Acceptability of the Deschutes Groundwater Mitigation Program

Eva Lieberherr*

“We can’t create water or increase the supply. We can only hold back and redistribute what there is.”1

In the last decade, the Deschutes River Basin in Central Oregon has faced growing urbanization, shifting water uses, and increasing ecosystem health concerns. This has led the Oregon Water Resources Department to experiment with a voluntary market-based approach to water management. To meet groundwater demands while maintaining instream flows and upholding prior water allocations, the Oregon Water Resources Department developed the Groundwater Mitigation Program in 2002. A program will be more effective and viable if it is deemed acceptable by its participants. As such, this research focuses on how acceptable the Groundwater Mitigation Program is to its participants.2 Comparing two hypothetical alternative scenarios to the Groundwater Mitigation Program, I determine acceptability by the following criteria: usability, accountability, enforcement, equity, information dissemination, cost-effectiveness, and utility. The research incorporates a mixed-method approach, conducting interviews and surveys of program participants. Results indicate that although the Groundwater Mitigation Program is more acceptable than the proposed alternatives, a lengthy groundwater permitting process, passive enforcement, and a lack of information nonetheless make the program unfavorable to its participants. Increased awareness could promote acceptance of the Groundwater Mitigation Program, and at the same time, contribute to the effectiveness of the program.

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* Eva Lieberherr is a Ph.D. Student in the Department of Innovation Research in Utility Sectors at the Swiss Federal Institute of Aquatic Research as well as with the Management of Network Industries Chair at the Swiss Federal Institute of Technology, Lausanne, Switzerland.

2. This research uses the Institutional Analysis and Development framework as a basis for analysis. This analysis is described in ELINOR OSTROM, ROY GARDNER, JAMES WALKER, RULES, GAMES AND COMMON-POOL RESOURCES (1994).
INTRODUCTION

In 2001, a study by the U.S. Geological Survey confirmed direct and extensive hydrologic connectivity between the Deschutes River and its surrounding groundwater aquifers. Hydrologically speaking, for every drop of water pumped from the aquifer, the river was deprived of that same amount of flow. Meanwhile, the Scenic Waterway Act was amended in 1995 to specify that all potential impacts of new groundwater uses on scenic waterways must be assessed. The statute included a key “measurably reduce” clause, which stated that no groundwater permit would be granted if an impact of one percent or one cubic foot per second, whichever was less, would occur to instream flow. Because the lower Deschutes is a scenic waterway and the hydrologic connection was established in 2001, it meant that either the Oregon Water Resources Department (OWRD) would have to place a moratorium on all new groundwater pumping or find a solution that would mitigate groundwater impacts.

At the same time, the population in the upper Deschutes Basin was booming, and the land use was changing dramatically. While historically irrigated agriculture was the central use and value for water in the Deschutes basin, with the influx of new residents, values in the basin were shifting from agricultural water uses to recreational and hobby-farming uses. As the rising population demanded more water and as surface water was over-appropriated, the new water users turned to groundwater. Due to the hydrologic connectivity in the lower Deschutes—confirmed by the U.S. Geological Survey study—and the amended Scenic Waterway Act’s “measurably reduce” clause, new water users faced seemingly impossible hurdles in obtaining groundwater permits. Thus, the conjunctive management of water resources in the Deschutes Basin became imperative.

4. See id.
6. Deschutes County, which contains a large portion of the upper basin, has been the fastest growing county in Oregon since 1989. See KOLLEEN E. YAKE, UPPER DESCHUTES SUBBASIN ASSESSMENT, UPPER DESCHUTES WATERSHED COUNCIL 23 (Aug. 2003), available at http://www.deschutesriver.org/CEDocuments/Downloads_GetFile.aspx?id=186897&fd=0. Between 2000 and 2006, the percent change in population growth in Deschutes County was 29.3 percent, while it was 8.2 percent in the state of Oregon; the population in Deschutes County grew from 115,367 to 149,140 over that time period. U.S. Census Bureau. State & County QuickFacts: Deschutes County Oregon (2008), http://quickfacts.census.gov/qfd/states/41/41017.html.
The problem may seem to have a clear solution: as irrigators sell their land to developers and retire a large portion of their senior surface-water rights, water is freed up for diversion, and then permits could be made available to new users. But, water is never that simple. As the land use was changing, so were social attitudes about water use and endangered fisheries. In order to balance the retiring of water rights, the permitting of new rights, and changing social and environmental concerns, the OWRD established the Groundwater Mitigation Program (GMP), which uses a combination of regulatory and market-driven mechanisms.\(^\text{10}\) The GMP is a voluntary program that caps new groundwater pumping\(^\text{11}\) and enables an existing water right to be designated as instream flow and to serve as mitigation of impacts to groundwater. Mitigation credits can either be obtained through mitigation banks or private parties.\(^\text{12}\) In 2001 legislation established a water bank, enabling the selling and buying of mitigation credits.\(^\text{13}\) Currently, there are two state-chartered mitigation banks: the Deschutes Water Exchange Mitigation Bank, run by the Deschutes River Conservancy (DRC),\(^\text{14}\) and the Deschutes Irrigation Mitigation Bank.\(^\text{15}\) In order to mitigate the new use’s impact on the Deschutes instream flow,\(^\text{16}\) the GMP would retire one surface water right for every new groundwater permit issued.

The OWRD intended to use a stakeholder group process to develop the GMP. However, the collaborative approach never reached consensus, and the final rules for the GMP were implemented by OWRD. Some stakeholders involved with the initial process were unsatisfied with the outcome because key issues under debate remained unresolved (e.g. the timing of mitigation). Hence, 

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\(^{10}\) The GMP is authorized via the OR. REV. STAT. §§ 537.505, .746, (2005). For groundwater mitigation bank and credit rules, see OR. ADMIN. R. 690-521-0100 (2001). For more information on regulatory and market-driven mechanisms, see EVA LIEBERHERR, ACCEPTABILITY OF MARKET-BASED APPROACHES TO WATER MANAGEMENT: AN ANALYSIS OF THE DESCHUTES GROUNDWATER MITIGATION PROGRAM (Oct. 4, 2009) (on file with the author).

\(^{11}\) Under the GMP rules, there is a cumulative total of 200 cubic feet per second maximum rate that serves as the cap for approving new groundwater permits in the upper Deschutes basin. Otherwise, groundwater permits are under a moratorium. LIEBERHERR, supra note 10. See also OR. WATER RES. DEPT., DESCHUTES GROUND WATER MITIGATION PROGRAM (2009), available at http://www.oregon.gov/OWRD/docs/Deschutes_2009_HB_3494_Report.pdf?ga=t.

\(^{12}\) Permanent mitigation credits can be created through private parties by permanently transferring water instream.

\(^{13}\) OR. REV. STAT. § 537.505 For groundwater mitigation bank and credit rules, see OR. ADMIN. R. 690-521-0100 (2001).

\(^{14}\) The DRC is a non-profit organization in the basin that works on restoring streamflow. It also operates the state-chartered Groundwater Mitigation Bank, which provides temporary and permanent mitigation credits. DESCHUTES RIVER CONSERVANCY, http://www.deschutesriver.org/ (last visited Apr. 9, 2011).

\(^{15}\) Water Res. Dep’t, Deschutes Water Mitigation Program, DESCHUTES BASIN MITIGATION PROGRAM (Apr. 25, 2011 5:52 PM), http://www.wrd.state.or.us/OWRD/Deschutes_five_year_eval.shtml.

\(^{16}\) An instream flow requirement specifies a volume of water required to sustain downstream water uses, such as aquatic habitat and recreation.
they filed a lawsuit that led to a ruling against the GMP. However, ensuing legislation reinstated the program with the conditions that its effectiveness must be evaluated by the Water Resources Commission every five years, and that the program may sunset in 2014.

In order to meet the evaluation criteria, the GMP must achieve its objectives effectively. Because a primary objective of the GMP is to “sustain existing water uses and accommodate growth through new groundwater development,” the GMP must meet the needs of the program participants in the basin. One way to evaluate whether the GMP meets the needs of the program participants is to assess how acceptable the GMP is to its participants, which is a gap in existing research. The focus is thus to use acceptability as an indicator of the program’s effectiveness and viability. This is based on the logic that a program will be more effective and viable if it is acceptable to its participants.

Economists often praise water banks as the solution to draconian water laws. However, water banking may not be a panacea. This research surveyed landowners in the community that had applied for new water permits via the GMP water bank and compared their experiences with the program with two alternatives: the unregulated groundwater system in use prior to 1995 and a complete moratorium on groundwater pumping beyond exempt uses. Thus, the main research question asked how acceptable the GMP is to its participants. Overall, the results indicate that the program works well. However, as the popularity of water banking grows, significant improvements should be considered by the DRC, future legislators, and water program bureaucrats throughout the water-deprived western United States.

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20. Program participants are defined as groundwater permit applicants with pending applications, permit holders, and withdrawn or denied applicants.
22. The objective of the GMP is not only to meet the needs of water users in the basin (i.e., the participants), but also to protect the water resources of the basin while developing new water uses. This includes offsetting the effects of groundwater pumping to meet statutory requirements and restore instream flows. OR. WATER RES. DEP’T, DESCHUTES GROUND WATER MITIGATION PROGRAM FIVE YEAR PROGRAM EVALUATION REPORT 1 (2008), available at http://www.wrd.state.or.us/OWRD/docs/Deschutes_Mitigation_5_Year_Review_Final_Report.pdf.
FRAMEWORK AND METHODS

This study employed the Institutional Analysis and Development (IAD) framework as a basis for analysis. Within the context of the study arena, the GMP is compared with two hypothetical institutional arrangements that bind the current program on either side: a moratorium on all new groundwater pumping beyond the exempt use, and a return to the pre-1995 institutional arrangement where there are no rules limiting further groundwater appropriations. Seven criteria are then used to evaluate acceptability of the GMP in comparison to the two hypothetical alternatives. Acceptability is determined by participants’ perception of certain criteria discussed below.

The IAD framework allows for a mixed-method approach. Primarily, qualitative data was collected through interviews, which were supplemented by quantitative data obtained through surveys. The first phase of research used a purposive sampling method to conduct interviews (face-to-face or telephone) with key experts. During the second phase, a census of all GMP participants were contacted and a sample were interviewed either face-to-face or via telephone. All interviews used a structured interview questionnaire with closed- and open-ended questions arranged in six themes: water use; application process; economic cost/benefit; awareness; suggestions, scenarios, overall rating; and, socio-economic parameters. Phase three involved a postal survey to all remaining contactable participants. The surveys used a modified form of the interview questionnaire. In total, data was collected from 100 respondents, seventy-eight of which were program participants.

RESULTS

The majority of participants can be characterized as irrigators who predominantly use groundwater for non-commercial grazing and pasture purposes (i.e., their participation in the GMP is predominantly a lifestyle rather...
than a livelihood choice; they are hobby farmers). These users consume less than ten acre-feet.\textsuperscript{30} In addition, these users are above the age of fifty (median age), attended college, and have lived on their property for less than ten years. These users frequently hired consultants\textsuperscript{31} to assist them in the process. Their median annual income is approximately $100,000. Of the 159 participants in the GMP since its inception in 2002, twenty-three have withdrawn. The subsequent analysis of acceptability of the program to its participants is broken into seven criteria: usability, accountability, enforcement, equity, information dissemination, cost-effectiveness and utility.

\textit{Usability}

“Usability” is measured by user-friendliness of the GMP. Usability is assessed through participants’ experiences and perspectives about the GMP process, including the permitting process. Many participants commented that the GMP was not user-friendly, and they saw it as overly complex. Several participants admitted that when they realized how extensive the process would be, they thought about quitting. Some participants said that their neighbors do not bother with the GMP because they see it as too bureaucratic and time intensive. A primary frustration among most participants was the length of the application process. An elderly survey participant commented that she was waiting until the “OWRD gets around to acting on my application—if I’m alive by then.” On average, it takes three years for the OWRD to issue a new groundwater permit.\textsuperscript{32} While many did not understand why the process was so extensive, some participants acknowledged that it was a new program with a steep learning curve. An interview participant involved in the early days of the program noted that the process was getting easier; data shows that the length of the permitting process is decreasing.

\textit{Accountability}

“Accountability” relates to the government officials’ (e.g., OWRD staff) ability to administer the GMP as well as other entities’ capability to assist in implementing the program. This involves assisting participants through the GMP process, as well as monitoring and enforcing water use; the latter should be done by government officials. In general, participants said that OWRD Salem (head office) and Bend (field office) were unresponsive. The OWRD Salem was rated the lowest in terms of its assistance.\textsuperscript{33} Participants involved

\textsuperscript{30} One acre-foot of water covers an area of one acre with a foot of water. Consumptive use means that water is used in a way that causes an overall reduction of streamflow, often associated with evaporation or transpiration.

\textsuperscript{31} Consultants are used as an umbrella term for anyone hired to assist with the GMP process. This includes engineers, lawyers, and developers.

\textsuperscript{32} The Median is 2.5; the standard deviation is 1.7. LIEBERHERR, supra note 10.

\textsuperscript{33} Participants ranked the responsiveness of OWRD and other organizations involved in the program at 2.9, on a scale of one to five (one is poor and five is excellent).
with the DRC’s water bank provided a positive review, yet several other participants were not aware of the DRC. Private consultants were rated as providing the highest level of assistance. Many participants felt that hiring a consultant was almost a prerequisite to partaking in the GMP.

 Enforcement

Numerous participants expressed concern regarding the lack of enforcement by OWRD. One participant noted that “just because there’s this process, illegal use has not stopped, maybe it made it worse.” Some participants who have not been issued a permit began pumping nonetheless. However, under the hypothetical moratorium scenario, many participants thought that illegal uses would increase; the potential to abuse exempted uses would rise. Currently, most participants do not report their annual water use. Furthermore, despite the fact that a water meter is a prerequisite for obtaining a permit, ten of twenty-nine permitted participants lacked a water meter.

 Equity

Beyond reducing the credibility of the program, the enforcement problems also lead to equity concerns. The term “equity” is used synonymously with “fairness.” Many participants said that enforcement was not uniform. Several viewed the GMP as unfair because those who abide by the law paid for pumping, yet there were no consequences for failure to abide by the law. Participants also found it unfair that they needed to provide mitigation before they were allowed to pump; some participants were paying for credits without being able to pump.

Another equity concern relates to the perception that “big water users are not paying and the small ones are.” Several participants said that some golf courses and resorts used a great amount of groundwater without having to pay. However, others noted that the resorts that were paying drove up the price of groundwater for others. Some participants disliked the idea of a water market; they said that water belongs to the public and resorts should not determine the price. Moreover, some said that only the rich could afford this program. Indeed, the monetary cost imposed on participants was a major impediment to joining for some participants who find these costs significant. Furthermore, it was difficult for the infrequent water user to accept being restricted from pumping when golf courses use water at a much greater rate. Many participants criticized the OWRD for allowing what they saw as wasteful water use by golf courses, while the small users had to wait three years to

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34. Thirty-seven percent of forty unpermitted interview participants began pumping.
35. It must be noted that this is certain participants’ perception; they believe that some golf courses and resorts are not required to supply mitigation credits. However, according to the regulations, golf courses and resorts are required to obtain mitigation credits.
36. Eighty percent of sixty-six participants say the costs are significant.
irrigate one acre. “When you see so much municipal and residential waste of water, but a draconian [approach] to my permit . . . it is difficult to take the OWRD Deschutes Mitigation process seriously.” Instead of being strung along due to vague policy goals as well as a lengthy permitting process, an interview participant said that he would rather be given a clear answer: “If the real goal is to stop new water uses then they should say that this is the public policy goal.”

Information Dissemination

While information dissemination was noted as occurring at the onset of the GMP, many participants felt uninformed, which led to false expectations and frustration. Many participants expected their groundwater application to go through quickly; sixty-one percent of sixty-seven participants said that they felt uninformed about the length of the process. While participants said that professional consultants are adequately informed about the GMP, the typical water user is not. Several participants stated that they were not aware of the fact that they even needed a groundwater permit in order to pump. Furthermore, a general lack of information regarding the GMP means that many potential participants were not aware of the ability to obtain a permit for a dry property. Many participants also felt uninformed as to why they had to mitigate, expressing the sentiment of “if we don’t need to mitigate then it’s a total waste to have the GMP.”

Cost-Effectiveness

Cost-effectiveness is used here as the perceived net benefits provided by one institutional arrangement in relation to another. Some participants noted that the costs of the program were large relative to the outcome; the GMP was a big investment without tangible outcomes. Yet, others believed that while the costs seemed huge upfront, the permit would increase property value, although this did not always occur. While several participants complained that mitigation credit costs were increasing exponentially, for others the cost of credits was reasonable. However, the pumping costs may still be high for certain participants, such as resorts.37

Several participants expressed satisfaction with temporary credits because they were cheaper and provided more flexibility. However, prices for temporary credits are increasing, which is of concern to small water users who are losing money through the GMP. One participant noted, “[A] lot of us who don’t make money off of the land don’t need these credits. But it seemed like the sensible thing to do in the spirit of the environment. Increasing the cost of credits will decrease the willingness to buy them.” This participant said he could probably get away without a permit, using just slightly over-use the exempt use, but he wanted it for future use. Despite the costs and limited 37. Key experts noted that a more affordable means to acquire permanent credits is to go through the DRC rather than the open market.
availability of permanent credits, most participants saw the benefits of permanent credits because they could retire their mitigation obligation for the life of the permit; 92 percent of sixty-one participants had considered or are considering purchasing permanent credits.

Utility

“Utility” is used to analyze how participants perceive the usefulness of the GMP. Utility is assessed in terms of meeting participants’ personal needs for groundwater, as well as how participants view the program’s utility for economic growth and development in Central Oregon, for instream flow, and for other general environmental benefits. Despite frustrations with the process and the rising costs associated with it, most participants said that the program was meeting their needs for groundwater. Many also saw the GMP as promoting economic growth and development in Central Oregon. While a representative from a resort noted that without the GMP no economic growth in Central Oregon would be possible, others said that the GMP hinders economic growth because of the lengthy process. For many participants, the idea that the GMP promoted development did not make the program more acceptable; the GMP was “good for economic growth, but on the flipside, it’s not necessarily good to have development in the long-run.”

While some participants were motivated to purchase credits because they believed it benefits the environment and provided “peace of mind,” most participants felt uncertain about the GMP’s utility for instream flows. Some rationalized that if the money from mitigation went toward restoring flows, then there must be some benefit. Others said the program was not worth the hassle. A few participants saw no utility in the GMP; they described it as a “joke,” a “game,” and a means for the state and/or consultants to make money. While certain participants were unhappy with any regulation of water on their land, others noted that water resources are limited and that they are living in the desert where a green pasture is not automatic. Thus, they thought it was important to control water use: “it’s our own benefit to be able to green-up our properties;” and “the GMP sounds like a socially responsible way to proceed.”

Discussion and Conclusion

In comparing the GMP with the two hypothetical arrangements on opposite ends of the spectrum, it must be recognized that the moratorium alternative is an extreme case that imposes large costs on participants in that it would prohibit them from pumping additional groundwater. For the majority of participants who are hobby farmers, this would impede their lifestyle. Moreover, for those who use groundwater for commercial purposes a moratorium could jeopardize their source of income. However, there would be no process and no incurred monetary costs in terms of mitigation credits. Thus,

38. Seventy-eight percent of sixty-two participants stated their groundwater needs were met.
a moratorium may be less frustrating in terms of usability as there is no institutionalized process with mitigation credit costs. Furthermore, since a moratorium would place a restraint on everyone, including developers, participants could view it as a more equitable alternative. However, accountability, enforcement, and information would remain major issues. Since many participants perceived the latter criteria as lacking and believed that illegal uses would increase under a moratorium, this alternative may be less acceptable than the GMP. In addition, since participants would be restricted from fulfilling their personal needs for groundwater, the moratorium would provide less utility than the GMP.

Under the alternative scenario of the pre-1995 institutional arrangement, participants could simply pump as much as they wanted. Again, there would be neither a process nor costs incurred besides pumping costs, making this option less frustrating than the GMP. Accountability and enforcement would be less of an issue under this alternative as it would be legal to pump. However, equity may become a major concern as the wealthy, who can afford to pump more, may use more groundwater, thereby making less available to others due to aquifer drawdown. Furthermore, this may lead to rapid development by golf courses and resorts, which would be met with disapproval by many participants, as they express a strong sentiment against the plethora of golf courses and resorts in the basin. While the utility may be high for participants initially, as their needs for groundwater would be met, the resource could be depleted under this free-for-all. Since many participants noted the need for conservation as well as expressed equity concerns, the pre-1995 alternative may be less acceptable to most participants than the GMP.

With regards to the results and the discussion of the two alternatives, it can be concluded that despite frustrations incurred by the program, the GMP is more acceptable to most participants. It enables them to meet their groundwater needs in a way that offsets depleting instream flows, while allowing for economic growth in a manner that may restrict development more than the pre-1995 alternative. The hypothesis that the GMP is more acceptable to its participants than the alternative management/regulatory options discussed in this research holds true. Moreover, given the “action arena” in the Deschutes Basin, with its unique hydrogeology, conjunctive water laws, and shifting values from agricultural to hobby-farming, the GMP is functioning to meet diverging needs. The simple fact that people are participating in and staying with the GMP is itself an indication of its acceptability.

Yet, there are many ways in which the program could be improved to increase its acceptability. Participants’ recommendations included communicating more accessible information, creating a time-line to set expectations, clarifying and simplifying the process, providing updates on the GMP, and increasing public awareness. The lack of clear information available
to participants seems to be a major concern. In fact, the lack of public information dissemination about water management is widespread and appears to pose a major challenge for effective water management, not only in the Deschutes Basin, but the U.S. at large.

Providing more understandable information may assist in alleviating other frustrations of the program. Improving information dissemination may enable the program to become more user-friendly as participants gain knowledge about the GMP. In addition, participants could gain a better understanding about the OWRD and its enforcement system. Furthermore, knowing why mitigation is required may make the program seem more equitable, increase the utility, and make it more cost-effective. By thus becoming more acceptable to participants through increased information dissemination, the GMP might also become more effective and viable. Compliance may increase and water might be pumped in a legal manner. As noted by Wallace Stegner in 1987, in order to manage water resources in an over-allocated basin, redistribution is central; without the acceptance and compliance of the water users, redistribution becomes an even greater challenge.

41. See STEGNER, supra note 1, at 215.