

20.10 **Dynamic Impact Model and Information System to Support Unconventional Fuels Development**

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Unconventional fuel development has the potential to enhance energy security in the U.S.; however with the development of these resources come sets of challenges including the technical aspects of oil extraction, environmental impacts (*e.g.* water), and socio-economic challenges related to rapid growth and development. Each set of challenges has a broad range of temporal and spatial scales with their solutions being highly interdependent upon one another due to the interconnected properties of the entire system. Current practices tend to base decisions on methods that only address one system and ignore the inherent interdependencies between systems. This approach has limited ability in providing optimal management solutions across all challenge sets.

The primary objective of this effort is to provide a scalable modeling framework for integrated basin management to enable resources managers to design holistically the unconventional fuel industry in the Intermountain West. At the core of this goal is the development of a modeling and simulation tool to assess potential impacts of developing oil shale leases, model the interdependencies between natural and human systems and evaluate potential management options. The tool will integrate multiple existing modeling capabilities to produce a modeling tool tailored to this analysis as well as provide a virtual test environment for climate change scenarios that will allow a user to visualize spatially and interact in a time-based simulation.