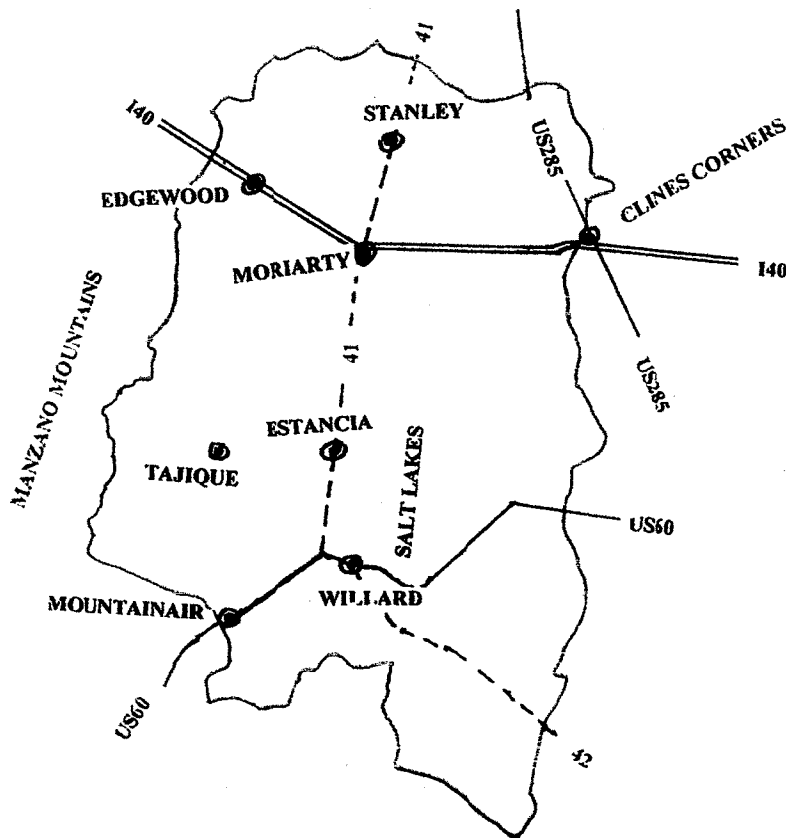


**ESTANCIA BASIN**  
**RECOMMENDED REGIONAL**  
**WATER PLAN**  
**(YEAR 2000 TO YEAR 2040)**

**EXECUTIVE SUMMARY**



**Estancia Basin Water**

**Planning Committee**

**January 8, 1999**

**Prepared by:**  
**Corbin Consulting, Inc.**  
**Santa Fe, New Mexico**

## **EXECUTIVE SUMMARY**

In the late 1980's and early 1990's residents of the Estancia Basin became increasingly concerned about declining water levels, and their perception that water quality was deteriorating in the Basin. In late 1993 Torrance County established the Estancia Basin Water Planning Committee composed of citizens representing major stakeholders in the Basin to address water resource related concerns. In mid-1995 the Committee was formally established as a tri-county entity (Torrance, Bernalillo and Santa Fe) to address water resource related issues through an integrated Basin-wide approach. With funding from the New Mexico Interstate Stream Commission, basin entities and counties, the Committee began to develop this Water Plan as its Number One Priority.

In 1995, 1996 and 1998 the Committee held a series of public meetings throughout the Basin to gather public input about water related concerns and possible recommended solutions, and to obtain public input on the Phase I Report (past and present water resource related data and future growth, population and use projections). Several concerns, comments and suggestions were offered. The major public concerns and recommendations have been summarized below:

### **THE TOP PUBLIC CONCERNS/RECOMMENDATIONS**

- **EXPORTATION OF WATER – prohibit or severely limit (the Number One Individual Concern)**
- **WATER RIGHTS – protect existing water rights; prevent additional appropriation of more water rights; address State of New Mexico “use it or lose it” policy to make rural conservation work**
- **SUSTAINABLE WATER SUPPLY – protect present lifestyle(s) and ensure future economic health of the Basin**
- **RECHARGE AND OTHER AQUIFERS – what is available in the other aquifers and how does recharge work**
- **BASIN MANAGEMENT (LOCAL CONTROL/LOCAL PROGRAMS) – Single-focused local entity with dedicated funding and basin-wide programs and policies that are developed and executed at the local level**
- **COMPREHENSIVE PROGRAMS–in the following areas:**
  - \*Conservation      \*Education      \*Information
  - \*Monitoring      \*Metering      \*Investigations

- **BUREAUCRACY – needs to be local effort and local control**
- **FUNDING – Basin specific Water Resources Trust Fund with dedicated sources of funding controlled at the local level**

Given the concerns and recommendations of Basin residents, the Committee compiled and reviewed known data on water resources in the Basin and developed future economic, population and water use projections (Phase I Report); evaluated and summarized the data; developed conclusions, goals and alternatives; applied the New Mexico Interstate Stream Commission Criteria from the NMISSC Regional Planners Handbook and Template to analyze five basic scenarios; developed the Water Plan; presented the Water Plan for public scrutiny and comment; finalized the Water Plan and presented it to the New Mexico Interstate Stream Commission.

**PUBLIC INPUT–THE KEY:** Public participation has been the key in the development of this Water Plan. The Committee is composed of citizens appointed by the respective County Commissions in each county and by the major stakeholders in the Estancia Basin. Committee meetings have been advertised in the Basin media, have been open to the public, and have been well attended by the appointed committee members and citizens interested in the effort. Newspaper articles, presentations to local civic groups, public presentations, briefings for the Office of the State Engineer and New Mexico Interstate Stream Commission and all three county commissions, and a series of public input meetings (1995, 1996 and 1998) have been conducted to ensure that the Plan reflects the concerns, needs and public welfare of Basin residents. The Water Plan has received positive press coverage in the Basin media and newspapers and has generally been well received by Basin residents.

**DECLINING WATER LEVELS:** Data indicates that water levels in the Valley Fill Aquifer (the primary aquifer supplying Basin water needs) are declining with a present annual average loss rate of about 45,000 acre-feet per year. The average loss (depletion) rate is projected to increase over the next 40 years to about 50,000 acre-feet per year based on the population and growth projections in and near the Basin by the Bureau of Business Economic Research. Irrigated agricultural acreage, the largest water user, while fluctuating based on market and climatic conditions is projected to remain generally constant over the next 40 years. The Office of the State Engineer's administrative and mined basin policies are projected as likely to continue. Recent presentations by the Middle Rio Grande Council of Governments to the press and media indicate significantly increased development in the northern portions of the Basin and in the areas adjacent to the northwestern portion of the Basin in the next 50 years. The amount of water supply available in the Valley Fill Aquifer is known with a reasonable degree of certainty. The water supply present in the other aquifers is quite uncertain. It is likely that significant amounts of water exist where there is major faulting and fracturing, but that the bulk of the other aquifers may have much less water than some would like to believe. Even if the other aquifers hold significant amounts of water, many residents of the Basin are not in a position to drill to the

depths required to tap these questionable water supplies. The economic hardship on Basin residents to shift to other sources of water (deeper aquifers or transportation of water over significant distances) will create severe economic hardship for many.

**DETERIORATING WATER QUALITY:** Deteriorating water quality, particularly in the more heavily developed and developing areas, is a concern. Increased nitrate levels have been observed and other contaminants are suspected, although the New Mexico Environmental Department and the counties have no specific evidence of widespread water quality deterioration. Significant concern about abandoned wells, poorly functioning or broken septic systems, the increasingly heavy concentration of septic systems in some areas of the Basin, and brine (salt water) intrusion into the aquifers exists. In addition, an E-coli incident from surface contamination in the Town of Estancia's water supply due to a break in their water supply system occurred last winter. Concern has been expressed about agricultural contamination (pesticides, fertilizers and animal waste) although no significant documented cases exist at this time.

**DEMAND (USE) CONCERNS:** The bulk of the Basin's current demand and water supply comes from the Valley Fill Aquifer, about 95 percent. Most of that water is used to support irrigated agriculture. The remainder serves the needs of the towns of Willard, Estancia, Moriarty and Mountainair and various individual domestic well users. About five percent of the Basin's water supply requirements are served by the other aquifers. Much of the new development projected over the next 40 years is located in areas that might be served by the other aquifers, assuming that the water is present and reasonably available. Many people believe that these other aquifers are interconnected with each other and the Valley Fill Aquifer, and may be providing some amount of water to the Valley Fill Aquifer. If true, depletion of water from the other aquifers could worsen the problem facing people and businesses who are dependent on the Valley Fill Aquifer. While portions of the Glorieta Sandstone and Madera Limestone Aquifers may be excellent sources of water, there are indications in some areas that yields are dropping and that well levels are declining in these aquifers as well. It is clear from reading the water level logs of wells over time that the water levels in most wells in the Basin are declining, some by as much as 60 feet in the past 30 years. Thus, a conservative approach to water resource management is required to forestall and lessen hardship on Basin residents.

**RECHARGE CONCERNS:** The recharge of the Valley Fill Aquifer seems to be averaging about 13,000 acre-feet per year based on demand and depletion data. The water level declines in the various wells in the majority of the Valley Fill area seem to bear this out as well. Recharge to the Basin as a whole appears to be about 37,000 acre-feet. While it is possible that this recharge goes into the Madera, Glorieta and other aquifers, it is also possible that invasive vegetation in the western part of the Basin and other activities may be intercepting much of that recharge. The Plan includes monitoring and investigation programs to begin to see if we can find out what's really happening to the recharge. Further, it has been suggested in the public meetings by old time oil and gas drillers and geologists that the other aquifers may not be as extensive as is presently believed. Again, the suggested programs should help to address these questions and concerns.

**AN UNCERTAIN FUTURE:** Based on the projections and past and current usage data about 120 years of water supply appears to remain in the Valley Fill Aquifer, the Basin's major source of water. The amount of water in storage in the other aquifers has not been determined with any real accuracy. The State Engineer administers the Basin based on the water in storage in the Valley Fill Aquifer and assumes that the Valley Fill Aquifer serves as the recharge mechanism for the other aquifers. Current water management policies ("mined basin," approved exportation of water, appropriation of new water rights) contribute to the continued depletion of the aquifers and do not assist in moving the Basin towards the goal of a sustainable water supply as required by the New Mexico Interstate Stream Commission. About three to four times more water rights have been recognized by the State Engineer than have been put to use, causing further concern. Under the current block water rights appropriation policies it appears that many more acre-feet of water rights could be appropriated than currently exist, causing even more concern.

**REQUIREMENT–SUSTAINABILITY/SELF-SUFFICIENCY:** The New Mexico Interstate Stream Commission has directed that regional water planning be based on the water supply available in a specific region. The guidelines published in their Regional Water Planning Handbook and Template emphasize that any regional water plan must be based on self-sufficiency and a sustainable water supply. The Estancia Basin Water Planning Committee has combined this guidance with that provided by the three counties (Santa Fe, Bernalillo and Torrance) and the concerns and recommendations received from Basin residents to guide the development of this Water Plan. It needs to be recognized that there is a significant conflict between the New Mexico Interstate Stream Commission guidance and the mined basin and block water rights appropriation policies that the Office of the State Engineer uses to manage the Estancia Basin.

**SCENARIO DEVELOPMENT AND EVALUATION:** The Committee developed five scenarios:

- Scenario #1 – "Status Quo" where current practices and policies continue
- Scenario #2 – "1910 Condition" where the Valley Fill Aquifer is returned to 8.1 million acre-feet of water supply in storage
- Scenario #3 – "1960 Condition" where the Valley Fill Aquifer is returned to 7.8 million acre-feet of water supply in storage
- Scenario #4 – "Year 2000 Condition" where the Valley Fill Aquifer is maintained at its present level of water supply in storage
- Scenario #5 – "Year 2040 Condition" where some continued mining is accepted over the next 40 years as the programs envisioned by the Water Plan are developed and executed

**Figure E1: SCENARIO EVALUATION – SUMMARY**

<u>Scenario</u>	<u>Annual Depletion Reduction Goal</u>	<u>Start-Up Costs (Initial)</u>	<u>Annual Cost</u>	<u>Remarks</u>
#1–Status Quo (Depletion of the aquifers continues, approx 4.5 mil ac-ft in storage-Yr 2040)	0 ac.-ft.	\$0	\$2,500K-\$5,000K	Wells dry up & Aquifer runs out of water in about 120 years. <b><u>Not Acceptable.</u></b>
#2–1910 Condition (8.1 mil ac-ft in storage by the Yr 2040)	85,000 ac.-ft.	\$1,500K	\$12,250K	Requires new water from the Rio Grande and a massive infrastructure to return to the 1910 water supply in the aquifer. <b><u>Not feasible.</u></b>
#3–1960 Condition (7.8 mil ac-ft in storage by the Yr 2040)	75,000 ac.-ft.	\$.1,250K	\$9,625K	Same as Goal #2 except returns to the 1960 water supply level in the aquifer. <b><u>Not feasible.</u></b>
#4–Year 2000 (Current level of 6.5 mil ac-ft)	50,000 ac.-ft.	\$1,000K	\$3,615K	Requires an immediate stop to depletion. Holds available water supply at about 6.5 million ac-ft. <b><u>Not feasible.</u></b>
#5–Year 2040 (5.2 mil ac-ft remains in storage in the Valley Fill Aquifer by the Yr 2040)	30,000 ac.-ft.	\$920K	\$2,115K	Accepts another 1.3 million ac.-ft. depletion over the next 40 years while programs become operational. Stretches Water supply out 380 years before it runs out. <b><u>Feasible.</u></b>

**SCENARIO NO. 5 – SELECTED AS THE BASIS FOR THE WATER PLAN!**

**SUSTAINABILITY/SELF-SUFFICIENCY–NOT ACHIEVABLE IN 40 YEARS**

**SUSTAINABILITY/SELF-SUFFICIENCY–NOT ACHIEVABLE IN 40 YEARS:** The Committee does not believe that the Basin can be brought to a sustainable, self-sufficient water resource posture (available supply and recharge versus projected demand) in the next 40-year period. The Water Plan is based on actions that have worked elsewhere to reduce the aquifer depletion and updated policies which appear prudent. Execution of the Plan should reduce the projected aquifer depletion of 50,000 acre-feet per year to about 20,000 acre-feet per year by the Year 2040. That reduction lengthens the life of the Valley Fill Aquifer from about 120 years to about 380 years. While this Plan does not achieve a sustainable water supply in the next 40 years as stated, the Committee feels this is the least disruptive, most reasonable approach given the unknown and disputed data reference the other aquifers. Executable programs have been developed through a conservative approach based on achieving 50 percent of the reported results of other area water plans. **It is possible that a pro-active locally driven effort may achieve a sustainable water supply in the Basin. The key to success is an unselfish, cooperative commitment by all water users in the Basin aided by local, county, state and federal governmental agencies.**

**WATER PLAN PROGRAMS SUMMARY:** The programs recommended in the Plan for the next 40 year period will enable us to better educate ourselves on the actual challenges we face and the potential solutions that may lead to a “sustainable, self-sufficient water resource posture” during the next century. The plan is divided into four major program areas with goals, objectives, priorities, time lines and program budget estimates. The four major program areas are summarized in the following chart:

**Figure E2: WATER PLAN PROGRAMS – SUMMARY**

<b><u>Program</u></b>	<b><u>Annual Depletion Reduction Goal</u></b>	<b><u>Start-Up Cost (Initial)</u></b>	<b><u>Annual Cost</u></b>
• <b>Management Program</b>	4,500 ac.-ft.	\$210K	\$355K
• <b>Conservation Program</b>	20,500 ac.-ft.	\$277K	\$1,235K
• <b>Water Development Program</b>	5,000 ac.-ft.	\$297K	\$260K
• <b>Water Quality Program</b>	<u>N/A</u>	<u>\$195K</u>	<u>\$510K</u>
<b>Total</b>	<b>30,000 ac.-ft.</b>	<b>\$979K</b>	<b>\$2,360K</b>

These four major programs were developed with several sub-programs that are intended to be more fully developed and executed by existing local governmental, civic action and private entities. There are ample opportunities for “partnering,” and it is hoped that the Estancia Basin will become a “pilot region” where the state and others find out what really works in a largely rural setting. The Plan is intended to be implemented and is phased to facilitate implementation. The objective is to move the Basin towards a sustainable, self-sufficient water resource posture consistent with state guidance and local needs. Essentially, this is a walk before you run approach that will prevent duplicate efforts and minimize waste.

**INFRASTRUCTURE:** A fifth program area, Infrastructure, listed in the New Mexico Interstate Stream Commission guidance, was evaluated and eliminated because there are no major existing water resource infrastructure items (dams, canals, main system pipelines) that offer any promise for depletion reduction or development of new water supplies within the Basin. The only candidate would be the elimination of the infrastructure which exports water from the Basin; however, it was felt that the concerns raised by exporting water could be addressed best in the Management Program portion of the Water Plan. There are some infrastructure efforts, but they are included in the various program objectives in the four listed program areas.

**PRIORITIES:** The Estancia Basin Water Plan offers a comprehensive program to address the water resource needs of the Basin and a cohesive strategy to ensure a successful effort. However, **how water rights are addressed will determine the overall success or failure of this Plan.** Existing water rights must be protected, the appropriation of new water rights stopped with the exportation of water stopped or significantly limited. Without these fundamental changes in policy any effort to conserve water in a largely rural area with significant irrigated agricultural use and large individual water rights holdings will fail.

<b>WATER RIGHTS – THE CRITICAL COMPONENT FOR SUCCESS</b>
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**WATER PLAN – CRITICAL PRIORITIES**

- **Single Focus Management and Adequate Funding**
- **Special Groundwater Management Area(s)**
- **Conservation, Water Resource Information and Education Programs**
- **Water Rights Program**
- **Comprehensive Monitoring, Metering and Investigations Programs**



- **Single Focus Management and Adequate Funding:** The establishment of a single-focus water resource Basin-wide entity with authority, necessary funding and a long-term approach enabling execution of the Plan and its programs year-after-year is absolutely crucial. (Management Programs–Programs No. 2 and No. 3)
  
- **Special Water Groundwater Management Area(s):** The Basin needs to be designated a Special Groundwater Management Area by all counties and the State of New Mexico to ensure focus, funding and effective coordinated efforts at all levels to address the concerns of water resource sustainability and self-sufficiency. (Management Programs–Program No. 1)
  
- **Conservation, Water Resource Information and Education Programs:** Aggressive, volunteer citizen driven Conservation, Information and Education Programs are critical to attain overall success. The amount of water pumped must be minimized, and that which is pumped from the aquifers must be used with maximum efficiency and reused again and again when possible. Residents must understand why it is in their best interests to conserve water, and how to best do so, given their individual circumstances. (Management Programs–Program No. 5; and Conservation Programs No. 1 through No. 7)
  
- **Water Rights Programs:** Crucial to any Conservation Program’s success in a largely rural area is a Water Rights Program(s) that rewards taking water rights out of production and not using existing recognized unused water rights, while protecting the validity and amount of water rights owned by each person or entity in the Basin. Must minimize pumping of groundwater while maximizing reuse. The State policy of “use it or lose it” must be changed. This program is the single most critical element to the success of the Water Plan. (Management Programs–Program No. 7)
  
- **Comprehensive Monitoring, Metering and Investigations Programs:** Comprehensive monitoring, metering and investigations programs are necessary to find out what is available, what is really being used, how the aquifers really interact and how recharge really works. The comprehensive monitoring program also functions as an “early warning system” in areas where contamination is or may become a concern. (Management Programs-Program No. 4; Conservation Programs-Program No. 4; & Water Development Programs-Program No. 4)

**Figure E3: SUMMARY — WATER PLAN PROGRAMS**

<u>Programs</u>	<u>Estimated Water Savings Goal</u>	<u>1999 Program Budget</u>	<u>Five-Year Program Budget</u>
<b><u>Management Programs</u></b>	<b><u>4,500 ac-ft</u></b>	<b><u>\$210K</u></b>	<b><u>\$1,775K</u></b>
Program No 1–Special Grd Wtr Mgmt Area	(N/A)	(N/A)	(N/A)
Program No 2–Coord, Plning & Oversight	(N/A)	(\$80K)	(\$600K)
Program No 3–Water Trust Fund	(N/A)	(\$80K)	(\$500K)
Program No 4–Comprehensive Monitoring	(N/A)	(\$20K)	(\$500K)
Program No 5–Information and Education	(N/A)	(\$10K)	(\$50K)
Program No 6–Local Codes and Ordinances	(4,500 ac-ft)	(\$20K)	(\$25K)
Program No 7–Geographic Information and	(N/A)	(N/A)	(\$100K)
<b><u>Conservation Programs</u></b>	<b><u>20,500 ac-ft</u></b>	<b><u>\$277K</u></b>	<b><u>\$6,175K</u></b>
Program No 1–Audit and Budget	(200 ac-ft)	(\$20K)	(\$100K)
Program No 2–Plumbing Retrofit	(300 ac-ft)	(\$20K)	(\$250K)
Program No 3–Ag Irrigation Efficiency	(5,000 ac-ft)	(\$102K)	(\$325K)
Program No 4–Metering	(5,000 ac-ft)	(\$30K)	(\$500K)
Program No 5–Watering Practices	(500 ac-ft)	(\$5K)	(N/A)
Program No 6–Codes and Ordinances	(N/A)	(N/A)	(N/A)
Program No 7–Water Rights	(9,500 ac-ft)	(\$100K)	(\$5,000K)
<b><u>Water Development Programs</u></b>	<b><u>5,000 ac-ft</u></b>	<b><u>\$297K</u></b>	<b><u>\$1,300K</u></b>
Program No 1–Cloud Seeding	(4,000 ac-ft)	(\$120K)	(\$500K)
Program No 2–Terrain & Vegetation Mod	(1,000 ac-ft)	(\$156K)	(\$300K)
Program No 3–Undeclared Area Annex.	(N/A)	(\$11K)	(N/A)
Program No 4–Underground Investigation	(N/A)	(\$10K)	(\$500K)
<b><u>Water Quality Programs</u></b>	<b><u>N/A</u></b>	<b><u>\$195K</u></b>	<b><u>\$2,550K</u></b>
Program No 1–Information	(N/A)	(\$10K)	(\$100K)
Program No 2–Monitoring	(N/A)	(N/A)	(N/A)
Program No 3–Aquifer (Well) Protection	(N/A)	(\$10K)	(\$500K)
Program No 4–Septic Tank Remedial	(N/A)	(\$121K)	(\$1,025K)
Program No 5–Sewer System Remedial	(N/A)	(\$20K)	(\$250K)
Program No 6–Septic Tank Effluent	(N/A)	(\$20K)	(\$500K)
Program No 7–Adv Indiv Treatment Sys.	(N/A)	(\$20K)	(\$250K)
Program No 8–Codes and Ordinances	(N/A)	(N/A)	(N/A)
Program No 9–Watershed Management	(N/A)	(\$4K)	(\$25K)

**ACTIVITIES—1999:** The Year 1999 will be utilized to develop understanding and gain acceptance, support and funding for the Estancia Basin Regional Water Plan, and to develop the programmatic and administrative mechanisms needed to implement the Plan successfully. The programs, projected funding, action items and agencies for the Year 1999 and follow-on efforts and funding for the Year 2000 through the Year 2004 are shown as part of the recommended individual program outlined in the main body of the Water Plan. The Plan is intended to be executed in five-year increments with updates, revisions and reports as necessary. Given the nature of the water resources business it was felt that five years was the best time frame to use for implementation efforts.

**FIRST STEP:** The Estancia Basin Water Plan is the first step, not the final step towards a practical approach to water resources for the future. The Plan is intended to serve as a guide to start the Basin into the future with respect to sustainable water resources. While the programs and recommendations presented are based on successful programs ongoing elsewhere, it is anticipated that the Plan will be refined, changed and adjusted as we find out what really does and does not work in our Basin. The Plan is not the end, rather it is the beginning of an effort that needs the support and help of all of us to be successful.

**LOCAL EFFORT:** The intent is to use the existing sovereign entities (counties, municipalities, soil and water conservation districts, governmental agencies, civic organizations and school systems) to develop and conduct the programs under the overall coordination of the Estancia Basin Water Planning Committee, or a similar basin-wide single focus entity. **Further, the Plan recommends control, development and execution of the individual programs at the local level to ensure that the Plan addresses the needs and concerns of the residents of the Basin.** Clearly the Office of the State Engineer needs to provide overview and guidance from the state level as do the Environmental Department and the Department of Finance and Administration. However, only through local acceptance and action will the Plan achieve its goals.

**FUNDING:** Maximum use will be made of existing federal and state funded grant programs with the possible imposition of impact fees, tax credits, and/or a slight increase in the gross receipts tax in the Basin to establish a water trust fund. A royalties program on water or water rights sold to third parties and a secure funding source such as a water trust fund that can only be used for water and wastewater related activities under local direction are crucial to ensure program continuity, and ultimately Water Plan success. One of the first follow-on steps should be the appointment of an Estancia Basin Water Planning Committee Sub-Committee to study and develop the funding program and Trust Fund, if applicable. This Sub-Committee should be augmented by individuals with considerable expertise in the funding area, an understanding of state government and the legislative process, and legal expertise.

**LOCAL PROGRAMS/LOCAL EFFORT:** Outlines of programs which have been developed to serve as suggested guidelines for action entities are presented in the Appendix of the Water Plan; however, the specific development and execution of all programs is left to the various action agents at the local level. The Plan addresses “why” and “what,” and suggests some approaches to “how,” but leaves the actual “how” to the local action agents (Basin residents and their established forms of government and action). As an example, one of the Basin’s Soil and Water Conservation Districts will probably function as the administrative and fiscal agent for the Water Plan and its programs.

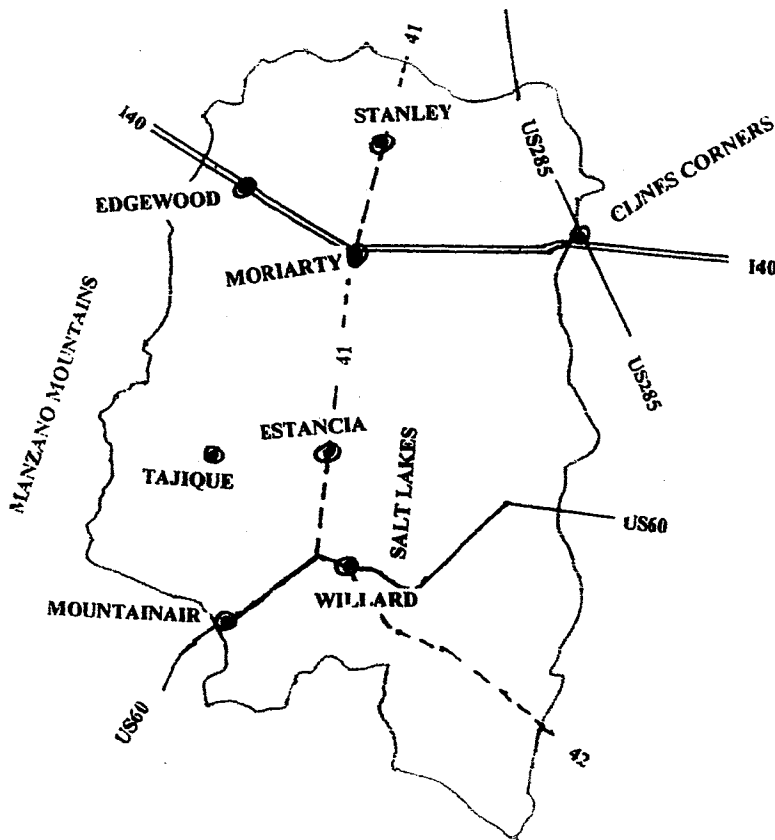
**THE PAST:** There are a lot of myths, misconceptions, fears and false communication ongoing in the water resource world. This Water Plan is a practical, pro-active effort to ensure that future generations will have the opportunity to enjoy the lifestyle(s) that today’s residents of the Basin find so appealing. The Plan is not in any way intended as criticism of anyone (individual, entity, local/state/federal governments or corporation). What has happened up to this moment has occurred because all of us and/or our ancestors played a part. The normal and very real tension that has developed between the rural agricultural lifestyle that has been present and formed the basis of much of the Basin’s economy for many years, and a more suburban lifestyle that has become particularly prevalent in recent years in parts of the Basin has made it more difficult to deal with water resource concerns. That tension and the resulting perceptions need to be acknowledged and energies channeled towards creating progressive action plans and executing those plans and programs or success will be impossible to achieve. We also believe that there is no point in fighting among ourselves about the past. It happened! We need to concentrate on the future!

**THE FUTURE:** In looking to the future we need to work together to develop a sustainable self-sufficient water resource posture or all of us and/or those who follow us may ultimately lose out. The United States is replete with areas where residents failed to work together to solve common water resource concerns. Those areas are easily identified today by the ghost towns, decaying infrastructure and empty, deteriorating buildings that are present.

**THE WATER PLAN – BOTTOM LINE**

**THIS WATER PLAN PROVIDES A PATH AND A FOCUS  
TO GUIDE US DURING THE NEXT FORTY (40) YEARS  
AND ON INTO THE NEXT CENTURY AS WE MOVE  
TOWARDS THE LONG-TERM VISION AND GOAL OF  
WATER RESOURCE SELF-SUFFICIENCY AND  
SUSTAINABILITY IN THE ESTANCIA BASIN.**

**ESTANCIA BASIN**  
**RECOMMENDED REGIONAL**  
**WATER PLAN**  
**(YEAR 2000 TO YEAR 2040)**



**Estancia Basin Water**

**Planning Committee**

**January 8, 1999**

**Prepared by:**  
**Corbin Consulting, Inc.**  
**Santa Fe, New Mexico**

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In 1995, 1996 and 1998 the Committee held a series of public meetings throughout the Basin to gather public input about water related concerns and possible recommended solutions, and to obtain public input on the Phase I Report (past and present water resource related data and future growth, population and use projections). Several concerns, comments and suggestions were offered. The major public concerns and recommendations have been summarized below:

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Given the concerns and recommendations of Basin residents, the Committee compiled and reviewed known data on water resources in the Basin and developed future economic, population and water use projections (Phase I Report); evaluated and summarized the data; developed conclusions, goals and alternatives; applied the New Mexico Interstate Stream Commission Criteria from the NMISSC Regional Planners Handbook and Template to analyze five basic scenarios; developed the Water Plan; presented the Water Plan for public scrutiny and comment; finalized the Water Plan and presented it to the New Mexico Interstate Stream Commission.

**PUBLIC INPUT–THE KEY:** Public participation has been the key in the development of this Water Plan. The Committee is composed of citizens appointed by the respective County Commissions in each county and by the major stakeholders in the Estancia Basin. Committee meetings have been advertised in the Basin media, have been open to the public, and have been well attended by the appointed committee members and citizens interested in the effort. Newspaper articles, presentations to local civic groups, public presentations, briefings for the Office of the State Engineer and New Mexico Interstate Stream Commission and all three county commissions, and a series of public input meetings (1995, 1996 and 1998) have been conducted to ensure that the Plan reflects the concerns, needs and public welfare of Basin residents. The Water Plan has received positive press coverage in the Basin media and newspapers and has generally been well received by Basin residents.

**DECLINING WATER LEVELS:** Data indicates that water levels in the Valley Fill Aquifer (the primary aquifer supplying Basin water needs) are declining with a present annual average loss rate of about 45,000 acre-feet per year. The average loss (depletion) rate is projected to increase over the next 40 years to about 50,000 acre-feet per year based on the population and growth projections in and near the Basin by the Bureau of Business Economic Research. Irrigated agricultural acreage, the largest water user, while fluctuating based on market and climatic conditions is projected to remain generally constant over the next 40 years. The Office of the State Engineer's administrative and mined basin policies are projected as likely to continue. Recent presentations by the Middle Rio Grande Council of Governments to the press and media indicate significantly increased development in the northern portions of the Basin and in the areas adjacent to the northwestern portion of the Basin in the next 50 years. The amount of water supply available in the Valley Fill Aquifer is known with a reasonable degree of certainty. The water supply present in the other aquifers is quite uncertain. It is likely that significant amounts of water exist where there is major faulting and fracturing, but that the bulk of the other aquifers may have much less water than some would like to believe. Even if the other aquifers hold significant amounts of water, many residents of the Basin are not in a position to drill to the

depths required to tap these questionable water supplies. The economic hardship on Basin residents to shift to other sources of water (deeper aquifers or transportation of water over significant distances) will create severe economic hardship for many.

**DETERIORATING WATER QUALITY:** Deteriorating water quality, particularly in the more heavily developed and developing areas, is a concern. Increased nitrate levels have been observed and other contaminants are suspected, although the New Mexico Environmental Department and the counties have no specific evidence of widespread water quality deterioration. Significant concern about abandoned wells, poorly functioning or broken septic systems, the increasingly heavy concentration of septic systems in some areas of the Basin, and brine (salt water) intrusion into the aquifers exists. In addition, an E-coli incident from surface contamination in the Town of Estancia's water supply due to a break in their water supply system occurred last winter. Concern has been expressed about agricultural contamination (pesticides, fertilizers and animal waste) although no significant documented cases exist at this time.

**DEMAND (USE) CONCERNS:** The bulk of the Basin's current demand and water supply comes from the Valley Fill Aquifer, about 95 percent. Most of that water is used to support irrigated agriculture. The remainder serves the needs of the towns of Willard, Estancia, Moriarty and Mountainair and various individual domestic well users. About five percent of the Basin's water supply requirements are served by the other aquifers. Much of the new development projected over the next 40 years is located in areas that might be served by the other aquifers, assuming that the water is present and reasonably available. Many people believe that these other aquifers are interconnected with each other and the Valley Fill Aquifer, and may be providing some amount of water to the Valley Fill Aquifer. If true, depletion of water from the other aquifers could worsen the problem facing people and businesses who are dependent on the Valley Fill Aquifer. While portions of the Glorieta Sandstone and Madera Limestone Aquifers may be excellent sources of water, there are indications in some areas that yields are dropping and that well levels are declining in these aquifers as well. It is clear from reading the water level logs of wells over time that the water levels in most wells in the Basin are declining, some by as much as 60 feet in the past 30 years. Thus, a conservative approach to water resource management is required to forestall and lessen hardship on Basin residents.

**RECHARGE CONCERNS:** The recharge of the Valley Fill Aquifer seems to be averaging about 13,000 acre-feet per year based on demand and depletion data. The water level declines in the various wells in the majority of the Valley Fill area seem to bear this out as well. Recharge to the Basin as a whole appears to be about 37,000 acre-feet. While it is possible that this recharge goes into the Madera, Glorieta and other aquifers, it is also possible that invasive vegetation in the western part of the Basin and other activities may be intercepting much of that recharge. The Plan includes monitoring and investigation programs to begin to see if we can find out what's really happening to the recharge. Further, it has been suggested in the public meetings by old time oil and gas drillers and geologists that the other aquifers may not be as extensive as is presently believed. Again, the suggested programs should help to address these questions and concerns.



**AN UNCERTAIN FUTURE:** Based on the projections and past and current usage data about 120 years of water supply appears to remain in the Valley Fill Aquifer, the Basin's major source of water. The amount of water in storage in the other aquifers has not been determined with any real accuracy. The State Engineer administers the Basin based on the water in storage in the Valley Fill Aquifer and assumes that the Valley Fill Aquifer serves as the recharge mechanism for the other aquifers. Current water management policies ("mined basin," approved exportation of water, appropriation of new water rights) contribute to the continued depletion of the aquifers and do not assist in moving the Basin towards the goal of a sustainable water supply as required by the New Mexico Interstate Stream Commission. About three to four times more water rights have been recognized by the State Engineer than have been put to use, causing further concern. Under the current block water rights appropriation policies it appears that many more acre-feet of water rights could be appropriated than currently exist, causing even more concern.

**REQUIREMENT-SUSTAINABILITY/SELF-SUFFICIENCY:** The New Mexico Interstate Stream Commission has directed that regional water planning be based on the water supply available in a specific region. The guidelines published in their Regional Water Planning Handbook and Template emphasize that any regional water plan must be based on self-sufficiency and a sustainable water supply. The Estancia Basin Water Planning Committee has combined this guidance with that provided by the three counties (Santa Fe, Bernalillo and Torrance) and the concerns and recommendations received from Basin residents to guide the development of this Water Plan. It needs to be recognized that there is a significant conflict between the New Mexico Interstate Stream Commission guidance and the mined basin and block water rights appropriation policies that the Office of the State Engineer uses to manage the Estancia Basin.

**SCENARIO DEVELOPMENT AND EVALUATION:** The Committee developed five scenarios:

- Scenario #1 – "Status Quo" where current practices and policies continue
- Scenario #2 – "1910 Condition" where the Valley Fill Aquifer is returned to 8.1 million acre-feet of water supply in storage
- Scenario #3 – "1960 Condition" where the Valley Fill Aquifer is returned to 7.8 million acre-feet of water supply in storage
- Scenario #4 – "Year 2000 Condition" where the Valley Fill Aquifer is maintained at its present level of water supply in storage
- Scenario #5 – "Year 2040 Condition" where some continued mining is accepted over the next 40 years as the programs envisioned by the Water Plan are developed and executed

**Figure E1: SCENARIO EVALUATION – SUMMARY**

<u>Scenario</u>	<u>Annual Depletion Reduction Goal</u>	<u>Start-Up Costs (Initial)</u>	<u>Annual Cost</u>	<u>Remarks</u>
#1–Status Quo (Depletion of the aquifers continues, approx 4.5 mil ac-ft in storage-Yr 2040)	0 ac.-ft.	\$0	\$2,500K-\$5,000K	Wells dry up & Aquifer runs out of water in about 120 years. <b><u>Not Acceptable.</u></b>
#2–1910 Condition (8.1 mil ac-ft in storage by the Yr 2040)	85,000 ac.-ft.	\$1,500K	\$12,250K	Requires new water from the Rio Grande and a massive infrastructure to return to the 1910 water supply in the aquifer. <b><u>Not feasible.</u></b>
#3–1960 Condition (7.8 mil ac-ft in storage by the Yr 2040)	75,000 ac.-ft	\$.1,250K	\$9,625K	Same as Goal #2 except returns to the 1960 water supply level in the aquifer. <b><u>Not feasible.</u></b>
#4–Year 2000 (Current level of 6.5 mil ac-ft)	50,000 ac.-ft.	\$1,000K	\$3,615K	Requires an immediate stop to depletion. Holds available water supply at about 6.5 million ac-ft. <b><u>Not feasible.</u></b>
#5–Year 2040 (5.2 mil ac-ft remains in storage in the Valley Fill Aquifer by the Yr 2040)	30,000 ac.-ft.	\$920K	\$2,115K	Accepts another 1.3 million ac.-ft. depletion over the next 40 years while programs become operational. Stretches Water supply out 380 years before it runs out. <b><u>Feasible.</u></b>

**SCENARIO NO. 5 – SELECTED AS THE BASIS FOR THE WATER PLAN!**

**SUSTAINABILITY/SELF-SUFFICIENCY–NOT ACHIEVABLE IN 40 YEARS**

**SUSTAINABILITY/SELF-SUFFICIENCY–NOT ACHIEVABLE IN 40 YEARS:** The Committee does not believe that the Basin can be brought to a sustainable, self-sufficient water resource posture (available supply and recharge versus projected demand) in the next 40-year period. The Water Plan is based on actions that have worked elsewhere to reduce the aquifer depletion and updated policies which appear prudent. Execution of the Plan should reduce the projected aquifer depletion of 50,000 acre-feet per year to about 20,000 acre-feet per year by the Year 2040. That reduction lengthens the life of the Valley Fill Aquifer from about 120 years to about 380 years. While this Plan does not achieve a sustainable water supply in the next 40 years as stated, the Committee feels this is the least disruptive, most reasonable approach given the unknown and disputed data reference the other aquifers. Executable programs have been developed through a conservative approach based on achieving 50 percent of the reported results of other area water plans. It is possible that a pro-active locally driven effort may achieve a sustainable water supply in the Basin. The key to success is an unselfish, cooperative commitment by all water users in the Basin aided by local, county, state and federal governmental agencies.

**WATER PLAN PROGRAMS SUMMARY:** The programs recommended in the Plan for the next 40 year period will enable us to better educate ourselves on the actual challenges we face and the potential solutions that may lead to a “sustainable, self-sufficient water resource posture” during the next century. The plan is divided into four major program areas with goals, objectives, priorities, time lines and program budget estimates. The four major program areas are summarized in the following chart:

**Figure E2: WATER PLAN PROGRAMS – SUMMARY**

<u>Program</u>	<u>Annual Depletion Reduction Goal</u>	<u>Start-Up Cost (Initial)</u>	<u>Annual Cost</u>
• Management Program	4,500 ac.-ft.	\$210K	\$355K
• Conservation Program	20,500 ac.-ft.	\$277K	\$1,235K
• Water Development Program	5,000 ac.-ft.	\$297K	\$260K
• Water Quality Program	<u>N/A</u>	<u>\$195K</u>	<u>\$510K</u>
<b>Total</b>	<b>30,000 ac.-ft.</b>	<b>\$979K</b>	<b>\$2,360K</b>

These four major programs were developed with several sub-programs that are intended to be more fully developed and executed by existing local governmental, civic action and private entities. There are ample opportunities for “partnering,” and it is hoped that the Estancia Basin will become a “pilot region” where the state and others find out what really works in a largely rural setting. The Plan is intended to be implemented and is phased to facilitate implementation. The objective is to move the Basin towards a sustainable, self-sufficient water resource posture consistent with state guidance and local needs. Essentially, this is a walk before you run approach that will prevent duplicate efforts and minimize waste.

**INFRASTRUCTURE:** A fifth program area, Infrastructure, listed in the New Mexico Interstate Stream Commission guidance, was evaluated and eliminated because there are no major existing water resource infrastructure items (dams, canals, main system pipelines) that offer any promise for depletion reduction or development of new water supplies within the Basin. The only candidate would be the elimination of the infrastructure which exports water from the Basin; however, it was felt that the concerns raised by exporting water could be addressed best in the Management Program portion of the Water Plan. There are some infrastructure efforts, but they are included in the various program objectives in the four listed program areas.

**PRIORITIES:** The Estancia Basin Water Plan offers a comprehensive program to address the water resource needs of the Basin and a cohesive strategy to ensure a successful effort. However, **how water rights are addressed will determine the overall success or failure of this Plan.** Existing water rights must be protected, the appropriation of new water rights stopped with the exportation of water stopped or significantly limited. Without these fundamental changes in policy any effort to conserve water in a largely rural area with significant irrigated agricultural use and large individual water rights holdings will fail.

## WATER RIGHTS – THE CRITICAL COMPONENT FOR SUCCESS

### WATER PLAN – CRITICAL PRIORITIES

- **Single Focus Management and Adequate Funding**
- **Special Groundwater Management Area(s)**
- **Conservation, Water Resource Information and Education Programs**
- **Water Rights Program**
- **Comprehensive Monitoring, Metering and Investigations Programs**

- **Single Focus Management and Adequate Funding:** The establishment of a single-focus water resource Basin-wide entity with authority, necessary funding and a long-term approach enabling execution of the Plan and its programs year-after-year is absolutely crucial. (Management Programs–Programs No. 2 and No. 3)
  
- **Special Water Groundwater Management Area(s):** The Basin needs to be designated a Special Groundwater Management Area by all counties and the State of New Mexico to ensure focus, funding and effective coordinated efforts at all levels to address the concerns of water resource sustainability and self-sufficiency. (Management Programs–Program No. 1)
  
- **Conservation, Water Resource Information and Education Programs:** Aggressive, volunteer citizen driven Conservation, Information and Education Programs are critical to attain overall success. The amount of water pumped must be minimized, and that which is pumped from the aquifers must be used with maximum efficiency and reused again and again when possible. Residents must understand why it is in their best interests to conserve water, and how to best do so, given their individual circumstances. (Management Programs–Program No. 5; and Conservation Programs No. 1 through No. 7)
  
- **Water Rights Programs:** Crucial to any Conservation Program’s success in a largely rural area is a Water Rights Program(s) that rewards taking water rights out of production and not using existing recognized unused water rights, while protecting the validity and amount of water rights owned by each person or entity in the Basin. Must minimize pumping of groundwater while maximizing reuse. The State policy of “use it or lose it” must be changed. This program is the single most critical element to the success of the Water Plan. (Management Programs–Program No. 7)
  
- **Comprehensive Monitoring, Metering and Investigations Programs:** Comprehensive monitoring, metering and investigations programs are necessary to find out what is available, what is really being used, how the aquifers really interact and how recharge really works. The comprehensive monitoring program also functions as an “early warning system” in areas where contamination is or may become a concern. (Management Programs-Program No. 4; Conservation Programs-Program No. 4; & Water Development Programs-Program No. 4)

**Figure E3: SUMMARY — WATER PLAN PROGRAMS**

<u>Programs</u>	<u>Estimated Water Savings Goal</u>	<u>1999 Program Budget</u>	<u>Five-Year Program Budget</u>
<b><u>Management Programs</u></b>	<b><u>4,500 ac-ft</u></b>	<b><u>\$210K</u></b>	<b><u>\$1,775K</u></b>
Program No 1—Special Grd Wtr Mgmt Area	(N/A)	(N/A)	(N/A)
Program No 2—Coord, Plning & Oversight	(N/A)	(\$80K)	(\$600K)
Program No 3—Water Trust Fund	(N/A)	(\$80K)	(\$500K)
Program No 4—Comprehensive Monitoring	(N/A)	(\$20K)	(\$500K)
Program No 5—Information and Education	(N/A)	(\$10K)	(\$50K)
Program No 6—Local Codes and Ordinances	(4,500 ac-ft)	(\$20K)	(\$25K)
Program No 7—Geographic Information and	(N/A)	(N/A)	(\$100K)
<b><u>Conservation Programs</u></b>	<b><u>20,500 ac-ft</u></b>	<b><u>\$277K</u></b>	<b><u>\$6,175K</u></b>
Program No 1—Audit and Budget	(200 ac-ft)	(\$20K)	(\$100K)
Program No 2—Plumbing Retrofit	(300 ac-ft)	(\$20K)	(\$250K)
Program No 3—Ag Irrigation Efficiency	(5,000 ac-ft)	(\$102K)	(\$325K)
Program No 4—Metering	(5,000 ac-ft)	(\$30K)	(\$500K)
Program No 5—Watering Practices	(500 ac-ft)	(\$5K)	(N/A)
Program No 6—Codes and Ordinances	(N/A)	(N/A)	(N/A)
Program No 7—Water Rights	(9,500 ac-ft)	(\$100K)	(\$5,000K)
<b><u>Water Development Programs</u></b>	<b><u>5,000 ac-ft</u></b>	<b><u>\$297K</u></b>	<b><u>\$1,300K</u></b>
Program No 1—Cloud Seeding	(4,000 ac-ft)	(\$120K)	(\$500K)
Program No 2—Terrain & Vegetation Mod	(1,000 ac-ft)	(\$156K)	(\$300K)
Program No 3—Undeclared Area Annex.	(N/A)	(\$11K)	(N/A)
Program No 4—Underground Investigation	(N/A)	(\$10K)	(\$500K)
<b><u>Water Quality Programs</u></b>	<b><u>N/A</u></b>	<b><u>\$195K</u></b>	<b><u>\$2,550K</u></b>
Program No 1—Information	(N/A)	(\$10K)	(\$100K)
Program No 2—Monitoring	(N/A)	(N/A)	(N/A)
Program No 3—Aquifer (Well) Protection	(N/A)	(\$10K)	(\$500K)
Program No 4—Septic Tank Remedial	(N/A)	(\$121K)	(\$1,025K)
Program No 5—Sewer System Remedial	(N/A)	(\$20K)	(\$250K)
Program No 6—Septic Tank Effluent	(N/A)	(\$20K)	(\$500K)
Program No 7—Adv Indiv Treatment Sys.	(N/A)	(\$20K)	(\$250K)
Program No 8—Codes and Ordinances	(N/A)	(N/A)	(N/A)
Program No 9—Watershed Management	(N/A)	(\$4K)	(\$25K)

**ACTIVITIES—1999:** The Year 1999 will be utilized to develop understanding and gain acceptance, support and funding for the Estancia Basin Regional Water Plan, and to develop the programmatic and administrative mechanisms needed to implement the Plan successfully. The programs, projected funding, action items and agencies for the Year 1999 and follow-on efforts and funding for the Year 2000 through the Year 2004 are shown as part of the recommended individual program outlined in the main body of the Water Plan. The Plan is intended to be executed in five-year increments with updates, revisions and reports as necessary. Given the nature of the water resources business it was felt that five years was the best time frame to use for implementation efforts.

**FIRST STEP:** The Estancia Basin Water Plan is the first step, not the final step towards a practical approach to water resources for the future. The Plan is intended to serve as a guide to start the Basin into the future with respect to sustainable water resources. While the programs and recommendations presented are based on successful programs ongoing elsewhere, it is anticipated that the Plan will be refined, changed and adjusted as we find out what really does and does not work in our Basin. The Plan is not the end, rather it is the beginning of an effort that needs the support and help of all of us to be successful.

**LOCAL EFFORT:** The intent is to use the existing sovereign entities (counties, municipalities, soil and water conservation districts, governmental agencies, civic organizations and school systems) to develop and conduct the programs under the overall coordination of the Estancia Basin Water Planning Committee, or a similar basin-wide single focus entity. **Further, the Plan recommends control, development and execution of the individual programs at the local level to ensure that the Plan addresses the needs and concerns of the residents of the Basin.** Clearly the Office of the State Engineer needs to provide overview and guidance from the state level as do the Environmental Department and the Department of Finance and Administration. However, only through local acceptance and action will the Plan achieve its goals.

**FUNDING:** Maximum use will be made of existing federal and state funded grant programs with the possible imposition of impact fees, tax credits, and/or a slight increase in the gross receipts tax in the Basin to establish a water trust fund. A royalties program on water or water rights sold to third parties and a secure funding source such as a water trust fund that can only be used for water and wastewater related activities under local direction are crucial to ensure program continuity, and ultimately Water Plan success. One of the first follow-on steps should be the appointment of an Estancia Basin Water Planning Committee Sub-Committee to study and develop the funding program and Trust Fund, if applicable. This Sub-Committee should be augmented by individuals with considerable expertise in the funding area, an understanding of state government and the legislative process, and legal expertise.

**LOCAL PROGRAMS/LOCAL EFFORT:** Outlines of programs which have been developed to serve as suggested guidelines for action entities are presented in the Appendix of the Water Plan; however, the specific development and execution of all programs is left to the various action agents at the local level. The Plan addresses “why” and “what,” and suggests some approaches to “how,” but leaves the actual “how” to the local action agents (Basin residents and their established forms of government and action). As an example, one of the Basin’s Soil and Water Conservation Districts will probably function as the administrative and fiscal agent for the Water Plan and its programs.

**THE PAST:** There are a lot of myths, misconceptions, fears and false communication ongoing in the water resource world. This Water Plan is a practical, pro-active effort to ensure that future generations will have the opportunity to enjoy the lifestyle(s) that today’s residents of the Basin find so appealing. The Plan is not in any way intended as criticism of anyone (individual, entity, local/state/federal governments or corporation). What has happened up to this moment has occurred because all of us and/or our ancestors played a part. The normal and very real tension that has developed between the rural agricultural lifestyle that has been present and formed the basis of much of the Basin’s economy for many years, and a more suburban lifestyle that has become particularly prevalent in recent years in parts of the Basin has made it more difficult to deal with water resource concerns. That tension and the resulting perceptions need to be acknowledged and energies channeled towards creating progressive action plans and executing those plans and programs or success will be impossible to achieve. We also believe that there is no point in fighting among ourselves about the past. It happened! We need to concentrate on the future!

**THE FUTURE:** In looking to the future we need to work together to develop a sustainable self-sufficient water resource posture or all of us and/or those who follow us may ultimately lose out. The United States is replete with areas where residents failed to work together to solve common water resource concerns. Those areas are easily identified today by the ghost towns, decaying infrastructure and empty, deteriorating buildings that are present.

### **THE WATER PLAN – BOTTOM LINE**

**THIS WATER PLAN PROVIDES A PATH AND A FOCUS TO GUIDE US DURING THE NEXT FORTY (40) YEARS AND ON INTO THE NEXT CENTURY AS WE MOVE TOWARDS THE LONG-TERM VISION AND GOAL OF WATER RESOURCE SELF-SUFFICIENCY AND SUSTAINABILITY IN THE ESTANCIA BASIN.**



## **SUMMARY ESTANCIA BASIN-POTENTIAL SCENARIOS**

The Estancia Basin Water Planning Committee considered several possible scenarios and criteria. In the end the Committee established five major planning scenarios upon which to base the development and evaluation of alternative programs shown below. The NMISSC requirement for Basin self-sufficiency and sustainability essentially forced the Committee into these scenarios.

**SCENARIO NO. 1—"STATUS QUO."** This scenario lets the market place, the climate and nature dictate the future. It requires no special behavioral changes and no program, policy or legislative changes. It leaves the water supply and demand outcome to the events that will occur over the next 40 years in the normal course of present day business. If projected trends are accurate, the Valley Fill Aquifer will be exhausted in about 120 years, possibly much earlier in some areas. While water supply in some amount is sure to exist in the other aquifers, that fact will not help people without the money to re-drill their wells or to drill deeper. The significant water supply and quality concerns occurring in some areas of the Basin today that were the initiating force for this effort will become prevalent in most areas of the Basin within the next 50 years.

**SCENARIO NO. 2—"1910 CONDITION."** This scenario requires very significant behavioral changes in governmental, political and economic approaches at all levels and in individual demand requirements. To balance current and future supply and demand an additional 45,000 acre-feet of annual water supply initially, increasing to 50,000 acre-feet of annual supply during the next 40 years is required. On the average an additional 35,500 acre-feet of recharge or supply per year is required to make up for the existing Valley Fill Aquifer depletion of about 1.42 million acre-feet.

**SCENARIO NO. 3—"1960 CONDITION."** This scenario requires significant behavioral changes in governmental, political and economic approaches at all levels and in individual demand requirements similar to those in Scenario No. 2. To balance current and future supply and demand an additional 45,000 acre-feet of annual water supply initially, increasing to 50,000 acre-feet of annual supply over the next 40 years, is required. The addition of an average of 25,500 acre-feet of additional recharge or supply per year, to make up for the existing Valley Fill Aquifer depletion (1.02 million acre-feet), is also required.

**SCENARIO NO. 4—"2000 CONDITION."** This scenario requires significant behavioral changes in governmental, political and economic approaches at all levels and in individual demand. To balance current and future supply and demand an additional 45,000 acre-feet of annual water supply initially, increasing to 50,000 acre-feet during the next 40 years, is required. This scenario accepts past depletions as fact and seeks to maintain the present level of water supply in storage, approximately 6.5 million acre-feet, in the Valley Fill Aquifer.

**SCENARIO NO. 5—"2040 CONDITION."** This scenario requires local governments and individuals to modify their water use behavior through aggressive, pro-active conservation efforts at all levels. It requires irrigated agriculture to improve delivery efficiencies and investigate alternative less water intensive crops. It requires the Basin to be managed as a Special Ground Water Management Area with administrative policies significantly different than the mined basin policies currently used by the Office of the State Engineer. The intent of this scenario is to

intensively manage the Basin during the next 40-year period (Year 2000 to Year 2040); fixing available water rights at existing levels and protecting ownership of those water rights so that the holders can minimize pumping and maximize reuse without fear of loss of their water rights. It slows the aquifer depletion with savings through conservation (more effective use of the existing water supply); protects the usable water supply that is known to exist; monitors and meters what is occurring so that future decisions can be based as much as possible on fact; conducts an extensive focused investigation of the other aquifers and their interaction; and initiates several small pilot programs that have worked elsewhere to see if new water supply can be developed. This scenario, if successful, results in 5.3 million acre-feet of available water supply remaining in storage in the Valley Fill Aquifer by the Year 2040.

The Scenarios and their water supply goals leading to the Year 2040 are shown in the following graphical presentation. Although Scenario No. 5 clearly appears to be the most reasonable course of action, it does not solve the depletion concern. It does buy some time lessening the present concern while attempting to develop both data and workable programs for future use.

## GOALS (40-YEAR ANALYSIS)

### Valley Fill Aquifer Storage (Mil. Ac.-Ft.)

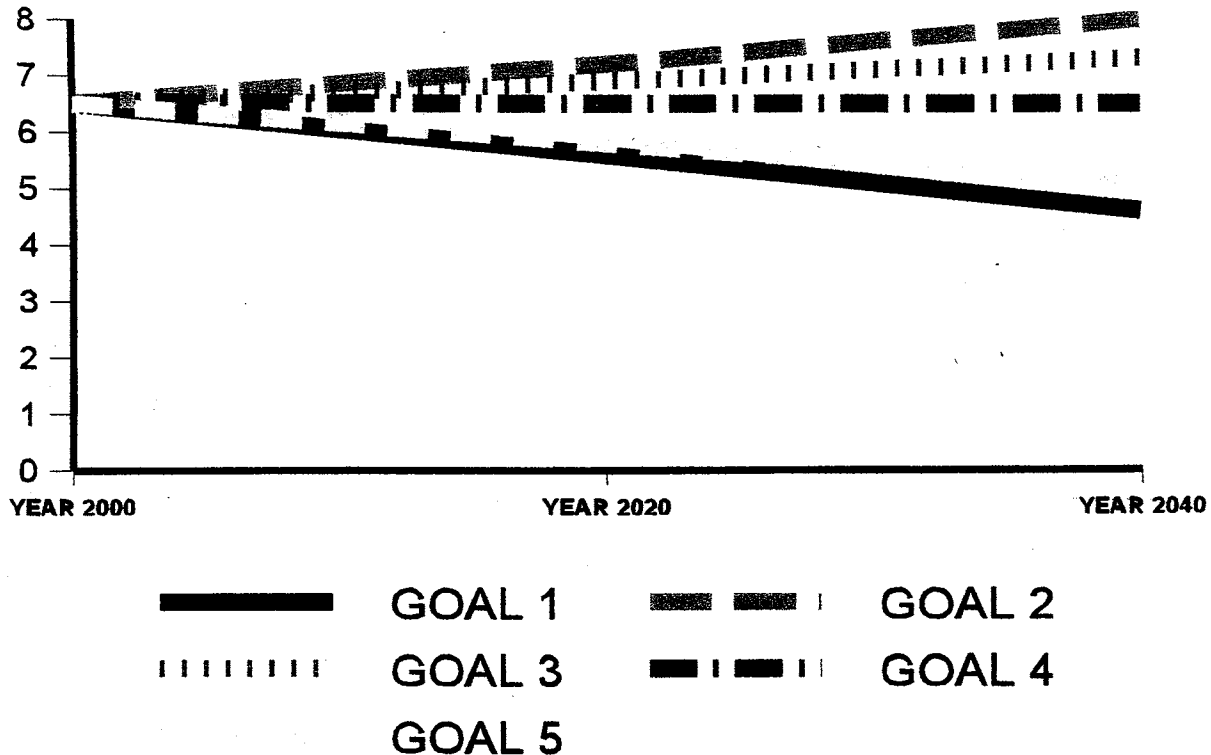


Figure 13: Water Supply Scenarios-Goals

## SUMMARY – SCENARIO EVALUATION

**BASIS:** Several alternatives were developed for each of the five major program areas listed in the New Mexico Interstate Stream Commission Handbook and Template. The program areas were then evaluated using the recommended NMISSC criteria modified by input from the residents of the Basin as presented at the public meetings and in open committee meetings. The most promising of the alternatives based on aquifer depletion reduction, cost, ease of implementation and overall contribution to sustainable, self-sufficient water supply in the Basin were then formed into specific programs with goals, objectives, cost and time estimates, priorities and suggested recommendations for their implementation.

The New Mexico Interstate Stream Commission's Regional Water Planning Handbook and Template suggests that alternatives should be developed in the following major program areas:

- Management
- Water Conservation
- Water Development
- Infrastructure
- Water Quality

The NMISSC further recommend that each of the alternatives should be evaluated as to the following factors:

- Technical Feasibility
- Political Feasibility (issues and evaluation)
- Social and Cultural Impacts (public welfare)
- Financial Feasibility
- Implementation Schedule
- Physical, Hydrological and Environmental Impacts
- Institutional Considerations

**TRENDS AND PROJECTIONS:** The Plan deals with and is based on trends and projections. Thus the Plan really represents an educated, best guess at the future. Every effort was made to find existing situations, solutions and programs currently being used elsewhere in the country to serve as models upon which to base programs and evaluate the alternatives and goals. In several instances programs appear to yield larger savings or different cost factors than those suggested in the Water Plan. The differences are not errors, rather they are conservative, value oriented judgments that the Committee aided by its consultants feels are prudent. Public input which has been formally received at public meetings and informally received over the past five years in other forums played a major part in Committee deliberations.

While the cost figures and results reported for programs that have been adopted in various parts of the country are known, the conditions in the Estancia Basin are somewhat different. The intent is to utilize a conservative approach which the Committee feels has a chance of success while causing the minimum amount of interruption and disruption to ongoing and planned activities in the Basin.

The New Mexico Interstate Stream Commission's guidance stresses several key factors for consideration in the development of a regional water plan.

- **BUREAU OF BUSINESS AND ECONOMIC RESEARCH (BBER):** Their projections are mandated for use in the development of a regional water plan. Several other future projections were reviewed as well. The other projections all portrayed more growth in the Basin than was projected by the BBER. It appears that a water plan based on BBER projections may show a more favorable picture (less growth and less water demand) than is warranted.
- **WATER CONSERVATION** is mandated as the cornerstone of a regional water plan. While certainly crucial for success, many conservation activities result in one time savings that will quickly be lost if the current Estancia Basin administrative policies are not changed. In a largely rural setting conservation's success hinges on an effective water rights program that includes banking, rebate incentives and buyout programs while protecting existing water rights holders who can then minimize the amount of water pumped and maximize the amount reused. Preventing or limiting new applications for water rights is critical to success of any conservation effort since 95 percent of the present demand, possibly more, comes from large water rights holders (irrigated agriculture and utilities and providers of water).
- **SELF-SUFFICIENCY and SUSTAINABILITY** are mandated as the foundation of each regional water plan in New Mexico. The Office of the State Engineer's (OSE) administrative policies, the approval of exportation of water, the "block water rights allocation system" consistent with the OSE "mined basin" policies all work exactly in opposition to the above in the Estancia Basin. The intent here is not to be critical of these policies or the people implementing them. Rather it is to indicate that in the Committee's opinion and the opinion of most of the Basin's residents these policies have outlived their usefulness, and it is time to change. The Basin is rapidly changing from a largely rural agricultural economy to a suburb of Albuquerque that is developing a significant services economic base. The past thirty years have seen a four-fold increase in population. The next 40 years are projected to see a three-fold increase from a population of 23,000 today to about 70,000 in 2040 (per BBER). The Middle Rio Grande Council of Governments (MRGCOG) projects an even greater population increase. The area immediately adjacent to the Basin to the west is projected to grow even faster with the potential for another 30,000 people who may have to rely on the Basin's aquifers for water supply.

**ALTERNATIVES ANALYSIS:** Analysis of alternatives developed and grouped under the major program areas suggested by the NMISSC is presented with the exception of an Infrastructure Program. There are no major infrastructure opportunities available in the Estancia Basin. The Self-sufficiency and Sustainability Requirements form the foundation of the Committee's analysis.

## MANAGEMENT PROGRAMS

<u>ALTERNATIVES ANALYSIS</u>			
<u>SUMMARY</u>			
<u>Item</u>	<u>Savings</u>	<u>Cost</u>	<u>Cost/Acre-Foot</u>
Special Ground Water Mgt. Area	N/A	\$ 40,000	N/A
* Comprehensive Monitoring Program.	N/A	\$120,000	N/A
Oversight Mechanism	N/A.	\$100,000	N/A
Special Improvements District	N/A	\$ 10,000	N/A
** Estancia Basin Water Trust Fund	N/A	\$ 20,000	N/A
** Water Rights Banking/Incentive Program	4,500 ac.-ft.	\$500,000	\$ 110
Land Use/Development Code Review & New Ordinance	N/A	N/A	N/A
Basin Model/GIS System	N/A	\$ 10,000	N/A

\* NOTE: Tied into Basin Model/GIS and the Water Quality Program.

\*\* NOTE: Also accounted for under Water Conservation Alternatives.

**Figure 14: Evaluation Process—Management Alternatives Summary**

DISCUSSION: All Management Alternatives should be pursued and pulled together as a Management Program, irrespective of the Scenario chosen for the Water Plan. Of critical importance is the recognition of the Basin at all levels of government as a Special Groundwater Management Area, and then the stabilizing of water rights as part of that effort. A Comprehensive Monitoring Program that includes a Metering Program that meters all water users is crucial to an understanding of the Basin's water resources. A Trust Fund specifically set up with a long-term funding mechanism, and a single focus (water resource) Management Entity to ensure execution and appropriate funding is critical for success. Counties and the State are grappling with code and ordinance concerns, successfully for the most part. Two Estancia Basin Computer Models exist, and if tied to the Monitoring System through a GIS interface, water resources management could and should be a near real time occurrence at some point in the future.

Another crucial element that must be dealt with is a Water Rights Incentive, Rebate and Banking and Buyout Program that rewards water users significantly for not using their historical allocation of water supply, and which rewards water rights owners for not using water rights not already in use. The Program requires OSE, legislative and executive branch action. Once set up by the State it should probably be administered by the Soil and Water Conservation Districts (agriculture and ranching), the acequias associations for traditional users, and probably the counties for domestic, municipal, co-op, business, industrial and all other users. Special Improvements Districts could be used in areas of critical supply and contamination concerns. Although 4,500 acre-feet might be possible, 3,000 acre-feet is a reasonable water depletion reduction goal for this

effort. It may be that as the Water Plan matures, water rights related efforts should be grouped together and placed in the Conservation Program. That would serve to highlight even more directly the cause and effect of an effective water rights program on conservation efforts in a largely irrigated agriculture dominated use situation.

## CONSERVATION PROGRAMS

<u>ALTERNATIVES ANALYSIS</u>			
<u>SUMMARY</u>			
<u>Item</u>	<u>Savings Goal</u>	<u>Cost</u>	<u>Cost/Acre-Foot</u>
Notification letter(s)	0 ac.-ft.	N/A	N/A
Information/Education	0 ac.-ft.	\$ 10,000/year	N/A
* Trust Fund	0 ac.-ft.	\$100,000 (once)	N/A
Free Audit/Water Budget	0 ac.-ft.	\$100,000 (once)	N/A
Retrofit Plumbing/Toilet	350 ac.-ft.	\$ 50,000	\$ 140
Agriculture System Efficiency	5,000 ac.-ft.	\$200,000	\$ 40
* Water Bank/Incentives	4,500 ac.-ft.	\$500,000	\$ 110
Watering Months/Hours	2,250 ac.-ft.	\$ 5,000	\$ 3
Metering	9,000 ac.-ft.	\$500,000	\$ 55
Ordinance/Zoning/Xeriscaping	4,500 ac.-ft.	\$ 10,000	\$ 3
Fire Hydrant Testing	100 ac.-ft.	\$ 10,000	\$ 100

\* NOTE: Also accounted for in Management Alternatives.

**Figure 15: Evaluation Process—Conservation Alternatives Summary**

**DISCUSSION:** The Conservation Program has both domestic and agricultural conservation components. The domestic component is based on finding and fixing leaks which can be extremely significant in the long term, retrofitting old plumbing (toilets/showers/faucets and plumbing) and metering. Savings ranging from 20 to 40 percent have been reported in most cases. Savings as high as 44 percent have been reported and documented in New Mexico based on metering efforts.

The agricultural component is based on minimizing pumping and maximizing efficient delivery and use of water for irrigated agriculture, reuse of water and metering. Less water intensive crops were explored, but economics really must drive that decision. A pilot program effort has been suggested, but no savings are projected for less water intensive crops at this time.

Utilizing ordinances and codes to ensure ultra low-flow fixtures and plumbing for all new and all rebuilt or renovated construction, xeriscape landscaping and changing watering habits are also critical to success. Savings in the 20 percent range have been reported where pro-active codes and ordinances have been used and enforced. While 25,700 acre-feet of savings might be possible; the Committee feels a goal of about 20,000 acre-feet of depletion reduction is reasonable for the Basin.

## WATER DEVELOPMENT PROGRAMS

### ALTERNATIVES ANALYSIS SUMMARY

<u>Item</u>	<u>Savings</u>	<u>Cost</u>	<u>Cost/Acre-Foot</u>
Cloud Seeding	6,000 ac.-ft.	\$ 100,000	\$ 20
Terrain Modification/Management	3,000 ac.-ft.	\$ 125,000	\$ 40
Effluent/Recharge	3,200 ac.-ft.	\$ 100,000	\$ 30
Buyout Program	5,000 ac.-ft.	\$ 1,000,000	\$ 200
Exploration	N/A	\$ 2,000,000+	N/A
Importation	50,000 ac.-ft.	\$230,000,000	\$4,600

**Figure 16: Evaluation Process—Water Development Alternatives Summary**

**DISCUSSION:** Cloud Seeding has been ongoing in North Dakota, Kansas, Texas, Oklahoma and California since the early to mid 1970's with significant success. Programs report 10 to 20 percent gains in precipitation in target areas with 5 to 10 percent precipitation gains in downwind areas adjacent to the target areas. Most programs target the increased precipitation at fields to increase soil moisture content with some increase in underlying aquifers. Monterey County in California comes closest to the Estancia Basin in terms of mountainous terrain, brushy or fairly small trees for cover. Monterey County is totally dependent on precipitation and groundwater for their water supply just like the Basin. They are beginning to experiment with ground based cloud seeding systems which, if successful, could significantly lower program costs. All other programs are based on plane-induced seeding underneath the clouds that is pulled up into the clouds by updrafts, becomes ice particles and then melts to become rain as they fall to earth. Most programs operators felt a five-year pilot program at about \$100,000 per year would be adequate to properly test the concept. The Basin cloud seeding program should probably be targeted at the high ground, probably the Manzano Mountains in the winter to increase the snow pack (recharge augmentation) and at the Valley Fill Aquifer during the monsoon season to increase soil moisture content and aquifer recharge.

Terrain modification and varied vegetation modification efforts (creation of ponds/playas and removal of water hungry invasive plants) have been successful in Texas, Utah, the Dakota's, California and New Mexico. Coupled with a buyout program aimed at buying up water rights currently in use and banking them for drought emergency could yield about 7,000 acre-feet of demand depletion reduction. The Committee does not feel that the importation of water from outside the Basin is a viable alternative given the lack of infrastructure to distribute that water within the Basin and the prohibitive cost to develop that infrastructure.

A pilot cloud seeding program coupled with a terrain and vegetation modification program might yield significant quantities of new or currently unavailable water supply (10 to 20 percent increase).

## INFRASTRUCTURE PROGRAMS

### ALTERNATIVES ANALYSIS SUMMARY

DISCUSSION: The infrastructure required under a variety of other alternatives is evaluated as part of those alternatives. There are no specific infrastructure improvements or additions that can impact the Estancia Basin concerns (dam construction/improvement, canals, etc.).

## WATER QUALITY PROGRAMS

<u>ALTERNATIVES ANALYSIS SUMMARY</u>			
<u>Item</u>	<u>Savings</u>	<u>Cost</u>	<u>Cost/Acre-Foot</u>
Information Program	N/A	\$ 10,000	N/A
Monitoring Program	N/A	\$ 100,000	N/A
Protection Program (Wells)	N/A	\$ 200,000	N/A
Protection Program (Septic Tanks)	N/A	\$ 400,000	N/A
Remedial Program	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
Total	N/A	\$, 710,000	N/A

Figure 17: Evaluation Process–Water Quality Alternatives Summary

DISCUSSION: Well capping and sewage treatment systems are critical to protecting the existing water supply in the aquifers. The monitoring program tied to a computer model through a GIS system is important as well. Septic systems generally do not recharge the aquifers and may in time pose a serious health threat both in terms of near-surface or surface contamination. Given the number and proximity of wells, abandoned and in use, to septic systems which may not be functioning properly, aquifer contamination is a serious concern. A septic tank monitoring and pumping program is a major component of the water quality and aquifer protection program.

NOTE: Based on the public input generated during the 1998 public meetings reference aquifer contamination the Committee re-evaluated sewer treatment systems, septic tank effluent treatment systems and advanced individual treatment systems and added them to the Water Quality Programs to be evaluated through pilot program efforts. Also more emphasis was placed on sealing the exterior of well pipes to prevent aquifer to aquifer or surface to aquifer contamination. And, a Watershed Management Program utilizing the existing U.S. Forest Service Program for the Manzano Mountains as an example of already ongoing efforts was added as well (Appendix D).



## SUMMARY- ALTERNATIVES

Alternatives were arranged in a variety of groupings to attempt to achieve the maximum depletion reductions in the shortest period of time for the least cost. The following presentation summarizes the total depletion reduction savings and total costs of the various alternatives grouped by program area. Savings and costs are based on what program operators of these programs have reported, and on the judgment of the Committee and their consultant on applicability to New Mexico and the relative probability of success of the various efforts. The total possible depletion reduction shown below might bring the Basin into a sustainable water supply posture, but the cost to do so appears prohibitive and the success of some of the programs is questionable.

<b><u>ANNUAL POTENTIAL DEPLETION REDUCTIONS AND ASSOCIATED PROGRAM AREA ANNUAL COSTS</u></b>		
<u>Program Area</u>	<u>Potential Annual Savings</u>	<u>Estimated Annual Program Cost</u>
Management Alternatives	4,500 acre-feet	\$ 800,000
Conservation Alternatives	25,700 acre-feet	\$1,485,000
Water Development Alternatives	17,200 acre-feet	\$1,325,000
Infrastructure Alternatives	N/A	N/A
Water Quality Alternatives	N/A	\$710,000
Totals	47,400 acre-feet	\$4,320,000

**Figure 18: Alternatives Summary by Major Program Area**

Major importation of water alternatives to satisfy the requirements of two of the scenarios (Scenarios # 2 and # 3) would cost about a billion dollars. The evaluation, estimating and analysis effort to quantify these alternatives was terminated part way through because of the cost of 50,000 acre-feet of water rights (about \$200,000,000) and a main trunk line infrastructure cost to move water from the Rio Grande River or Basin or from the City of Albuquerque Water System of approximately \$230,000,000. To distribute the water throughout the Basin to major water users or to aquifer recharge areas would cost well over \$500,000,000 and may not be technically feasible. Based on the political power of the City of Albuquerque, the Middle Rio Grande Conservancy District and Bernalillo County tapping the Middle Rio Grande Basin for water supply is probably not politically feasible, at least at this time.

## SCENARIO EVALUATIONS

The alternatives in the program areas were grouped and evaluated to see what effects they would have in achieving the five potential goals. A summary of that evaluation effort is summarized below:

<u>SUMMARY-SCENARIO EVALUATION</u>					
<u>ITEM</u>	<u>SCENARIO No. 1 (Status Quo)</u>	<u>SCENARIO No. 2 (1910)</u>	<u>SCENARIO No. 3 (1960)</u>	<u>SCENARIO No. 4 (2000)</u>	<u>SCENARIO No. 5 (2040)</u>
Technical Feasibility	Yes	Yes	Yes	Yes	Yes
Political Feasibility	Yes	No	No	Maybe	Yes
Institutional Feasibility	Yes	No	No	Yes	Yes
Social/Cultural Feasibility	Maybe	No	No	Maybe	Maybe
Financial Feasibility	Yes	No	No	Maybe	Yes
Timing - Feasible	Yes	Maybe	Maybe	Yes	Yes
Physical/Hydrological/ Environmental Feasibility	Yes	Maybe	Maybe	Yes	Yes
Water Supply (GOAL)					
Required	None	81,000 ac.-ft.	71,000 ac.-ft.	50,000 ac.-ft.	30,000 ac.-ft.
Generated	None	30,000 ac.-ft.	30,000 ac.-ft.	30,000 ac.-ft.	30,000 ac.-ft.
Shortfall	N/A	41,000 ac.-ft.	41,000 ac.-ft.	20,000 ac.-ft.	0 (**)
Total Cost	\$100-\$200M	\$500M	\$400M	\$145M	\$104M
Cost Per Year	\$1.375M- \$2.5M	\$12.125M (*)	\$9.625M (*)	\$3.615M	\$2.595M
Evaluation	Doable	Not Doable	Not Doable	Maybe	Doable
Rank Order	3	5	4	2	1

NOTE: (\*) Neither analysis has evaluated the cost to distribute imported water to the major water users in the Basin. Based on distance and dispersion, infrastructure cost would be at least double.  
(\*\*) Still leaves 20,000 acre-feet of demand generated depletion that is depleting the aquifers in the Year 2040.

**Figure 19: Summary Evaluation of Alternatives by Scenario**

- Accommodate through existing and future county ordinances and policies in all three counties a measured level of growth. A healthy Basin economy is crucial to the success of the Water Plan.
- Inform and educate about water resources (use and reuse).

Cost to accomplish Scenario # 4 appears a bit too high at this point in time to make it reasonable to execute. There also appears to be enough water supply existing in storage in the aquifers to enable the Basin to incrementally move into a pro-active program that will be the outgrowth of Scenario # 5. Scenario # 5 accepts some loss of water supply in storage but extends the life of the Valley Fill Aquifer by at least 300 percent over the present situation (approximately 380 years versus 120 years), and provides the least amount of disruption to the lives and economic plans of Basin residents.

The market place over the next 40 years may place the Basin in an even better position than is envisioned here. If it doesn't, a much better understanding of the Basin's water resources through pro-active management and monitoring programs will assist in making better decisions about the future. Some of the new water pilot programs (cloud seeding and water harvesting -- terrain and vegetative modification and management) offer real promise of help, at least in some areas of the Basin. These programs have worked quite well, adding 10 to 20 percent to the normal precipitation and recharge elsewhere. However, before we accept these figures as fact in the Basin Plan, the Committee feels that "pilot programs" should be executed to see if the savings realized elsewhere can be accomplished in the Estancia Basin.

An aggressive Conservation Program based on a realistic water rights policy for a rural area where the major user is irrigated agriculture, coupled with workable policies and a Basin-wide approach to management should reduce the aquifer depletion by about 40 to 60 percent as reported in other areas. Particular emphasis needs to be applied to the creation of water rights and water use policies based on incentives which will cause users to limit pumping and maximize distribution and use efficiencies, minimizing the amount of water used. Clearly these strategies and policies need to be targeted at irrigated agriculture, water supply utilities, and the other large users of water.

As pointed out by individuals in the 1998 round of public meetings, the Basin should attempt to attract clean industries, probably along the I-40 corridor. The policies and efforts outlined in Scenario # 5 contribute to this type of effort to improve and broaden the Basin's economic base.

**RECOMMENDATION—Base the Water  
Plan on Scenario # 5**

DISCUSSION: The Committee wanted to achieve the results associated with Scenario # 2 or Scenario # 3; however, those scenarios rely on acquiring large amounts of new water (37,500 acre-feet and 25,000 acre-feet on an annual basis) and a massive infusion of funding to acquire the water rights, develop the infrastructure to bring the new water to the Basin and develop the infrastructure within the Basin to distribute the water. Only the cost to acquire the water rights and get the water to the edge of the Basin has been estimated with any degree of certainty. The dispersion of major water users, particularly irrigated agricultural users, makes any distribution system within the Basin unrealistic. Each of these scenarios results in what would probably become a billion dollar program. Financially that eliminates both scenarios as feasible options for the future. Cultural, social, and political considerations involved in transferring water from the Middle Rio Grande Basin to the Estancia Basin also eliminates both scenarios as feasible.

Scenario # 1 continues the mined basin concept of water supply for the next 40 years or until the cost of re-drilling or deepening wells, finding water, deteriorating water quality and economic concerns result in enough public outcry and pressure to cause corrective action. The cost to maintain the "status quo" (approximately \$100,000,000 to as high as \$200,000,000) is comparable to or exceeds the cost of Scenario # 5. Substantially de-watering the Valley Fill Aquifer over the next 80 years based on future projected trends and completely de-watering it in about 120 years is not acceptable in the Committee's view; thus, Scenario # 1 has been rejected as well.

Scenarios # 4 and # 5 are really the same with Scenario # 5 being a scaled down version of Scenario # 4. Scenario # 5 is really a "let's walk before we run" approach that the Committee feels should be adopted while Comprehensive Monitoring, Metering and an Investigations Programs are undertaken to ascertain many of the unknowns. While water levels are declining in most parts of the Basin and water quality appears to be worsening, it is the Committee's judgment that we have the time in the next 40 years to:

- Develop and implement effective water resources management in the Basin.
- Put in place a decent monitoring program to help us understand what is happening.
- Begin to execute a pro-active protection program for our aquifers.
- Stabilize the water rights situation.
- Develop an Estancia Basin Water Trust Fund and a funding and utilization process.
- Put in place an effective conservation program for domestic and agricultural users.
- Meter every major user and set up an effective water rights program that rewards those who minimize their use of water or use it most effectively while protecting existing water rights holders.

## SCENARIO NO. 5—"2040 CONDITION"

### (INITIAL EVALUATION)

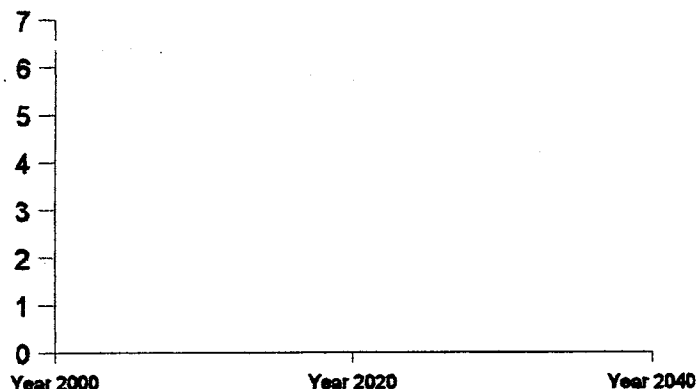
**OBJECTIVE:** Control and slow the depletion of the Valley Fill Aquifer from an average of 45,000 acre-feet per year to an average annual rate of 20,000 acre-feet per year by the Year 2040. Water supply in storage will be reduced from 6.5 million acre-feet in the Year 2000 to about 5.2 million acre-feet in storage in the Year 2040.

**DISCUSSION:** This Scenario accepts the fact that the Basin is in an unsustainable condition ("being mined") and that no new supplies of water are immediately available. It significantly reduces depletion through pro-active conservation, metering and monitoring programs targeted at agriculture and domestic use while increasing the awareness and understanding of the Basin's water resources by its residents. Pilot programs combining cloud seeding and terrain and vegetative modifications are undertaken to explore development of new water sources and supplies. The Basin is managed as a special water management area by each county and the Office of the State Engineer to ensure effective use of funding and to keep water rights availability and use under control.

It may be possible by metering, system audits, efficiency modifications and crop selection to reduce annual irrigated agriculture depletions to a level that can bring the Basin's water supply into a sustainable posture by the Year 2040 or at least in the following 40-year period.

### Goals (40-Year Analysis)

#### Valley Fill Aquifer Storage (Mil. Ac.-Ft.)



**Exhausts Aquifer water supply in storage by the Year 2380**

#### GOAL 5

**Figure 20: Water Supply Goal in Scenario # 5**

**SCENARIO NO. 5--"2040 CONDITION" (cont.)**  
 (INITIAL EVALUATION)

DEMAND:           45,000 acre-feet--current demand  
                       5,000 acre-feet--projected additional demand  
                       50,000 acre-feet--total demand

<u>SUPPLY:</u>	Annual		
	Depletion Reduction	/Program	Cost
Management Alternative:	4,500	ac.-ft./\$	590,000
Conservative Alternative	14,000	ac.-ft./\$	820,000
Water Development Alternative	11,500	ac.-ft./\$	725,000
Water Quality Alternative	0	ac.-ft./\$	460,000
Infrastructure Alternative	<u>0</u>	ac.-ft./\$	<u>0</u>
Total Available	30,000	ac.-ft./\$	\$2,595,000

COST: Scenario # 5 has been developed to cut the demand driven depletion to 20,000 acre-feet by the Year 2040. This appears to be an executable program with a reasonable chance of success that could extend the life of the Valley Fill Aquifer to the Year 2380. Irrigated agriculture may be able to reduce their depletion of the aquifers by another 30 percent. Cloud seeding and vegetative management programs might add another 10 to 20 percent in terms of precipitation. The actual recharge to the aquifer will be somewhat less. Heightened awareness has caused demand to drop from 0.31 acre-feet per residence (1993-1994) in Eldorado, NM, outside of Santa Fe to 0.19 acre-feet (1997). That type of reduction in domestic use coupled with some fallowing of irrigated acreage or conversion to housing developments might enable achievement of water resource sustainability by the Year 2040. The program to achieve Scenario # 5 is a pragmatic, pro-active attempt at an achievable, executable program utilizing the major alternatives previously presented.

The goals and objectives for each major program have been conservatively set at from 50 percent to 75 percent of results attained elsewhere to enable the residents, local entities and governments to build programs in a realistic manner through education, information, conservation and "pilot programs" for new water and system efficiencies while developing funding sources to sustain those programs over a 40-year period. The level of effort in all alternatives except the Water Rights Program (100 percent) and Cloud Seeding Program (100 percent) and Terrain and Vegetative Modification and Management Program (100 percent) are reduced by about 40 to 60 percent from those presented in Scenario # 4. Scenario # 5 eliminates the creation of a Special Improvements District (Management), Fire Hydrant Testing (Conservation), Effluent Recharge and Importation of Water (Water Development).

**SCENARIO NO. 5—"2040 CONDITION"(cont.)**  
**(INITIAL EVALUATION)**

<b>SUMMARY – FEASIBILITY</b>				
<u>CRITERIA</u>	<u>YES</u>	<u>NO</u>	<u>MAYBE</u>	<u>REMARKS</u>
Technical	X			Feasible technology
Political	X			Ease in approach
Institutional	X			Maintains current Institutions
Social/Cultural			X	Requires Info & Ed
Financial	X			Feasible
Time Frame	X			Feasible
Physical/Hydrological/ Environmental	X			Stabilizes water resource situation

**Figure 21: Scenario #5 Feasibility**

Rating: Feasible

Program Cost: \$2+ million per

Time/Cost Schedule: 1998/1999,  
set up—less than \$1 million  
Annual 2000 to 2040: \$2.2million

Funds Source: Estancia Basin  
Trust Fund; Soil & Water  
Conservation Districts; Counties;  
State.

Action Agents: Residents, Water  
Conservation Districts; State and  
Counties

Technical Feasibility—All proven technologies. Only question is how much Cloud Seeding coupled with terrain modification/vegetation modification will yield. Water reuse is also critical.

- Political Feasibility—Yes! Eases into water conservation.
- Institutional Considerations—None. Uses in place institutions.
- Social and Cultural Impacts—Some residents will still question the need for any effort. Good information and education program is critical.
- Financial Feasibility—Cost is feasible if an oversight coordinating entity is in place to ensure efficient use of funding and a cooperative effort.
- Implementation Schedule—1998/1999 set up. Begin execution at about \$2.2 million per year in the Year 2000.
- Physical, Hydrological and Environmental Impacts—
  - Physical—Slight (some change in terrain appearance)
  - Hydrological—Major (positive effect)
  - Environmental—Major (positive effect)

**Evaluation:** Feasible and acceptable! Relatively reasonable cost. Moves cautiously into most of the water resource areas, minimizing the possibility of major mistakes and funding/cost disasters.

## WATER PLAN GOAL

**OVER THE NEXT 40 YEARS (YEAR 2000 TO YEAR 2040) REDUCE THE PROJECTED ANNUAL AVERAGE DEMAND DEPLETION (LOSS) OF THE VALLEY FILL AQUIFER FROM 50,000 ACRE-FEET PER YEAR TO 20,000 ACRE-FEET PER YEAR.**

### PROGRAM GOALS:

- **Management Program—Goal: 4,500 acre-feet per year reduction**
- **Conservation Program—Goal: 20,500 acre-feet per year reduction**
- **Water Development Program—Goal: 5,000 acre-feet per year reduction**
- **Quality Program—Goal: 0 acre-feet per year reduction (protect existing water supply in storage)**

**DISCUSSION:** The above goals are different from those presented in the discussion of scenarios in the preceding section. Based on further analysis and public input the Conservation Program offers more opportunity for depletion reduction than was initially estimated. This change also has a very positive financial effect, reducing the annual cost to \$2,360,000 per year from the initial estimate of \$2,595,000 per year (a \$235,000 reduction per year in program cost).

The Water Plan moves carefully into the development and funding of single-focus (water resources) administration, development and use/reuse of water in the Estancia Basin through a comprehensive Management Program ensuring a clear understanding of the aquifer interaction and a clear presentation of that information to the Basin's residents. The stabilization of water rights within the Basin is a major priority as is the establishment of an Estancia Basin Trust Fund ensuring continuity and execution for all programs. Local involvement and development and execution of the various programs is critical for long-term success (must be a local effort).

The savings (depletion reductions) associated with the Conservation Program are based on conservative projections that have been intentionally understated (based on program results achieved elsewhere). There is a strong feeling that accurate measurement of land actually under irrigation and water actually pumped will result in a reduction which is accounted for within agricultural efficiency savings.

Savings (new water) associated with the Water Development Program are the result of very conservative projections of cloud seeding and terrain vegetation management and modification program success coupled with state, county or local buyback of presently in use water rights and production infrastructure to be placed in an emergency/drought water rights bank.