. By determining beneficial use to include instream flow there would be some legal protection for riparian uses of water.

BRIEF ANALYSIS:

Water:

- Benefit to riparian environments

Cost:

- Water right transaction cost (move water from existing beneficial use to instream flow use)

Time:

- Immediate and ongoing

Tradeoffs:

- May not necessarily augment flows (water could be lost to seepage)

Other Considerations:

- Office of the State Engineer has authority to recognize instream flow as beneficial use
- Additional statutory clarification would strengthen
- Requires gaging

Conjunctive Management (A-144)

DESCRIPTION: Address groundwater/surface water interactions in the statutes for administering water rights. There is a connection between surface water and shallow ground water. That is, by extracting groundwater, surface water will percolate down to the shallow groundwater and "fill in" the volume of water that has been pumped. This interaction has a time lag and will not be immediately observable. For groundwater wells near the river, the effect may take days or weeks depending on the separation distance. For groundwater wells further away, the effect could take weeks or years. One example of the need for this accounting of the interaction of surface water and groundwater is that a junior water rights holder, who has pumped groundwater, could later "infringe" on the water supply to senior surface rights holders, ~~as~~ particularly during a time of drought. ~~The State Engineer has the power, through permit conditions, to allow the commingling of water rights and the conjunctive use of water. Conjunctive management could be strengthened through the passage of legislation, which would allow for the augmentation of surface waters depleted by groundwater pumping.~~

BRIEF ANALYSIS:

Water:

- Maximizes use of available water resources

Cost:

- Administrative and permitting costs

Time:

- Immediate and ongoing

Tradeoffs:

- Requiring junior users to purchase or lease senior water rights can offset tension
- Administrative (OSE) change necessary to implement

Other Considerations:

- Reduced uncertainty about water availability and transfer

Water Rights Adjudication (A-71)

DESCRIPTION: Identify, quantify, and adjudicate all water rights and the order of wet water utilization in the water-planning region. Adjudication is the legal process of reviewing all water rights claims in an area to determine which are actually defensible. The process results in a clear accounting of how much water may be used and by whom. Currently, on average, there are more claims than there is water, so this process would clarify who must stop using water during a water shortage.

BRIEF ANALYSIS:

Water:

- Prerequisite to water rights determination

Cost:

- High cost to administer

Time:

- Long term to complete adjudication

Tradeoffs:

- Uncertainty of junior rights
- Process may create social conflict

Other Considerations:

- Tribal and acequia concerns
- More orderly management of water

Evaporative Loss Accounting (A-51)

DESCRIPTION: Establish more equitable accounting for evaporative losses in Rio Grande Compact water. Per the Rio Grande compact, NM is required to keep a certain amount of water in Elephant Butte reservoir A large amount of the water in the reservoir is lost to evaporation. The evaporative loss would normally be shared among all water users, both Texas and New Mexico. Change the Compact so that Texas is responsible for some of the evaporative loss, which would reduce the delivery amount that New Mexico owes Texas. Renegotiating the Compact is highly unlikely.~~As the fact sheets in Supporting Document J discuss in more detail, in 1948 the Compact Commission made the evaporative losses more equitable to New Mexico when the gaging points were moved from San Acacia and San Marcial to a new gaging station at Elephant Butte Dam.~~

BRIEF ANALYSIS:

Water:

- Reduction in evaporative losses of water in Rio Grande system ~~Not Applicable~~
- Storage location changes

Cost:

- Cost undetermined~~Not Applicable~~

Time:

- Medium to long range period to implement~~Not Applicable~~

Tradeoffs:

- Impact on lake recreation uses~~Not Applicable~~

Other Considerations:

- Rio Grande Compact issues
- River management
- Fair distribution of consumptive accounting
- ~~It may not be in New Mexico's interest to open negations on the Rio Grande Compact because other issues may arise.~~

8.1.5 Category: Water Quality Protection

Water Quality (A-47)

DESCRIPTION: Identify, protect and monitor areas vulnerable to contamination (quality issue) and restrict groundwater supply wells in sensitive areas. This is a particular issue where there is a high-density of shallow wells, septic systems, and leaking storage tanks. Development near many public wells is not monitored or controlled and could create sources of contamination of the public water supply. In addition, high concentrations of domestic wells in close proximity to septic systems represent a serious regional water contamination issue. Local governments do not keep records on the relative placement of wells and septic systems.

BRIEF ANALYSIS:

Water:

- Higher treatment costs required to make water available for different beneficial uses
- Arsenic and septic contamination are primary water supply concerns

Cost:

- Cost of administration and management
- High cost to monitor ground water quality
- High clean-up costs

Time:

- Immediate and ongoing

Tradeoffs:

- Development restrictions in vulnerable areas

Other Considerations:

- New standards (i.e., arsenic by 2006)
- Already numerous contaminated areas
- Identification and protection of vulnerable areas

Domestic Wastewater (A-26)

DESCRIPTION: Expand use of centralized wastewater collection and treatment systems into all areas of urban and suburban development within the water planning region. Certain areas of the region rely on septic tank systems, which do not adequately purify the water before it returns to the groundwater. Technical limits such as distance and pipeline size make implementation costly.

BRIEF ANALYSIS:

Water:

- No effect on demand
- Supply could be increased with use of treated wastewater

Cost:

- Regional system expansion capital cost in 2003: $67 to181 million
- Regional system operation and maintenance cost for 2003: $3 to12 million

Time:

- Ongoing

Tradeoffs:

- More water for use, less pollution, reduced ground water recharge
- May induce new development

Other Considerations:

- Major infrastructure development required

Well Head Protection (A-50)

DESCRIPTION: Enforce wellhead protection programs on all public water supply wells within local government jurisdictions. Federal and state regulations stipulate that public water supply wellheads must be protected to prevent contamination of groundwater.

Time:

- Current and ongoing

Tradeoffs:

- Potential for incompatible and contentious local water management without consensus on regional water policy

Other Considerations:

- Necessity of dedicated, ongoing funding
- Regional plans provide crucial input to state water plan

8.2 Evaluation of Alternative Actions

The contracted consultant (Daniel B. Stephens & Associates, Inc.) rated the 44 alternative actions using a 5-point rating scale, with a score of 1 meaning low feasibility and a score of 5 meaning high feasibility. Each alternative action was assigned a feasibility rating score for each of five attributes:

- Technical feasibility
- Physical, hydrological, and environmental aspects
- Economic impacts
- Social and cultural implications
- Legal implications.

Attribute Ratings are based on professional judgment of technical team. The consultant team established the following written criteria to use in determining an alternative's rating:

Technical feasibility

1 Major impediment, very high cost, requires developing and proving new technology, lengthy or unknown time frame to implement.

2 Technology is under development but not proven, not cost effective, lengthy time frame to implement.

3 Innovative technology, costs are generally higher than market price of water, moderate time frame to implement.

4 Can be implemented fairly quickly, cost effective, common technology.

5 No impediments, quick, very cost effective, already being done.

Physical, hydrological, and environmental aspects

1 Will lose some water, (e.g. increases evaporation), highly detrimental environmental effects, degrades water quality.

2 Potential to lose water, negative environmental effects, potential to degrade water quality, significant infrastructure requirements.

3 Does not necessarily gain water or improve water supply management. No significant environmental impacts, does not improve or impair water quality, moderate infrastructure requirements.

4 Results in some water savings, potential to enhance natural environment, may improve water quality. Few infrastructure requirements.

5 Results in significant water savings, environmental enhancements, and improves water quality. No infrastructure requirements or highly feasible infrastructure requirements.

Economic impacts

1 Economic impacts are borne solely by the region, without state or federal assistance.

2 Economic impacts are borne by the region, with minimal outside assistance.

3 Economic impacts are borne by the region with some state funding of the alternative.

4 Significant amount of funding will come from state and federal resources. Region will contribute minor portions. Beneficial to regional economy.

5 Majority of funding will come from federal and state sources outside the region, with region gaining significant economic benefit. Highly beneficial to regional economy.

Social and cultural implications

1 Unacceptable to broad range of social groups.

2 At least one social group will oppose the alternative.

3 Advantages and disadvantages are in equilibrium.

4 Generally acceptable to most social groups, some resistance may still occur.

5 Acceptable and desirable for most social groups.

Legal implications

1 Very difficult change in existing federal/interstate law; high risk that any proposed change to such existing law would not be successful, not in compliance with Compact, permit applications precedent-setting approval not likely within planning period.

2 Possible to change law, but difficult due to political opposition; lengthy process to make legal change, Compact issues, permits are extensive, technically complex, and may require entire planning period to obtain approval. Few permits, if any, exist for similar projects.

3 Possible, more routine, less controversial legal change; still may involve complex approval requirement; may involve potentially novel concept, significant permitting efforts, but some similar permitting has been achieved.

4 Minimal legal barriers; local or regulatory change already supported by statute, permitting process lengthy, but similar projects already permitted.

5 No legal barriers/already occurring; permitting routine.

The political feasibility for each alternative was assessed via a survey of elected officials with jurisdiction in the regional water planning area. Because local government officials have the authority to ultimately carry out a local water management program, the elected officials were asked to consider whether there might be local support or opposition to the alternative, potential interagency conflicts, and what the means of implementation might involve. Like the other feasibility scores, a 1 meant that the alternative had low feasibility and a 5 meant that the alternative was highly feasible. **Table 8-1** shows the results of these rankings.

8.3 Public Preferences Among Alternative Actions