

# ***Mountain West Water Institute Overview***

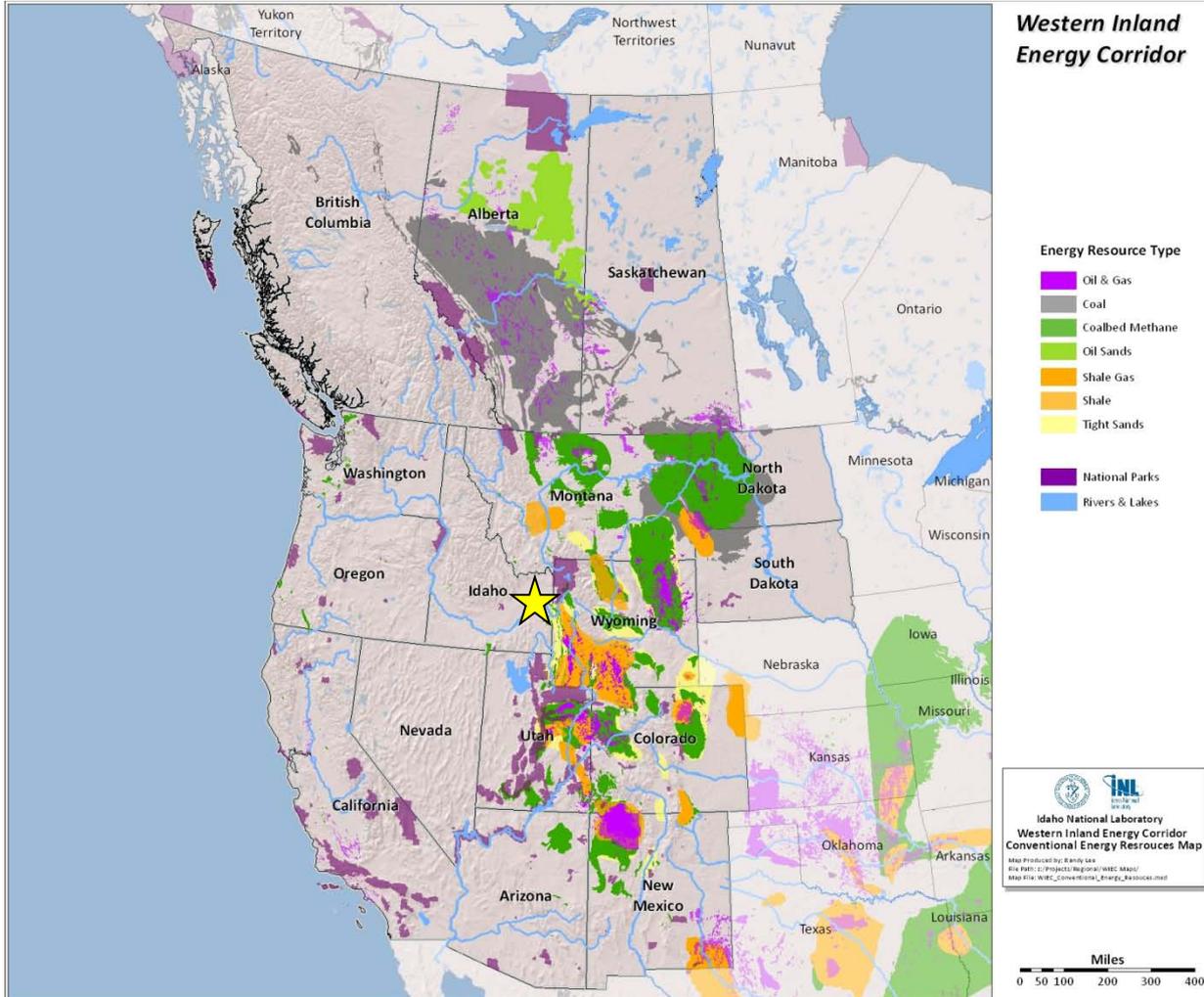
*Rich Rankin  
Mountain West Water Institute*

*May 15, 2012*

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# Water in the Western Energy Corridor



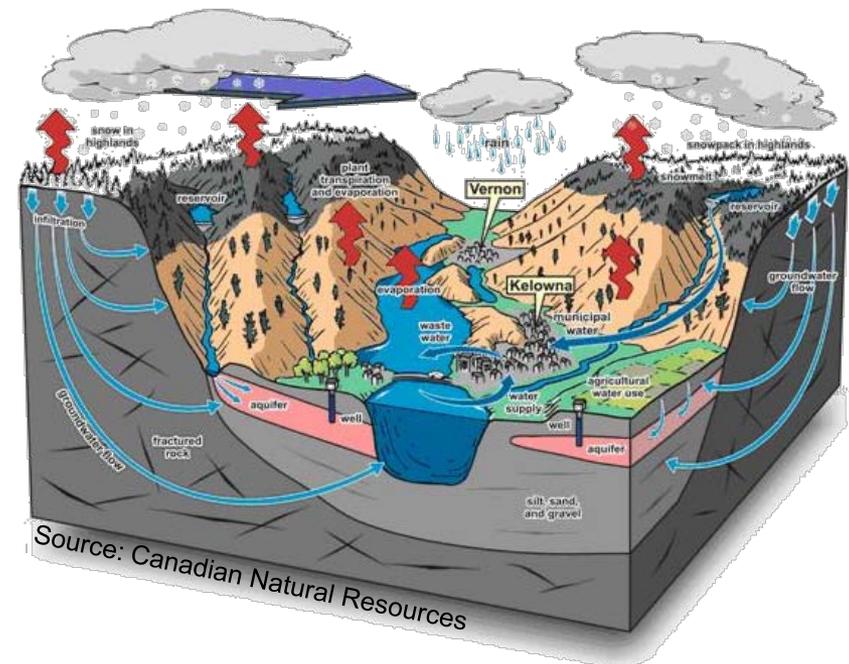
*The headwaters of major western rivers and several environmentally sensitive national parks are located in the Western Energy Corridor*

# 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

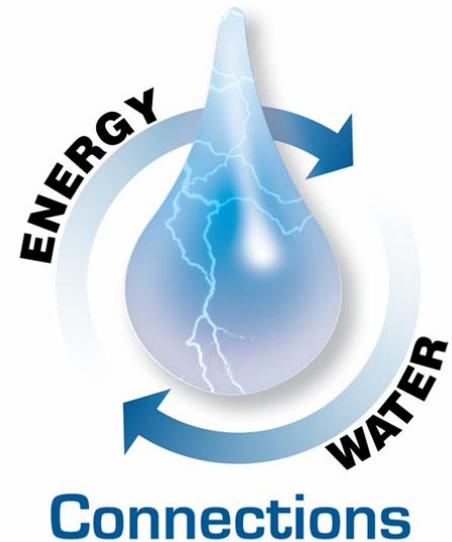
*Advances in science and technology can play a major role in meeting these challenges.*



## ***What is the Mountain West Water Institute?***

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

- Enhance Federal/State collaborative R&D
- 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



# Mountain West Water Institute

- MWWI was formally launched in July 2011
  - Board of Advisors formed
  - Initial projects selected
- INL has engaged regional and Federal collaborators for MWWI:
  - Regional/States (Idaho/IWRRRI, Montana/MWC, Oregon/IWW, Utah/UWRL, Washington/SWWRC, Wyoming/UWY, WSWC)
  - Federal (EPA, BLM, USGS, DOE, WestFAST)



Center for Advanced Energy Studies



# Partnerships

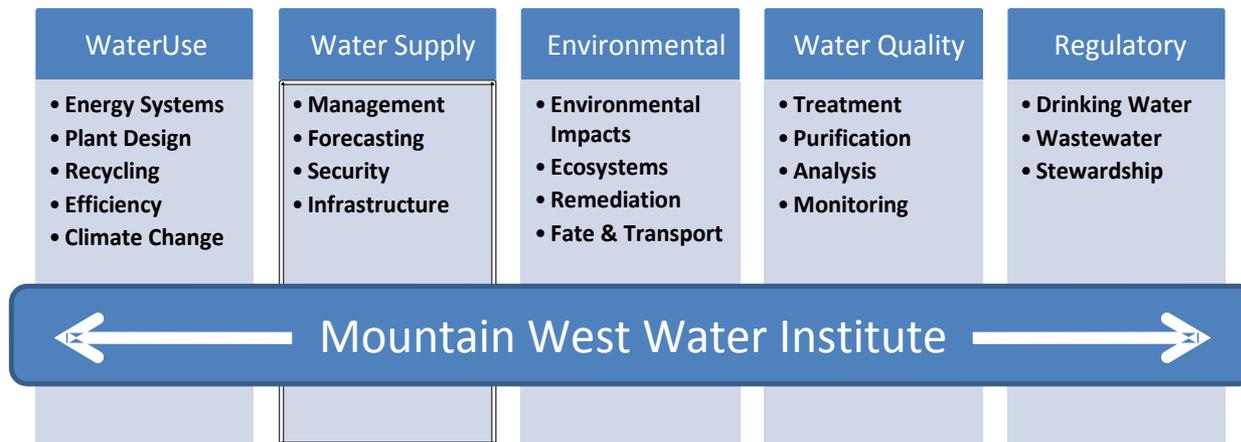
- Partnerships are critical!
- For example, INL already works with EPA
  - Ultra-filtration concentrator
  - Water security
  - Environmental technology
- EPA has agreed to partner in MWWI
  - MOU signed in June 2011
  - Research Plan
- Focal areas for initial research plan
  - National Safe and Sustainable Water Resources Program / ORD
  - Hydraulic fracturing
- Strong support for this collaboration
  - Deputy Assistant Administrator



# 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
  - Water Modeling Tools and Data
- ➔ Focus - Environmental Aspects of Energy Resource Recovery



## MWWI Research Areas – Water/Energy

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

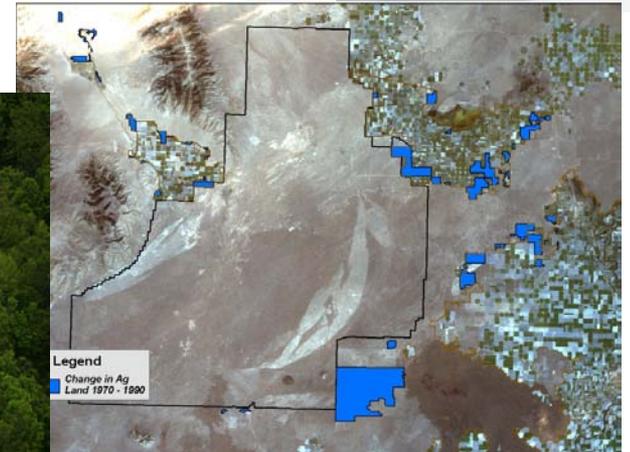
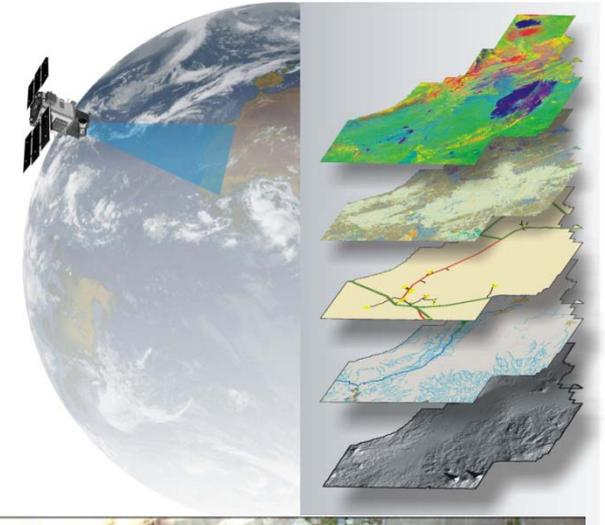
Energy resource development and power generation are significant regional issues.

Energy Sector Type	Average Water Consumption – Extraction & Processing (gal/MBtu)
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.



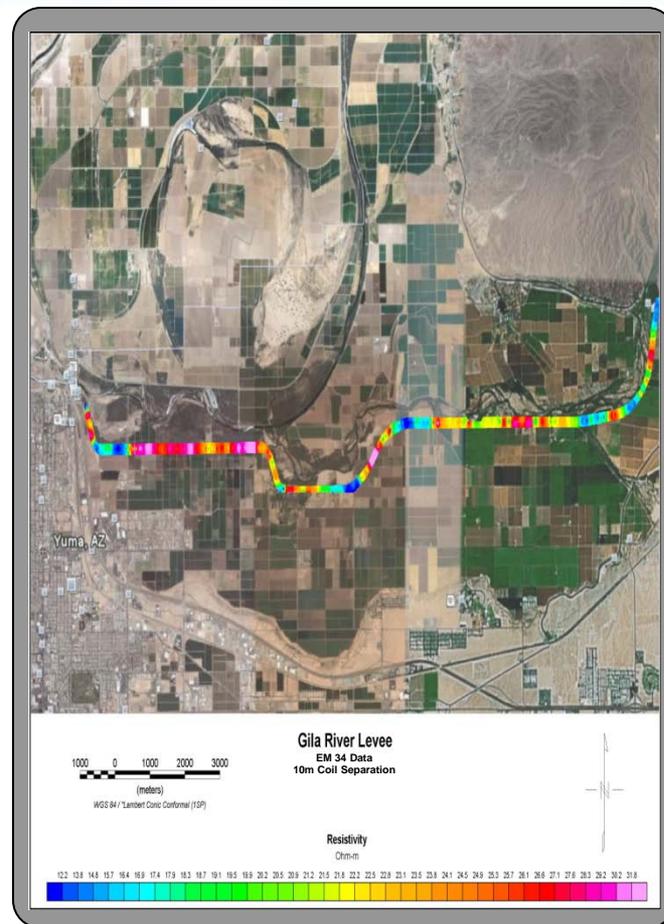
*Water containers needed for a hydraulic fracturing operation.*

# 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.

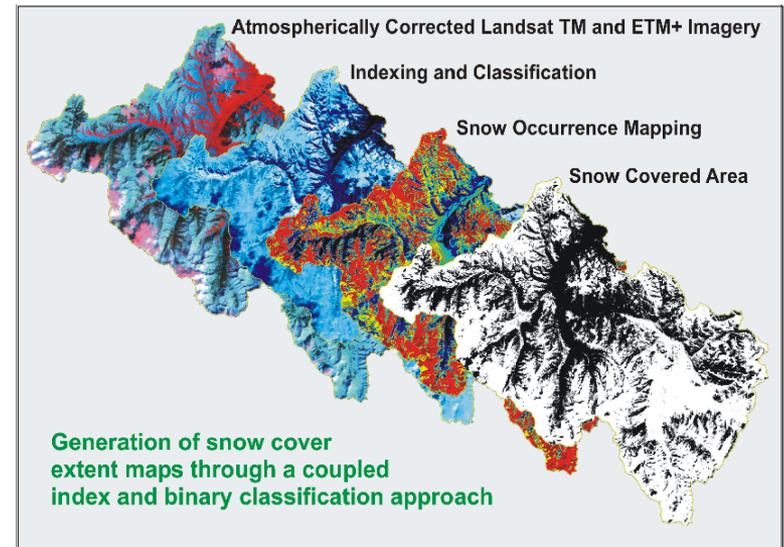
MWWI research has had these areas of emphasis:

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



# MWWI Collaborative Research Agenda

- **Water-Energy**
  - Water availability vs. production
  - Hydrofracing/Water Quality
  - Climate Change
- **Future Availability of Water**
  - Timing of precipitation/snow
  - Lack of storage/Drought
  - Robust predictive modeling tools
- **Water Use Efficiency**
  - Efficient Irrigation technologies
  - Sustainability/reuse
- **Water Treatment and Management**
  - Point-of-use water treatment
  - Purpose-designed water treatment
  - Desalination



## ***MWWI Research Portfolio***

- FY-2011/2012 LDRD Portfolio - MWWI Research Investment ~ \$1.5M
  - Advanced Remote Sensing Applications
  - Water and Energy System Interdependency Modeling
  - Hybrid Water Purification
  - CO<sub>2</sub> Behavior in Deep Reactive Formations (CAES)
  - Boise River Water Quality (IWRRI)
  - Elimination of Pharmaceutical Compounds from Municipal Wastewater Effluent (IWRRI)
  - Bakken Hydrofracturing Water Needs (MWC)
- Ph.D. Investments
  - Bobby Jeffers, WSU; John Koudelka, USU
- Faculty/Staff Exchanges/Joint Appointments
  - Idaho State University, Utah State University

## Summary

- The West faces a number of water issues
- States, municipalities and federal agencies must work together to address these issues
- MWWI has been recognized for a leadership role:
  - Selected by DOE-HQ for WestFAST seat
  - With State of Idaho – Hosted WSWC Fall meeting 2011
  - Involvement with Nat'l issues (sequestration, fracing/SAB)
  - Regional and national carbon sequestration leadership
- Significant potential for positive regional impact



Thank You!