



# Water landscapes: representing multiple outreach organizations

Bethany B. Cutts

School of Life Sciences, Arizona State University

Decision Center for a Desert City



## 1. Introduction

Access to water education may influence household conservation and decisions at larger scales. Determining the distribution of educator effort is a first step in understanding accessibility. In the Phoenix metropolitan area, 42 organizations provide water education to some portion of citizens. Interactions between organizations occur in two ways:

- Organizations develop programs in tandem & share ideas
- Program audiences overlap - residents receive information from multiple educators.**

I look at the landscape of educator effort created by the overlapping program boundaries. I aim to:

- Explore preliminary methods for representing program distribution
- Test  $H_0$ : There is no spatial pattern associated with the distribution of education effort.
- Examine the stability of patterns across representations
- Discuss future improvements to and uses for effort maps

## 2. Methods

- Face-to-face interviews with 29 organizations between June and December 2006.

| Organization Type                   | Total Identified | Interviews |
|-------------------------------------|------------------|------------|
| Water provider                      | 14               | 10         |
| Education or Research Group         | 13               | 10         |
| Environmental Group                 | 7                | 5          |
| Non-water utility government agency | 5                | 2          |
| Multi-organization Coalition        | 3                | 2          |
| <b>Total</b>                        | <b>42</b>        | <b>29</b>  |

Response Rate = 69%

- Geocode programs with addresses, delineate boundaries of disperse programs to appropriate extent. Three effort maps:

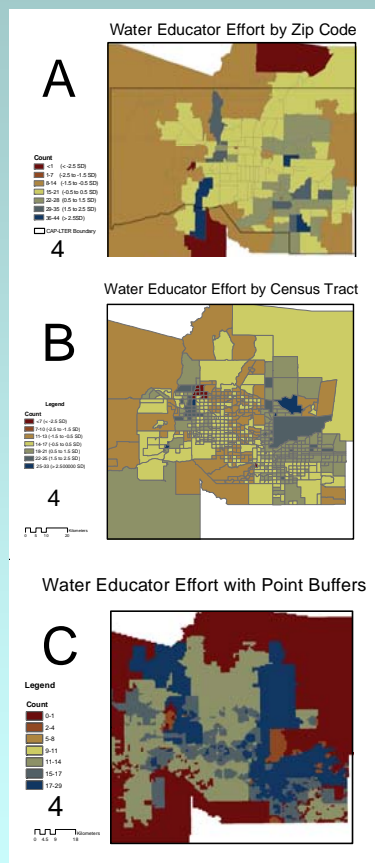
**Map A:** All spatially disperse programs are credited to relevant zip codes. Point information is aggregated to the zip code level.

**Map B:** All spatially disperse programs are credited to the relevant census tracts. Point information is aggregated to the census tract level.

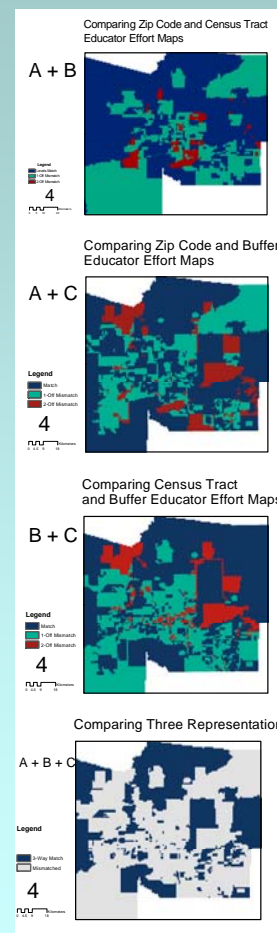
**Map C.** All spatially disperse programs are credited to the city unless a smaller area of geographic distribution can be delineated from interview information. Point information is buffered with a buffer radius equal to one half the average distance to the nearest neighbor.

- Calculate Moran's I and Local Moran's I statistics for each map.
- Based on the program count for each geographic unit, assign areas ranking of "High", "Average", or "Low" education effort levels using quantile breaks.
- Use raster calculator to determine areas with stable effort ranking across maps.

## 3. Results



|                                      | Zip Code           | Census Tract       | Point Buffer       |
|--------------------------------------|--------------------|--------------------|--------------------|
| Moran's I                            | 0.0583             | 0.1249             | 0.0845             |
| Z-Score                              | 6.5930             | 53.1400            | 42.7003            |
| Significant Positive Autocorrelation | Highly Significant | Highly Significant | Highly Significant |



## 4. Discussion

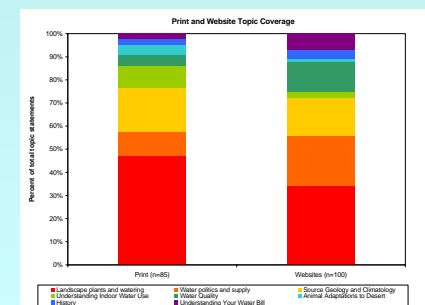
- The general pattern of education effort distribution holds across all three representations.
- Reject the  $H_0$  that programs distribution is spatially random.**
- Using city boundaries and point buffers is less dependent on population density than zip codes or census tracts. This explains why there are more differences between this map and the others.
- Future Work will:

Consider other properties of effort distribution.

- The benefit of a course on xeriscape is very different than that of a bill insert or newspaper story. Expense information that accounts for volunteer and real hours of labor and production costs may be useful for determining program effort intensity.
- The type of information provided across various "high" education zones may vary in its provider, content, and format diversity.

Examine differences in distribution variables mentioned above to determine whether or not there are systematic differences in audience service created by the interaction of educators.

- Use maps to choose areas suitable for participation in a survey of public preferences and awareness of water education. This will help determine if there are barriers to information accessibility are geographically based, and/or due to topic and medium



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