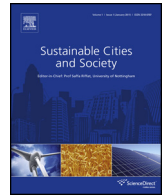




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Facilitating collaborative urban water management through university-utility cooperation

Britt Crow-Miller^{a,*}, Heejun Chang^a, Philip Stoker^{b,1}, Elizabeth A. Wentz^c

^a Department of Geography, Portland State University, 1721 SW Broadway, Portland, OR 97201, USA

^b Department of City and Metropolitan Planning, University of Utah, 375 South 1530 East, Suite 235, Salt Lake City, UT 84112, USA

^c School of Geographical Sciences and Urban Planning, Arizona State University, Coor Hall, 975 S. Myrtle Ave., Tempe, AZ 85287, USA

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ABSTRACT

In the face of intensifying stresses such as climate change, rapid urban population growth, land use change, and public concern with rates and use restrictions, water management is becoming increasingly complex in the cities of the American West. One strategy to improve water management practices in this changing social-ecological context is to develop collaborative relationships that facilitate the engagement of multiple stakeholders at multiple scales. At the local level, one important but frequently underdeveloped collaborative link is that between university researchers and water utilities, who together occupy the interstitial space between science and decision-making, while at the same time interfacing with water users. Based on workshop data, a pilot survey, and interviews with representative water managers and university researchers from cities across the American West, we identify a number of barriers to establishing collaborative platforms from which utilities and university researchers can effectively work together to tackle challenges around sustainable urban water management in the twenty-first century. We make suggestions for overcoming these barriers and argue that developing an integrated model for university-utility collaborations is a critical area on which we must focus our collective attention if sustainable urban water management is to be achieved.

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1. Introduction

With more than half of the global population now residing in urban areas (Ash, Jasny, Roberts, Stone, & Sugden, 2008), sustainable water resource management has become one of the most important issues faced by growing cities. Municipal and regional water utilities are constantly searching for reliable sources of water for their residents and industries. Additionally, with prolonged drought and projected climatic changes, many water utilities in major urban areas are facing multiple challenges when it comes to maintaining high quality services. In the United States, while severe water shortage in California has captured the news headlines in recent years (for example, see Stevens, 2014), stress on water resources has been intensifying across the region for several

decades. In addition to the high probability of prolonged regional droughts in the Western U.S. (Cook et al., 2010), climate change is also shifting precipitation patterns from winter snow to rainfall, reducing water supplies in the late summer months (Bardsley et al., 2013; Barnett et al., 2005; Chang, Jung, Steele, & Garnett, 2012; Hale et al., 2015). Adding to the stress caused by climate change, all of the arid and semi-arid Western states have experienced significant growth in urban populations over the last 15 years (Fig. 1) (US Census Bureau, 2015). Growing urban populations have contributed to increased competition for scarce water supplies (Bardsley et al., 2013; Gober, 2010; Hale et al., 2015). Furthermore, as land is converted for agriculture or urban uses, we are beginning to see changes in the hydrologic cycle in the arid southwest (Scanlon, Reedy, Stonestrom, Prudic, & Dennehy, 2005) and in the Pacific Northwest (Chang, 2007; Cuo, Lettenmaier, Alberti, & Richey, 2009). Together, these three stresses—climate change, urban population growth, and land use change—have placed enormous pressure on the water management capacity of the cities of the American West.

In the face of these mounting challenges, decisions about how water resources are managed for our cities are increasingly impor-

* Corresponding author.

E-mail addresses: bcrowmiller@gmail.com (B. Crow-Miller), changh@pdx.edu (H. Chang), philip.stoker@email.arizona.edu (P. Stoker), wentz@asu.edu (E.A. Wentz).

¹ Current address: College of Architecture, Planning, and Landscape Architecture, University of Arizona, 1040 N. Olive Road A303F, Tucson, AZ 85721, USA.

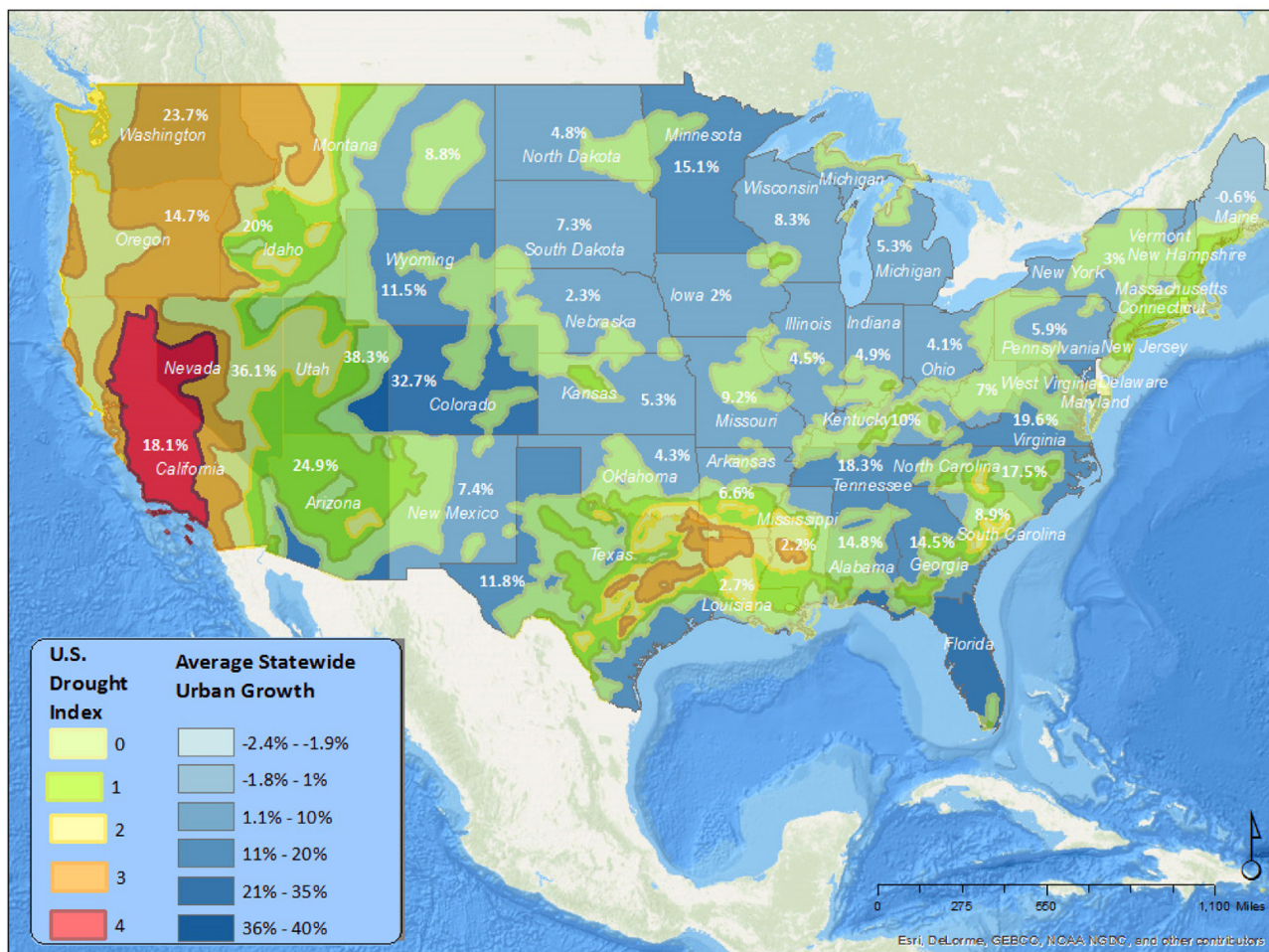


Fig. 1. Population growth from 2000 to 2010 in urban areas and drought conditions in the U.S. in October 2015.

Data sources: U.S. Drought Monitor November 2015 and MPC (2011).

tant. As Farrelly and Brown (2011:721) note, “While traditional [urban water management] systems have been relatively successful in the past, the capacity of this large socio-technical regime to respond to emerging challenges [...] is currently being questioned.” Developing collaborative relationships that facilitate the engagement of multiple stakeholders at multiple scales is central to fostering adaptive water resource management strategies in this changing social-ecological context (Gober et al., 2013; Hare, 2011; Mysiak, Henrikson, Sullivan, Bromley, & Pahl-Wostl, 2010). This paper focuses on one important but frequently underdeveloped collaborative link, that between university researchers and water utilities, who together occupy the interstitial space between science and decision-making, while at the same time interfacing with water users.

Based on evidence from workshops, a pilot survey of water managers from across the American West, and 16 semi-structured interviews with relevant water managers and university researchers, we identify a number of barriers to utility-university collaboration. We make suggestions for overcoming these barriers and argue that improving opportunities in this area is critical if sustainable urban water management is to be achieved. Finally, we advocate for a shift away from models of siloed or limited interaction between university researchers and utilities toward a model of integrated collaboration in which a new, shared institutional culture is created and problem framing, management goals and knowledge are co-produced.

1.1. Project background

This research builds upon an NOAA-SARP funded project called, “Integrated Water and Land Planning as a Climate Adaptation Strategy: Comparisons of Portland, Oregon and Phoenix, Arizona” (<https://www.sites.google.com/site/portlandstatenoasarp/>). The project is one of the few attempts to compare two different cities regarding their urban water resource management and it has, to-date, been a productive investigation of the spatial and temporal variability in urban water consumption in the face of stress. Initial efforts on this project revealed an understudied and critically important social dimension to these issues, specifically related to the role of multi-party collaboration in fostering adaptive capacity. The results from two stakeholder workshops held at Portland State University in 2010 and 2011 suggested that this is an important area of consideration when it comes to urban water management in the American West. Specifically, results from these workshops indicated that limited cooperation across water management and land use planning sectors presents a major challenge to sustainable urban water resource management and limits adaptive capacity (Gober et al., 2013; Larson, Polsky, Gober, Chang, & Shandas, 2013; Shandas, Lehman, Larson, Bunn, & Chang, 2015). Other cross-sector collaborations, such as those between university researchers and utilities, have been shown to be important in fostering adaptive capacity (Chang, Franczyk, & Bae, 2006; Folke, Hahn, Olsson, & Norberg, 2005; Pahl-Wostl et al., 2007; Pahl-

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