

Assessing Farmers' Willingness to Participate in Water Banking: a Case Study

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This paper examines potential barriers to water banking as a tool to manage scarce water resources in the western United States. A water dispute is described in northwestern Nevada. The paper outlines the concept of water banking to manage the dispute and discusses the results of a survey to assess local farmers' willingness to participate. Results indicate that farmers are willing to fallow cropland and lease their water rights to a water bank conditionally. These conditions include: 1) farmers maintain local design, control and operation of a water bank, 2) changes to water law to prevent water right losses, 3) enable temporary water transfers to occur as part of the hay crop rotation and 4) understand and anticipate potential negative economic impacts to agriculture suppliers and other related local industries from water banking.

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Introduction

Water scarcity is one of the most complex and pressing issues facing the arid western United States. Compared with other economic sectors in the west, irrigated agriculture remains the largest user of freshwater accounting for 74 percent of total water withdrawals (Golleson and Quinby, 2000). Demand for this scarce resource is growing and increasingly represents urban interests whose priorities for water use are divided among recreation, protection of threatened or endangered species and human consumption (Schaible, 2000). Farmers are named as defendants in a number of lawsuits in the western United States where the competition for water resources remains fierce and volatile.

Water transfer mechanisms such as water banking often are proposed as a way to satisfy increased water demand and resolve these disputes. A water bank is a centralized institution that facilitates negotiated voluntary water transfers for a specified time-period without a permanent change in water rights. In order for a water bank to function, there must be institutional arrangements to legalize short-term transfers, a centralized system to monitor release and delivery of banked water, adequate hydrologic capacity to allow storage and delivery

without significant water loss to users and water users who desire and are able to rent water. The centralized aspect of a water bank, in particular, can reduce transactions costs through identifying the suppliers and demanders of short-term water transfers, negotiating price paid for water and facilitating the storage and delivery of water to users at the appropriate time and location.

In theory, the market place can direct the flow of water from lowest to highest value (Gould, 1988). Benefits to society from market-based water transfers include the provision of water for recreation and urban consumption plus increased in-stream flow to protect wildlife habitat and ecosystem health. In an effort to consume less water and, consequently, provide water in exchange for revenue, farmers may be more likely to invest in more efficient irrigation technology or grow less water intensive crops (Green and Hamilton, 2000). In over-allocated systems, market-based transfers could result in additional water supplies to help expand existing farm operations, "make whole" junior appropriators or supply other competitive nonagricultural uses.

Individual economic incentives for farmers to participate in water banks involve strategic fallowing of fields. When the anticipated market

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price for an annual crop is significantly low or when rotation of perennial crops is necessary or timely, a farmer may choose to fallow fields and receive cash revenue for water. In years when farmers may need to fallow fields, a water bank offers the opportunity to potentially increase or stabilize a farmer's income. This may mean the difference between some farmers remaining in business or selling out.

In sum, in western states where water rights typically are already fully or over adjudicated, water banking can serve as a potential tool to manage scarce water resources. In spite of the incentives described, barriers to the development of water markets are widely documented. Much of the research literature on barriers focus on third party effects that involve a threat to water rights as established through Prior Appropriation Doctrine (Acton and Narayanan, 2000; Gould, 1988; MacDonnell, et al., 1994, 1995; Gopalakrishnan, 1973; Huffaker, Whittlesey and Hamilton, 2000; Whittlesey and Huffaker, 1995; Whittlesey, 1997). Additional potential barriers involve hydrologic limitations and economic externalities (Gillilan and Brown, 1997; Green and Hamilton, 2000; MacDonnell, et al., 1994; McKinney, 1991). Potential social barriers involve farmers' reluctance to participate in a solution they may perceive as foisted upon them either through governmental intervention or by special interest groups (Colby and d'Estree, 2000; Gray, 1989).

In this paper, water banking is examined as a potential tool to manage scarce water resources in order to address water disputes.

Considerations in establishing water banks are discussed including legal, hydrologic, economic and social. A water dispute in the Walker River Basin in Nevada is described. Results of a case study are presented that assesses Walker River farmers' willingness to participate in water banking as a way to manage that dispute.

Considerations in Establishing a Water Bank

Legal Considerations

The Prior Appropriation Doctrine, established in the 19th century, provided incentives to develop western territories by developing water resources for mining and agriculture. The concept was based upon a simple premise of beneficial use; the first to prove a beneficial use for water

established the perpetual right to use water (Whittlesey, 1997; Gopalakrishnan, 1973). Conversely, if appropriated water went unused for a consecutive number of years then the water user would lose that appropriated entitlement. This aspect of western water law still governs water use.

Although prior appropriation protects the integrity of early water allocation, in terms of water bank development, it can lead to economic externalities and third-party effects. One such effect involves continuous nonuse of water. Since prior appropriation stipulates that farmers risk losing their water entitlement if they continually do not use excess water, farmers are not motivated to admit, much less advertise, that they have excess water for sale (MacDonnell, et al., 1994).

A potential third-party effect from water banking involves the possible increase in consumptive use of water. Consumptive use is that portion of diverted water removed from the hydrologic system by irrigation, industrial use, evaporation, transpiration or other manner. The return flow is the difference between the amount of water diverted and consumptive use. The return flow reenters the system and becomes available for use by others, including junior appropriators. Water banking may motivate increases in water use efficiency, which may decrease water diverted for crop production with the excess being leased. This action may ultimately increase consumptive use and therefore result in less return flow to the system available to junior appropriators (Green and Hamilton, 2000; MacDonnell, et al., 1995).

Similar third-party effects are possible also if water that is transferred changes place and purpose of use. Prior appropriation stipulates specifically where and how water is to be used based on point of diversion. If water changes point of diversion, timing or purpose of use as a result of water banking, this could also affect the hydrologic supply for others through a change in return flows (Green and Hamilton, 2000).

An irrigation system regulated by Prior Appropriation Doctrine, however, precludes water diversions to be decreased consistently without decreasing the amount of land irrigated and ultimately modifying the water right

accordingly. This aspect of the law has served as a system of checks and balances to assure that water entitlements are allocated to support the historical definition of beneficial use, which is to reclaim desert lands through irrigated agriculture. To avoid third-party effects associated with possible increases in consumptive usage, water law would have to be modified to account for improvements in production efficiency that enable farmers to consistently decrease both their diverted amounts and return flow coincidentally. Additionally, changes to Prior Appropriations Doctrine specifically must update and define more clearly "beneficial use," which currently limits how water is to be used, and designated place of use, which legitimizes the withdrawal of water. To enable water banking as an institutional mechanism to function effectively, Prior Appropriation Doctrine must be modified to protect water rights holders who participate (Acton and Narayanan, 2000; Gould, 1988; MacDonnell, et al., 1995).

Hydrologic Considerations

Hydrologic considerations are simpler in comparison to legal considerations. Sufficient capacity within a river basin is needed to store and deliver water at required times to specified users. Ditch and canal infrastructure must be adequate to deliver water with the least amount of evaporation possible. This may require ditches be concrete-lined and consolidated. Automated flow measurements and water delivery can also facilitate efficient delivery. A centralized entity, such as an irrigation district, must exist to oversee and arrange transactions, monitor the physical movement of water to users and attend to operations and maintenance details (Acton and Narayanan, 2000).

Economic Considerations

It is difficult to anticipate precisely the economic impacts of water banking. Leasing water to nonagricultural uses instead of crop production would likely diminish the demand for agricultural labor. It may also negatively impact agriculture-related supply businesses. Combined effects may ultimately reduce the tax base of rural communities (Green and Hamilton, 2000). In addition, fallow fields may encourage invasive weed infestation. Long-term weed control can become cost-prohibitive, depending upon the weed species (Smith, et al., 1999).

To avoid fallowed fields farmers may have to adopt a mix of water conservation measures to enable them to bank water and keep fields under less water intensive cultivation. Farmers can respond to water shortfalls by choosing to produce higher-value crops (Gollehan and Quinby, 2000). Adoption of drip irrigation technology or dry land alternative crop production provides options but require additional investment.

In short, economic incentives to participate in a water bank must balance the potential costs of participation. Obviously, water banks could reduce transactions costs for farmers who currently negotiate lease prices and timing of delivery amongst themselves. This savings should factor into and buffer additional costs farmers bear when implementing a new management strategy or technology to avoid fallowing fields completely.

Social Considerations

Water disputes are particularly complex that arise from an attempt to establish a new institutional arrangement to allocate water. There are a number of diverse interests at the table to outline their demands. Many interests may elect to work behind the scenes through political lobbying which further complicates the dispute (Gray, 1989). Multi-generational farm families may feel personally attacked and violated by the onslaught of new competitors and new institutions for water allocation. Emotions escalate quickly and positions harden creating unspoken rules for deciding who is responsible for any losses incurred. Litigation typically exacerbates the conflict, enhancing the conditions to breed fear, suspicion and anger (Carpenter and Kennedy, 1988).

It is often under such a scenario that market solutions, such as water banks, are proposed (Colby and d'Estree, 2000). Unfortunately, social dynamics at this point are such that water right holders seldom view water banking as a simple, efficient water allocation tool. Instead, the suggestion, and in fact the tool often is considered by farmers to be suspect. The protection of private property rights inclusive of water right entitlements become the focal point of heated debates between farmers and other potential water users.

How farmers are introduced to the concept of water banking may be as critical as the actual design and operation of the bank. Government intervention which mandates the establishment of water banks to reallocate water for the purpose of resolving a dispute is not likely to garner support of farmers to willingly participate. Farmers are more likely to consider water banks and other market-based solutions if they feel they have some control over the choices made that affect them directly.

Walker River Basin: A Case Study

The Walker River Basin, located in western Nevada and eastern California, covers an area of approximately 4,270 square miles and is comprised of portions of three counties: Lyon and Mineral Counties, Nevada and Mono County in California (Horton 1996). Of the total area, 3,340 square miles are in Nevada. On the Nevada side, the larger communities are Yerington, in Lyon County, and Hawthorne, in Mineral County. Smaller communities in Nevada include Wellington, Smith and Schurz, and in California include Bridgeport, Walker, Coleville and Topaz.

The Walker River System is comprised of two forks in the upper watershed, the East and West Walker River, both of which rise in the Sierra Nevada Mountains in northern Mono County of California. Bridgeport Reservoir on the East Walker, with a capacity of 42,460 acre-feet, and Topaz Reservoir on the West Walker, with a capacity of 59,440 acre-feet, provide water storage and recreation. The two rivers flow into Nevada through the irrigated farming communities of Bridgeport, Antelope Valley, Smith Valley and Mason Valley. The West Walker joins the East Walker River south of the town of Yerington and becomes the Walker River. After the confluence, the Walker River flows through the Walker River Indian Reservation and into Walker Lake. Weber Reservoir, with a capacity of 13,000 acre-feet, located on the Indian reservation allows for irrigation water storage for the numerous small farms on the reservation.

The Antelope Mutual Water Company represents farmers along the East and West Walker River in Mono County, California. The Walker River Irrigation District (WRID) represents the

remainder of farmers. The WRID owns and operates both Topaz and Bridgeport Reservoirs and is responsible for overseeing water withdrawals to farmers from the Nevada border of the Walker to the Weber Reservoir on the Walker River Paiute Reservation. A court appointed Federal Watermaster, under the jurisdiction of the United States Board of Water Commissioners and in coordination with the Antelope Valley Mutual Water Company and Walker River Irrigation District, monitors reservoir and river flows and regulates irrigation diversions in accordance with Federal Court Decree C-125 and the flood permit issued by the Nevada State Engineer.

Walker River Basin Water Dispute

Irrigated agriculture is very important to the Walker River Basin economy. Primary crops are alfalfa, onions, garlic, and potatoes, with alfalfa accountable for the lion's share of water withdrawals. Today, the basin is faced with several critical water resource issues. Walker River, like many western rivers, is over-allocated. In 1992, the United States joined with the Walker River Tribe to file claims for a water right for the Reservations' Reservoir (est. 1933) and for lands added in 1936. All water right holders upstream of the reservation are named as defendants. Walker Lake's surface elevation and water quality have declined steadily since 1882. There is a build up of total dissolved solids, especially salts. The Lake's viability has been diminished as a fishery for the Lahontan Cutthroat Trout. The Walker Lake Working Group, an environmental group organized to protect Walker Lake, moved to intervene in 1994 and file a new and senior claim to water rights to establish a minimum lake level at Walker Lake. In 1995 state lawmakers and water conservation experts proposed water banking as a means to manage the environmental dispute involving Walker Lake as well as a way to manage tribal water claims (Horton 1996).

Survey of Walker River Basin Farmers

To assess willingness to participate in water banking, a survey was conducted involving all water rights holders in the Walker River Basin. Prior to the survey, University of Nevada Cooperative Extension (UNCE) assembled a diverse group of key stakeholders in the Walker River Basin to teach them about water banks. This group unanimously requested more

information about water banks including reports from other states where water banks are located.

In response to this request, University of Nevada Cooperative Extension published a series of short reports to educate the public about water banking. The reports outlined the current water dispute, established a working definition for a water bank and explained various aspects of how water banks operate in other western states. Reports discussed legal, hydrologic, economic and social considerations as well. All water rights holders in the Walker River Basin received the reports by mail. Also excerpts from reports appeared in local newspapers.

In addition, University of Nevada Cooperative Extension organized a workshop in a centralized location within the basin to explore the topic of water banking. Individuals from the Snake River Water Bank in Idaho and the Drought Water Bank in California were invited to explain and answer questions about how water banks work in their respective states.

Construction of Survey questionnaire

The questionnaire used in the survey was designed based upon input from key stakeholders, including the Walker River Basin Federal Water Master, WRID Manager and Antelope Valley Mutual Water Company President. Faculty at the University of Nevada, Reno and employees with the Snake River Water Bank in Idaho and the Drought Water Bank in California reviewed the questionnaire as well. Final revisions were made based on recommendations suggested by reviewers.

As one measure of willingness to participate, the questionnaire asked farmers under a range of three price scenarios, the number of acres they would fallow in order to lease their water rights in a normal (100%) water available year and in a moderate (75%) water available year. Options provided for acreage reductions included crops produced in the basin currently. These are alfalfa, other hay, grain, pasture and other. The price intervals were \$25, \$50 and \$75 per acre-foot of water.

This price range was determined using per acre gross value of production of alfalfa hay. In the Walker River Basin this figure is approximately \$500 per acre, based on a market price of

approximately \$100 per ton and a yield estimate of 5 tons per acre yield. Economic costs of production include variable cash expenses, general overhead, machinery, capital replacement, operating capital and cost of land.

The questionnaire asked farmers to comment about water banking as a tool to manage the water dispute in the Walker Basin. Specifically, they were asked about their willingness to participate if a water bank were established.

Survey Implementation

The survey was implemented using a modified three-stage mailing procedure (Dillman 1978). First, water rights holders were mailed a hand-signed cover letter explaining the purpose of the survey, instructions on how to complete the survey, and the survey questionnaire. The envelopes were individually addressed and stamped (not metered) and included a self-addressed and stamped return envelope. In the second stage, one week after the initial mailing, a postcard was mailed to all water rights holders reminding them to return their completed survey. In the final stage, three weeks following postcard mailings, those water right holders who had not yet returned their survey received another complete survey package via unregistered mail. All water rights holders in the Walker River Basin (567) received the questionnaire.

Survey Results

Completed and returned questionnaires available for data analysis represent a 22 percent response rate. This response rate is slightly above the average 10 to 12 percent for a mail survey (Dillman 1978). Respondents indicated the number of acres they would fallow in order to participate in a water bank. Written comments about water banking as a tool to manage the dispute and willingness to participate provide additional data for a qualitative assessment.

Acreage Fallowed

Table 1 illustrates acreage fallowed by crop in moderate and normal water available years including alfalfa, other hay, grain, pasture and other. In a moderate water year respondents indicated that at prices of \$25, \$50 and \$75 per acre-foot of water, they were willing to fallow 16, 24 and 33 percent of total acres, respectively. This represents a 48 percent increase in total

Table 1. Percent Total Acreage Followed by Crop and Average Percent Total Water Rights Banked

Percent of Total Acreage Followed by Crop	Moderate (75%) Water Available Year			Normal (100%) Water Available Year		
	\$25	\$50	\$75	\$25	\$50	\$75
Alfalfa Hay	.03	.37	.50	.06	.27	.32
Other Hay	.10	.06	.05	.01	0	0
Grain	0	0	.02	0	.02	.02
Pasture	.84	.55	.42	.90	.69	.64
Other	.03	.02	.01	.03	.02	.02
Average Decree Water Right	1,573	--	--	1,734	--	--
Average Storage Water Right	46	--	--	80	--	--
Average Percentage of Total Water Rights Banked	.16	.24	.33	.27	.36	.39

acreage fallowed between \$25 and \$75 per acre-foot of water in a moderate water year. When we look at acreage fallowed in a normal water year, farmers were willing to follow 27, 36 and 39 percent of total acreage, respectively. This represents a 68 percent increase in total acreage fallowed between \$25 and \$75 per acre-foot of water in a normal water year.

Looking at the results for alfalfa hay, the primary crop in the basin, in a moderate water year, at \$75 per acre-foot, farmers would willingly follow 50 percent of about half of their alfalfa crop acreage. In contrast, in a normal water year at \$75, the amount of alfalfa acreage fallowed decreases to 32 percent of total acreage. The percentage of pasture acreage fallowed increases from 42 percent in a moderate water year to 64 percent in a normal water year.

Farmers' Comments about Water Banking and Willingness to Participate

Respondents volunteered numerous written comments and questions about water banking as a tool to manage the water dispute and expressed varying degrees of willingness to participate. These comments were categorized into three groups to qualitatively assess farmers' willingness to participate. By descending order

of percentage responses, these groups are: (1) willing to participate provided questions were answered and conditions were satisfied (57%); (2) unwilling to participate (23%) and; (3) do not know enough to decide (19%). The following selected comments represent each group.

Group (1) Willing to participate with certain conditions and more information (57%):

- I would like to see the agreement before committing to numbers of acres. The agreement would have to be very flexible from year to year.
- It makes sense—we have water rights and I doubt if they are used to the fullest extent.
- Under drought conditions, what mix of considerations would be used to determine the use (availability) of water for agriculture vs. maintenance of wild land resources (as an example)?
- I think it can be a good idea. I don't think farmers should be "gouged" in dry years ... the bank should try to be cooperative.
- Will ranchers have to bid against the United States treasury for water in dry year? If water is to leave a given area, a percentage of that water should be used for alleviating effects on neighbors (ditch loss, etc.).
- Water conservation is possible, but some in

farming would only continue to pump groundwater. beyond their allocation—as there are not enough personnel to enforce water usage.

- The price for an acre-foot of water would need to be pretty high (\$100/a.f.) to interest me. This would be likely under 2 scenarios: 1) plenty of water: a 100% year, and 2) a low water year-- 65% year. Under a moderate water year, I'd rather be a buyer at low prices.
- My primary crop is alfalfa. This crop cannot be used as a yearly crop. I need water every year or not at all.
- Good idea, but is there a danger that the water seller could lose some of their water right by showing lack of need?
- Would an agreement to lease water be permanent and irrevocable?
- Do we establish a price on normal (100%) year and still get the same price on an above-normal year?

Group (2) Unwilling to participate (23%):

- Do not support water use that is nonagricultural.
- Our water rights are in trust with the federal government. We have no control over them.
- There is not sufficient surface water to go around. Groundwater would have to be pumped.
- More water and water storage would be required. It takes a high flood year to meet demands now. Also, I do not intend on bidding against outsiders for agricultural water. We are buyers not sellers!

Group (3) Do not know enough to decide (19%):

- We are a small water right holder and don't really have enough knowledge to make good comments. I might make a mistake and not have enough water.
- I don't know enough about water banking. Need more information on this.

Discussion

The results of a survey of farmers in the Walker River Basin indicate the potential exists for water banking to be an acceptable tool to reallocate scarce water resources and effectively manage that dispute. The majority of survey participants (57%) asked questions, outlined concerns and specified conditions that must be satisfied in order for farmers to participate willingly,

however. These concerns and conditions reaffirm the social, legal, hydrologic and economic considerations outlined earlier.

The first condition indicates that farmers desire to have local control over design and daily water bank operations—especially water pricing. Farmers indicated the need to have a hand in determining how to lease, store and distribute banked water. Based on the kinds of questions farmers asked, this may include negotiating lease terms including stipulations for how the water is used and where it is used.

A second condition farmers outlined requires that Nevada state legislators modify water law to protect farmer's water rights if they choose to bank their water. Nevada does not have any legal mechanisms currently in place to enable such market transactions. The protection of water rights is a critical condition, since, under Prior Appropriation Doctrine, water rights within the Walker River basin require continuous beneficial use and are subject to forfeiture and abandonment under both Nevada and California State Law. Farmers are less likely to participate in water banking if their water rights are under threat for repossession by the state or Federal government for other intended uses.

A third condition involves strategic fallowing of cropland. As indicated in the analysis of cropland fallowed, farmers are willing to voluntarily fallow a percentage of their cropland and lease water rights in both moderate and normal water supply years. Not surprisingly, the percentage of cropland and water rights banked increase as the price per acre-foot of water increases.

Although farmers indicated that they would fallow crops under a range of price and water availability scenarios, a qualitative assessment of written comments indicated that farmers perceive their current water rights as inadequate to simultaneously lease water and continue to farm. Many farmers perceive that after irrigation, there is no water to spare. In the Walker River Basin where the leading crop is a perennial, it is not realistic to fallow an alfalfa crop for one year in order to transfer water temporarily. Storage facilities in the basin may need expansion in order to allow more flexibility for water transfers that fit a strategic crop rotation plan.

A fourth and final condition requires that farmers understand and anticipate the economic impacts to the local area from fallowing cropland and leasing water for other purposes. Farmers perceive that a water bank may generate regional negative economic impacts to agricultural related industries in addition to those felt directly by farmers. These include impacts to the agricultural supply and service industry, hired farm labor and recreation and tourism-based industry.

Although more than half of the survey respondents indicated a willingness to participate given concerns and conditions, 19 percent indicated they did not have enough information to decide. This result indicates the need and opportunity for additional education followed with a repeat survey.

Finally, 23 percent of the respondents indicated unwillingness to participate. Farmers communicated their unwillingness as generally negative comments. These include statements such as, having "no control" over water rights, lack of sufficient surface water to lease, lack of water storage to enable banking and concern about water use that is nonagricultural.

Conclusions and Recommendations for Further Research

To summarize, farmers in the Walker River Basin indicated they were willing to fallow fields and lease water as a way to address the Walker River dispute. And, the percentage of acreage farmers willingly fallowed increased as price offered for water increased. Farmers outlined social, legal, hydrologic and economic concerns to address through further investigation, however.

A primary consideration involves the social aspect of water-market development. Survey respondents expressed this concern as desire to have local control of water bank design, operations, lease terms and water pricing. Satisfying this first condition is likely to address social barriers that arise from a common perception held by farmers in western water reallocation disputes. That is that their water rights are under Federal trust and they have no real control when it comes to reallocation.

Since the Walker River Basin maintains an

irrigation district manager, locally elected district board members and a Federal water master, there are individuals already in place who can lead efforts to establish local control and ownership of a bank. They are also in an ideal position to determine how to alter the river system physically in order to effectively store and lease water annually. In addition, they can help select pricing methods and negotiate other issues in the early stages of bank establishment.

Setting the price of water will perhaps be the thorniest issue to address. Will the irrigation district board members set the price or will the price fluctuate in an unregulated market through some form of sealed bidding or through auction? What will be the order of water use priorities? Will priorities include, along with agriculture, municipal and industrial, environmental and recreational interests; provisions for entry into the market of interests not yet identified or that will emerge in the future? The issues of priority and pricing clearly merit additional research on a case-study basis.

Farmers also expressed legal concerns. Specifically they require changes to Nevada state water law to enable short-term water leases. Additional research may examine and contrast historical and contemporary definitions for "beneficial use." While the Prior Appropriations Doctrine focused on agriculture as the primary beneficial use, contemporary social opinion has changed concerning prioritizing the use of scarce water resources. Farmers need to understand that changes to state water law can also effect changes to definitions of beneficial use reflecting contemporary views.

Another necessary condition for participation requires farmers to develop and successfully practice a strategic crop-rotation system to facilitate leasing water rights. University researchers and extension professionals can play an important role in helping farmers develop a strategic hay crop-rotation system by investigating and experimenting with alternative water-conserving crops as well as irrigation technology.

In addition, farmers express a valid concern regarding potential negative regional economic impacts. Farmers and other local citizens should examine and consider carefully those economic

enterprises that are readily available to the region, in lieu of agriculture and related industry. Again, university researchers and extension professionals can play a critical role in investigating these potential impacts, outlining and describing viable alternatives and explaining the research results to farmers clearly, encouraging farmers to make an informed rather than a forced decision.

Each of these concerns and conditions merits further research. Much of this research likely will use case study and survey methods. At any rate, farmers must have their concerns addressed satisfactorily before they seriously consider water banks as a reallocation and dispute resolution tool in the Walker River Basin.

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