Investigating the influence of geographical barriers on public awareness about water issues

Bethany B. Cutts (bcutts@asu.edu)[12], Ariana Fox[12], Allyn Knox[13], and Nicholas R. Moore[4]

1Decision Center for a Desert City, POB 878209, Arizona State University, Tempe AZ 85287-8209 2School of Life Sciences, POB 874601, Arizona State University, Tempe AZ 85287-4601: 3Barrett Honors College, POB 871612 , Arizona State University, Tempe AZ 85287-1612: 4 Department of Geography, Hunter College – CUNY, 695 Park Avenue New York, NY 10065

Current methods used to evaluate public information campaigns ignore the systematic barriers that may reinforce environmental inequities

Evaluation methods used to gauge the influence of information campaigns on the public almost always focus on short term, individual behavior changes. They often under-emphasize the ways that efforts to educate the public can legitimate community interests and empower political and community action beyond the individual or household level. Few studies have considered the potential impact of several programs administered by several organizations with overlapping geographic ranges. Using an environmental justice framework, we evaluate the landscape of opportunity to engage with information about water supply and water quality created by the 42 organizations serving metropolitan Phoenix.

Study focus: Phoenix-area water information providers

Are there systemic differences in the distribution water information?

How does locally available information influence knowledge and opinions about water issues?

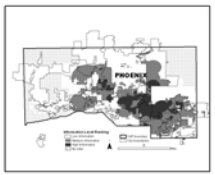
The study area is the Phoenix, Arizona metropolitan area in the southwestern U.S.

Type of water information organizations	*Total identified*
Water provider	14
Education or Research Group	13
Environmental NGO	7
Government agency (not including water utility)	5
Multi-organization Coalition	3
Total	**42**

Range of Informational Programs	
•School Programs	•Newspaper
•Teacher Training	•Radio
•Demonstrations and Exhibits	•Television
•Landscaping Courses	•Direct Mail
• Neighborhood Canvassing	• Rebates
• Booths at Community Events	•Information Kiosks

Classifying water information availability

Using data gathered through information on websites, organizational records and interviews, we constructed a list of locations for all information campaigns concerned with local water quality and water supply. We calculated the probable range of influence for point-based water information (e.g. exhibits) using a distance buffer equal to the average distance between similar events. We calculated the number of opportunities for the public to engage with water information at any location within the study area and aggregated across all organizations and classified in to "High" "Medium" and "Low" categories of availability.



Water information availability is highest in central Phoenix and the southeast

Geographically Weighted Regression

Because of the spatial contingency of the data, we used a logistic geographically weighted regression model to assess the significance of three demographic variables in explaining access to information: Percent renters, percent Latino, and percent school-aged children. We predicted, based on opinions shared in interviews with water information providers, that there would be a negative relationship between water information availability and percent renters and percent Latino. While we predicted a positive relationship between percent of the population ages 5-18 and water information. This is due to the high degree of material relating to outdoor water conservation designed to appeal to homeowners, a general recognitions that materials translated into Spanish may not be culturally relevant, and a large reliance on reaching the adult public indirectly through outreach to schools[2].

Public Survey

We began by selecting two neighborhoods, whose demographic profiles indicate a high propensity for assimilating information about the environment, to participate in a multi-modal public survey. The survey assesses a broad spectrum of knowledge related to water issues. Preliminary results are shown below.

Systematic difference in the distribution of water information exist, but vary geographically

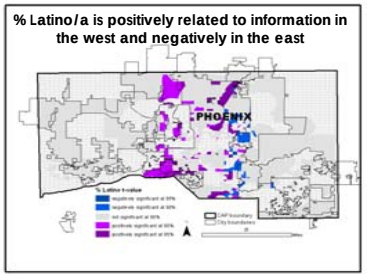
Global Model
Global AIC corrected 1115.710

Parameter	Estimate	Std Err	T	Exp(B)
Intercept	-0.234	0.168	-1.391	0.792
% Latino	0.334	0.403	0.829	1.397
% Renter**	2.564	0.406	6.321	12.989
% Children 5-18*	-7.114	2.466	-2.885	0.001

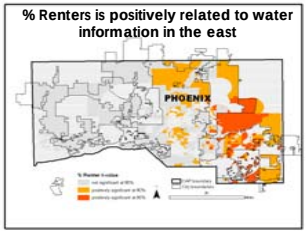
* Significant at 0.10 ** significant at 0.05

Logistic geographically weighted regression comparing
Low water information Availability (0) to High water information availability (1)
n= 840
Bandwidth= 216.705
Local AIC corrected 795.634

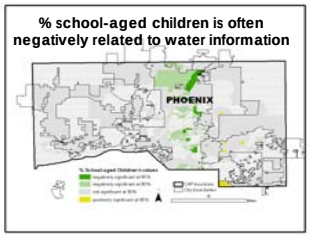
% Latino/a is positively related to information in the west and negatively in the east



% Renters is positively related to water information in the east

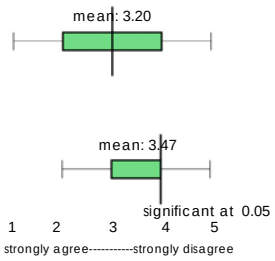


% school-aged children is often negatively related to water information



High WI n=99
Low % Latino
Low % Renter
High % children 5-18

Low WI n=131
Low % Latino
Low % Renter
High % children 5-18



Local water issues are confusing

In the past 30 days, I have noticed information about... (mode response)

	High WI	Low WI
Water Supply	No	Yes
Drinking Water Quality	Yes	Yes
River and wetland restoration	No	No
Flooding	Yes	No
Drought	Yes	No
Household Water Conservation	Yes	No
Local effects of climate change	Yes	Yes
Local water policies	Yes	No

Living with high water information availability enhances perception that water issues are confusing and improves awareness

Conclusions and future research

Our results indicate that spatial barriers to information exists, but that it does not systemically disenfranchise the groups water educators perceive to have an information deficit. The observed difference in information awareness suggests that the spatial arrangement of information disenfranchises one set of residents while the mechanisms employed to motivate learning may disenfranchise a second set of residents. This would lead to lower public awareness about water issues than would otherwise be expected given the quantity of water information provided to the public. Additional survey data will provide more insight into these relationships.

Acknowledgment: This material is based upon work supported by the National Science Foundation under Grant No. SES-0345945 Decision Center for a Desert City (DCDC) and Doctoral Dissertation Improvement Grant BCS-0803102. Any opinions, findings and conclusions or recommendation expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation (NSF). Thanks to Bill Edwards, Ann Kinzig, the Kinzig lab and CGRS course. References: 1.Cutts, B.B. In preparation. Assessing the water education landscape: The process and product of a participatory mapping approach 2. Cutts, B. B., C. Saltz and M. Elser. 2008. Considering the cumulative impact of educational messages: multiple organizations address water issues in Maricopa County, Arizona. Applied Environmental Education and Communication 7(1): 40-50.