

Introducing the Mountain West Water Institute

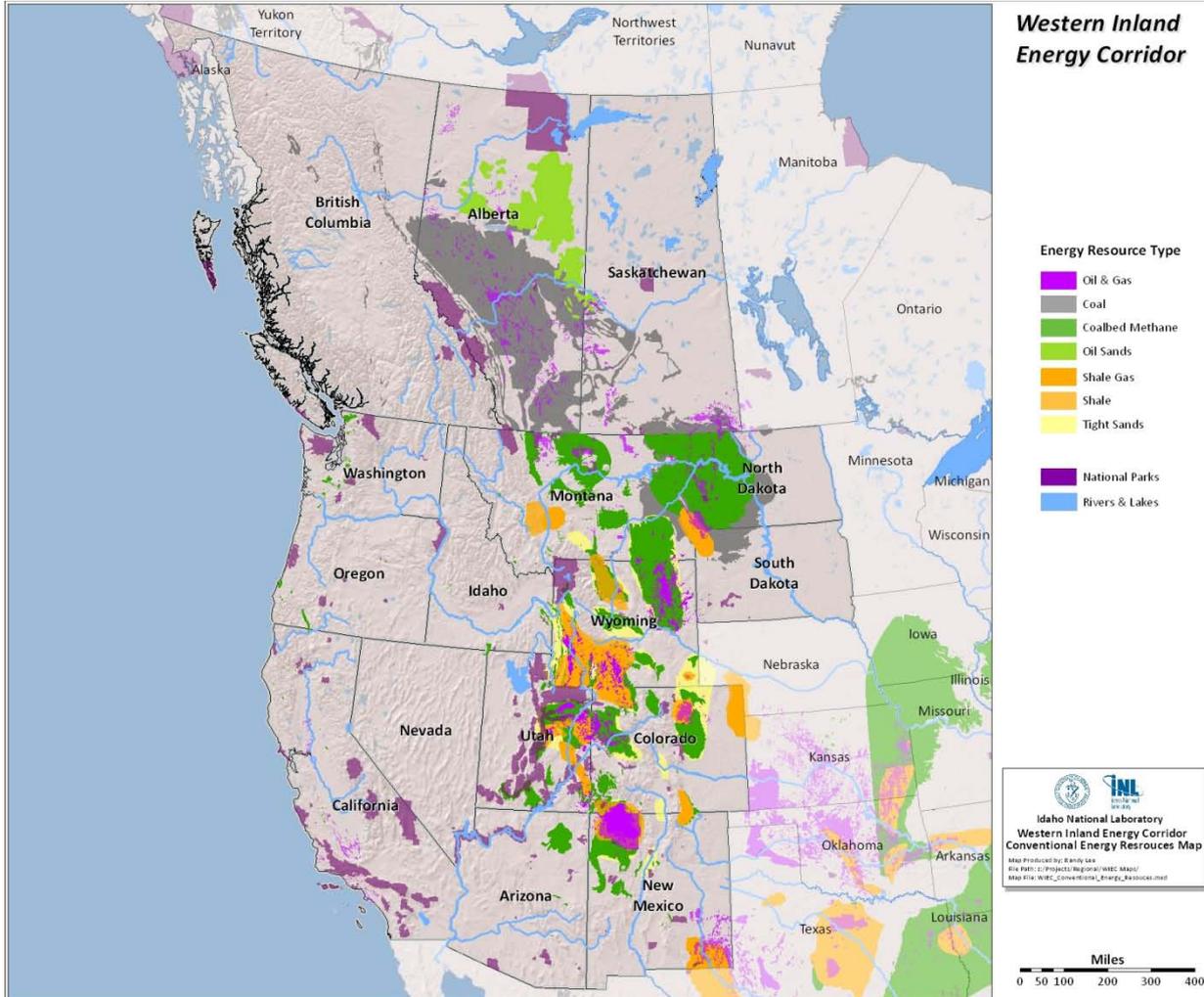
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Water in the Western Energy Corridor



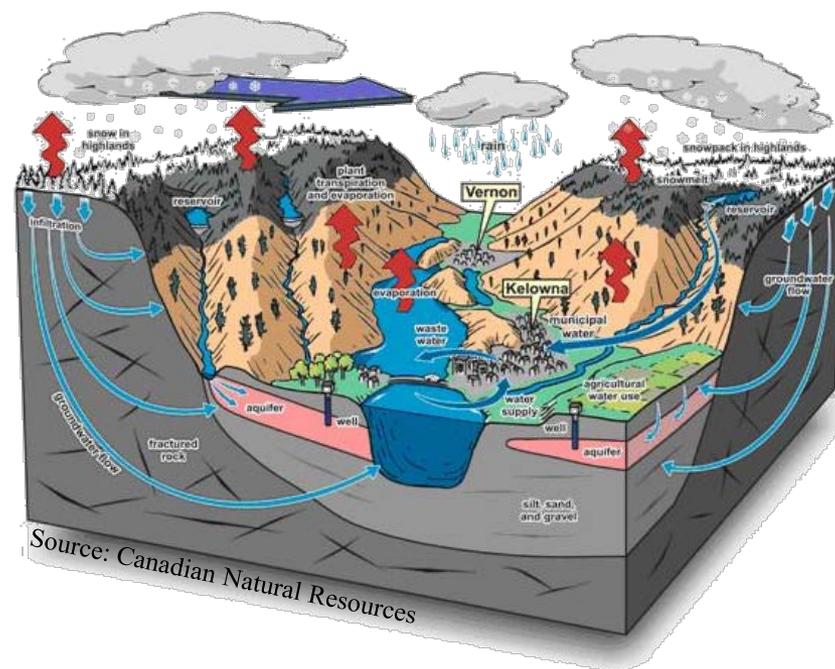
The headwaters of major western rivers and several environmentally sensitive national parks are located in the Western Energy Corridor

The Challenges

Competing interests face decreasing water availability due to population growth and large scale climate variability. Serious constraints on available water quantity and quality have implications for:

- Energy
- Agriculture
- Public health
- Ecosystem integrity
- Economic development
- Regional vulnerability of water & energy infrastructure

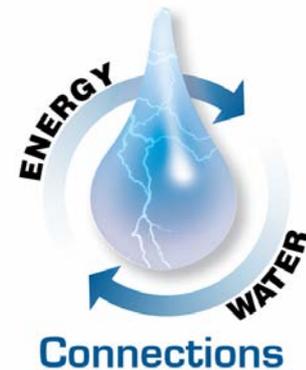
Advances in science and technology can play a major role in meeting these challenges.



What is the Mountain West Water Institute?

The Mountain West Water Institute (MWWI) is a regional science and technology research institution dedicated to delivering science-based solutions for sustainable water resource management in the Mountain West. MWWI will provide local, state, and federal entities with consistent science, technology, and information to do the following:

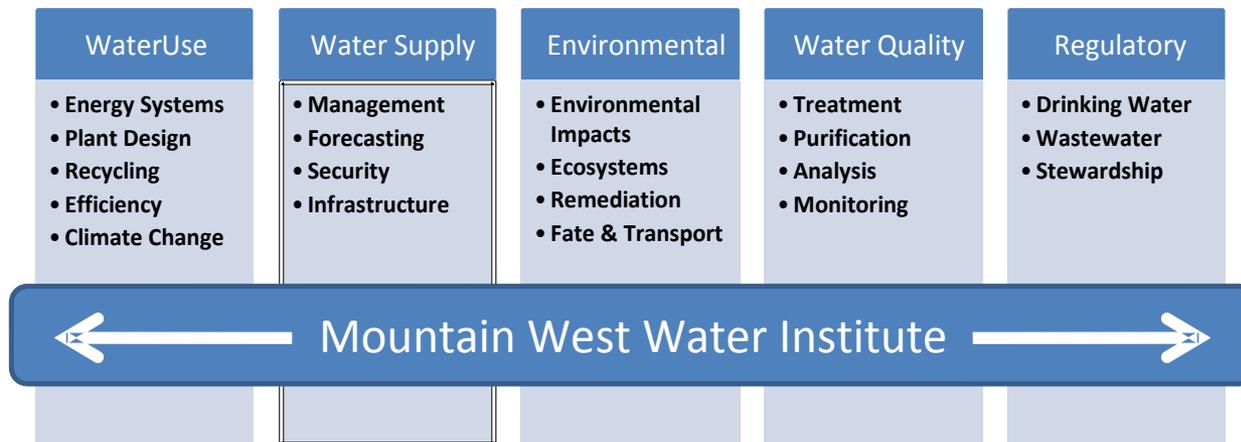
- Improve water and energy resource management
- Address water quality concerns
- Enable more accurate projections of water availability
- Increase water-use efficiency
- Understand climate impacts and strategies



MWWI Brings a Host of Capabilities and Tools

MWWI will make stakeholder and partner tools and capabilities available to address western water needs.

- Energy-Water Systems R&D
- Water Cleanup and Recycle Technology
- Water Security Technology
- Climate Effects Tools and Research
- Water Modeling Tools and Data



MWWI Research Areas – Water/Energy

Energy production accounts for a significant portion of all water consumed, ranking only behind agriculture.

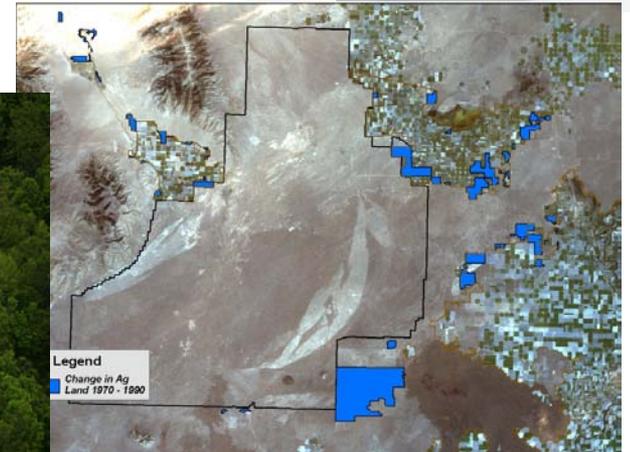
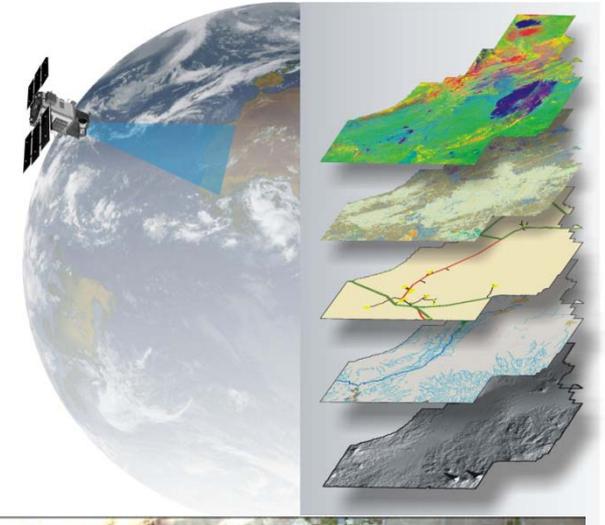
Energy resource development and power generation are significant regional issues.

Energy Sector Type	Average Water Consumption – Extraction & Processing (gal/MMBtu)
Natural gas and transportation	4
Coal	5
Coal with slurry piping	10
Uranium mining and enrichment	11
Oil Shale by in situ	Unknown
Oil Sand by in situ	13
Oil Shale by mining	25
Oil Sands by mining	30
Natural gas with gas to liquid	45
Oil (primary and secondary)	62
Oil (EOR)	65

MWWI Research Areas – Water/Energy 2

MWWI's efforts specifically seek to:

- Reduce demand for water in energy generation and resource development
- Minimize the impact of energy development and operations on water quality
- Improve energy technology to better work within the multiple constraints imposed on the region's water resources.



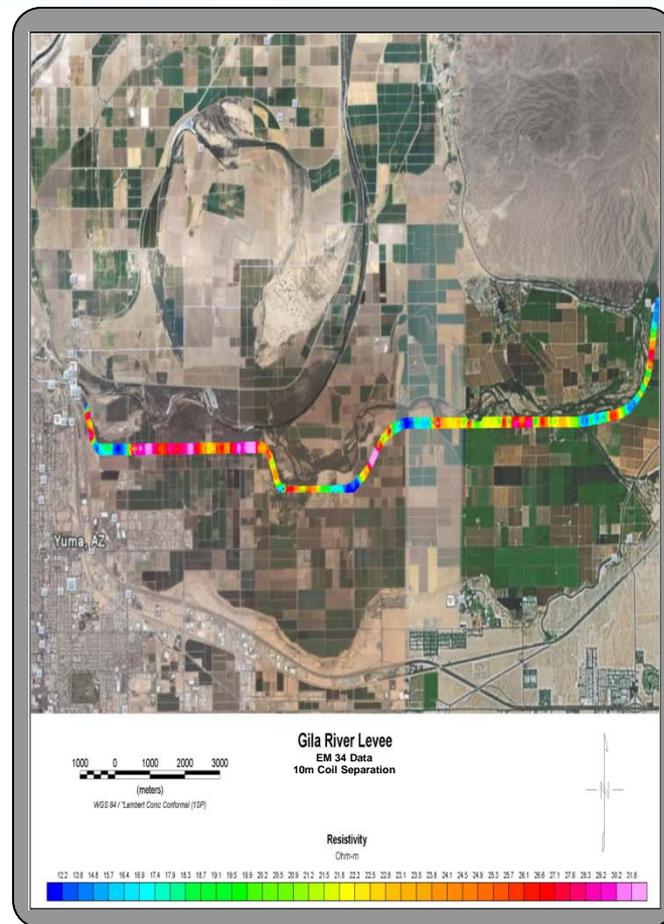
Water containers needed for a hydraulic fracturing operation.

MWWI Research Areas – Water Security

Concern for safety of the nation’s drinking water and infrastructure is driving new emphasis on biological sciences, systems and methods development, monitoring, detection, alarm design, and water treatment to improve the nation’s ability to optimize water quality and safety.

MWWI research has had these areas of emphasis:

- Detection of contaminants in drinking water
- Dam and levee health monitoring
- Water treatment technology



MWWI Research Areas – Water/Climate

In the US, some of the most pressing climate related water issues are:

- *Higher incidence of drought.* “[>] than 1,100 counties – one-third of all counties in the lower 48 – will face higher risks of water shortages by mid-century as a result of global warming.” (NRDC, *Climate Change, Water, and Risk*)
- *Deviation of water availability from historic baselines.* “Of all the potential threats posed by climatic variability and change, those associated with water resources are arguably the most consequential for both society and the environment.” (USGS, *Water – The Nation’s Fundamental Climate Issue*)
- *Negative impacts on U.S. land management agencies.* “[F]ederal land and water resources are vulnerable to a wide range of effects from climate change, some of which are already occurring.” (GAO, *Climate Change: ...*)

MWWI research will support effective solutions to water-resource issues related to climate change in the Mountain West:

- Subsurface water management
- Ecosystem services management
- Improved prediction of climate impacts
- Improved mitigation of water resource impacts

Summary

- **The Western U.S. faces a number of water related issues**
- **States, municipalities and federal agencies must work together to address these issues**
- **The Mountain West Water Institute provides a platform to encourage research collaboration.**

Thank You!