Investigating water scarcity and governance across social-ecological systems (WaterSES): a program on ecosystem change and society (PECS) perspective

Cristina Quintas-Soriano*, Antonio J. Castro, Jodi Brandt, Dainee Gibson, Jenna Narducci, Marina García-Llorente, Morey Burham, Katrina Running, Berta Martín-López, Caryn C. Vaughn, Colden Baxter, Felix Haifeng Liao, Carla Atkinson, Jason Julian, Benis Egoh & Albert Norström

*Idaho State University
e-mail: quincris@isu.edu

http://pecswaterses.com

Overview

WaterSES: Water scarcity and governance across **S**ocial-**E**cological **S**ystems

WaterSES is an endorsed project within the Program on Ecosystem Change and Society (PECS). PECS promotes transdisciplinary, placed-based comparative research to identify appropriate operational scales for SES stewardship and management, and determine when drivers of global change are fast or slow, direct or indirect.

The PECS-WaterSES compares the social-ecological dynamics causing and caused by water scarcity and governance across international research sites with conflicting local and regional water needs and governance, including arid southern Spain, the south-central Great Plains of Oklahoma (US), and the Portneuf and Treasure Valleys, Idaho (US). **WaterSES** sites have different climates, water needs and socio-ecological dynamics, but are all experiencing new regional, societal demands for limited water resources. The goal of this working group is to propose sustainable water use and governance solutions.

Case studies

SEMI-ARID WATERSHEDS IN SE SPAIN

Spanish drylands are located on the SE of Iberian Peninsula, which is considered the most arid region of continental Europe. This is a unique region where conservation and human development have coexisted and coevolved over many decades. However, conflicts between economic development and conservation have generated increasing concern due to the rapid expansion of greenhouse horticulture and the abandonment of rural and mountainous areas.

PORTNEUF VALLEY IN SE IDAHO

Pocatello is a mid-sized city poised to expand along the length of the Portneuf River. Urban expansion upstream and into the foothills is replacing traditional farming and grazing. Moreover flood control of Portneuf river via levees and concrete channel along the city was promoted, reducing water quality and recreational use. And significant nitrate pollution, derived by land management decision, highlight the need to a Comprehensive Plan to emphasize healthy lifestyles, business growth, and outdoor recreation.

KIAMICHI RIVER IN SE OKLAHOMA

Located in southeastern Oklahoma, the Kiamichi river is a major tributary to the Red River. Water availability from the 2 main reservoirs is predicted to decrease over the next 25 years because of increased drought and increased water demand from an increasing human population. Current and planned inter-basin water transfers will extract hundreds of thousands of acre-feet of freshwater per year out of southeastern Oklahoma, with 220,000 acre-feet/year going to Oklahoma City alone by 2050.

TREASURE VALLEY IN SW IDAHO

Located in southwestern Idaho, the Treasure Valley falls within the Snake River Plain, and is home to Boise, the state capital and largest city in Idaho. The Boise metropolitan area is the 11th fastest growing region in the country with a 120% population increase between 1990 and 2015. Urban expansion occurs primarily in agricultural areas and it is projected to continue growing due to the low cost of living, high job growth rates and quality of life.

Next Goals & Steps

- Synthesize the data that has been collected across the three PECS-WaterSES research sites, and identify the novel and pressing SES science questions.
  - Develop new SES science research questions that can be answered using additional data that could be collected across the sites in the next year.
    - Identify potential new research sites for PECS-WaterSES, such as China, South Africa, Madrid in Spain or Texas in US.
- Target cross-institutional funding opportunities at the national and international level to continue the data collection process, as well as other venues to support future synthesis workshops

Next WaterSES meeting: II PECS-WaterSES Workshop in Oaxaca (Mexico) at the PECS 2017 Conference