Views and Activities among Municipal Water Managers and Land Planners: Stressors and Strategies for Resource Management in Metropolitan Phoenix, AZ

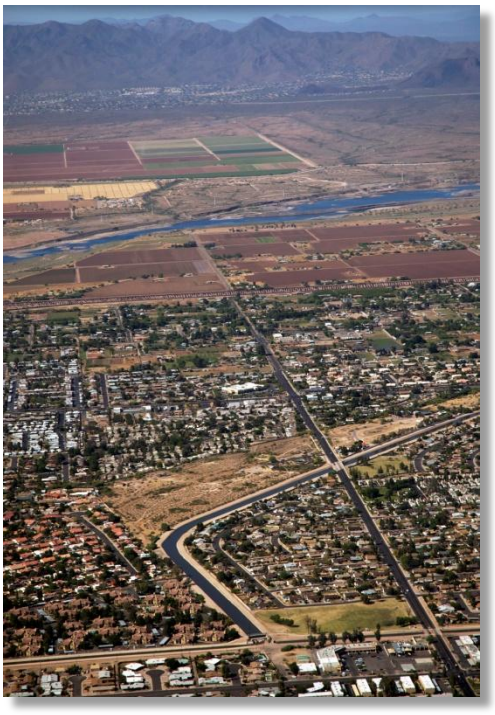
Overview

This report stems from a survey conducted in 2010, aimed at understanding water resource and land use planning activities across municipalities in the greater Phoenix region. Since land use and land cover (e.g., vegetation) affect water demand, and since water use and conservation affect the condition and management of land use and land cover, a primary objective of this research is to explore the potential for integrated planning across sectors. With special attention to land-water connections under climate variability and urbanization, we focus on planning strategies within and across sectors. Below, we present some of the survey results from Phoenix-area municipalities.[1]

Here, we present the results from two sets of survey questions. First, we explore how professional views about water resource *stressors* and management *strategies* converge and diverge among water resource managers (WRMs) and land use planners (LUPs) (i.e., to what extent do these two groups hold similar or different perspectives from one another). Second, we examine the degree to which water managers and land planners are engaging in integrated planning by asking them the degree to which they consider both issues in their decision making (i.e., water issues in land planning and land issues in water management) and the extent to which they are involved in planning activities in the other sector (i.e., WRMs in land planning and LUPs in water management).

Approach

In order to characterize local-level issues and initiatives, our survey targeted one LUP and one WRM in each municipality in the greater Phoenix region. This led to a response rate of 66% (n=21) for land-use planners and 38% (n=12) for water resource managers. Although our sample size is small, we provide a narrative to stimulate ideas and initiatives for collaborating across agencies and sectors.



Results

Professional Views on Water Stressors and Strategies

A set of two survey questions—each referring to a list of potential water *stressors* and management *strategies* (see Figures 1a and 1b, respectively)—asked, "in your professional opinion:" 1) how much does each of the following contribute to the possibility of future water shortages or outages in your municipality?, and 2) how effective do you think each of the following are or would be to ensure your municipality has an adequate and reliable source of water into the future?

[1] Although we focus on the Phoenix region here, the broader project included surveys and cross-regional modeling of land use, water demands, and climate conditions in Portland, OR (see references below for more information).

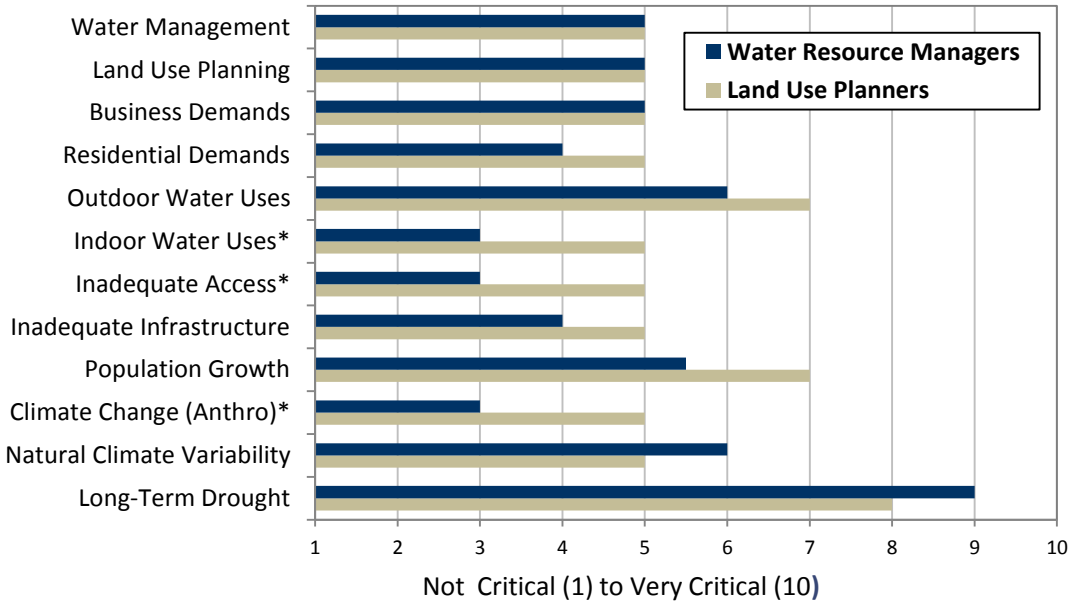
Regarding *stressors* (Figure 1a), climate variability was a critical concern across both groups, especially in terms of drought and natural variability. While water managers were more concerned about natural variability, land planners were reportedly more worried about human-induced (anthropogenic) climate change. Such differing views may lead to difficulties in communicating about climate risks across sectors. Beyond climate, growth and outdoor water use were seen as critical stressors, particularly among LUPs who were also relatively concerned about indoor water use and inadequate access to water. While individuals within both groups varied considerably in their views, water managers generally agreed about the importance of natural climate variability and the relative insignificance of indoor water use.

Written explanations on surveys further indicate that stressors vary across municipalities. For example, poor water quality and private water companies place additional stresses on some municipalities, as do policy deficiencies (e.g., Groundwater Management Act (GMA) loopholes and un-remediated Superfund sites) and institutional constraints (e.g., legal allocations, water reuse impediments, state laws about growth). Overall, both groups ranked the top stressors as drought, growth, and outdoor demands. Thus, these topics may be ripe for cross-sector collaborations to aid resource management and planning.

Figure 1. Views on Water Scarcity among Water Managers and Land Planners

Note that asterisks* indicate the factors on which WRMs and LUPs differ most.

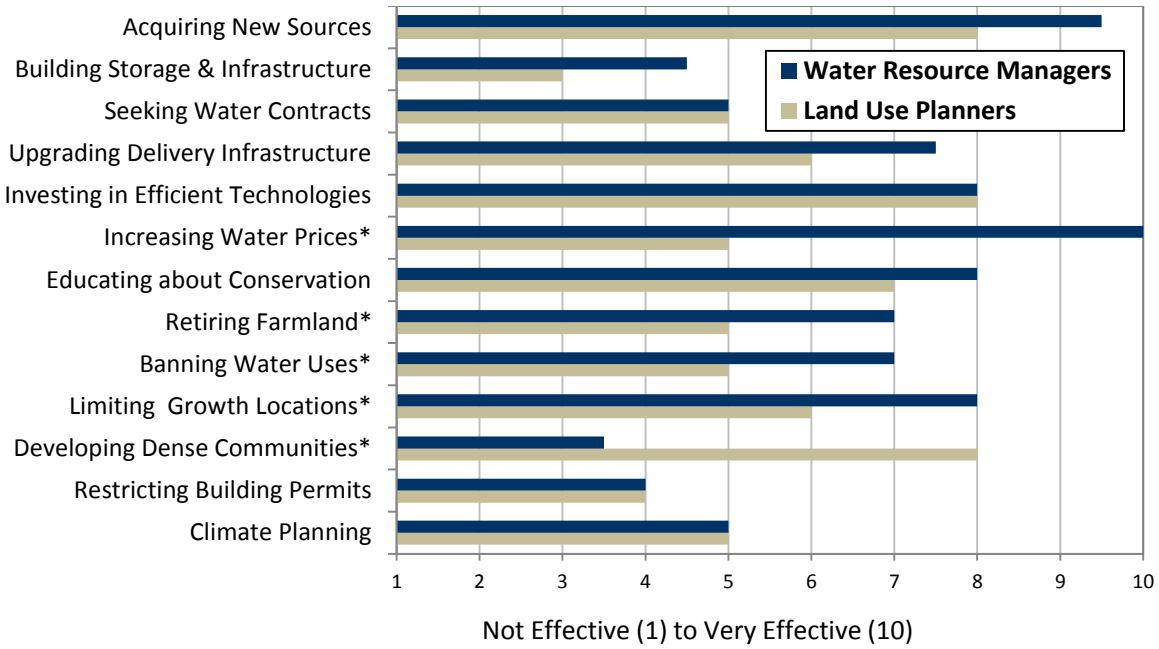
a. Stressors: Perceived Causes of Potential Water Shortages/Outages



Professional views about *strategies* for avoiding future water shortages varied more than stressors both within and across sectors (Figure 1b). WRMs ranked increasing water prices, acquiring new sources, and limiting where growth can occur as the most effective strategies for avoiding water shortages, whereas LUPs rated investing in efficient technology and designing dense communities as paramount. Additionally, the two groups differed in that water managers viewed retiring farmland and limiting water uses as more effective than land planners. Although these differences highlight conflicting viewpoints that might thwart collaboration across sectors, these areas of diverging perspectives also

represent possible topics for discussion in order to develop a shared understanding of issues. Notably, planning for climate variability and change was a point of agreement across WRMs and LUPs, as was seeking water contracts. But these were only rated as moderately effective management strategies.

b. Strategies: Effectiveness of Approaches to Avoiding Water Shortages/Outages



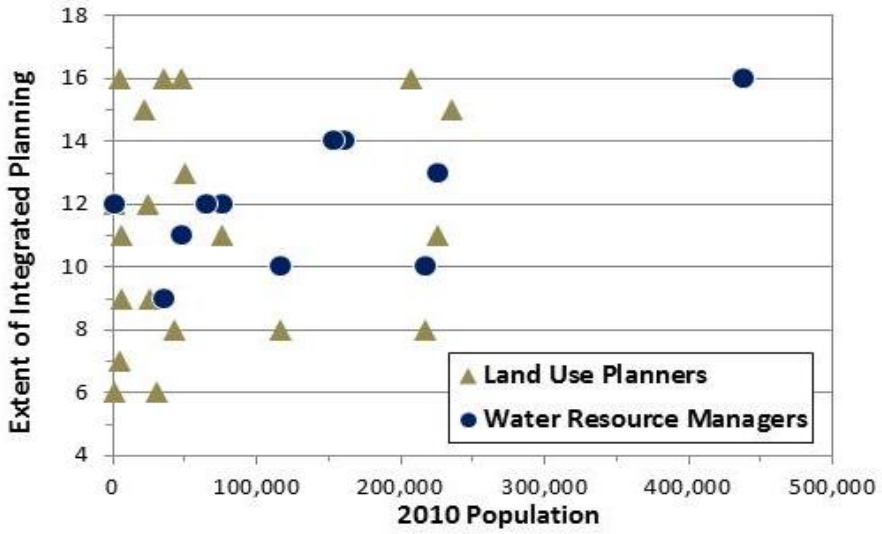
Written comments further explain how institutions and planning processes both constrain and provide opportunities for decision-making. Mixed reviews of the GMA indicate that while provisions such as Assured Water Supply (AWS) rules and general planning processes direct attention to the water needs of new development, loopholes in the GMA (e.g., regarding AWS requirements) need to be addressed. Several respondents also noted significant capacity for conserving water, while others argued for stronger conservation efforts, even if only as a matter of "regional responsibility" (rather than need). Impact fees were also mentioned by one respondent as a way to acquire new water supplies, and to make landowners/developers responsible for their own water supplies. Finally, several WRMs and LUPs emphasized the importance of planning processes and institutions that support decision-making.

Extent and Nature of Integrated Planning

As a whole, both land planners and water managers reported moderate levels of integrated planning across sectors. While *consideration* of land use in water management as well as water issues in land planning are common across both groups, collaborative *involvement* of LUPs in water management and WRMs in land planning is comparatively low and more variable across municipalities. Larger cities tend to be more engaged in integrated planning than smaller ones, in addition to having greater reported capacity for planning. This applies especially to water management, as cross-sector planning tended to increase

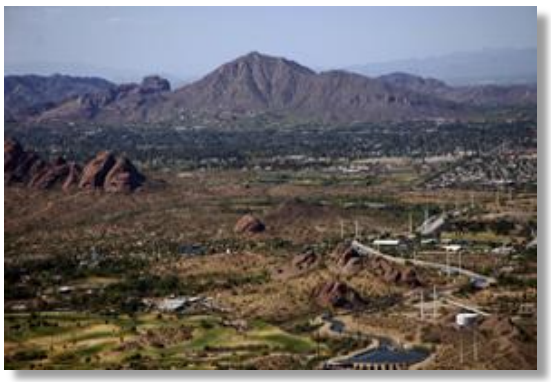
with the size of the community for water resource management but not land use planning (Figure 2). However, some smaller municipalities do report significant capacity for collaborative and consultative activities, whereas some larger cities indicate limited initiatives and abilities due largely to fragmented divisions within local governments and political resistance to water being a limit to growth.

Figure 2. The Relationship between Integrated Land-Water Planning and Town Size



According to survey respondents, the primary way in which integrated planning plays out is by estimating water demands based on general land plans and projected growth, or in other words, planning so that water supplies can accommodate expected development. Especially because of AWS criteria, some planners emphasize drought-tolerant or low water-use landscapes to reduce the water needs and demands of new developments. Meanwhile, "separate divisions" and "distinct separation" between water and land planning was noted as a barrier to collaboration across sectors. These divisions also apply to utilities and planners within water management as the separation of private utilities from municipal planning appears problematic for planning since town planners with private water companies tend to see water resources outside of their "justification" or "province" of duties and capabilities.

Nevertheless, water and land planners both report substantial collaborations in their activities, including expert consultants, universities, non-profit organizations, and neighboring communities, in addition to regional entities such as the Maricopa Association of Governments (MAG) and the Arizona Municipal Water Users Association (AMWUA). The Sustainable Cities Network (SCN) is another venue for collaboration among planners and municipalities (http://sustainablecities.asu.edu/). Indeed, many planners have much experience participating and running advisory and inter-governmental committees. Thus, venues such as these—both within and across municipalities—could be critical in addressing the interconnections and tradeoffs (e.g., water conservation vs. heat mitigation) across resources such as land and water, while broadly increasing the ability to deal with land-use and environmental changes that affect local and regional water resource availability and sustainability.



Concluding Thoughts

While the majority of municipalities surveyed expect increases in total water demands, most also anticipate decreases or no change in per capita consumption. Gains in efficiency are largely due to more compact development, outdoor water conservation efforts, and more efficient housing infrastructure with new development. Increasing efficiencies is one way to 'increase' water supplies, yet some water managers warn against "demand hardening," which implies a hyper-efficient system that may experience difficulties in saving extra water during shortages. Thus, allowing some non-essential water uses—ideally aimed at multiple purposes such as local cooling, public parks, and/or habitat benefits—present one option for adapting to short-term water shortages while also addressing tradeoffs. But as Rossi and Quay warn (2009: 29), "allocating conserved water to growth compromises a water providers' ability to meet customer demand during shortages." Since this issue of demand hardening has not been thoroughly explored by researchers or policymakers, it seems to be a topic ripe for conversations about resource management. Other topics addressed herein also offer worthwhile opportunities for collaborating across land and water sectors, especially issues pertaining to climate variability, outdoor water use, and integrated planning for an uncertain future.

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Relevant Publications

Breyer B, Chang H, Parandvash H (2012) Land-use, temperature and single family residential water use patterns in Portland, Oregon and Phoenix, Arizona. Applied Geography 35:142-151

Gober P, Brazel A, Quay R et al. (2010) Using watered landscapes to manipulate urban heat island effects: How much water will it take to cool Phoenix? Journal of the American Planning Association 76(1):109-121

Gober P, Larson KL, Quay R et al. (2012) Why land planners and water managers don't talk to one another and why they should! Society and Natural Resources DOI:10.1080/08941920.2012.713448.

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Quay R, Larson KL, White DD (forthcoming) Enhancing water sustainability through university–policy collaborations: Experiences and lessons from researchers and decision-makers. Water Resources IMPACT

Rossi S, Quay R (2009) Phoenix demand management plan—a shifting paradigm. Southwest Hydrology Nov/Dec:29