

Appendix H

**Supporting Information for
Alternatives Analysis**

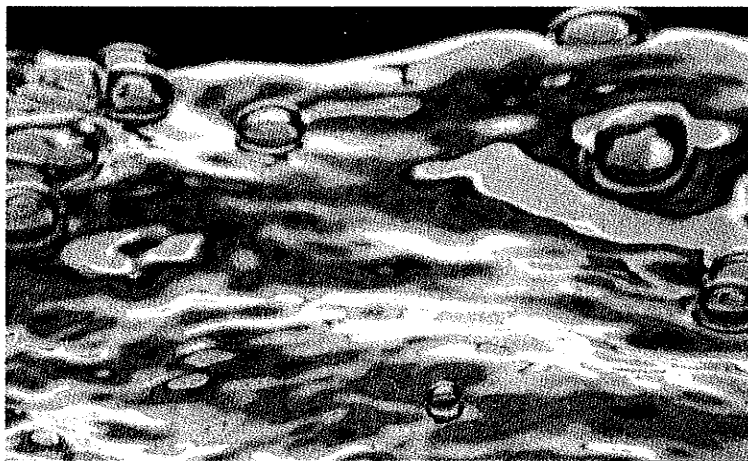
Appendix H1

OSE Guidance for Drought Management Plans

A WATER CONSERVATION -GUIDE FOR- PUBLIC UTILITIES

**NEW MEXICO OFFICE OF THE
STATE ENGINEER**

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1-800-WATER-NM

EMERGENCY ACTION PLAN FOR DROUGHT MANAGEMENT

PLANNING AHEAD TO AVOID CONFUSION

Recurring drought is a natural part of New Mexico's arid climate. Drought, which is defined as a prolonged period of below-normal rainfall, can have a widespread impact on communities—especially if those communities have not prepared for periods of drought or water shortages.

Drought contingency plans improve a water utility's efficiency and response time during a drought or water emergency. Planning ahead will enable the water utility to avoid confusion during a crisis when immediate action is required and ensure better results from water use reduction programs. The following procedure may be used to develop an emergency action plan for drought management.

DEVELOPING AN EMERGENCY ACTION PLAN

Water shortages may not be predictable, but preparations can be made so that the effect of water shortages—whether caused by drought, natural disaster, or other emergency—can be minimized.

Step 1: Form a Drought Task Force and Define its Structure and Membership

The responsibilities of the Drought Task Force must be clearly defined, and will typically include:

- (1) supervising and coordinating the development of the plan
- (2) public education
- (3) monitoring reservoir levels, groundwater levels, and precipitation to estimate water shortages
- (4) assessing the impact of shortages on each customer class and the economic livelihood of the community
- (5) coordinating the implementation of drought mitigation actions
- (6) monitoring compliance

Step 2: Prepare a History of Droughts in the Area

Prepare a chronological history of droughts in the study area and describe the effects on the community based upon articles published in newspapers, journals, professional papers, public records, and interviews with the public. Determine the reductions in demand that were necessary to provide adequate amounts of water to customers. Based on this information, what will be the impacts on the community with reduced allocations of water in the next drought? This information will play an important role in educating the public and gaining their support for the emergency action plan.

Step 3: Identify Supply Constraints

Identify constraints affecting the water utility's ability to meet water demand. These will include limits on supply and limits on system capacity.

- **Limits on Supply.** What are the limits on the utility's sources of water such as stream diversions, reservoir levels, aquifer yield, and water supply contracts? The firm yield of surface water and groundwater supplies should be established. The firm or sustainable yield of a stream or reservoir may be defined as the maximum quantity of water that can be withdrawn on a dependable basis, during a repetition of the most critical drought on record. The firm or sustainable yield of an aquifer may be defined as the average annual recharge from snowmelt and precipitation, seepage

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from watercourses, and return flow from surface and groundwater withdrawals for water-use activities. Sustainable aquifer yield may also be defined as the annual withdrawal that does not result in a long-term decline in the water table.

- **Limits on System Capacity.** What are the limits on production, treatment, storage, and distribution capacity? During droughts, customer demand typically increases. However, older systems or systems serving rapidly growing areas may not have the infrastructure capacity to meet above-average demands.

Step 4: Examine Additional Supply Options

If the available supply is the limiting factor in meeting demand, evaluate supply augmentation options. The following questions must be asked:

- Are there existing wells or reservoirs that can be used?
- Can water be purchased from another water utility?
- Can unaccounted-for-water losses be reduced?
- Can wastewater be reused for non-potable water requirements?

In the event that a community is close to exhausting its water supplies entirely, additional options must be considered. These can include actions such as setting up agreements with neighboring communities to lease or share supplies and laying emergency pipelines to supply water on a temporary basis.

Step 5: Identify Necessary Infrastructure Improvements

If system capacity is the limiting factor in meeting demand, identify the critical system components that are vulnerable to failure or need to be upgraded and enlarged to meet the projected peak demand. Evaluate the feasibility of making infrastructure improvements and rank each option based on (1) feasibility of implementation and (2) effectiveness in increasing capacity.

When evaluating the effectiveness of a proposed change, the relationships between system components must be considered. For example, increasing pumping capacity at the source of supply will not increase the amount of water that can be delivered to customers if the treatment plant or distribution mains cannot handle the increased flow rate.

Step 6: Define Criteria That Will Trigger Drought Responses

Define trigger criteria that will determine the level of response required based upon the severity of drought. Acceptable triggers include the Palmer Index, precipitation, reservoir/lake storage, streamflow, groundwater levels, soil moisture, or any combination of these parameters. Criteria for the phaseout or a downgrade of the condition's severity should also be considered. The following are examples of trigger conditions that might be used for various levels of severity.

Phase 1 Trigger: Water Shortage Advisory

Snowpack, precipitation, streamflows, and reservoir levels are only 70% of normal.

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Phase 2 Trigger: Water Shortage Watch

- (1) Water demand has reached or exceeded a specific percentage of the firm capacity of the system.
- (2) Reservoir or well levels are still high enough to provide an adequate supply, but the levels (specify level) are low enough to disrupt some other beneficial activity, such as recreation.
- (3) The water supply is still adequate, but the reservoir or well levels are low enough that there is a possibility that the supply situation may become critical if the drought or emergency continues. An example is a reservoir that has a 12-month supply in storage, if no more rain occurs, or a well that has dropped to a specified level.

Phase 3 Trigger: Water Shortage Warning

- (1) Water demand has reached the predetermined limit of the system, beyond which the failure of a pump or some other piece of equipment could cause a serious disruption of service to part or all of the system. An example might be that daily demand has exceeded 90% of the capacity of the system for three consecutive days.
- (2) Reservoir levels, well levels, or streamflows have reached the second impact level, beyond which operational problems will occur.
- (3) Water supply storage levels have declined to the second impact level.

Phase 4 Trigger: Water Shortage Emergency

- (1) The imminent or actual failure of a major component of the system has occurred which will cause an immediate health or safety hazard.
- (2) Water demand has reached or exceeded the third impact level. An example might be that demand exceeds the system's capacity on a regular basis, thereby presenting the imminent danger of a major system failure.
- (3) Reservoir levels, well levels, or streamflows have declined to the third impact level. An example might be that reservoir levels (specify a level in feet above mean sea level) are so low that diversion or pumping equipment will not function properly.
- (4) Water levels in the distribution storage reservoirs are too low to provide adequate fire protection.

Step 7: Specify Actions To Be Taken

Define the level of response and actions that will be taken in each phase. The following are examples of actions that might be taken for various levels of severity.

Phase 1 Response: Voluntary Conservation

- (1) Provide the public with information on current storage levels in reservoirs and streamflows and the long-range forecasts for precipitation. Alert water customers to the possibility of implementing mandatory conservation measures if drought conditions persist.
- (2) Inform the public by mail and through the news media that they should try to reduce their water use.
- (3) Inform the public daily whether they should water or not water their lawns.

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Phase 2 Response: Mandatory Conservation—Level 1

It is important that the water utility take a lead role in setting an example on efficient water use. Before the utility can expect cooperation from its customers, it must put its own house in order. The utility can demonstrate its intent to improve the efficiency of operations and minimize waste by pursuing any or all of the first three actions listed in this section.

- (1) Implement leak detection and repair program.
- (2) Reduce flushing of water mains, sewers, storm drains, and streets to the minimum necessary to maintain sanitary conditions.
- (3) Reduce frequency and duration of irrigation at public landscape sites such as golf courses, athletic fields, parks, cemeteries, and greenbelts. Adopt irrigation schedules based on the results of water audits if available.
- (4) Impose a mandatory lawn watering schedule such as alternate day sprinkling and restrictions on time of day for watering.
- (5) Prohibit nonessential water uses such as ornamental fountains; pool filling; car, bus, and heavy equipment washing; washing and steam cleaning of building exteriors.

Phase 3 Response: Mandatory Conservation-Level—2

In addition to the above:

- (1) Implement a special pricing structure.
- (2) Distribute water-saving plumbing fixture kits.
- (3) Curtail irrigation at athletic fields, parks, cemeteries, and greenbelts.
- (4) Curtail fairway irrigation at all public and private golf courses using public water supplies, and reduce watering of tees and greens to a minimum.
- (5) Prohibit all outdoor water use.

Phase 4 Response: Rationing

In addition to the above:

Limit the amount of water each customer can use and take legal action as needed to achieve compliance. For example, restrict residential water users to 45 gallons per capita per day and require a percentage reduction by commercial, institutional, and industrial users.

Step 8: Establish a Public Education Program

No drought plan will be successful without a comprehensive public education program. Customers must understand why their cooperation is needed before they will sacrifice water uses.

Customers must also be instructed in how to conserve. Often they are willing to cooperate but do not know how. The utility's credibility is crucial to the success of any drought program. Customers must believe that the utility is an authority on the drought situation and that the emergency action programs are necessary and effective. To maintain credibility, the utility must be consistent:

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- each spokesperson must report the same data or advice
- each education effort must be coordinated
- programs should proceed without major changes.

Step 9: Establish Implementation Procedures

Procedures for the implementation of the emergency action plan should define when and how customers, other utilities, and government agencies are informed that the emergency action plan is going into effect. Procedures may include:

- (1) automatic regulatory implementation provisions
- (2) prearranged media notification or press release procedures
- (3) direct notification procedures including mail, or, if needed, telephone notification systems
- (4) prearranged contract procedures to obtain emergency water supplies from other sources if needed
- (5) checklists or operating procedures as necessary.

Step 10: Establish Procedures for Termination Notification

The termination of water restrictions procedure should define when and how customers and others are informed that the emergency has passed and the program is being shut down. The establishment of termination triggers and the decision to terminate must be based on sound judgment by appropriate city or utility authorities.

Step 11: Obtain Legal Authority

Obtain the required legal authority and regulatory permits for implementing the individual measures in the emergency action plan. It is generally advantageous to adopt an ordinance or regulation providing authorization to a designated official to begin immediate implementation of contingency measures when a trigger condition is reached.

Prepare memorandums of agreement (MOA), and contracts as needed, with all agencies that will be players in the implementation of the drought action plan so that the role of all participants is clearly understood. Because verbal agreements are easily forgotten or compromised by changes in priorities or personnel within an agency, agreements must be documented in writing to ensure that they will be honored in time of need.

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SANTA FE WATER ORDINANCE RESTRICTIONS CHART

This table highlights the four stages of water restrictions outlined in the water conservation ordinance adopted by the Santa Fe City Council on June 25, 1997. Each of the stages is tied to projected shortages of water. This drought management plan was instrumental in the summer of 2000 when water shortages prompted Santa Fe to declare its first Stage 2 Water Alert and Stage 3 Water Warning. (For more information, see the Santa Fe case study on page 157.)

	Stage 1 Water Watch	Stage 2 Water Alert (City Manager)	Stage 3 Water Warning (City Council)	Stage 4 Water Emergency
Voluntary (V) or Mandatory (M)	V	M	M	M
Demand deficiency*	15%	16% - 35%	36% - 50%	> 50%
Residential				
Outdoor landscape watering	All elements of Stage 2 apply on voluntary basis from 10 a.m. to 4 p.m.	All elements of Stage 2 apply on voluntary basis from 10 a.m. to 4 p.m. No watering on Mondays, then every other day depending on address; No watering between 10 a.m. and 4 p.m. Handheld buckets, shut-off hoses can be used anytime. Reclaimed and greywater may be used anytime.	Permitted only on Tuesdays and Fridays, even for hose with shut-off. May water anytime if by hand-held container or drip irrigation, or if using reclaimed or greywater.	Prohibited except for plants that are rare, exceptionally valuable or essential to well being of public or rare animals. Trees and shrubs only with shut-off hose, hand-held container or drip. Greywater okay on fruit trees, ornamental trees and shrubs.
Car washing		Anytime if bucket or shut-off hose is used.	All vehicle washing at a residence is prohibited.	Prohibited
Spas and Swimming Pools		One initial filling for recirculating pools only, no draining and refilling.	Filling and refilling prohibited except when used for water storage. Pool must be covered when not in use.	Prohibited except as water storage
Water runoff from property; washing down pavement, sidewalk		Prohibited	Prohibited	Prohibited
Ornamental Fountains		Allowed only if water is recirculated	Prohibited	Prohibited

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SANTA FE WATER ORDINANCE RESTRICTIONS CHART (cont.)

	Stage 1 Water Watch	Stage 2 Water Alert (City Manager)	Stage 3 Water Warning (City Council)	Stage 4 Water Emergency
Voluntary (V) or Mandatory (M)	V	M	M	M
Demand deficiency*	15%	16% - 35%	36% - 50%	> 50%
Commercial				
Car washing	All elements of Stage 2 apply on voluntary basis from 10 a.m. to 4 p.m.	Anytime on immediate premises	Anytime on premises, but if business does not use reclaimed or recycled water, volume will have to be reduced.	All car washes must reduce usage.
Nurseries		Must curtail all non-essential watering and encouraged to use conservation practices, but exempt from irrigation restrictions.	Reduce use.	Reduce use; may use greywater to irrigate fruit trees, groundcovers and ornamental trees and shrubs.
Restaurants		Only serve water on request	Only serve water on request	Only serve water on request
Construction Projects		Limited to water use required by regulatory agencies (e.g. dust control). Must use reclaimed water if reasonably available.	Limit to new construction meters; water used only for purposes required by regulatory agencies. Effluent water used for dust control only.	No new construction meters will be issued. Construction water not used for earth work or road construction. Effluent water used for dust control only.
Golf courses		Only during designated hours/days	Only during designated hours/days	Prohibited

*Applies during periods when the possibility exists that the utility will not be able to meet all of the water demands of its customers by up to X% of the annual demand projection.

Appendix H2

Acéquia Water Banking Information

AMENDMENT TO ACEQUIA BY-LAWS

ARTICLE 2 : ACEQUIA APPROVAL OF CERTAIN WATER RIGHT TRANSFERS

General

1. The members of (name of Acequia) declare that a transfer of a water right served by the Acequia, or a transfer of a water right into the area served by the Acequia, may be detrimental to both the Acequia and its members. Therefore, any such proposed transfer by any person or entity must be formally approved by the Commissioners, using the procedure in this Article, prior to application for the transfer to the Office of the State Engineer. As used in this Article, "transfer" means a change in point of diversion, and/or place of use and/or purpose of use of a water right.
2. Without formal consent of the Commissioners to such a transfer, any attempt to obtain approval of the transfer from the State Engineer, or any other effort to implement the transfer, is unlawful and void.
3. This Article is adopted under Section 73-2-21(E) NMSA 1978. (or "under Section 73-3-4.1 NMSA 1978." depending on the county)

Approval Procedure

1. A request for approval of a transfer of a water right served by the Acequia or a transfer of a water right into the area served by the Acequia must be made by the owner of the water right in writing, delivered by certified mail to each Commissioner. It must be on a written form prepared by the Commissioners requiring any information about the proposed transfer which they feel appropriate.
2. Within 90 days of receipt of the written request, the Commissioners will hold a public meeting to allow members who support and oppose the request to be heard or submit additional information.

Notice of the meeting will be given in the same manner required for the Acequia's annual meeting. In addition, notice will be given 1) by mail to the applicant at the address on the request form, and 2) by posting a notice of the request and meeting date, at least 10 days before the meeting, at a prominent place near the site of the proposed change.

The conduct of the meeting, such as its location, length, and other matters will be decided by the Commissioners. The Commissioners will accept and consider any documents, written or oral statements, or arguments offered by the applicant or any Acequia member, as well as any information from individuals who may be presented by the applicant or any Acequia member. The applicant or any Acequia member may have an attorney or other representative present his or her information to the Commission in his or her place. The applicant or any Acequia member, or their representative, may respond to evidence or arguments offered at the meeting, directing such response to the Commission. The rules of civil procedure and the rules of evidence shall not apply to the meeting.

The Commissioners may ask any questions they believe may help in their decision. The Commission is not required, during the meeting, to make any decisions or answer any questions on issues raised. Its conclusions on all relevant matters will be contained in its written decision. The Commission may be represented by an attorney or other representative, and may be assisted in the conduct of the meeting by other such persons as it may designate.

Except as provided in this section, only the applicant, other Acequia members and the Commissioners may speak at the meeting.

3. The request may be denied, in whole or in part, if the Commissioners find it would be detrimental to the Acequia or its members. The burden is on the applicant to prove that the proposed transfer will not have a detrimental impact. The Commission will base its decision on the presentations, documents and arguments made at the meeting; provided that the Commission may take notice of facts and circumstances generally known with respect to the Acequia and its operation. Approval requires a unanimous vote of the Commissioners, including any approval sought on reconsideration.
4. Within 30 days of the public meeting, the Commissioners will either approve or deny the request, in whole or in part, and notify the applicant in writing. The Commissioners will give a written explanation of the reasons for their decision. This will constitute a decision of the Acequia in compliance with the 120-day deadline set forth in Section 72-5-24.1 (D) NMSA 1978, regardless of whether there is a request for reconsideration as set forth below.

Reconsideration

1. If either the applicant or a member of the Acequia is aggrieved by the Commissioners' decision, that person may request that the Commission reconsider its decision. This procedure is to give Commissioners the opportunity to review the correctness of their decision.
2. The request must be made in writing, by certified mail to each Commissioner, within 30 days of the date of the decision. The person requesting reconsideration must list the reasons why the decision is erroneous. The person requesting reconsideration shall not introduce new evidence. The Commissioners will decide if a meeting with the requesting person or others is needed to properly reconsider their decision. The Commission shall issue a written decision, along with an explanation of the reasons for the decision, within 30 days of the reconsideration request; provided, however, that if a meeting is held, the decision shall be issued within 30 days of the meeting. A copy of the decision shall be mailed to the aggrieved person.

REQUEST FOR APPROVAL OF WATER RIGHT TRANSFER

Name of requesting person: _____

Address: _____

Mailing address (if different): _____

Phone No.: _____

Current point of diversion of water right:

Current place of use of water right:

- State Engineer Hydrographic Survey
map name, map number, and tract number: *(or other legal description)*

- Number of acres sought to be transferred, if any:
(attach map showing current location of water
rights to be moved to new place of use)

- Number of acre-feet sought to be transferred, if any:

Current purpose of use of water right:

Proposed new point of diversion of water right, if any:

Proposed new place of use of water right, if any:

Proposed new purpose of use of water right, if any:

Appeal to Court

If the applicant or a member of the Acequia is aggrieved by the Commission's decision, he or she may appeal to the _____ County District Court under the provisions of Section 73-2-21(E) NMSA 1978; (or "under the provisions of Section 73-3-4.1 NMSA 1978;" depending on the county) provided, however, that he or she must first seek reconsideration of the decision as provided in this Article. The appeal must be filed within 30 days of the Commissioners' decision on reconsideration.

Arbitration (Optional, after thorough explanation)

1. Instead of an appeal to court, the applicant or a member of the Acequia aggrieved by the Commission's decision may submit the Commission's decision to binding arbitration; provided, however, that he or she must first seek reconsideration of the decision as provided in this Article. The request must be in writing, sent to each Commissioner by certified mail within 30 days of the Commission's decision on reconsideration. The Commission must agree to the request for the arbitration to proceed.
2. The arbitrator must be a person experienced in acequia organization, governance and procedure and must be mutually agreed upon by the Commission and the aggrieved party. If agreement cannot be reached, the arbitration will not proceed.
3. The issue presented to the arbitrator will be solely whether the Commissioners' decision was fraudulent, arbitrary or capricious, or whether it was otherwise not in accordance with law. The arbitration will be conducted in a manner directed by the arbitrator, and must include a) the right of any party to be represented by an attorney, b) the right to present testimony or other evidence, c) the right to cross-examine witnesses and d) the opportunity to present written briefs or summaries at the end of the hearing. No formal record need be made and the formal rules of civil procedure and evidence will not apply. ^{TAC arbitrator's} Fees will be paid equally by the Commission and the person or persons requesting arbitration. The arbitrator must provide a written explanation of the reasons for the decision. The result of the arbitration shall be final and binding.

Adopted by the membership of the _____ (name of Acequia) on _____ (date).

TVAA

ACEQUIA

Water Bank Policy and Procedures

The _____ (name of acequia) hereby forms a Water Bank to promote conservation and beneficial use of Acequia water rights. The Acequia has adopted the following procedures to manage the operation of the Water Bank. The Commissioners will apply them in the best interest of the Acequia and its parciantes.

These procedures have been adopted under the Acequia's powers as a political subdivision of the State of New Mexico, and under Section 73-2-55.1 NMSA 1978 (2003).

Nothing in the formation of the Water Bank or its operation will affect the traditional and recognized lawful authority of the Acequia's Commissioners and Mayordomos. Issues of daily water use, periodic allocation, water issues between parciantes, and all other matters normally managed by the Acequia's officers will continue without change. Use of the Water Bank will not affect existing vested water rights, priority dates or any existing lawful use of water by parciantes. No action of the Water Bank will be considered an adjudication of any person's water rights.

Section 1: Purpose

The purpose of the Water Bank is to promote conservation and beneficial use of Acequia water through a locally managed system of temporarily reallocating water for beneficial use within the area served by the Acequia. The Water Bank will allow water right owners who are temporarily not using some or all of their water rights to benefit by protecting those rights from loss for non-use.

Section 2: Protection from Loss for Non-Use

As provided in Section 73-2-55.1 NMSA (2003), water rights deposited in the Water Bank are not subject to loss for non-use during the time they are placed in the bank.

Section 3: Definitions

- a) Water Bank: The system used by the Acequia by which water rights are deposited and reallocated for beneficial use.
- b) Reallocation Fund: The amount of water rights on deposit in the Water Bank.
- c) Water Bank Ledger: The written records of all Water Bank deposits and any other information determined appropriate by the Commissioners or Mayordomo.
- d) Person: An individual, corporation, partnership, unincorporated association, political subdivision, or any other recognized legal entity.

Section 4: Water Bank Procedures

a) Water Rights in the Reallocation Fund

The Water Bank Ledger will identify water rights in the Reallocation Fund by Map and Tract Number of the most recent Hydrographic Survey or, in the absence of that, by whatever system is traditionally used by the Acequia for the identification of water rights.

b) Use of the Reallocation Fund

The Reallocation Fund will be used to hold and distribute water rights for temporary reallocation to parciantes, without change of purpose of use or point of diversion, to augment shortfalls of available water in the Acequia. The fund may also be used in any other lawful manner which, in the judgment of the Commissioners, will benefit the Acequia.

c) Water Bank Record Keeping

The Water Bank Ledger will contain current written records of all Water Bank deposits or other information required by the Commissioners. The Commissioners may delegate their record keeping duties to the Mayordomo or any officer of the Acequia.

d) Depositing Water Rights

Any person owning a water right on the Acequia may submit a water right deposit to the Water Bank. A deposit is made by completing a deposit form prepared by the Acequia, and giving the form to the Water Bank's designated record keeper. The record keeper may require proof of ownership and extent of the water right being deposited. The record keeper will use the Map and Tract Number of the most recent Hydrographic Survey or, in the absence of that, the Acequia's traditional identification system to correctly identify the right being deposited. The deposit shall become effective upon signing of the deposit form by a Commissioner or by the Mayordomo.

A deposit will be for one year, renewable annually. At the end of the deposit period, the Acequia shall notify each depositor by written notice or otherwise that the depositor must contact the Acequia if the depositor desires to withdraw his or her water right from the Water Bank, and that if the depositor does not contact the Acequia to withdraw the water right from the Water Bank, the deposit will be deemed to be renewed for another year. Non-response by the depositor to the notice will be deemed to be consent to renewal of the deposit for another year, if the depositor does not otherwise communicate his or her intentions to the Acequia.

e) Water Right Reallocation

Temporary reallocation of water rights from the bank shall be done by the Mayordomo. The Mayordomo will apply traditional, accepted methods of managing the reallocation.

Section 5: Ditch Dues and Fees

Ditch dues or fees owed the Acequia by a water right owner who has deposited water rights in the Water Bank will continue to be paid by the water right owner.

Approved by the membership of the _____ (name of Acequia) on _____ (date).

Commissioner

Commissioner

Commissioner

