School of Sustainability
Arizona State University

In partial fulfillment of the requirements for the degree of

Doctor of Philosophy
Wenjuan Liu

will defend her prospectus

Multi-scale interdependencies of Li-mining expansion and its impacts on local socio-ecological systems

Monday, April 20, 2020
3:00 pm
Zoom: https://asu.zoom.us/j/5243001377

Faculty, students, and the public are invited.

Supervisory Committee:
Dr. Datu Buyung Agusdinata, Chair
Dr. Hallie Eakin, Member
Dr. Hugo Romero, Member

Abstract

Global interests in low-carbon technologies and renewable energy have rapidly driven the production of Lithium (Li) mineral, one of the most important minerals used in rechargeable batteries, expanding at an escalating rate. However, studies related to the impacts of lithium extraction have never kept up with the growth of this industry. This dissertation proposes to detect the linkages between global green-tech policies and the social-ecological systems of Li extracted place, in order to understand telecoupled interactions of Li-mining and the way it affects human-nature dynamics at resource extracted place. Such telecoupled interactions are analyzed to disclose major components, feedback mechanisms, and complex relationships. The impacts of Li-mining on the local social-ecological systems are holistically assessed using a mixed method of spatial analysis, statistical analysis,

interviews, and Q-methodology. This assessment provides a comprehensive analysis of the local environmental health, sustainability of frontline communities, and their living experiences. An interactive agent-based model, modified from an existing model (FlowLogo), is developed to represent the dynamics of mining-community interactions under the global low-carbon trend. This model also tests the effect of the policy lever and technological improvement, potentially emerged from telecouplings, on the local mining-community dynamics. This dissertation explores and explains the existing debates and social tensions driven by the global low-carbon transitioning, and highlights the socio-ecological concerns alongside such transitioning.