



DRAFT

MEMORANDUM

Date: September 4, 2001

To: The Honorable Chair and Members
Pima County Board of Supervisors

From: C.H. Huckelberry
County Administrator

A handwritten signature in dark ink, appearing to read "CH Huckelberry", is written over the printed name and title.

Re: **Arivaca Resource Management Zone**

Background

The State Law that defines the Elements of the Comprehensive Plan calls for the development of a Water Resources Element that addresses availability of water sources, and provides an analysis of how future growth will be served by legally and physically available water. Under separate cover I have issued the baseline document for this Element, entitled *Water Resources in Pima County*. One insight from that study is that Altar Valley "has very limited water supplies and not enough renewable water to support dense development." Within Altar Valley, the Arivaca community has taken a close look at their own water supply. The attached study from the citizens of the community proposes to establish an Arivaca Resource Management Zone through cooperative measures.

Arivaca Resource Management Zone

The Arivaca watershed contains one of the last remaining cienegas and perennial streams in southern Arizona. These unusual water features exist because the area is still in a state of balance, where annual water consumption is less than the natural recharge replenishing the aquifer during years of average precipitation. The very fragile "surplus" fills the cienega and keeps Arivaca Creek flowing. Local residents believe it is possible to maintain a state of equilibrium if they are able to develop creative approaches to protect their water resources from overallocation and overuse. In order to decrease potential water demand and increase potential water recharge, the creation of a Resource Management Zone is proposed, where a two level management plan integrates the otherwise fragmented land use and water policies of the various regulatory agencies. At one level, the plan would eliminate threats to the local water supply through mechanisms such as purchase of development rights programs, conservation easements on rights acquired from willing sellers, incentives to reduce lot splits, and retooling the water management strategies of Arivaca Lake to enhance recharge. An expansion of the existing watershed monitoring program is recommended as well as producing and publishing an annual evaluation of the current hydrological conditions. At another level, the plan suggests that an advisory committee of local residents and government staff members be created to develop management criteria to be implemented in times of prolonged or severe drought to protect scarce water resources as much as possible.

Conclusion

The Arivaca Resource Management Zone proposal represents the best of citizen participation in the Sonoran Desert Conservation Plan and the Comprehensive Land Use planning process. I have directed my staff to work with the community so that policies might be considered by the Board upon adoption of the Comprehensive Plan, or partnerships can be created under the Sonoran Desert Conservation Plan.

A Proposal to Create the Arivaca Resource Management Zone

Prepared for the Sonoran Desert Conservation Plan
by the Arivaca Watershed Education Taskforce (AWET)
Arivaca, Arizona

March, 2001

Executive Summary

The creation of an Arivaca Resource Management Zone would maintain the existing wetlands ecosystem by decreasing potential water demand and increasing potential water recharge through an integration of land use and water use policies. The regulatory tools of the many governmental entities with jurisdiction in the Arivaca watershed can be woven together to produce solutions to the specific threats to the aquifer. The first level of the management plan involves a number of measures to be implemented in the near future while retaining flexibility and low regulatory impact. These include the purchase of development rights, conservation easements on irrigation rights from willing sellers, lot split incentives and water management changes to Arivaca Lake, as well as other specific suggestions. The success of these proposed solutions can be monitored through cooperation between residents and governmental agencies using established tracking projects. The second level of management would be implemented if conditions warranted.

Front cover: Arivaca Lake dam, looking northwest
Back cover: Arivaca Lake, looking southeast

TABLE OF CONTENTS

Topic	Page
Proposal	1
Justification	1
Threats	2
Local Support	2
Proposed Management Plan	3
Level 1 Management Goals & Objectives	3
Research & Monitoring Proposals	8
Conclusion	9

LIST OF FIGURES

Figure number & Title	Page
1, Arivaca watershed location & proposed Arivaca Resource Management Zone...	1
2, Land ownership in the Arivaca watershed	2
3, Private lands at full buildout	4
4, Private ranch lands	4
5, Existing irrigation rights	5
6, USFWS acquisition zone	5
7, Arivaca Lake and subbasins	6
8, Mercury warning	7
9, Arivaca Lake gate valve	7
10, Existing monitoring stations	8

AWET Background:

In 1997 a group of volunteers formed the Arivaca Watershed Education Taskforce (AWET) in response to widespread community concern about the future of Arivaca water resources and the lack of information about our aquifer. The volunteers are a diverse group of Arivacans including fourth-generation ranchers, professionals, business owners and retirees. AWET organized a network of forty people throughout the Arivaca Valley to measure rainfall and monitor well levels and has been collecting data for four years. The goal is to create a groundwater budget specifying maximum safe yield. There is a parallel effort to educate the community about the watershed, methods to promote recharge and the importance of land stewardship. Workshops on watershed preservation and restoration involve Arivaca residents in building water retention structures on their land to slow runoff and enhance recharge. Dozens of landowners in the valley have constructed gabions as a result of this project and have become aware of the importance of erosion control and land revegetation.

ARIVACA RESOURCE MANAGEMENT ZONE
Presented by Arivaca Watershed Education Taskforce
March, 2001

Proposal: Create the Arivaca Resource Management Zone to maintain existing annual sustainable yield of water resources supporting the wetlands ecosystem and the local population. The goal is to *decrease* potential water demand and *increase* potential water recharge by integrating land use and water use policies. Figure 1 shows the location of the Arivaca watershed in southern Arizona.

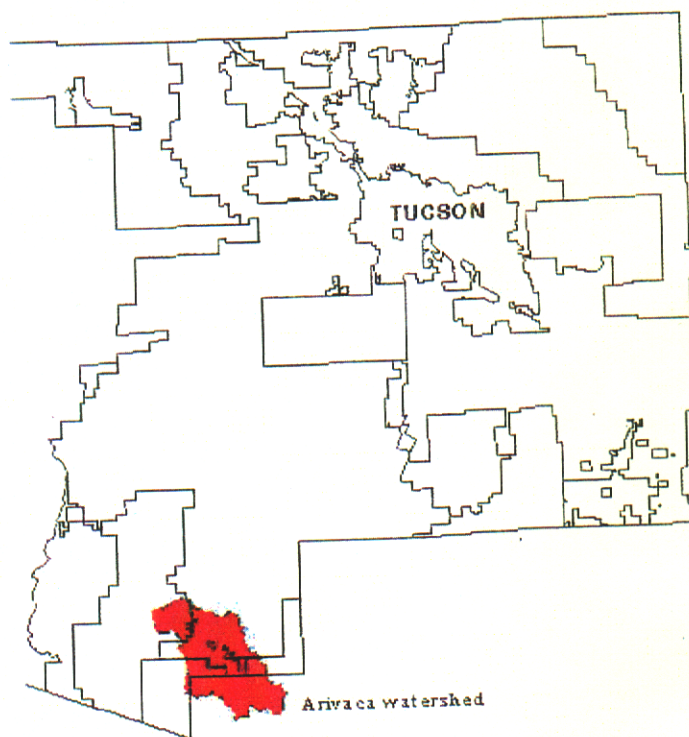


Figure 1. Arivaca watershed location and proposed Arivaca Resource Management Zone

Justification:

The Arivaca microbasin is still environmentally healthy. Overallocation of water supplies and increasing demand threatens the preservation of the surface waters and the shallow aquifer needed to maintain the cienega and the population.

- *current water use is sustainable*
- *the riparian area and cienega hosts 21 threatened and endangered species*
- *wildlife corridors are largely unfragmented*
- *the historical sites and ranching community have not been degraded.*

The proposed Resource Management Zone is easily defined by the isolation of the watershed, the shallow aquifer created by unusual geologic formations and the presence of rare wetlands.

Even before mankind began to tap the aquifer with wells and divert the stream to irrigate fields, history records times the cienega and creek have gone dry. Recently following only two dry winters and one summer without adequate precipitation to recharge the aquifer, the cienega and creek began to disappear in early October 2000. Some local wells reflected the drying trend as water levels dropped until a series of storms dumped ten inches of rain over a period of several weeks. The result was heavy runoff, ephemeral surface flows and an increase in water level in one monitored well of fourteen feet in a month. Estimated aquifer recharge is 300-400 acre-feet annually (AFA).

For references on these and other AFA numbers see "Arivaca Resources: Pima County Sonoran Desert Conservation Plan, March 2000".

The following threats have been identified:

- *Lot splitting could result in an estimated additional water use of 412 AFA.*
- *Ranches (including GR-1 land) could be developed adding an estimated additional water use of 501 AFA.*
- *The groundwater has been over-allocated with 924 AFA of grandfathered groundwater rights.*
- *Arizona Department of Water Resources (ADWR) regulations allow transfers of groundwater rights from one locale to another within the Tucson AMA, and assured water supply rules can be met by recharging water into distant aquifers in the AMA.*

Local Support: Before Arizona became a state, Arivaca residents were already actively joining together to safeguard their water resources and this activism has continued to this day. Because it is an isolated microbasin with shallow groundwater, the connections between rainfall, water in the cienega and water in the tap are experienced directly---- these connections have meaning in daily life. Thus we believe Arivaca is an excellent locale for a resource management project based on local cooperation.

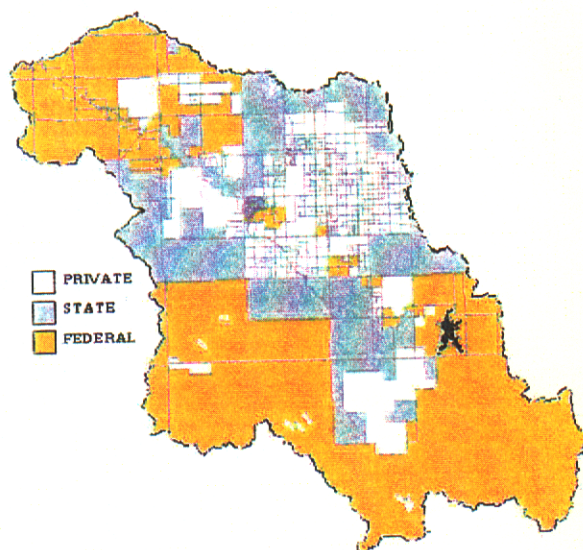


Figure 2. Land ownership in the Arivaca watershed.

Regulatory tools are isolated in different departments and agencies at the Federal, State, and County levels, making coordination difficult. When a potential problem is recognized, agencies step forth to apply their tools, leading to a hodge-podge of mounting regulations. The federal Endangered Species Act, the county Sonoran Desert Conservation Plan and the state Groundwater Management Act are approaches to different faces of the same problem. Figure 2 on the previous page illustrates the mix of land ownership present in the watershed.

There is room for flexibility in management because the Arivaca watershed is still healthy. Weaving together the multiple regulatory options would result in a more efficient and effective solution.

The Arivaca Watershed Education Taskforce (AWET) has been collecting hydrologic information since 1997 and working with local, state and federal agencies towards solutions to potential problems facing the Arivaca watershed. AWET advocates addressing issues through voluntary actions, incentives and cooperation between residents and the numerous government agencies with jurisdictional authority in the watershed. AWET does not support obtrusive governmental regulation.

Proposed Management Plan: AWET suggests a two level management plan be tested in the Arivaca Resource Management Zone.

The *first level* would be a number of measures implemented in the near future in order to forestall or eliminate the need for more drastic regulation. Thus far, the Arivaca watershed is not in a crisis; however there are a number of threats looming on the horizon. These specific threats have been identified and solutions proposed.

The *second level* would be implemented during periods of prolonged drought indicated by precipitation records, low or no recorded stream flow at the USGS stream gauge over a certain period and extended lowered water levels in strategically located monitored wells throughout the aquifer. Major development or a large number of new wells could also trigger the implementation of the second level. These additional management tools must be developed in public forums where the goal is clearly defined as a chance to preserve dwindling water supplies by implementing emergency measures.

Level 1 Management Goals & Objectives

I. Eliminate threats to sustainable yield in the Arivaca watershed.

- 1. Lot splitting could result in an estimated additional water demand of 412 AFA.*

- Pima County Sonoran Desert Conservation Plan addresses this issue by providing tax incentives for individuals who agree to sign over split-rights in perpetuity. Figure 3 illustrates buildout density.

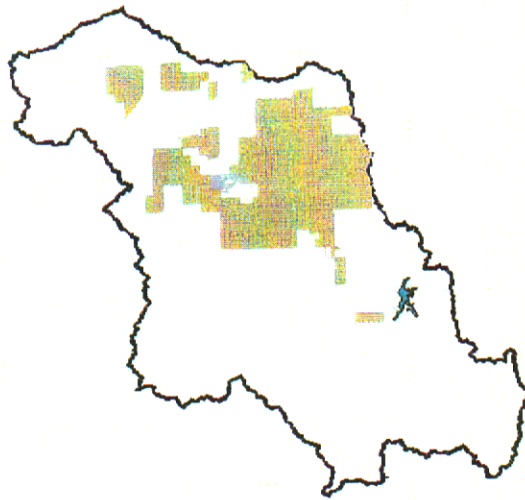


Figure 3. Private lands at full buildout under existing Pima County zoning.

2. *Ranches (including GR-1 land) could be developed adding an estimated additional water demand of 501 AFA.*
 - Pima County Sonoran Desert Conservation Plan addresses this issue by offering to buy conservation easements from willing sellers who would continue ranching. Figure 4 displays the private ranch holdings in red.

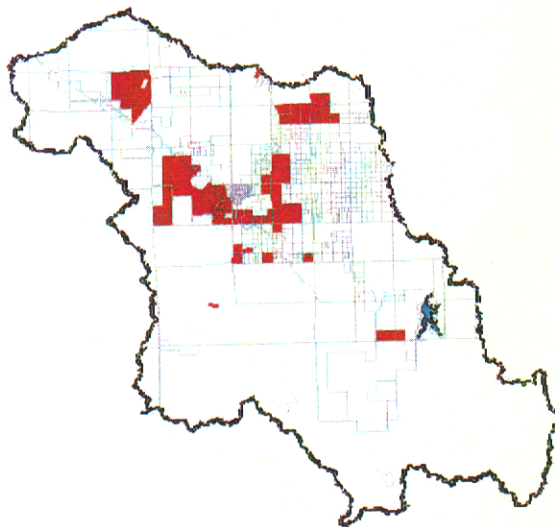


Figure 4. Private ranch lands.

3. *The groundwater has been over-allocated with 924 AFA of grandfathered groundwater rights (approximately three times the amount of estimated annual recharge to the basin). Figure 5 shows the irrigation rights in the valley in dark blue.*

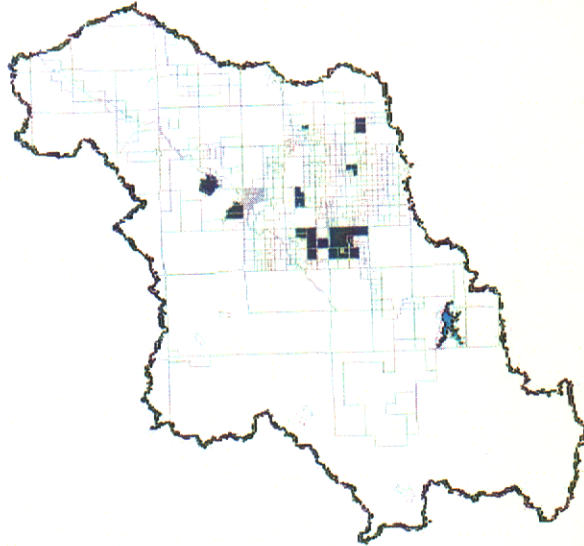


Figure 5. Existing irrigation rights.

- USFWS or other conservation groups could purchase conservation easements on grandfathered groundwater rights (GFRs). USFWS Buenos Aires Wildlife Refuge already includes the cienega and some of the riparian areas. The USFWS acquisition zone extends beyond the land owned by the Refuge and encompasses much of the privately owned riparian habitat on the valley floor. By purchasing conservation easements from willing sellers on land with and without GFRs within the acquisition zone, USFWS could help to alleviate threats (1), (2) and (3) in perpetuity. Figure 6 displays the area where USFWS could purchase conservation easements.

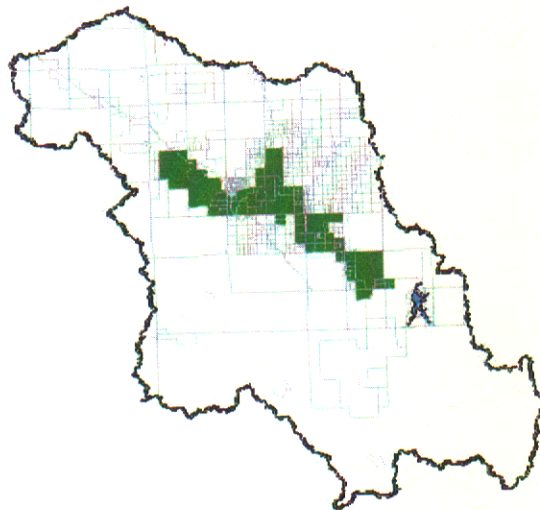


Figure 6. USFWS acquisition zone

4. *ADWR regulations allow transfers of groundwater rights from one locale to another within the Tucson AMA, and assured water supply rules can be met by recharging water into distant aquifers.*
 - Through legislation, an Arivaca subarea of the Tucson AMA could be established to be managed cooperatively with the community to achieve the goal of balancing paper-water and wet-water. This would include:
 - a) Establishing additional mechanisms for retiring water rights.
 - b) Requiring that recharge projects provide hydrologic benefits to the area where groundwater withdrawals are occurring, thus pursuing safe yield on a subarea basis. Under current regulations, a developer could prove a 100 year assured water supply in the Arivaca microbasin by paying to have CAP water recharged somewhere else in the Tucson Active Management Area. This would plunge the watershed into an overdraft situation where groundwater in storage is mined.
 - c) Disallowing the transfer of water rights into the watershed and/or within the watershed.

II. Increase potential recharge to the Arivaca Resource Management Zone.

1. *Review surface water diversion practices. Arivaca Lake collects runoff from 17% of the land area in the Arivaca microbasin, but this accounts for as much as 33% of the runoff available for recharge to the cienega and its upstream riparian corridor. When it was constructed in 1970 the Arizona Game and Fish Department biologists indicated there would be times when it would be desirable to release Lake water in times of drought to maintain the cienega and creek. Figure 7 shows the watershed subbasins draining into the Lake.*

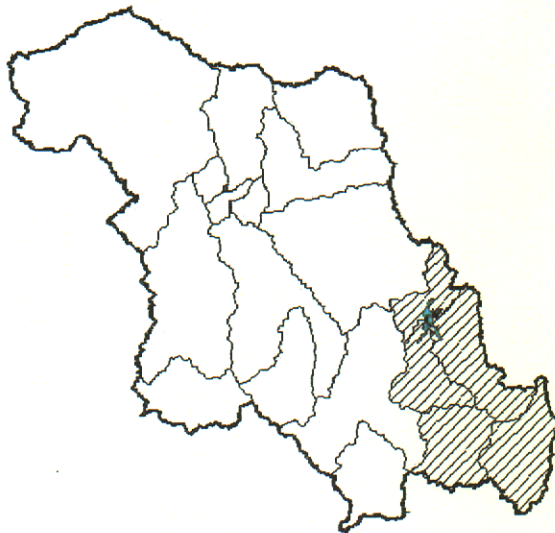


Figure 7. Arivaca Lake and subbasins (hatched) captured by Lake.

Mercury levels in fish from Arivaca Lake exceed federal Food and Drug Administration consumption guidelines and warnings have been posted advising fishermen not to consume fish caught in the lake. The Environmental Protection Agency has been unable to locate a point source for the high levels of mercury. Figure 8 displays the warning sign posted at the boat ramp on Arivaca Lake.

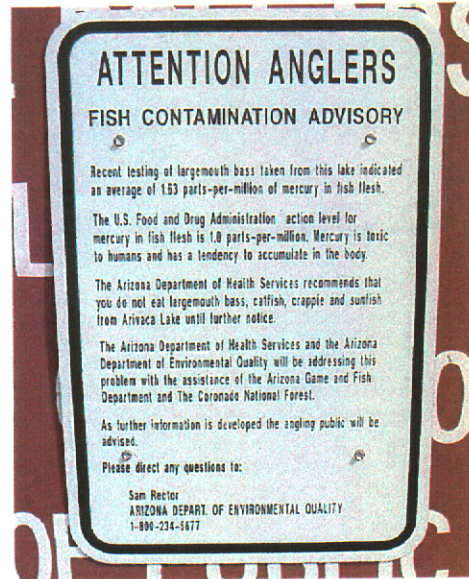


Figure 8. Mercury Warning

- ❑ In cooperation with AZ Game and Fish and the Forest Service a traffic counter could be installed on the road to the lake and use figures could be compared to those obtained before the fish were poisoned. These numbers could be used to determine the impact of fish contamination on recreational use of the Lake
- ❑ The resource value of Arivaca Lake could be increased by addressing water quality issues, and the lake's uses expanded to enhance recharge, stream flow and cienega water levels, creating further recreational opportunities downstream. A small volume of water could be discharged from the lake in late spring for a few months, before the monsoon season, when the water needs of plants downstream are at their highest levels and the aquifer supplies all of the human needs of the area. Figure 9 shows the gate valve for releasing water from Arivaca Lake.



Figure 9. Arivaca Lake gate valve.

2. *Expand the recharge capabilities of the Arivaca Watershed.*

- Funding could be sought to expand on-going efforts to mitigate erosion and promote stormwater recharge through the building of gabions and the native revegetation of the private lands in the watershed. Cooperative projects with state and federal stakeholders could slow runoff, control erosion and increase the amount of water which remains in the valley while enhancing habitat for threatened and endangered species.

Research and monitoring proposals

1. Utilize and expand existing environmental monitoring systems in cooperation with AWET and participating agencies. AWET has a network of monitor wells and rain gauges throughout the watershed. The USGS has a stream gauge on Arivaca Creek and the Buenos Aires National Wildlife Refuge has plans to develop monitoring stations throughout the watershed. With coordination and the development of a web site, all this information could be centralized and made available to everyone as well as used to determine when declining hydrologic conditions warrant additional management strategies. Figure 10 displays the existing environmental monitoring stations in the watershed.



Figure 10. Existing monitoring stations.

2. Perform annual evaluation of current hydrologic conditions in the Arivaca Resource Management Zone in cooperation with AWET. Publish results locally and on a web site dedicated to Arivaca hydrology.

3. Create an advisory committee with members of AWET, ADWR, USFWS, Pima County and other interested parties. Cooperatively determine hydrologic criteria necessary to implement a level 2 management plan. Extended drought, new development or revitalization of irrigated agriculture could trigger a second level of management in order to prevent the watershed from going dry, causing ecological disaster and hardship to residents. At that point, community meetings could be held to discuss the management options, so residents will have knowledge and input on the additional measures necessary to protect their water resources.

Conclusion

We have presented a number of specific actions which could be taken by the various governmental entities who have jurisdiction in the Arivaca watershed. These suggested actions primarily rest upon voluntary citizen cooperation and incentives. If each suggestion were enacted and were only partially successful, the potential problems could still be averted. There is room for flexibility because the Arivaca microbasin is not in a water crisis, unlike many other basins in the Southwest. With regular monitoring we will be able to track the success of the management plan in detail. Further regulation could be enacted if it is deemed necessary. The Arivaca Resource Management Zone presents an opportunity for government and residents to cooperate in producing a sustainable ecosystem friendly to humans, plants and animals.

