ENTRANOSA WATER AND WASTEWATER COOPERATIVE

WATER CONSERVATION PLAN

ADOPTED: February 12, 1998

BOARD OF DIRECTORS

Peter Ide, President

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1. GENERAL OVERVIEW

The objective of this Water Conservation Plan is to provide a framework that guides the Entranosa Water and Wastewater Cooperative (Entranosa) to practice management techniques which will increase water use efficiency, promote the policy goals of Entranosa and encourage the beneficial use of water. The primary focus of the plan is to increase long term efficient water use.

Entranosa has been actively practicing water conservation for several years, however it has not previously committed these conservation practices to writing. This plan identifies these practices and designates each distinct practice as a definitive Best Management Practice (BMP). In our context, a BMP is defined as:

A policy, program, rule, regulation, or ordinance by which a water supplier accomplishes, requires, or promotes the conservation of water.

The Entranosa service area is located on the east side of the Sandia Mountains. This area was once a great inland sea and is part of the Estancia Water Basin. Water supplied by the Cooperative is primarily for residential drinking water and other domestic uses, as evidenced by the relatively low per capita consumption. This plan recognizes the composition of our membership and their needs. Entranosa obtains its water from a ground water supply, the aquifer of the Estancia Basin.

New Mexico law explicitly provides for regional water planning, N.M.S.A. § 74-14-44 1978 (1994 Commutative Supplement) and N.M.S.A. § 72-1-9 1978 (1985 Repl. Pamph.). These statutes recognize that different regions have distinct hydrologic, economic, and political conditions and requirements and that these differences necessarily will impact a region's water plan. Section 74-14-44 provides funding for regional water planning through the Interstate Stream Commission based on identification of hydrologically and politically cohesive regions. Section 72-1-9 recognizes that individual municipalities and counties have distinct development, water planning, and conservation needs, by authorizing such individual entities to formulate individual forty year water and conservation plans. For the same reasons identified in these statutes, Entranosa's conservation plan takes into account its distinct hydrologic, political, and social needs and requirements.

2. INTRODUCTION

Entranosa serves an unincorporated rural area encompassing approximately 77 square miles in central New Mexico. This area is east of Albuquerque and is locally referred to as the East Mountain Area (EMA). Entranosa provides water to approximately 6,475 people in the EMA. Most of the service area is located within the Estancia Basin, a closed hydrologic unit, at an average elevation of 6,800 feet above sea level. The basin is recharged by rain and snowfall.

The Estancia Basin has an abundant water supply, but has experienced increasing usage since World War II. In the 1990's, the EMA realized rapid growth with meter connections served by Entranosa doubling in the past four years. Because the Estancia Basin has been declared a closed basin by the State Engineer, new water rights can not be created and most water rights have already been allocated.

In light of the increasing demand for water, Entranosa intends to protect against future water shortages by acquiring water rights now and by establishing a long term water conservation strategy. Our conservation plan is designed to implement the mission of the Entranosa Board of Directors and the staff to ensure an adequate supply of water to its members, both now and in the future. State law requires consideration of conservation in the context of water planning. Accordingly, "an adequate supply of water" in this area includes projected demands coupled with conservation. More stringent conservation techniques may be required in the future. They will be phased in to ensure a water supply for the Cooperative's members.

The conservation plan must also consider drought years and appropriate measures that will ensure an adequate supply of water during periods of shortage. In order to obtain an accurate accounting of water availability in the basin and to ensure an adequate water supply for its membership, Entranosa has funded the construction of a computer model of the entire Estancia Basin.

3. WATER USE PATTERNS AND TRENDS

Water conservation planning requires knowledge of past usage and a projection into the future. Additionally, accuracy and separation of demand data by types of users and uses. Long term demand projections have been developed for each appropriate water-use category -- residential, commercial, and unaccounted for water.

3.1. Water use demand, pumping rates and category of usage

Table 1 on the next page shows the historic annual water demand for Entranosa since 1990 and makes future projections which have been used by Entranosa for planning purposes. We have keyed the projected demand for acre feet of water to our projected meter installation rate, and used a conservative usage rate of 270 gallons per meter per day.

Table 1: Historic Water Demand and Projections

Yéar	(ac-ft)	
1990	180	374
1991	211	518
1992	247	712
1993	249	950
1994	329	1130
1995	449	1376
1996	510	1685
1997	558	1846
1998	607	2006
1999	655	2167
2000	704	2328
2001	753	2488
2002	801	2649
2003	850	2810
2004	898	2970
2005	947	3131
2006	996	3292
2007	1044	3452
2008	1093	3613
2009	1141	3774
2010	1190	3934

B. Annual Pumping and Category of Use

The following table provides the data for 1997, illustrating how much water we pumped into the system and how it was accounted for. The average use per meter is 256 gallons/day.

Total Pumped	166,577,828 gallons
Total Water Sold	139,125,000 gallons
Other Uses	27,452,828 gallons
Residential Sales	138,168,000 gallons
Commercial Sales	957,000 gallons
Water for Flushing & Testing	7.77%
Unaccounted for water	8.71%

Table 2: Entranosa Annual Pumping & Category of Use

3.2 Seasonal Trends

A. Seasonal use and climatic trends. Water use varies throughout the year as temperature and precipitation changes. This table illustrates water use peaks in the hottest months of summer.

Month	Monthly Water Pumped (MG)	Number of Meters	Average Use (Gal/Meter/Day)	Average Gallons per Capita Day
January 1997	10,763,100	1697	205	59
February 1997	11,604,900	1710	242	69
March 1997	9,635,400	1725	180	51
April 1997	11,581,000	1730	216	62
May 1997	19,269,500	1751	355	101
June 1997	15,249,000	1770	287	82
July 1997	21,875,128	1784	396	113
August 1997	14,166,900	1798	254	73
September 1997	16,045,400	1817	294	84
October 1997	12,448,600	1825	220	63
November 1997	11,553,300	1846	209	60
December 1997	12,385,600	1846	216	62
Average	13,881,486	1796	256	73

Table 3: Monthly Consumption Rates

The household average population for Entranosa is estimated at 3.5 members. That number flucutates throughout the East Mountain area, and some authorities figure an average family population at 2.7. If that number is used, the per capita consumption rises to 94 gpd. The average usage per meter does not change.

B. Peak day and minimum daily use. Table 4 on the next page shows daily water pumpage for November1997 and December 1997 and projected peak flows in the out-years. Water demand varies considerably by day. Peak flow was .837 million gallons per day (MGD) while minimum flow for the period was at .10780 MGD. The average daily flow for 1997 was .365087 MGD.

Time Hours	1997 Nov-Dec Avg Gals/Hour	1998 Est. Peak Day Gals/Hour	1999 Est. Peak Day Gals/Hour	2000 Est. Peak Day Gals/Hour	2001 Est. Peak Day Gals/Hour	2002 Est. Peak Day Gals/Hour
Midnight	7,572	27,277	30,116	32,956	35,795	38,634
1.00	8,260	29,757	32,854	35,952	39,049	42,146
2,00	3,770	13,579	14,993	16,406	17,820	19,233
3.00	1,836	6,613	7,301	7,989	8,678	9,366
4.00	3,638	13,107	14,471	15,836	17,200	18,565
5.00	3,048	10,982	12,125	13,268	14,411	15,554
6.00	5,703	20,546	22,685	24,824	26,962	29,101
7.00	14,095	50,775	56,061	61,346	66,631	71,917
8.00	17,241	62,111	68,577	75,042	81,507	87,972
9.00	25,141	90,569	99,997	109,424	118,852	128,279
10.00	27,272	98,245	108,471	118,697	128,924	139,150
11.00	26,059	93,876	103,647	113,419	123,190	132,962
Noon	25,666	92,459	102,083	111,707	121,331	130,955
1.00	23,863	85,964	94,912	103,860	112,808	121,756
2.00	21,306	76,754	84,743	92,732	100,722	108,711
3.00	21,306	76,754	84,743	92,732	100,722	108,711
4.00	22,617	81,477	89,958	98,439	106,920	115,401
5.00	25,305	91,160	100,649	110,137	119,626	129,115
6.00	22,781	82,067	90,610	99,152	107,695	116,237
7.00	18,749	67,543	74,574	81,604	88,635	95,666
8.00	16,750	60,340	66,621	72,902	79,183	85,464
9.00	10,161	36,606	40,416	44,226	48,036	51,847
10.00	6,392	23,026	25,423	27,820	30,217	32,613
11.00	6,556	23,616	26,075	28,533	30,991	33,450
TOTAL	365,087	1,315,202	1,452,103	1,589,004	1,725,905	1,832,80

Table 4: Peak Day Demands

4. CONSERVATION PROGRAMS

This section delineates 13 BMP's which Entranosa will continue to use or adopt under this plan. Each BMP has been developed in recognition of the nature of the water supply resource available to Entranosa.

Several BMP's contain practices that can be implemented in phases. Each BMP has been developed considering practices which will assist the Cooperative to operate its water system more efficiently and as an indirect result, reduce the ratepayers cost of purchasing water.

- BMP No. 1 Resolutions
- BMP No. 2 Accounting
- BMP No. 3 Phased Implementation
- BMP No. 4 Conservation at public facilities
- BMP No. 5 Metering
- BMP No. 6 Rates
- BMP No. 7 Prohibition of waste
- BMP No. 8 Plumbing code
- BMP No. 9 Landscaping
- BMP No. 10 Industrial
- BMP No. 11 Operation and Maintenance
- BMP No. 12 Drought Management
- BMP No. 13 Education

The basic framework of many of the BMP's have been actively utilized by the Cooperative for several years.

4.1 BMP No. 1 - Resolutions

Although the Cooperative has been practicing conservation for many years, the Board of Directors will consider a kickoff program designed to focus on the issue and inform its members that as the Cooperative plans for its future, it will continue to value conservation. Appendix A is a resolution which was enacted by the Board of Directors. The resolution says that the Cooperative supports conservation within the context of a renewable resource.

4.2 BMP No. 2 - Accounting

The BMP requires the Cooperative to obtain and maintain complete and reliable records of water use and practices. Portions of this BMP already have been implemented by the Cooperative. A water conservation planner must be familiar with the types and patterns' of water use that occur within the water service area. To be able to make recommendations on how water can be used more efficiently within any sector of the Cooperative, the knowledge of historical and current water use by customer category is essential.

The Cooperative should prepare an Annual Water Use Report. A checklist is provided on the topics the Annual Report should include:

General information

System facilities

Service population, number of customers by class or size of meters

Water Use

Total Water Pumped

Sales by customer class

Estimated return flows to the aquifer

Monthly values of precipitation and temperature

Data Evaluation

Per capita demand

Unaccounted water

Customer analysis

Capacity analysis

Other analysis completed during year

Evaluation of BMP effectiveness

4.3 BMP No. 3 - Phased Implementation of Water Conservation

This BMP requires the Cooperative to investigate phased implementation of water conservation. Phasing implies a gradual but continued imposition of water conservation practices over a period of time. Water conservation practices would be implemented as the benefits of conservation become greater. Because of its importance to the Cooperative's development, this management practice is shown as a separate distinct action. This BMP is an integral part of other BMP's detailed elsewhere in this Conservation Plan-such as rates, landscaping, drought management, and education. Part of this BMP includes the development of definite time or period schedules that define when a more stringent conservation technique should be implemented.

A phased conservation approach is consistent with the intent of state law which advocates water development plans. As an example, the 40-year planning statute, N.M.S.A. § 72-1-9 (1994 Commutative Supplement), encourages water development plans that take the longer view and allow water rights to be held by a municipality for its future generations. This concept of allowing

municipalities to ensure an adequate water supply also is supported by the New Mexico Public Utility Commission. Water leasing or banking allows water to be put to beneficial use while it is being reserved for a public water supply. Entranosa should investigate types of conservation methods that reduce the amount of water that is 'consumptively' used.

4.4 BMP No. 4 - Conservation at public facilities

To promote good water conservation practices and to serve as a model for its customers, this BMP requires the Cooperative to employ good water conservation practices at its own facilities. The Cooperative already has the general elements of this policy in place.

This public facility conservation program includes various elements:

- A. Accounting for all water use:

 The Cooperative has instituted this portion of the BMP. Meters have been installed at all Cooperative Facilities where water is consumed.
- B. New construction:

 The Cooperative will regulate water use in construction of any new facilities it puts in place.

Elements of design consideration include:

All toilets installed are low flow toilets
No toilet installed is equipped with a timing device
Hot water pipes are thermally insulated
Faucets incorporate flow restriction devices
Showers incorporate low flow nozzles
Drinking water fountains are designed to operate only upon demand

4.5 BMP No. 5 - Metering

This BMP requires the Cooperative to implement with minor exceptions, universal, reliable metering of all water uses. Metering is essential in determining the amount of unaccounted for water. Although the American Water Works Association recommends that a water utility begin a program to investigate excessive losses only when the value exceeds 15%, Entranosa has worked diligently to keep this number below 10%.

A. Metering:

The Cooperative shall maintain its policy of universal metering. Meters are now installed at all public schools, Cooperative owned facilities, residences, and commercial users. The Cooperative has a metered location for bulk water sales, should those occur.

- B. Charging:
 The Cooperative will continue its policy of charging for water service. Other than for fire protection, no free water should be provided.
- Meter Repairs and Calibrations:
 The Cooperative will continue its program of repairing and calibrating all meters.
 The master meter at the main pumping station should be calibrated yearly.

4.6 BMP No. 6 - Rates

This BMP involves the establishment of a rate system which promotes efficient use of water. Entranosa should continue to utilize its inverted block rate charge that discourages excessive use of water. Cooperative management should continue to review system costs and make recommendations on rate schedules, considering capital improvements and annual operation and maintenance costs. Planning models should be developed to aid in evaluation of the rate structure. The rate structure will include both a system charge and a charge for amount of water used. System charges are designed to help offset fixed charges against the system such as billing, meter reading, administrative, and capital costs.

4.7 BMP No. 7 - Prohibition of waste

This BMP is intended to discourage the waste of water by making conservation a term of service. Members that allow irrigation or other waters to run or flow off their property, or fail to fix leaks in their system, risk discontinuation of water service.

4.8 BMP No. 8 - Plumbing code

This BMP establishes support for the use of efficient water fixtures, installation of pressure reducing valves when the static pressure inside a home is greater than 80 PSI, and the installation of insulation on hot water pipes during new construction and remodeling of homes. Plumbing construction within the Entranosa service area is regulated by the Bernalillo County Building Department, Santa Fe County Land Use Department and the New Mexico Construction Industries Division. Upon the passage of the Conservation Resolution recommended in Best Management Practice No. 1, the Cooperative will institute a program to inform members that it will be cooperating with the local mechanical inspectors to enforce the code.

A. Water efficient fixtures

Plumbing fixtures installed in new construction and remodeling are required to meet the manufacturing standards contained in Public Law 102-486, Section 123 that requires the fixtures listed on the next page to have a specified maximum water use, when measured at a flowing pressure of 80 PSI:

Lavatory faucets

Kitchen faucets

Lavatory and kitchen faucet

aerator replacement

Showerhead

2.5 gallons per minute

2.5 gallons per minute

2.6 gallons per minute

The maximum water use for water closets and urinals must conform to the following flush criteria:

Gravity tank-@ toilets	1.6 gallons per flush
Flushometer tank toilets	1.6 gallons per flush
Urinals	1.0 gallons per flush

The estimated unit water savings from the use of ultra low flush toilets using 1.6 gallons per flush is 7.6 gpcd. The estimated savings on a low flow shower is 12.4 gpcd and on a low flow faucet is 0.5 gpcd. Based on Entranosa's current water use of 73 gpcd, savings from water efficient fixtures could reduce water used in new homes by 14%.

B. Thermal Insulation

All hot water pipes in a home should be thermally insulated. Insulation is accomplished with split foam tubing. This insulation will help retain heat in the system and will reduce the water that is typically wasted when a hot water faucet is opened and allowed to run until hot water finally reaches the faucet. The estimated water savings from the use of thermal insulation is 2.0 gpcd. Based on Entranosa's current water use of 73 gpcd, savings from use of thermal insulation could reduce water used in new homes by 1.5%.

C. Pressure Reducing Valves

Pressure reducing valves should continue to be installed at the entrance to all homes where the static pressure inside a home is greater than 80 pounds per square inch. Reduction of high water pressure will greatly reduce quantities of water consumed in normal use, and perhaps reduce the occurrence and frequency of leaks.

D. Other Plumbing Works

To reduce evaporation of water, the Cooperative will recommend that any swimming pools or hot tubs have a cover placed on the water surface when not in use. This practice would also indirectly help a ratepayer by reducing water heating costs and water consumption.

4.9 BMP No. 9 - Landscaping

This BMP encourages the promulgation of landscape guidelines. Entranosa has promoted low water use landscaping by distributing pamphlets and will continue to encourage xeriscaping efforts. Three distinct types of landscaping guidelines to promote water efficiency are:

- Guidelines that reduce consumptive use and encourage near term efficiency.
- Guidelines that will promote short-term conservation efforts during a drought emergency.
- Guidelines that will contribute to long term water-supply management.
 - A. Guidelines which reduce consumptive use and encourage near term efficiency: Entranosa should highlight existing inefficiencies in landscaping that currently inhibit water efficiency. For example, poor design of irrigation systems often results in over spray and runoff. Over irrigation can result in the loss of landscapes where plants cannot tolerate soggy soil conditions.
- 2. Guidelines that will promote short-term conservation efforts during a drought emergency:

Entranosa should promote short term conservation efforts for use during a drought emergency. Emergency measures could included restricting outside watering to some alternating schedule, reducing peak demand periods by asking members to alter their daily schedule, and requesting curtailment of all non-essential uses of water.

- 3. Guidelines that will contribute to long term water-supply management:
 Entranosa should investigate landscaping in terms of the setting that exists in the EMA.
 Long term conservation landscaping practices guidelines might include:
- Irrigation design requirements
- Grading and revegetation requirements
- Low water use planting requirements
- Exceptions to design standards
- Administration and appeal process

4.10 BMP No. 10 -Industrial

Entranosa has no industrial users, but a BMP to require any large industrial user that proposes to purchase water from the Cooperative to develop a water conservation program that is relevant to the type of work being done at the facility should be considered.

4.11 BMP No. 11 - Operation and Maintenance

This BMP requires the Cooperative to develop an ongoing operation and maintenance program which is designed to enhance water efficiency. Entranosa already has a developed a program in place and this program should be continued. Elements of the program include:

- Maintenance of underground and above ground pipelines and tanks
- Pipe and hydrant flushing
- Detection and replacement of severely leaking pipelines

4.12 BMP No. 12 -Drought Management

This BMP requires the Cooperative to begin developing a drought management plan. The drought management plan should include the following elements:

- Obtain public input
- Define drought mitigation goals and objectives

What users should be restricted

What uses can tolerate drought conditions better than others

Effect on water cost

Assess supply and demand

Water supply available

Effect of state laws

Water demand

Define drought indicators

Palmer index

Area stream flow conditions

Precipitation and snow pack

• Identify and assess drought mitigation measures

Additional treated water storage

Public information and education

Nonessential-use restrictions and bans

Pricing

Rationing Schemes

Large water-user contingency plans

Local regulations and ordinances

4.13 BMP No. 13 - Education

This BMP requires education of all of Entranosa's members on the importance of conservation. This challenge will, in the long run, be one of the most essential ingredients in this water conservation program.

The member education program could include the following subjects:

A. Distribution of written materials from AWWA, State Engineer, WPCF, and New Mexico Water & Wastewater Association regarding the following:

Cooperative water sources

Water efficient landscapes

How to detect and fix leaks

Types and benefits of water-conserving household fixtures

Good indoor water conserving practices

B. Presentations and outreach:

Paid and public service advertising

"Water Tips" column in newspaper or newsletter

Development and presentation of a conservation library with films, books, videos, Conferences

C. School education:

Distribution of material from AWWA, State Engineer, etc.

Discussions by teachers in science and social studies classes

Working models

Demonstration gardens

Poster contests

D. Board of Directors:

Passing of resolutions supporting conservation

Involvement of members in setting rates, developing landscaping

Setting policy to prevent waste of water and how to re-act to a drought emergency

5. CONCLUSION

This water conservation plan, after adoption by the Entranosa Board of Directors is intended to serve as a framework on which Entranosa can build and implement a water conservation strategy to help ensure an adequate supply of water to its members. This conservation plan includes thirteen Best Management Practices, many of which the Cooperative has already instituted without formal identification as such, which will promote the efficient and wise use of water both now and in the future.

Entranosa Water and Wastewater Cooperative 1998 Education Plan for Water Conservation

The Board of Directors for Entranosa Water and Wastewater Cooperative will promote water conservation by informing their membership of methods to conserve water. The overall membership education will commence in 1998 with a first year program and a new customer program.

First Year Program

The first year program will include the distribution of educational materials including brochures and/or newsletters to all customers four times a year (once each quarter). The first information to be distributed will explain the water conservation program and state its goals. This initial distribution will be accompanied by a local newspaper press release informing the public of Entranosa's support for National Drinking Water Awareness Week which commences May 3, 1998. Subsequent news releases during the first year will correspond to information distribution times.

The educational materials and news releases will promote water conservation by informing water users about ways to save water inside the home; in landscaping and lawn uses; and in recreational uses. The water conservation methods to be emphasized include:

- Bathroom water saving hints
- Kitchen water saving hints
- ~ Laundry water saving hints
- Appliance and plumbing practices
- ~ Outdoor water conservation

New Customer Program

New customers will be given the initial conservation education material that describes the conservation plan and states its goals, as well as any materials sent out during the first year program. The new members will receive these materials in a kit when they are given their membership.

Entranosa Water & Wastewater Cooperative



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Conservation and Drought Survey

Thank you for taking a few minutes to fill out this survey for the Conservation Committee. Your additional comments on any of these matters are invited. Please feel free to use the back of this page. We have additional paper, should you require it – and again, thank you.

What are they?	
Do you know how to check for water leaks? Do you check for leaks regularly?	
3. Do you have a water efficient landscape plan? Do you think that the Coop should consider restrict use plants? Do you think the Coop should consider a maximum lot size for landscaping? I would you consider reasonable? I	ing high wate f so, what size
4. Do you reuse water for any purposes? What are they?	
5. If have a pool or spa, do you use a cover to reduce evaporation? Do you think this should be required?	
6. Do you think your children make wise choices in the use of water at home? Would you like to see more activities and educational materials on conservation geared toward our you members?	ıngest
7. Do you think there should be a limit on water usage for individual homes? Currently, in the eve shortage, the Coop can set a maximum usage of 9000 gallons a month. Do you perceive this amount as: a high or too low?	nt of a dequate, too
8. Do you think the Coop should assess penalties for excessive water use? What is excessive '?	
9. In the event of a mild drought are you willing to voluntarily reduce your water usage by 5%, 15%, 20%? Other?	
10. In the event of a moderate drought are you willing to voluntarily: reduce your outdoor watering schedule? not to refill your pool or hot-tub?	
11. In the event of a severe drought condition would you support the adoption of: an emergency provision that implements water rationing? an emergency provision that applies a surcharge on excessive water use?	
12. What do you consider to be the most critical issues in water conservation education for our membership? (Please use the back of this page.)	
13. Would you consider rounding up your monthly bill to the nearest dollar to fund a water conservation education program?	
14. Which, if any, of these areas would you like more information on? (Please check.) Efficient Landscape Planning Water Saving Devices Finding Leaks Others?	