Roundtable on Science and Technology for Sustainability

The National Academy of Sciences

December 5, 2013

Tony Willardson

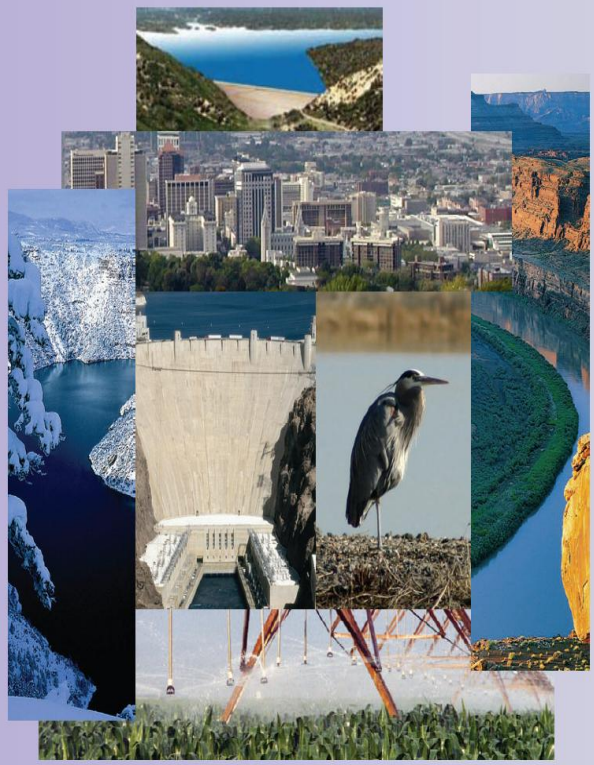
Executive Director

Western States Water Council


A REVIEW OF
INTER-REGIONAL AND INTERNATIONAL
WATER TRANSFER PROPOSALS


SMITH

Water Needs and Strategies for a Sustainable Future



Western Governors' Association ◊ June 2006

1. Growth and Water Policy
2. Meeting Future Water Demands
3. Water Infrastructure Needs and Strategies
4. Resolution of Indian Water Rights Claims
5. Climate Change Impacts
6. ESA & Protecting Aquatic Species

Water Needs and Strategies for a Sustainable Future

Western Governors' Association ◊ June 2006

Water Needs and Strategies for a Sustainable Future: *Next Steps*

Western Governors' Association ◊ June 2008

Western States Federal Agency Support Team

A Declaration of Cooperation

Working Together for the Sustainable and Efficient Use of Western Water Resources

We, as representatives of our respective Federal agencies, do hereby declare our intent to cooperate as members of a Western States Federal Agency Support Team (WESTFAST) partnership. We will work together whenever and wherever possible throughout the 17 Western States to promote and educate the public on the benefits of sustainable and efficient use of water resources.

We declare that WESTFAST supports a continued commitment on the part of Federal, and State organizations; working with local, Tribal, and other stakeholders; to improve the effectiveness of collaboration to seek watershed solutions to water issues in the Western States. This effort emphasizes proactive, voluntary, participatory and incentive-based approaches to water resource management and conservation assistance programs throughout the Western States.

We hereby declare that we as WESTFAST partners will collaborate with the Western States Water Council to guide the development of an appropriate action plan for this partnership.

We hereby declare to support, in concept, the establishment of a Federal liaison position to work with the WESTFAST members and the Western States Water Council in developing a collaborative work plan to carry forward joint water resource initiatives. Contributory cost-sharing such a position will be based on authorized and available funds.

- Assistant Secretary of the Army for Energy & Sustainability
- Army Corps of Engineers
- Bureau of Land Management
- Bureau of Reclamation
- Environmental Protection Agency
- National Aeronautics and Space Administration
- National Oceanic and Atmospheric Administration
- Natural Resources Conservation Service
- U.S. Fish & Wildlife Service
- U.S. Forest Service
- U.S. Geological Survey
- U.S. Department of Energy

Water Policy and Growth

Population growth is continuing at an unprecedented rate in the West with ramifications not only for cities but rural communities and agricultural areas.

Changing demographics and values placed on various water uses are transforming the future of water management.

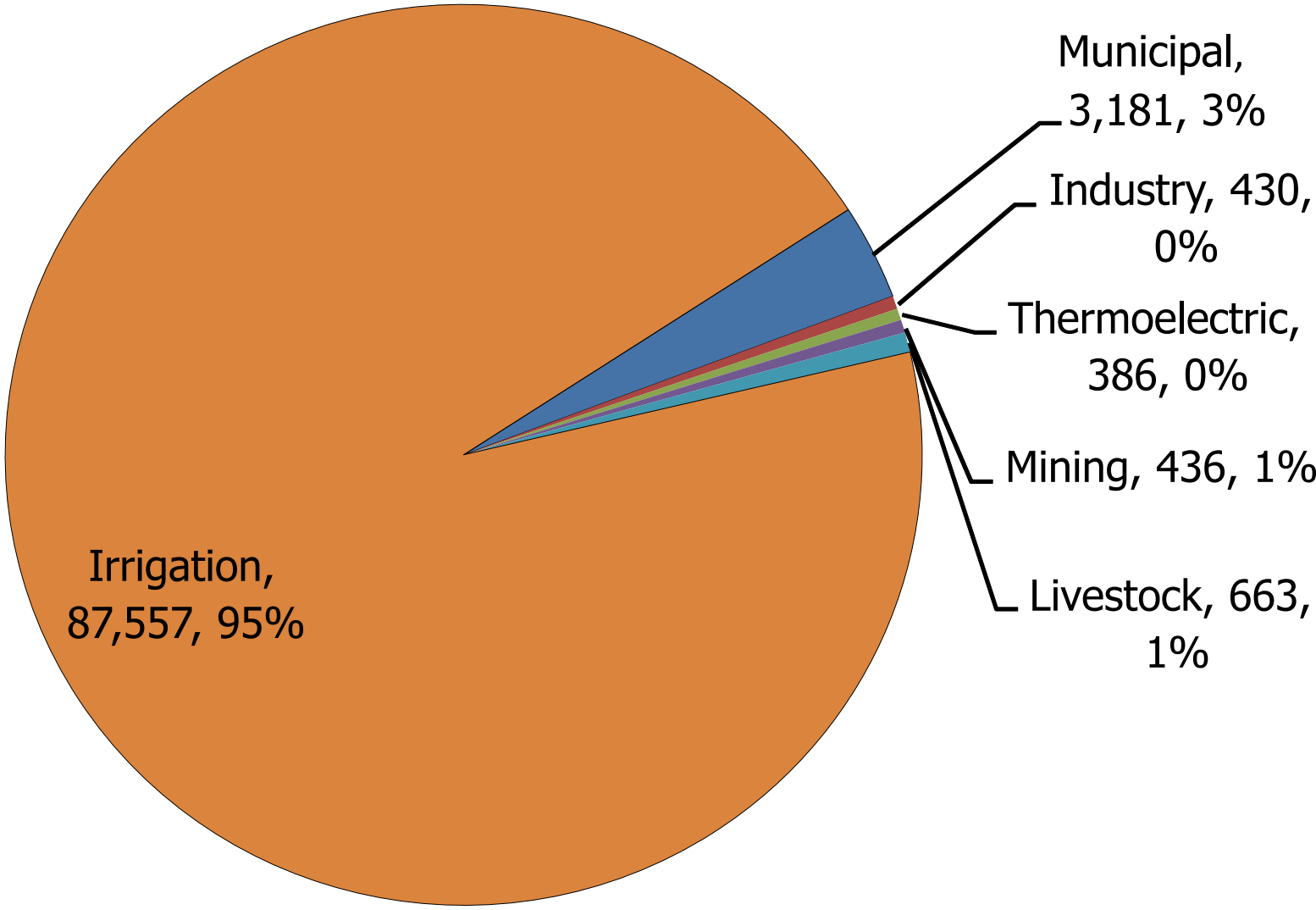
In the future, we may not be able to sustain unlimited growth and still maintain our current quality of life. Difficult political choices will be necessary….

Decisions about where and how to grow are rarely influenced by water policy or by the availability of water

Water moving from agricultural to urban uses.

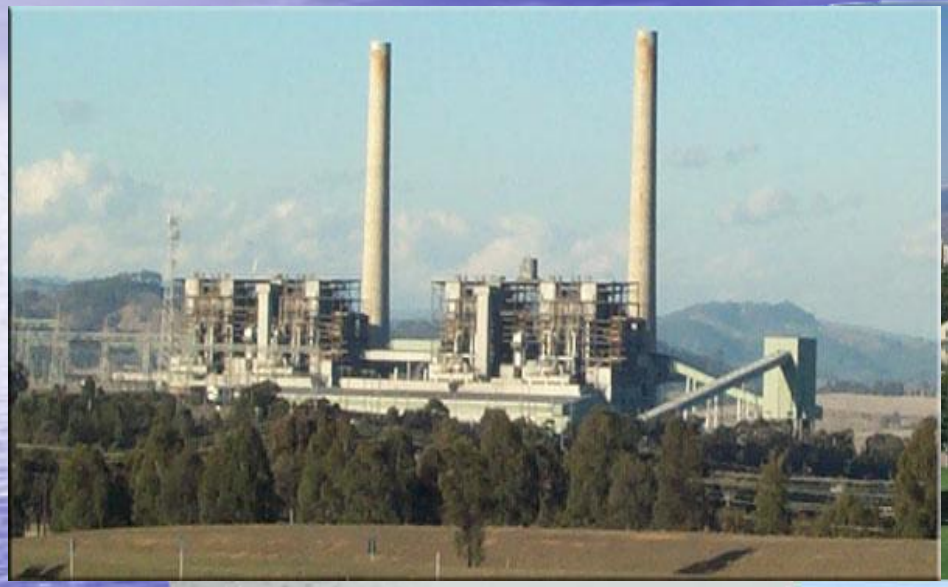
We need to integrate water resources and land use planning and energy planning.

2010 Water Consumption (MGD)



Competing Uses for Limited Supply

Energy



Municipal and Industrial

Instream Flows for Recreation and for The Environment

Agriculture

Many effective programs are underway to measure aspects of our water resources. However, simply stated, quantitative knowledge of U.S. water supply is currently inadequate.

A Strategy for Federal Science and Technology to Support Water Availability and Quality in the United States
September 2007

A robust process for measuring the quantity and quality of the Nation's water resources requires a systems approach.

Surface water, groundwater, rainfall, and snow-pack all represent quantities of water to be assessed and managed – from the perspectives of quantity, quality, timing, and location.


NASA/USGS
NOAA
NWS
NRCS
NOAA
NOAA
USGS
USGS
NWS
NOAA

National Science and Technology Council Subcommittee on Water Availability and Quality (SWAQ)

The United States:

- should accurately assess the quantity and quality of its water resources;
- should accurately measure how water is used;
- should know how water supply and use change over time;
- should measure water resources more strategically and efficiently.

Priority Water Information Needs

- Gather and disseminate real-time data
- Increase support and funding for data
- Identify data gaps and ways to close gaps
- Foster remote sensing capabilities
- Reduce costs through technological innovation

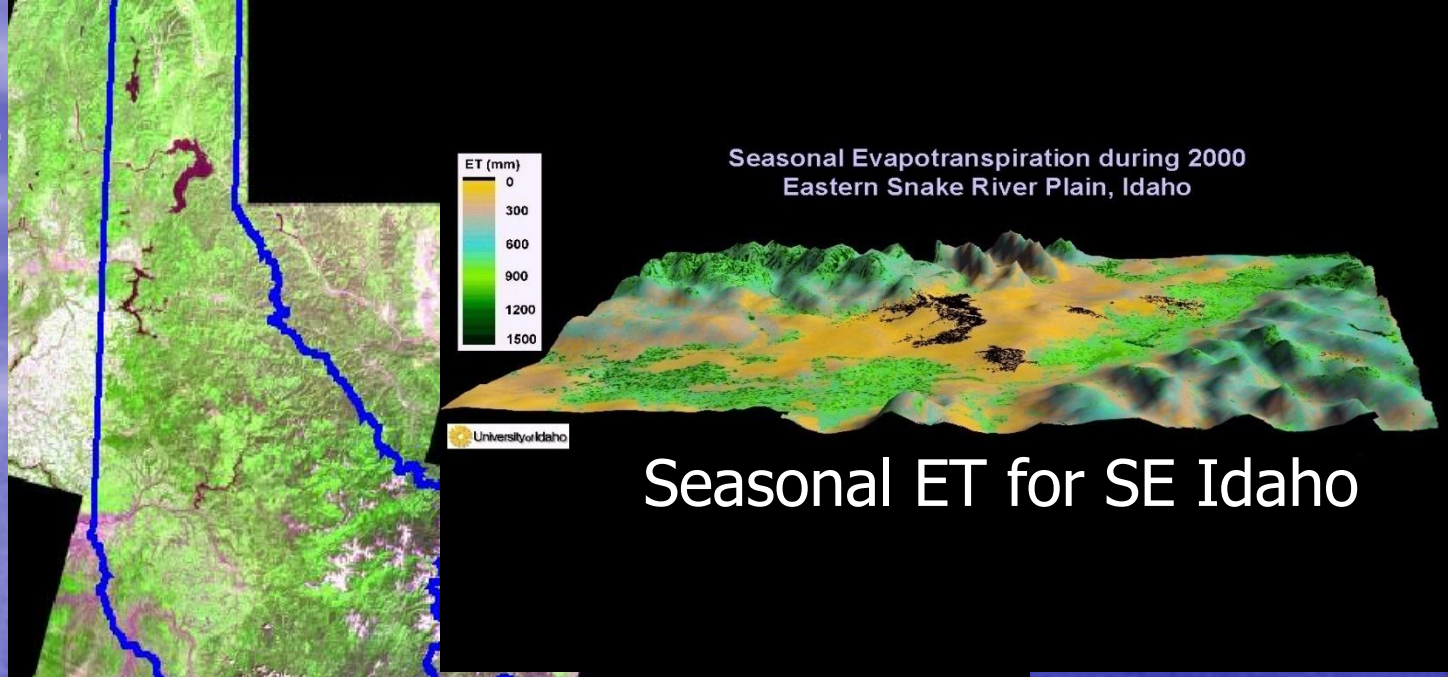

GSFC • KSC
DCM
LANDSAT
Data Continuity Mission
NASA • USGS


USGS

USGS/NASA Landsat Program

- National Land Imaging Program (NLIP)
- Vegetative Cover and other Products
- Thermal infrared imagery
- Evapotranspiration and Energy Exchange
- Translated into Consumptive Water Use
- Used for Administering Western Water Law
- Critical for Evaluating Water Transfers

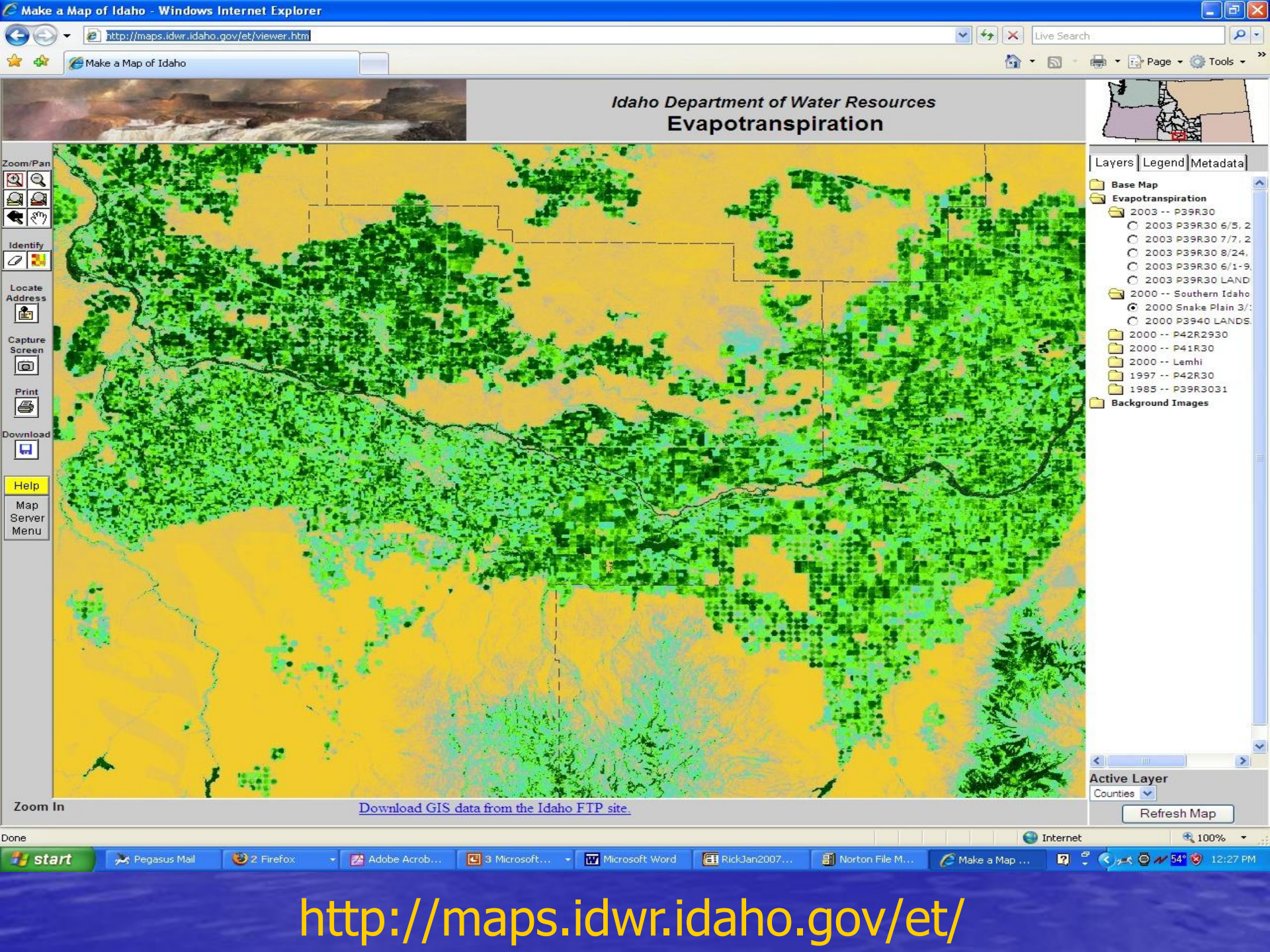
Vegetation, Water and ET are variable in space and time



Seasonal ET for SE Idaho

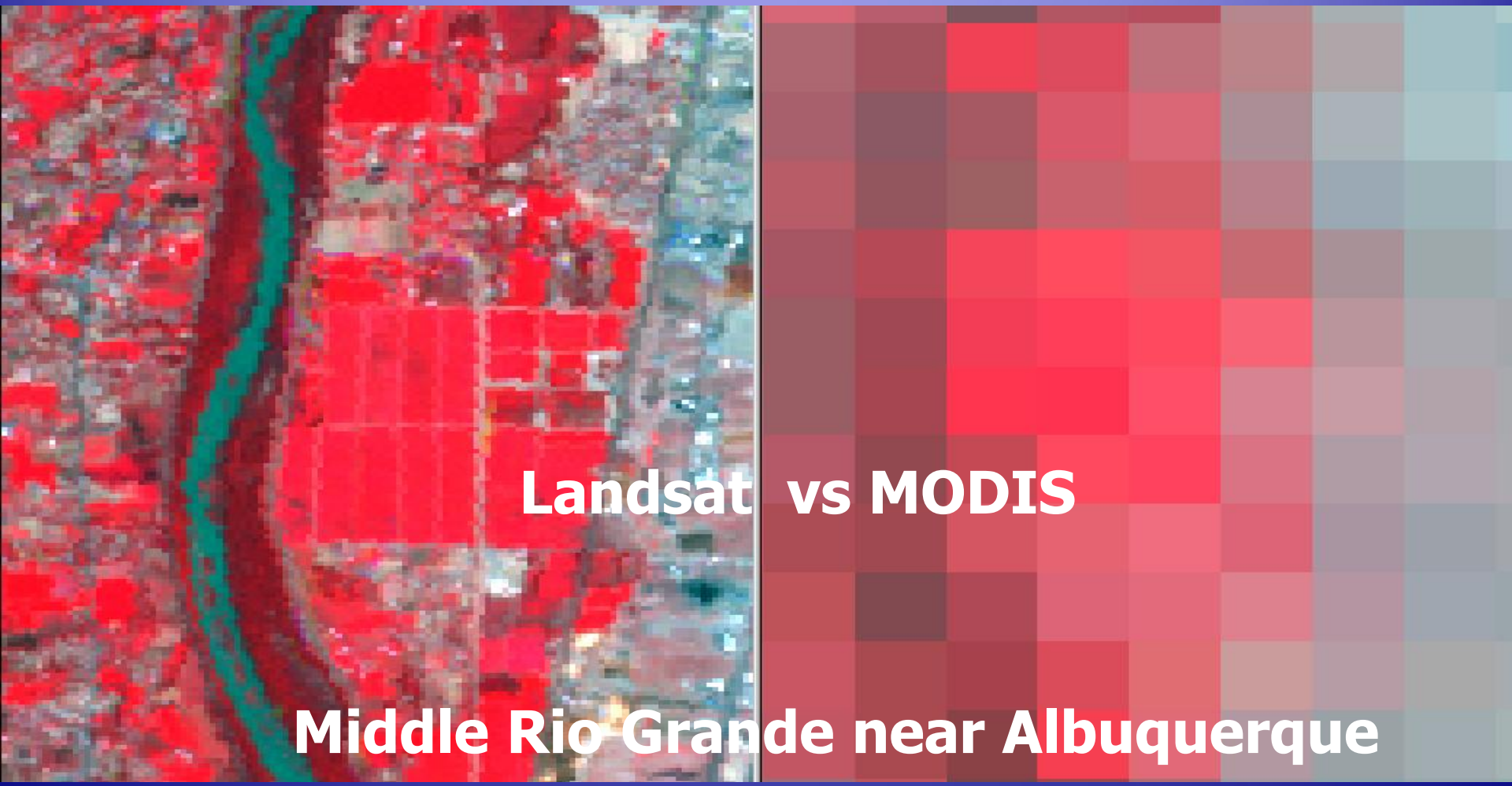
Idaho from Landsat

Major Irrigated areas in Idaho and areas of METRIC application



http://maps.idwr.idaho.gov/et/

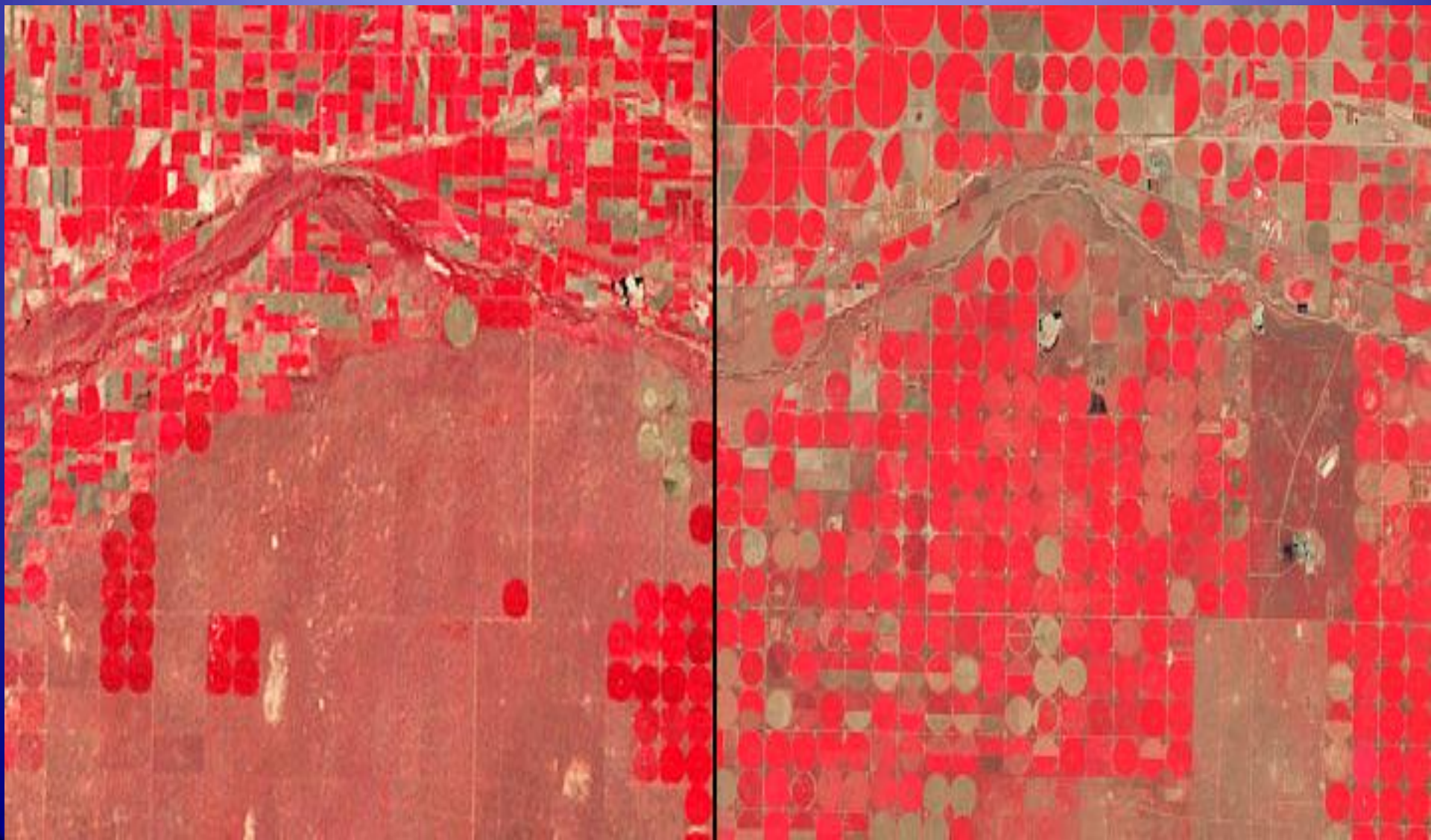
Why use High Resolution Imagery?



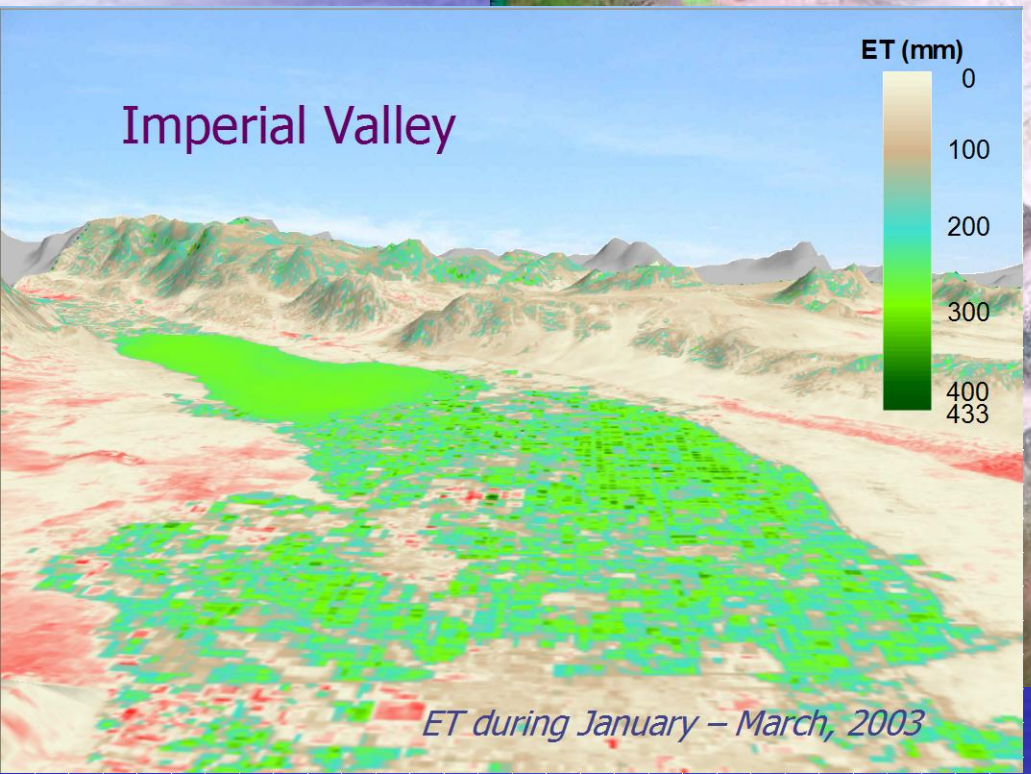
Landsat False Color
8/26/2002 10:33am

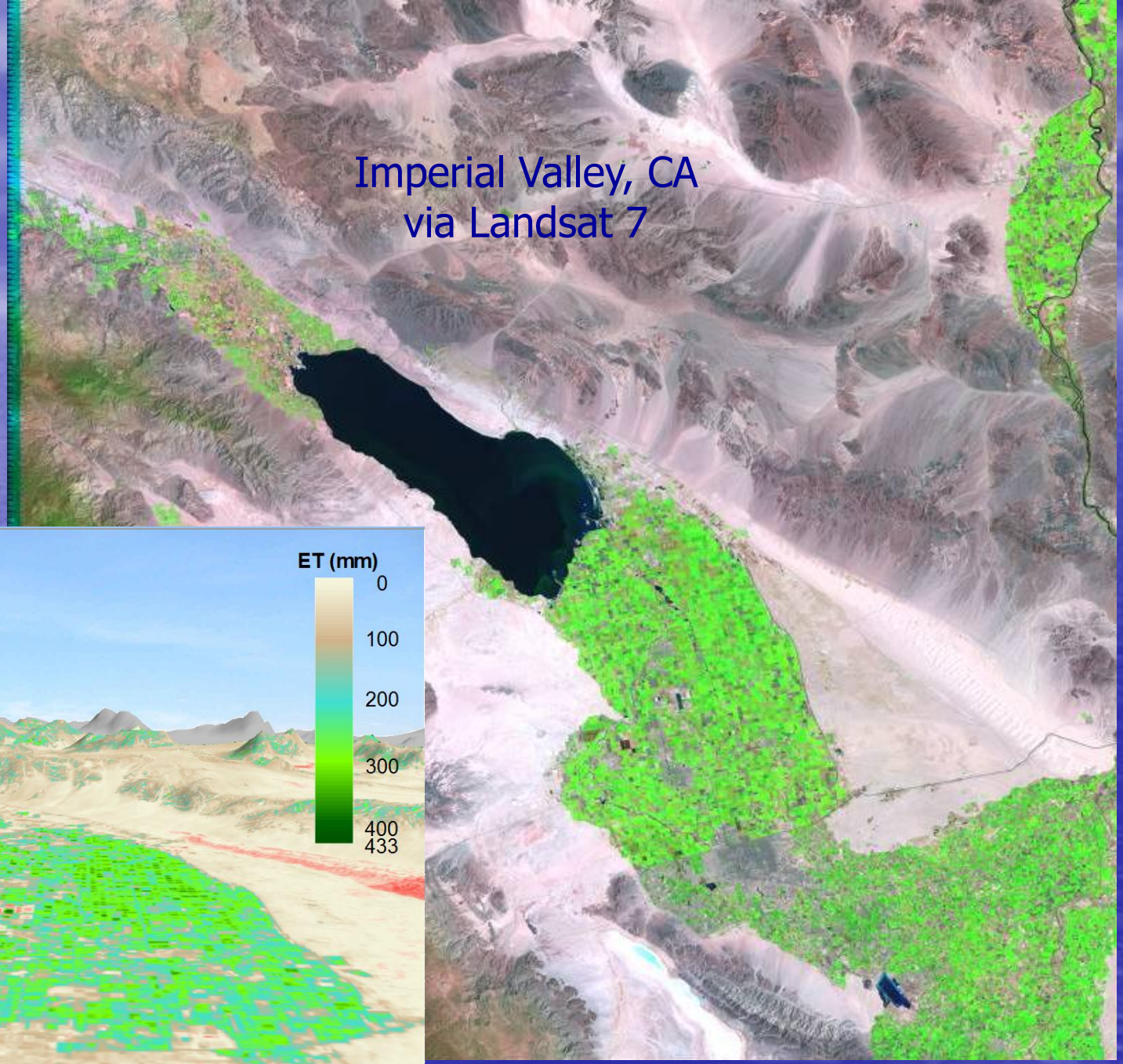
MODIS False Color
8/26/2002 11:02am

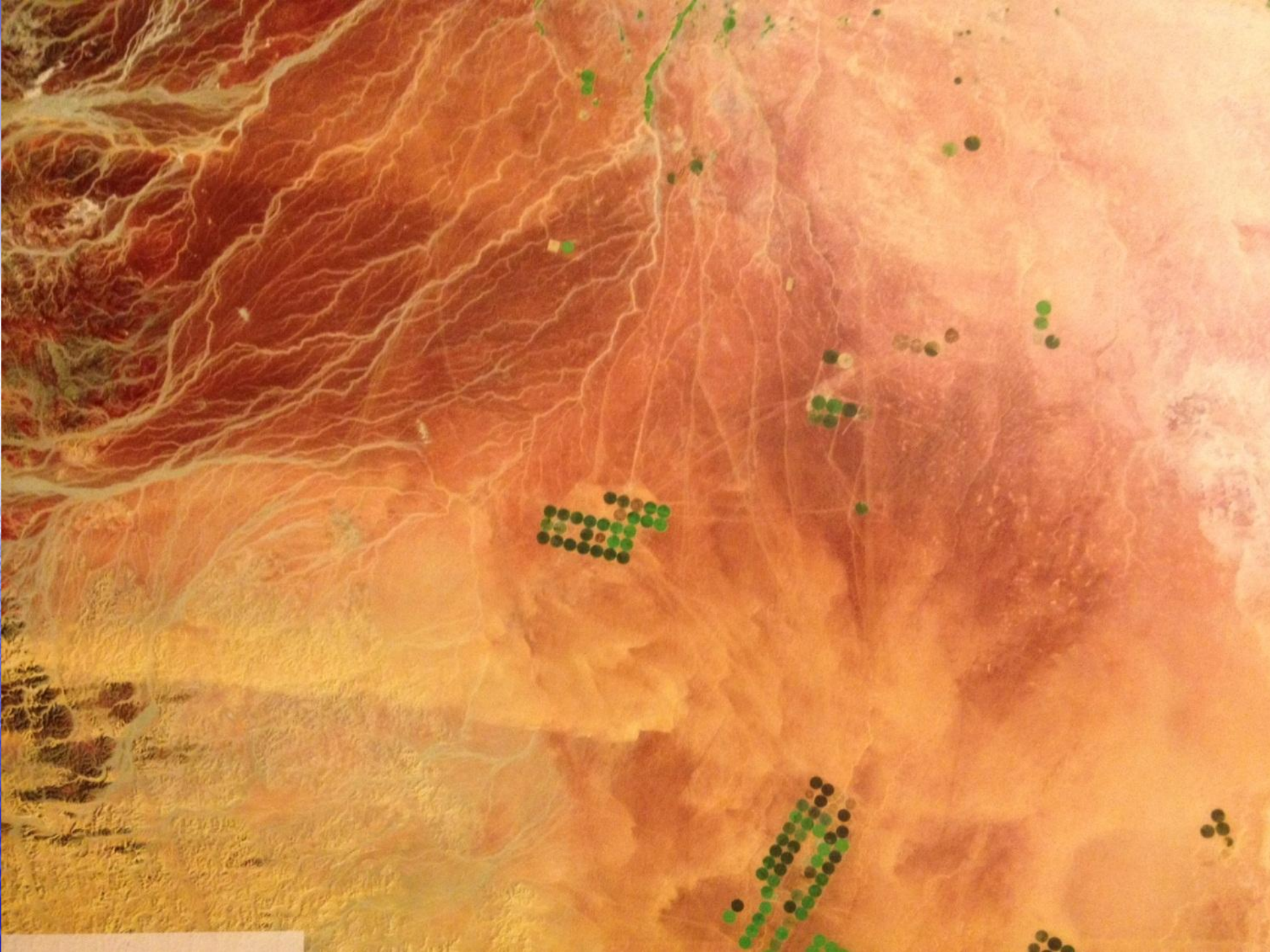
Nebraska Sandhills 1972 and 2011



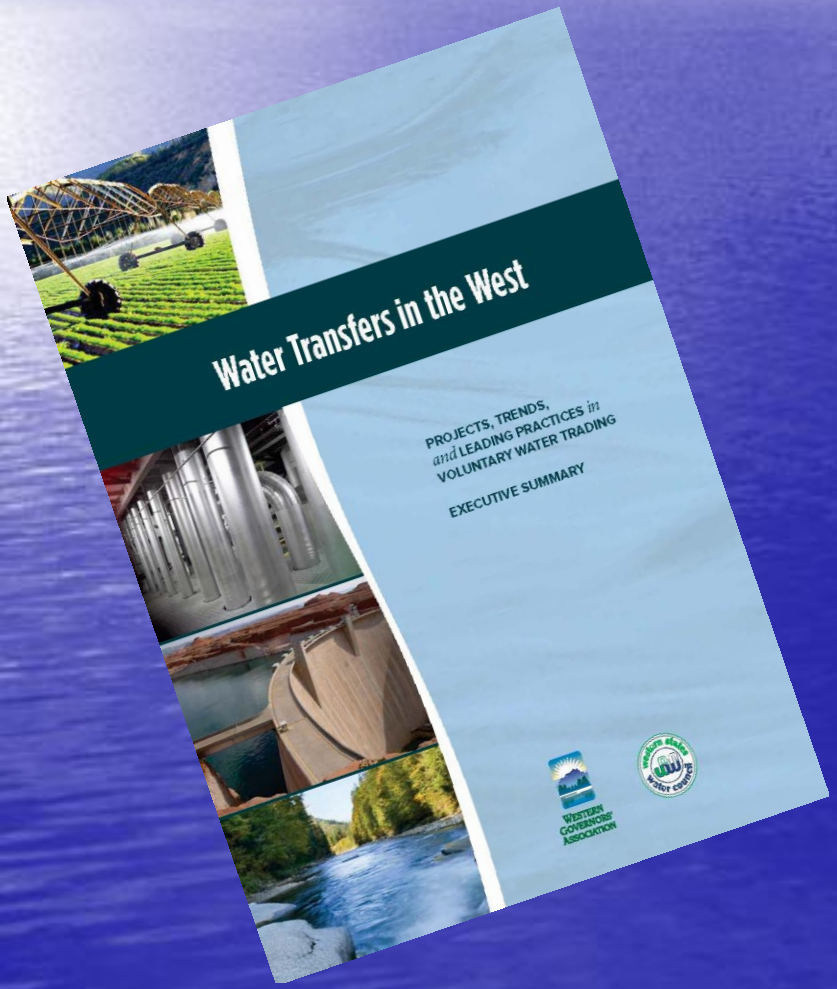
Shortage Sharing and Intentionally Created Surplus (ICS) Water







The Western Governors' Association



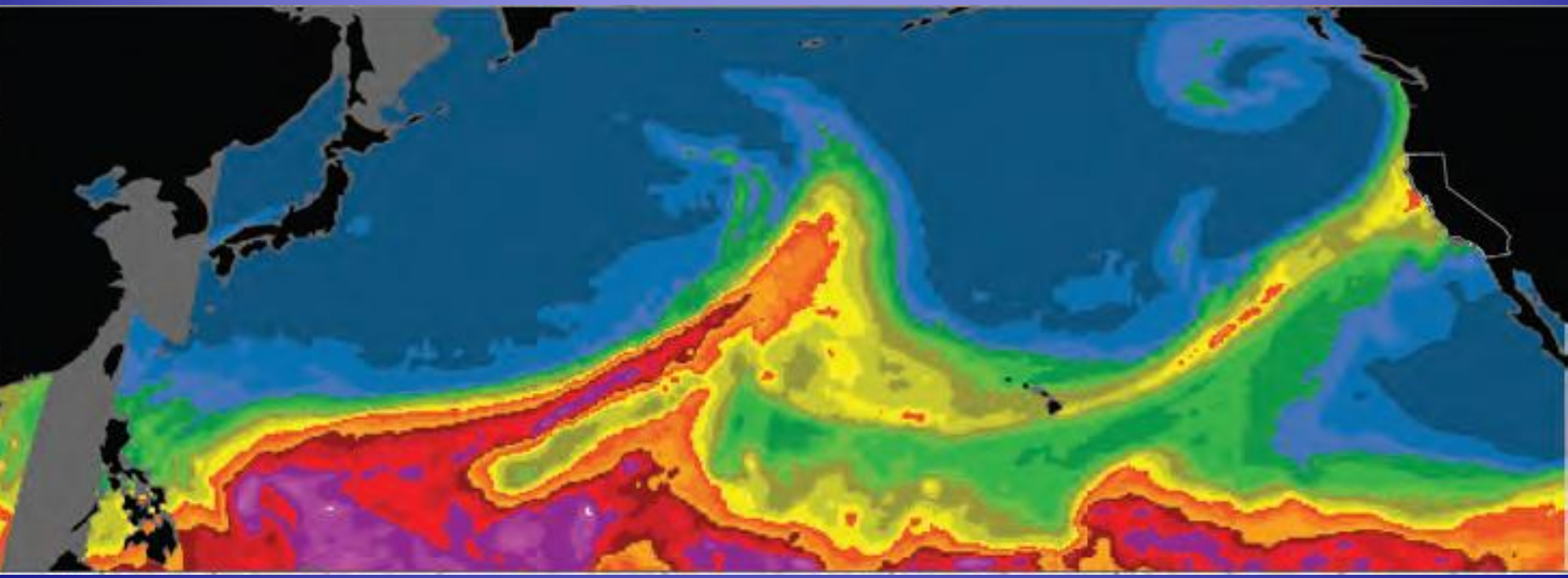
Western Governors believe states should identify and promote innovative ways to ***allow water transfers from agricultural to other uses*** *(including* ***urban, energy*** *and* ***environmental****) while* ***avoiding or mitigating damages to agricultural economies*** *and communities.*

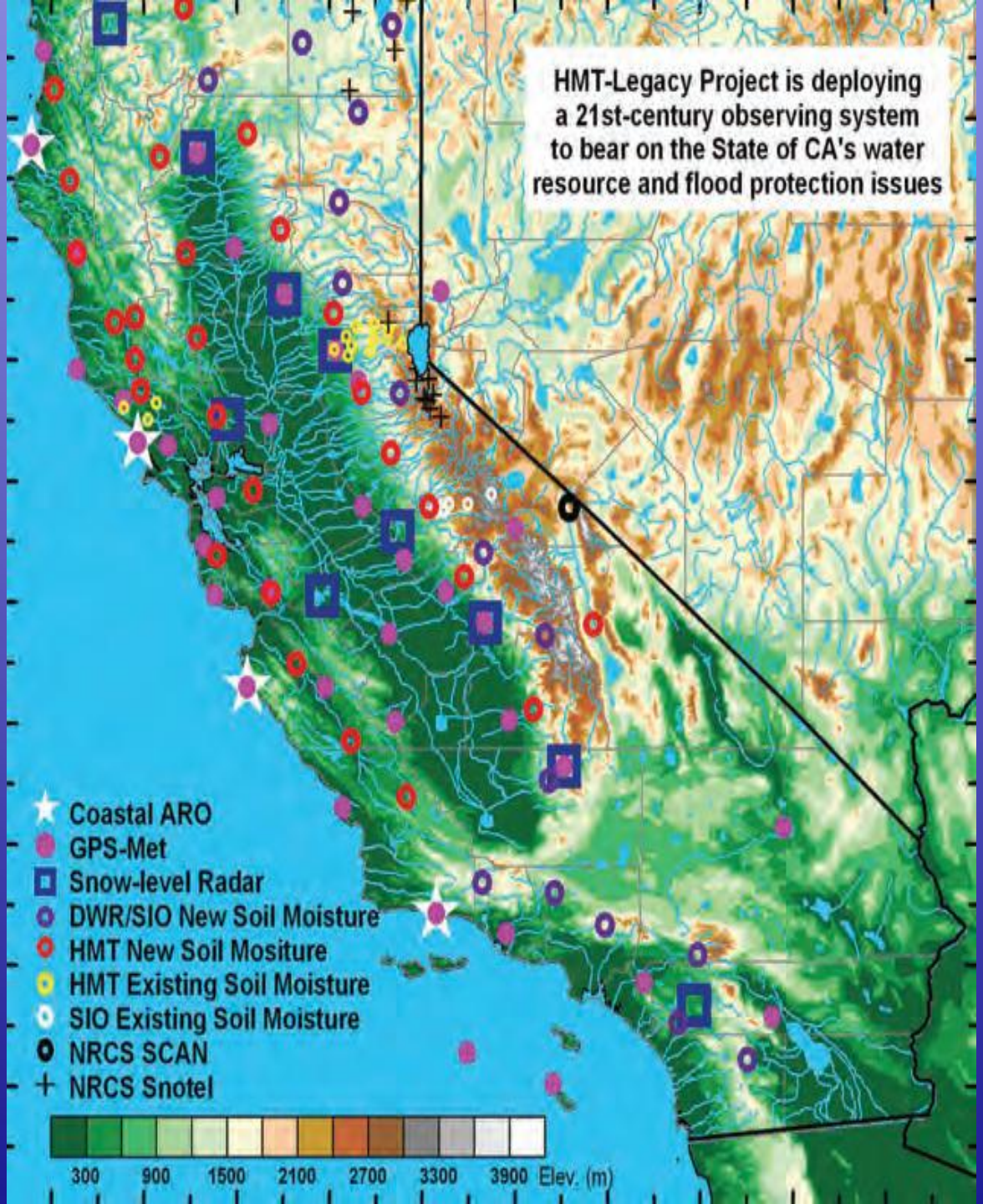
Policy 11-7

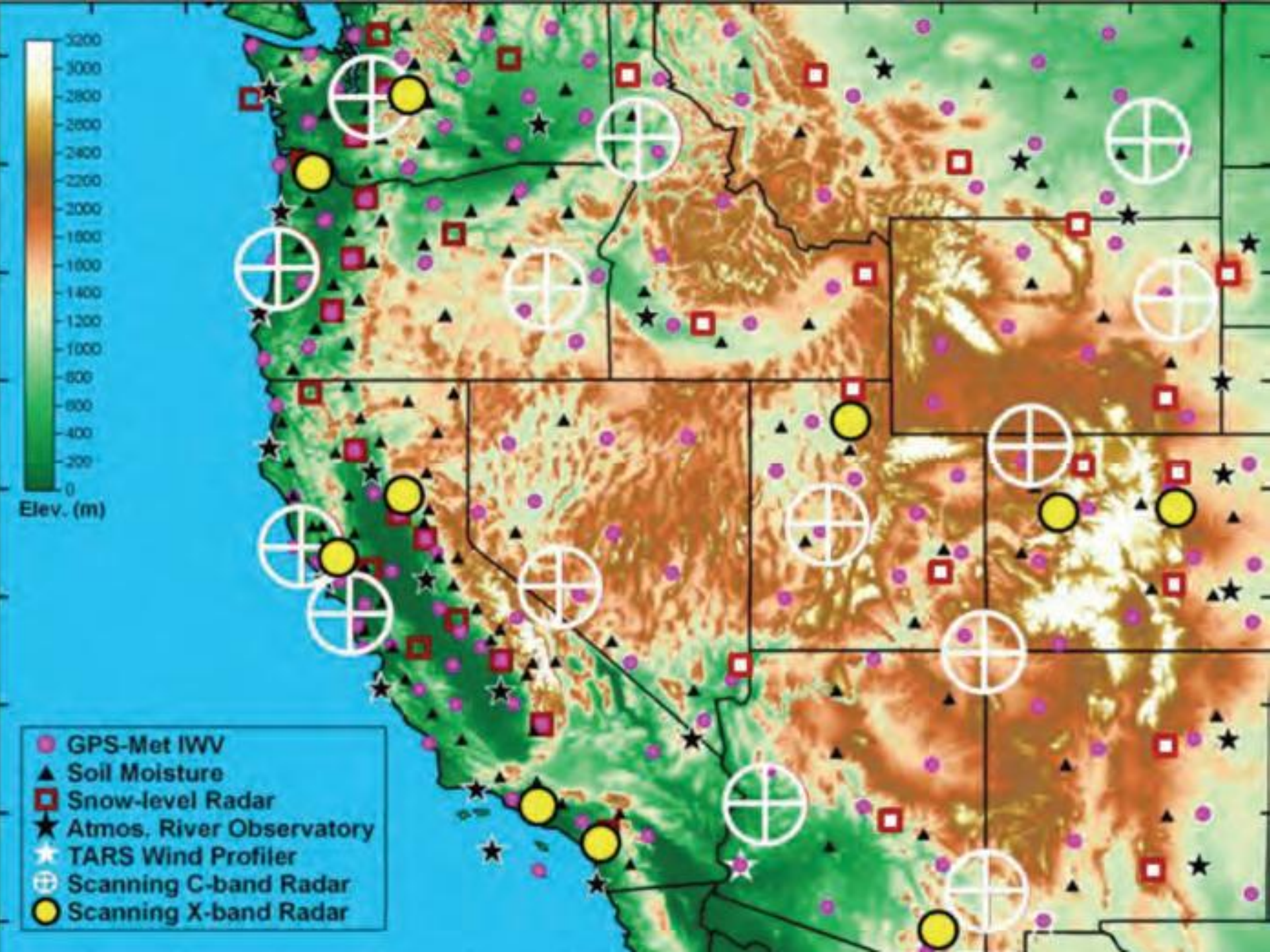
Water Law 101

- Law of Prior Appropriation
- First in Time, First in Use
- Priority Dates and Water Duties
- Use it or Lose it! (Non-speculation)
- Forfeiture and Abandonment Statutes
- Prohibits Waste (Water Conservation)
- Water Rights Transfers
- Consumptive Water Use
- No Injury

Atmospheric Rivers

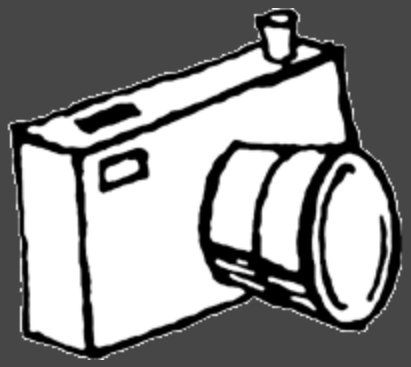



HMT-Legacy Project is deploying a 21st-century observing system to bear on the State of CA's water resource and flood protection issues
Coastal ARO
GPS-Met
Snow-level Radar
DWR/SIO New Soil Moisture
HMT New Soil Mositure
HMT Existing Soil Moisture
SIO Existing Soil Moisture
NRCS SCAN
NRCS Snotel
300
900
1500
2100
2700
3300
3900
Elev. (m)


3200
3000
2800
2600
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Elev. (m)
GPS-Met IWV
Soil Moisture
Snow-level Radar
Atmos. River Observatory
TARS Wind Profiler
Scanning C-band Radar
Scanning X-band Radar

Water Data Exchange (WaDE)

What are the Big Picture Goals?



To better enable the states to share important water data with each other, the public and federal agencies.

To improve the sharing of federal data with the states, to assist their planning efforts

On a Smaller Scale…

1) Identify the variability between states' data management systems
2) Develop a common data schema (common format for planning data)
3) Demonstrate how the data exchange will work and its benefits
4) Encourage other partners to share data by adopting standardized formats

Western Water Data Exchange (WaDE) Central Portal

A mapping application for discovering water data web services hosted by the states, federal agencies and Sandia National Lab

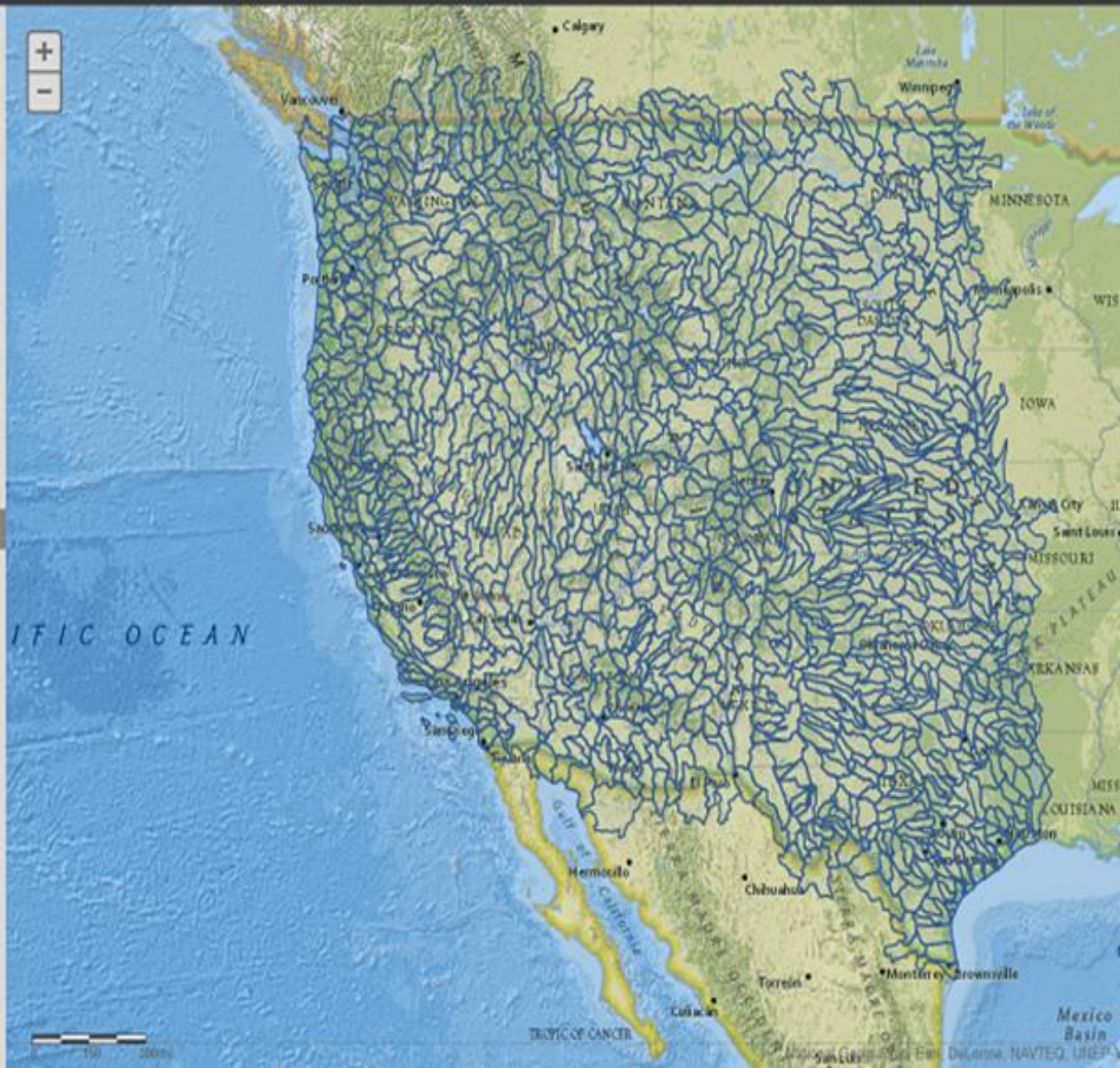
An state agency sponsored initiative to better share water data was begun in 2008 and has taken on a greater importance in more recent years. Faced with the need to collaborate on regional watershed management issues and the growing requests for access to water data, state agencies have initiated the Water Data Exchange (WaDE) project.

This Central Portal for WaDE provides access to state water data (pictured on the left), such as water planning, availability, use and allocation data, as well as summary water availability results from Sandia National Laboratory's Water/Energy Nexus Study (pictured on the right).

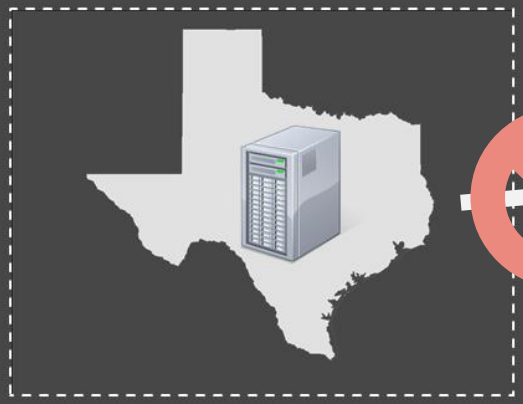
To use the portal, zoom and pan to find your area of interest. Both maps will adjust to the same location. Click on either of the maps to see summary information about the hydrologic unit (HUC) and for a link that queries active web services running at each of the state nodes and for Sandia National Laboratory. The hyperlink sends parameter information to the various databases and brings back the information requested in a new browser window.

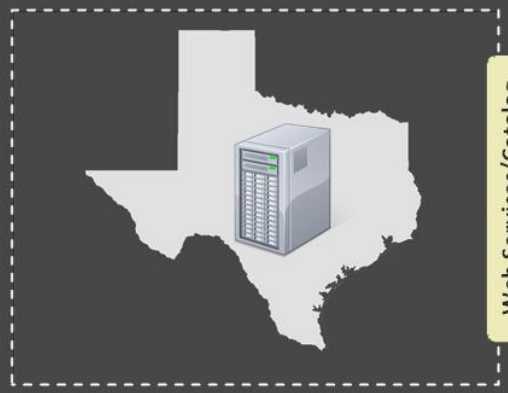
LEGEND

Western 8-Digit HUC Layer

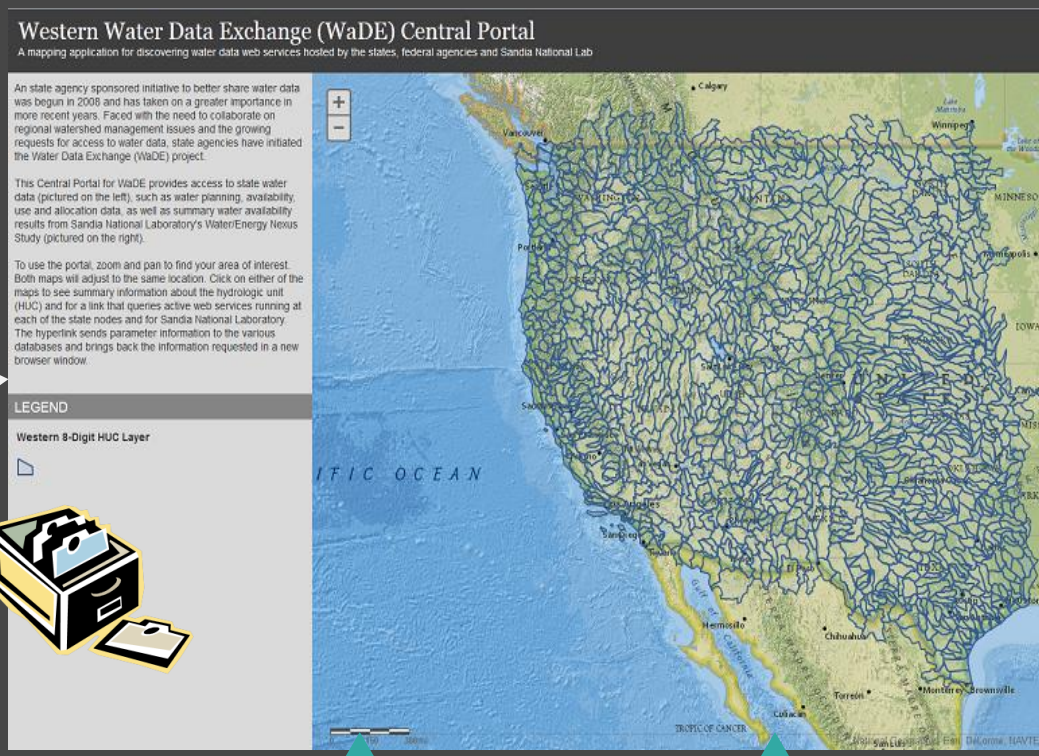


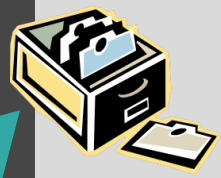
HOW DOES IT WORK?





Web Services/Catalog





Web Services/Catalog

Web Services/Catalog

Web Services/Catalog

USGS science for a changing world

Sandia National Laboratories

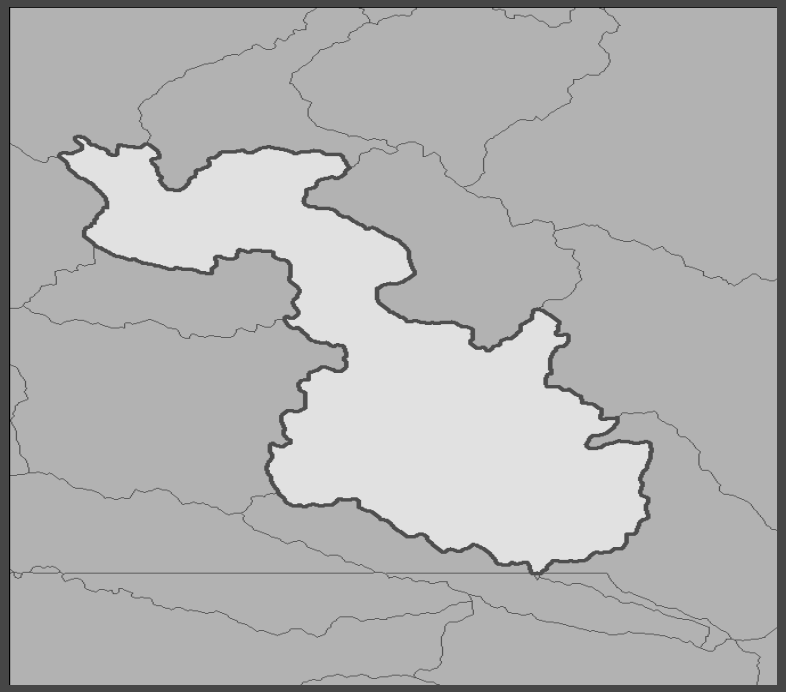
USDA NRCS

United States Department of Agriculture
Natural Resources Conservation Service

Representational State Transfer (REST) Endpoint

http://www.state.us

WHAT WILL IT PROVIDE?

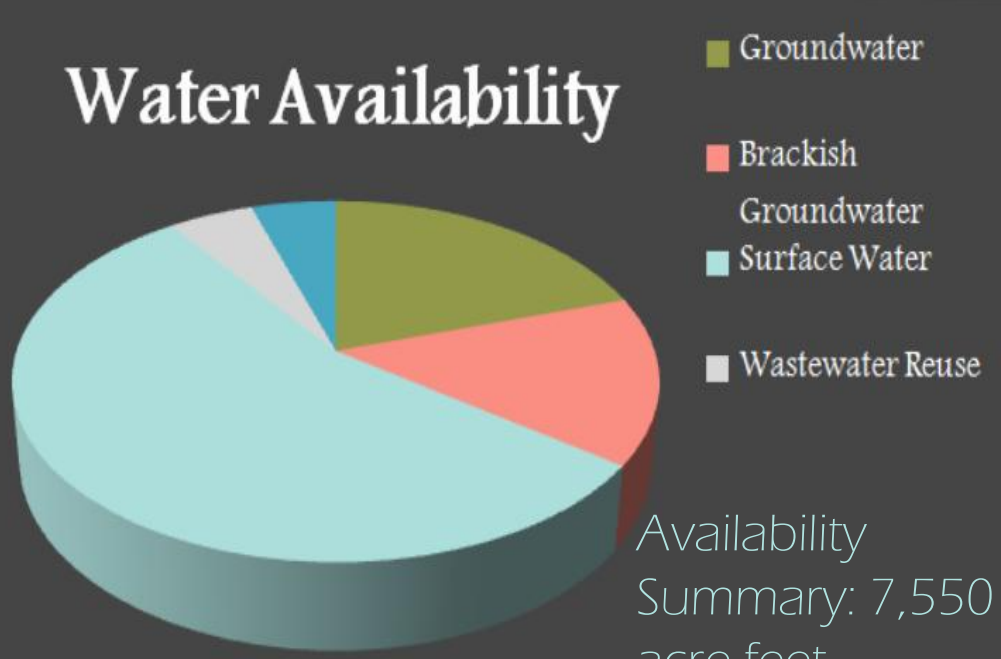


Water Supply Summary:

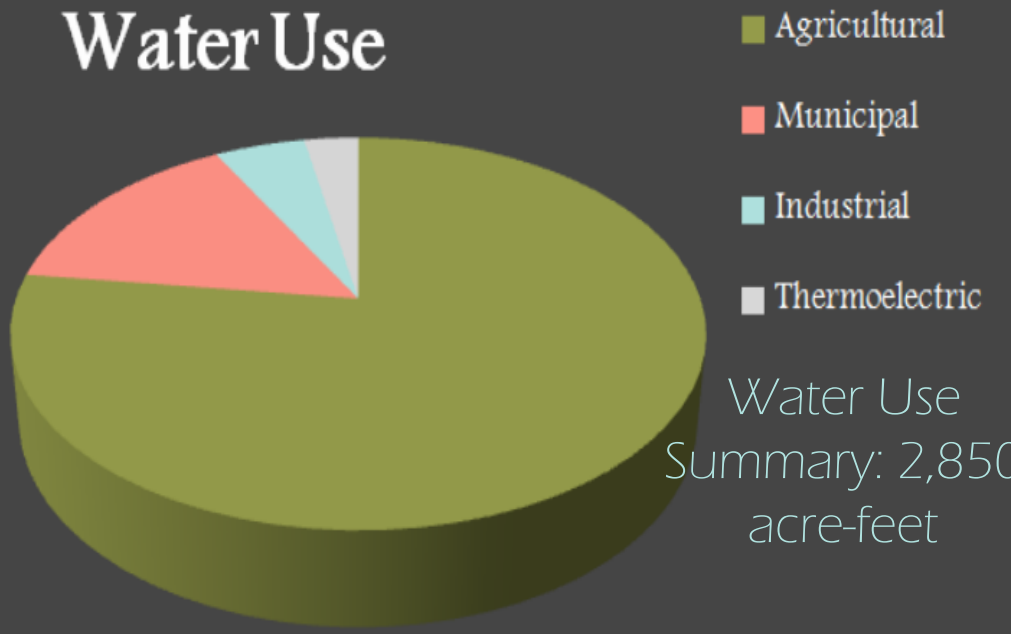
24,000 acre-feet

Regulatory Summary:

- Groundwater Management Area
- Minimum Instream Flow Requirements

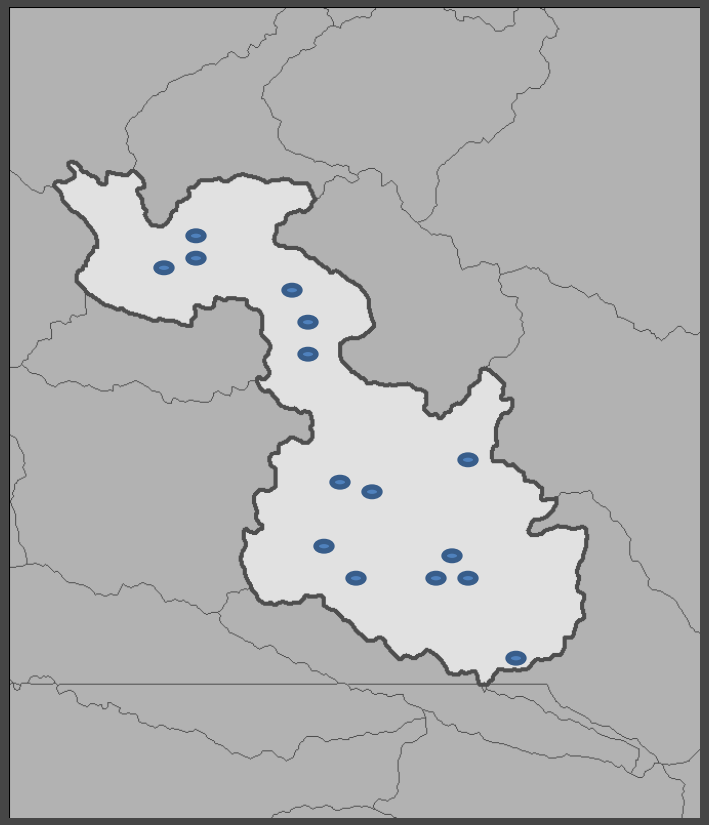


Availability Summary: 7,550 acre-feet



Water Use Summary: 2,850 acre-feet

REPORT – 2013 – Details



Allocation Data

- Owner
- Beneficial Use
- Status
- Priority Da

Diversions

Uses (withdra

Return Flows

```
<?xml version="1.0"?>
<catalog>
  <book id="bk101">
    <author>Gambardella, Matthew</author>
    <title>XML Developer's Guide</title>
    <genre>Computer</genre>
    <price>44.95</price>
    <publish_date>2000-10-01</publish_date>
    <description>An in-depth look at creating app
    with XML.</description>
  </book>
  <book id="bk102">
    <author>Ralls, Kim</author>
    <title>Midnight Rain</title>
    <genre>Fantasy</genre>
    <price>5.95</price>
    <publish_date>2000-12-16</publish_date>
    <description>A former architect battles corpor
    an evil sorceress, and her own childhood to bec
```

FUTURE STEPS:

States plugged in, streamgauging, etc. federal data, too.

WHY IS IT SO IMPORTANT?

States and Federal agencies, utilities, farmers, journalists, urban planners, politicians, academics… anyone who wants to know more about water…

… questions about water availability will only increase!

With population growth, greater competition, energy security, food security, drought, climate change…

Tony Willardson, Executive Director
Western States Water Council
801-685-2225
twillards@wswc.state.ut.us

www.westernstateswater.org