Panarchy: Applying the Framework to a Prehistoric Socio-Ecological Case
Destiny Crider, Cathyn Meegan, Steve Swanson
Department of Anthropology, Arizona State University

**ABSTRACT**
Panarchy is a new theoretical framework for investigating the interrelationships of coupled social and ecological systems. Among those ecology, Panarchy promotes the understanding of complex socio-natural interactions. In this paper, we examine the utility of Panarchy for understanding the drastic changes in Hohokam society from the Preclassic to Classic Period (AD 500-1500) in the Phoenix Basin. During the Preclassic, Hohokam socioecological interaction was expressed in a Ballard system that extended for hundreds of kilometers across Arizona, and functioned to redistribute variable natural resources. In the Classic Period, the Ballard system was abandoned, economic interaction and territorial extent contracted, and new hierarchically organized communities developed across the Basin. Panarchy helps us relate these social changes to variable ecological and climatic conditions.

**AXES ON THE ADAPTIVE CYCLE**
- Potential: the amount of accumulated energy, material, knowledge. Biophysical systems, this adaptive ability is whether in terms of social processes, technology, capacity for investment in infrastructure.
- Constraints: degree of interdependence between variables. Socially, the biophysical system is anything that limits the ability to accumulate potential.
- Release: release of stored energy/materials to more available form. Socially, economic collapse or crisis, release of capital.
- Reorganization: restructuring/reorganization of released energy/materials. Socially, entrepreneurial experimentation with new strategies.

**PHASES IN THE ADAPTIVE CYCLE**
- Release (1): release of stored energy/materials to more available form. Socially, economic collapse or crisis, release of capital.
- Decision-making at varying social scales:
  - What are the long-term impacts of increased subsistence on social organization?
  - What are the short-term impacts of increased subsistence on social organization?

**CROSS-SCALE LINKAGES: CLIMATE VARIABILITY AND BALLIWORDS**
In Panarchy theory, linkages across scales can be as important as the operation of cycles at a given scale. The operation of the Hohokam Ballard system provides an example of the importance of multiple-scale participation. At any of the proposed social scales, participation or non-participation can have cascading effect (i.e., changing the Ballard system at any other scale).

**CONCLUSIONS: PANARCHY AND THE HOHOKAM TRANSFORMATION**
The Panarchy framework is useful for linking ecological change to social processes. While archaeologists have proposed climatic changes at different scales to explain the transformation of the Hohokam during the 12th century A.D., there is little research into the mechanisms that link these changes to observed scales of decision-making. Panarchy facilitates the investigation of these mechanisms, without lending priority to single external "drivers" of change at any particular scale of interaction. By stressing the importance of interactions within and across social and natural scales, Panarchy helps explain cascading effect from lower to higher scales, or a top-down effect from higher scales.

Changes in Hohokam society occurred in several domains: economic, social, political, and ideological. These changes were the result of decisions made at a variety of social scales and in a variety of contexts: at larger community as well as smaller, household scales. Thus, we suspect that cascading effects may be important to understanding the transformation of Hohokam society by the end of the Preclassic Period. Our intention in this poster is to illustrate the application of Panarchy to a complex socio-natural system. Ongoing research by faculty and students at ASU focuses on developing mechanisms and linkages to explain the Hohokam transformation, as well as further refinement of the Panarchy framework for the investigation of prehistoric cultural change.