

In Partial Fulfillment of the Requirements for the Degree of

Doctor of Philosophy
Lauren Withycombe Keeler

Will defend her dissertation

**Quenching our Thirst for Future Knowledge:
Participatory Scenario Construction and Sustainable Water
Governance in a Desert City**

Abstract

Transformational sustainability science demands that stakeholders and researchers consider the needs and values of future generations in pursuit of solutions to sustainability problems. In considering the future, scenarios are commonly used to explore plausible future developments and manage or reduce uncertainty with an eye toward informing transition efforts. There is a need to refine scenarios to enhance their relevance and utility for solving problems and informing sustainability transitions. This requires that plausible and normative scenarios be constructed in transdisciplinary settings that engage with affected stakeholders and those responsible for carrying out transition activities. This dissertation aims to refine scenario methodology to generate scenarios that: (i) feature enhanced stakeholder participation; (ii) incorporate normative values and preferences; (iii) focus on governance actors and their activities; and (iv) meet an expanded set of quality criteria. These refinements are applied in a case study of water governance in metropolitan Phoenix, Arizona. The first study in the dissertation analyzes and evaluates participatory climate change scenarios to provide recommendations for the construction and use of scenarios that advance climate adaptation and mitigation efforts. The second study proposes and tests a set of plausibility indications to substantiate or evaluate claims that scenarios and future projections could become reality, helping to establish the legitimacy of radically different or transformative scenarios among an extended peer community. The case study of water governance begins with the third study, which includes a current state analysis and sustainability appraisal of the Phoenix-area water system. This is followed by a fourth study which surveys Phoenix-area water decision-makers to better understand water-related preferences for use in scenario construction. The fifth and final study applies a multi-method approach to construct future scenarios of

water governance in metropolitan Phoenix in 2030 using stakeholder preferences, among other normative frames, and testing systemic impacts with WaterSim, a dynamic simulation model of water in the region. The scenarios themselves act as boundary objects around which stakeholders can weigh tradeoffs, set priorities and reflect on impacts of water-related activities, broadening policy dialogues around water governance in central Arizona. Together the five studies in this dissertation advance transformational sustainability research by refining methods to engage stakeholders in crafting futures that define how individuals and institutions should operate in transformed and sustainable systems.

Friday, April 11th, 2014
9:00 AM

Decision Center for a Desert City, Orchid House at the Brickyard
Suite 126b, Room 175

Faculty, students, and the general public are invited.

Supervisory Committee:
Dr. Arnim Wiek, Chair
Dr. Dave White, Member
Dr. Daniel Lang, Member