Water Needs & Strategies for a Sustainable Future: Managing Uncertainty

Mountain West Water Institute
Idaho Falls, Idaho

May 16, 2012

Tony Willardson, Executive Director
Western States Water Council

WSWC Organization

- Western Governors' Conference - Portland, OR June 1965

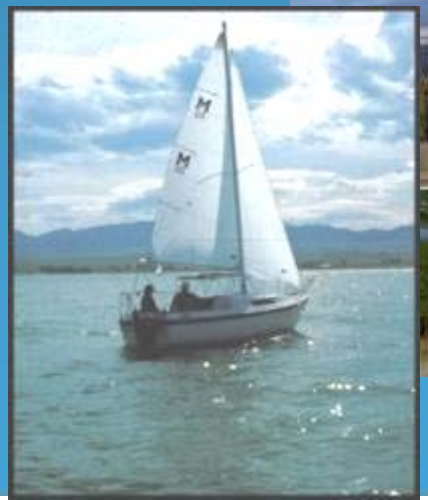
- "The future growth and prosperity of the western states depend upon the availability of adequate quantities of water of suitable quality."
- A fair appraisal of future water needs
- The most equitable means of meeting such needs
- Requires a regional effort
- Water availability and interstate transfers
- Rapid federal water development and regional planning
- A unified voice in the use of their own water resources
- State forum on western water resource issues
- Commitment to striving for a regional consensus on issues of mutual concern

Nevada Governor Grant Sawyer

Today we stand on the threshold of an expanding economy, greater than could possibly have been foreseen as late as 10 years ago.... However, one grave danger lies in the path of this expanding economy – water.... In many areas we are depleting out groundwater... We must now take the next step – westwide water development.... The time has come to conduct yourselves as statesmen and sit down around the table to work out the best plans to meet the needs of the entire West –

To ensure

the West has an adequate, sustainable supply of water of suitable quality to meet our diverse economic and environmental needs now and for future generations will require a regional effort.



Vision Statement

Water in the West is an increasingly scarce and precious resource, given population growth and an expanding range of often competing economic and ecological demands, as well as changing social values. Surface and ground water supplies in many areas are stressed, resulting in a growing number of conflicts among users and uses. A secure and sustainable future is increasingly uncertain given our climate, aging and often inadequate water infrastructure, limited knowledge regarding available supplies and existing and future needs and uses, and competing and sometimes un-defined or ill-defined water rights. Effectively addressing these challenges will require a collaborative, cooperative effort among states and stakeholders that transcends political and geographic boundaries.

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.

Army Corps of Engineers

Bureau of Land Management

Bureau of Reclamation

Environmental Protection Agency

National Oceanic & Atmospheric Administration

Natural Resources Conservation Service

U.S. Fish & Wildlife Service

U.S. Forest Service

U.S. Geololgical Survey

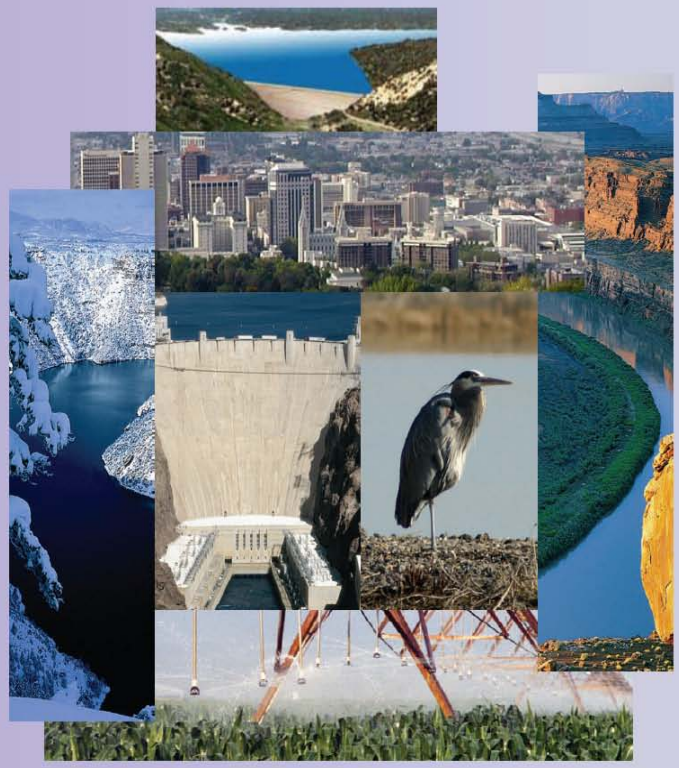
U.S. Department of Energy

National Aeronautics and Space Administration

U.S. Dept. of Defense

[National Park Service]

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

Law of Prior Appropriation

- First in Time, First in Right (Seniority)
- Priority Dates - First to put water to use
- Reasonable Beneficial Use (Water Duties)
- Use it or Lose it!
- Non-speculation/Maximum Economic Benefit
- Forfeiture and Abandonment Statutes
- Changes in Use Approved by the State
- Water Rights Transfers/Consumptive Use
- Public Interest Review
- Interstate Compacts

Certainty!

Risk and Uncertainty

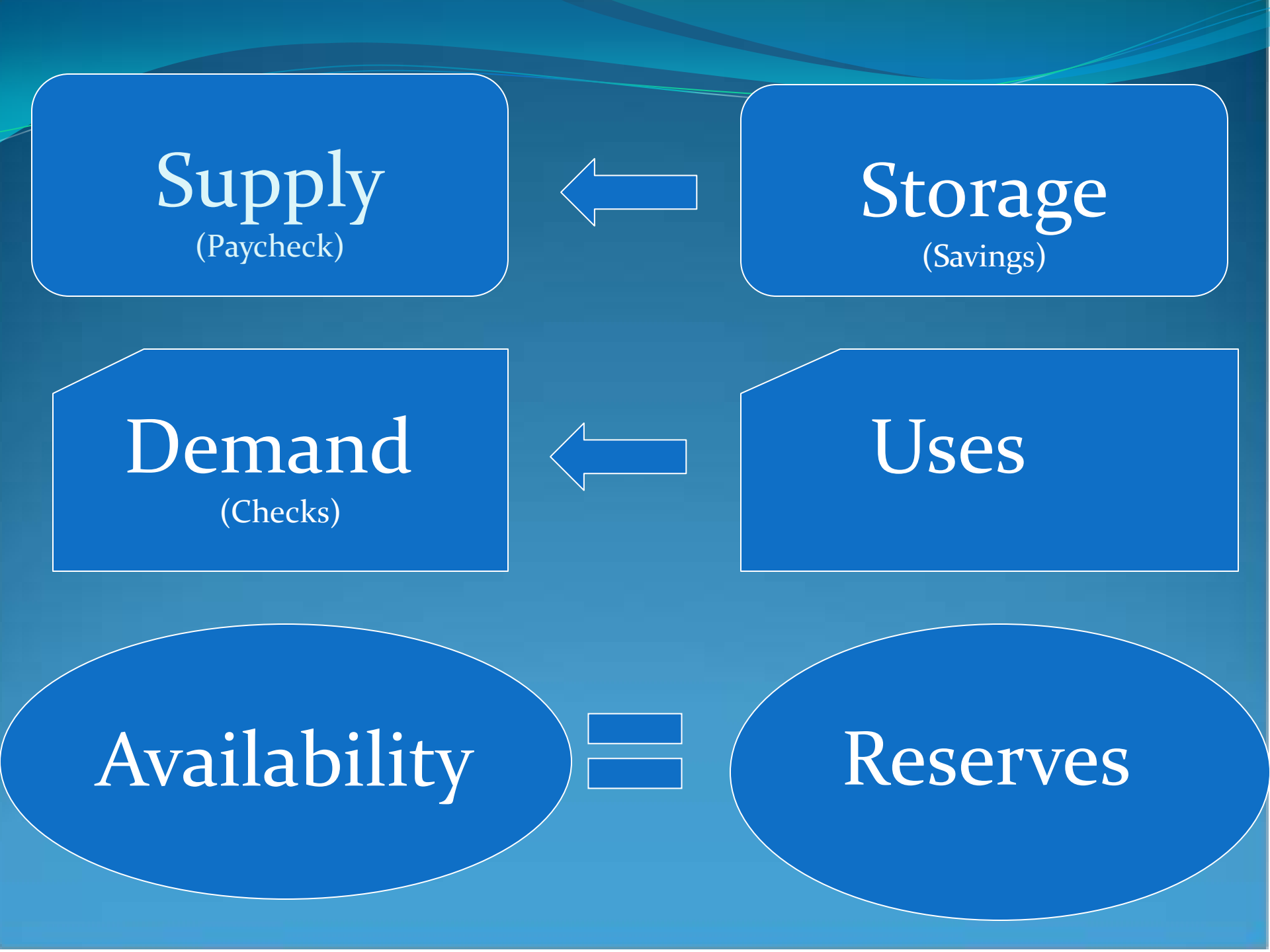
- General lack of data on regional water needs and past, present and future uses
- Climate change and variability
- Endangered species and other instream uses and outflows to bays and estuaries
- Unquantified Native American water rights
- Other Federal reserved rights and needs
- Increasing population & energy needs

How much water do we have?

How much water do we need?

Do we have enough?
(Now and in the Future?)

Quantifying Supplies & Demand


Supply
(Paycheck)
Storage
(Savings)
Demand
(Checks)
Uses
Availability
Reserves

Supply

Precipitation
Snowpack
Streamflow
Groundwater
Reservoirs
Wastewater
Saline Waters

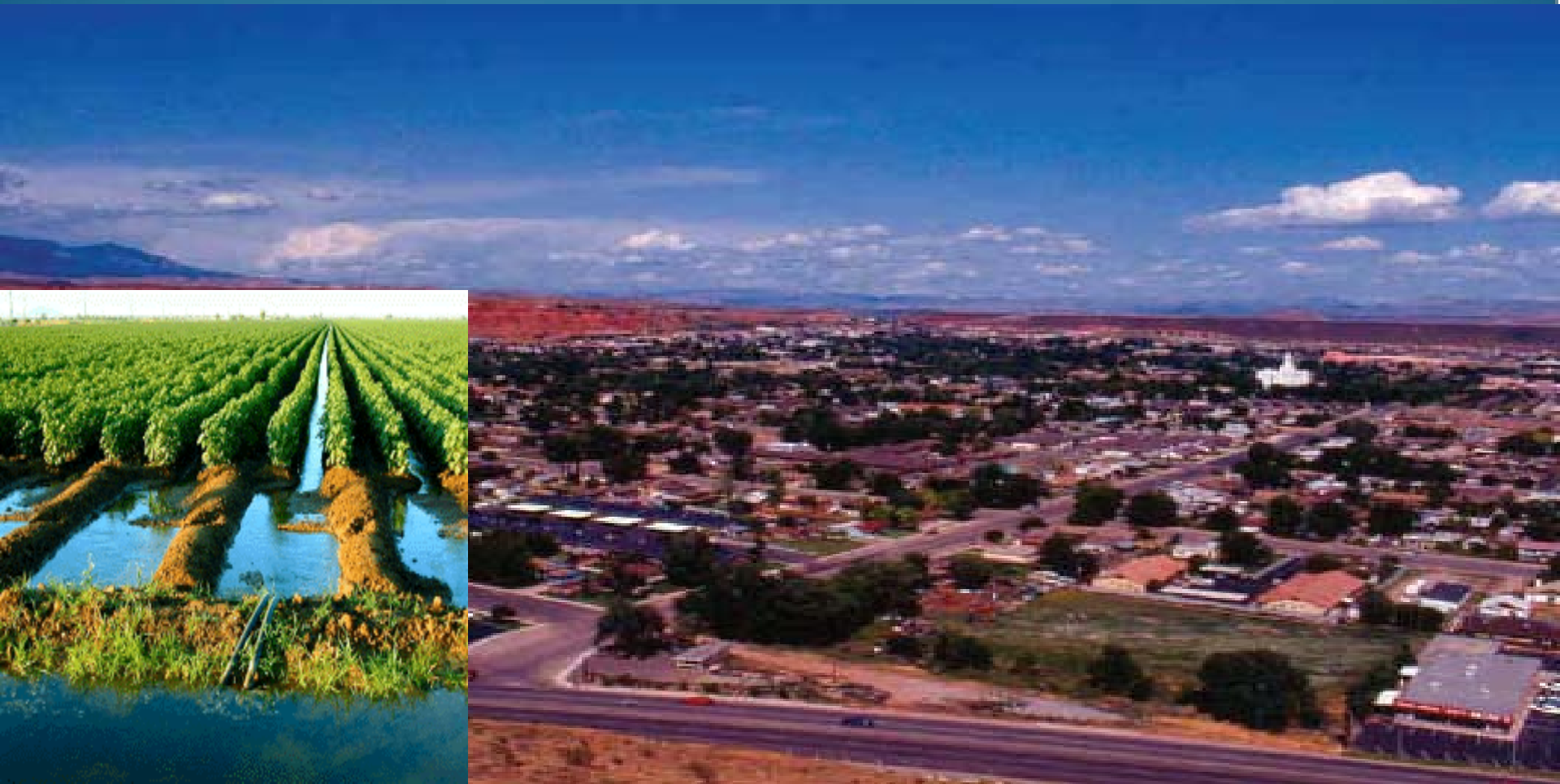
Demand

Agricultural
Municipal
Industrial
Energy
Environment
Recreation
Evapo-transpiration

Physical
Economic
Legal
Environmental
Social

Availability

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

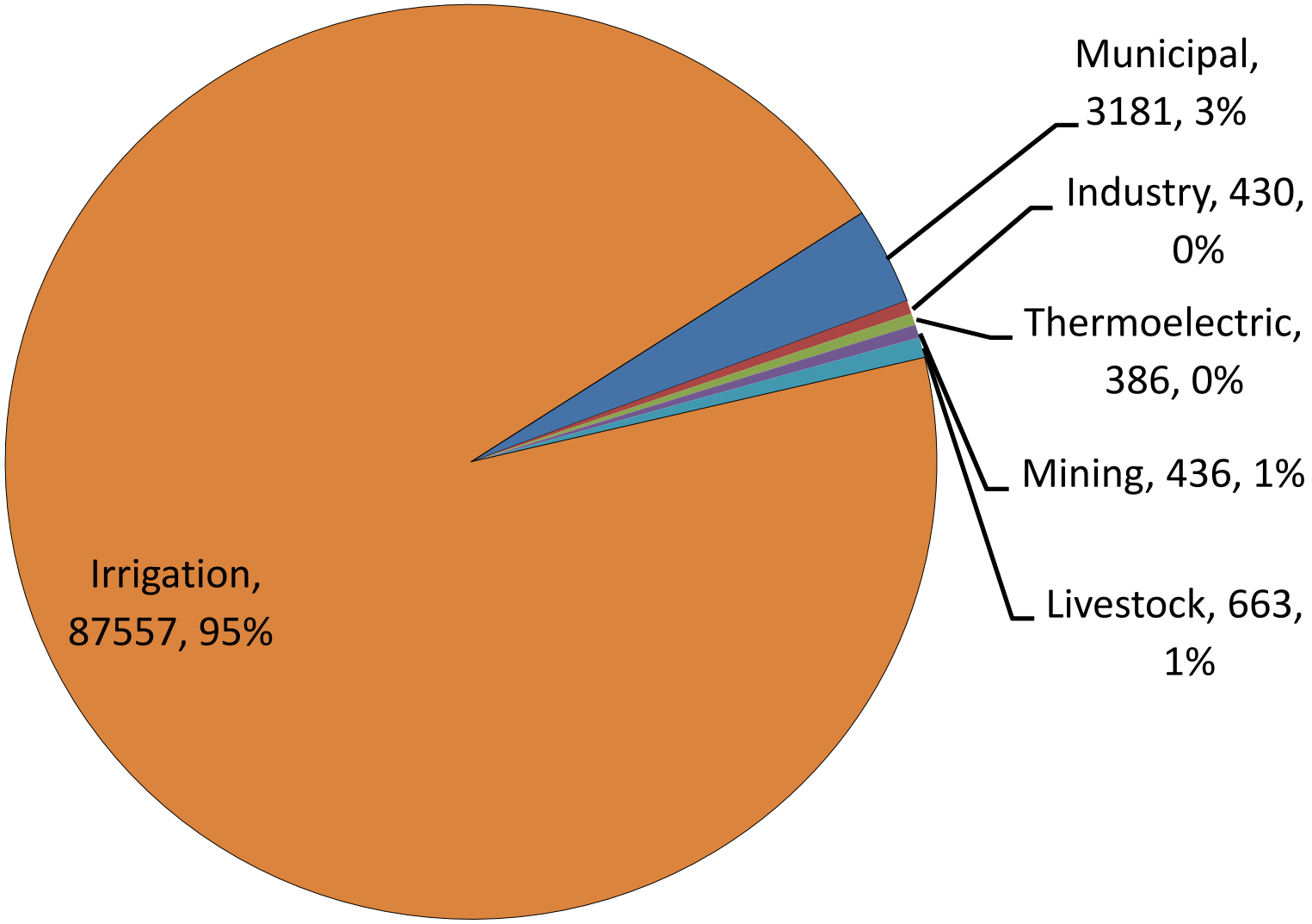


Measure

Monitor

Manage

2010 Water Consumption (MGD)



Predictability

Probability

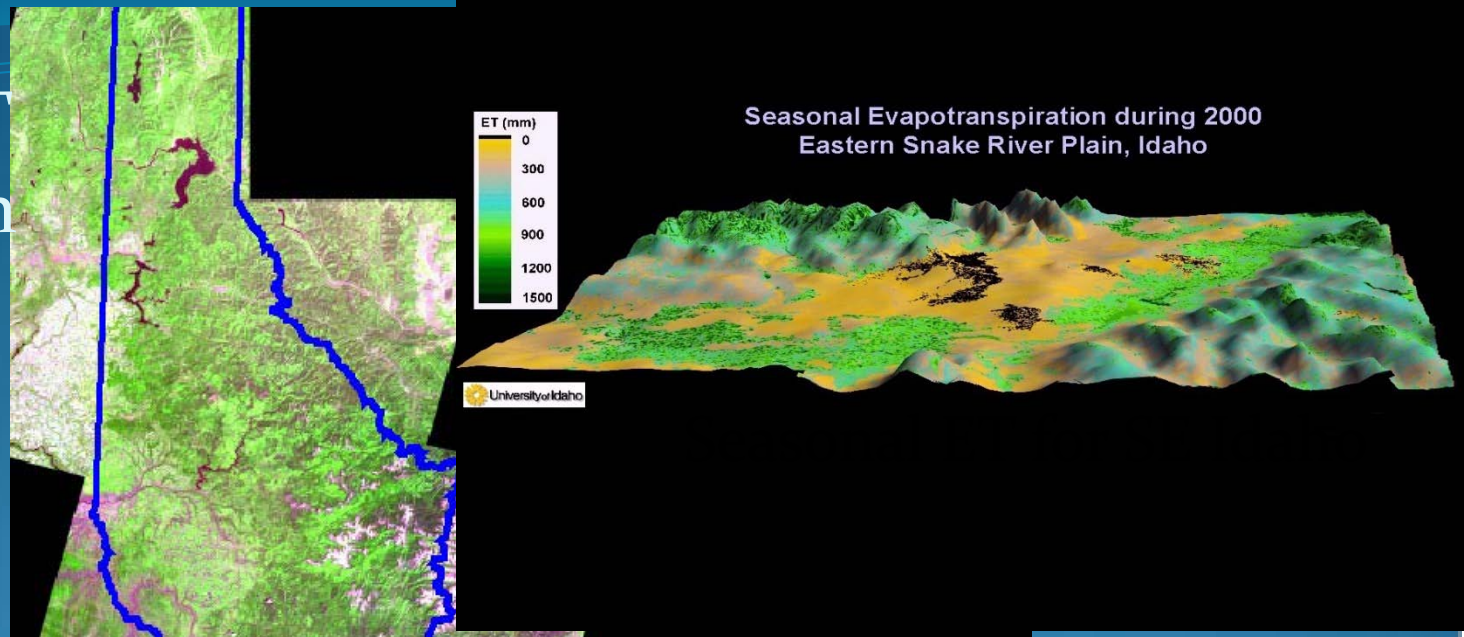
Inevitability

Unpredictable Event

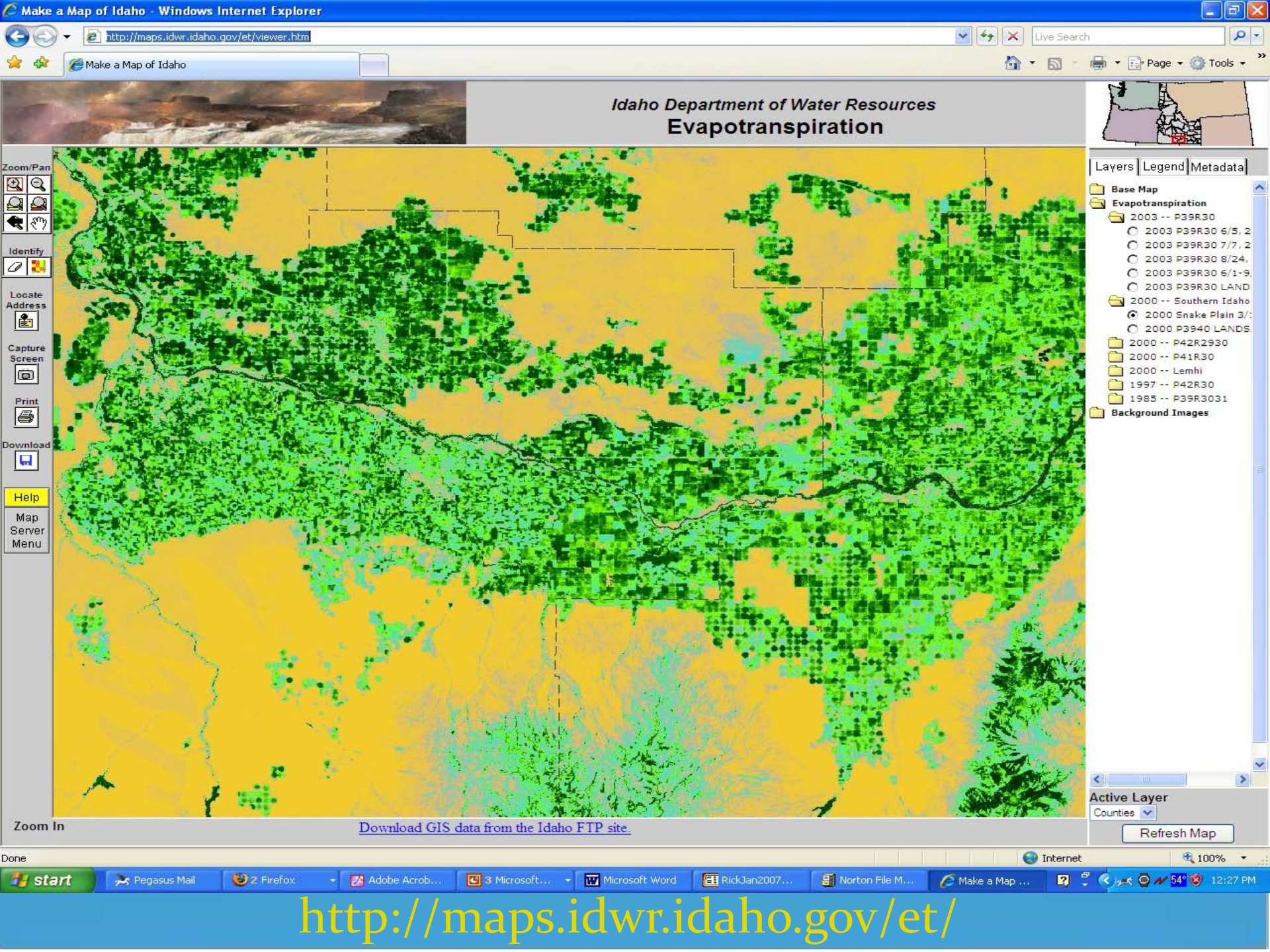
Priority Water Information Needs

- Available Surface and Ground Water Supplies
- Present Water Uses
- Snowpack (NRCS)
- Streamflow (USGS)
- Evapotranspiration (NASA Landsat 8)
- Climate Change Impacts & Adaptation

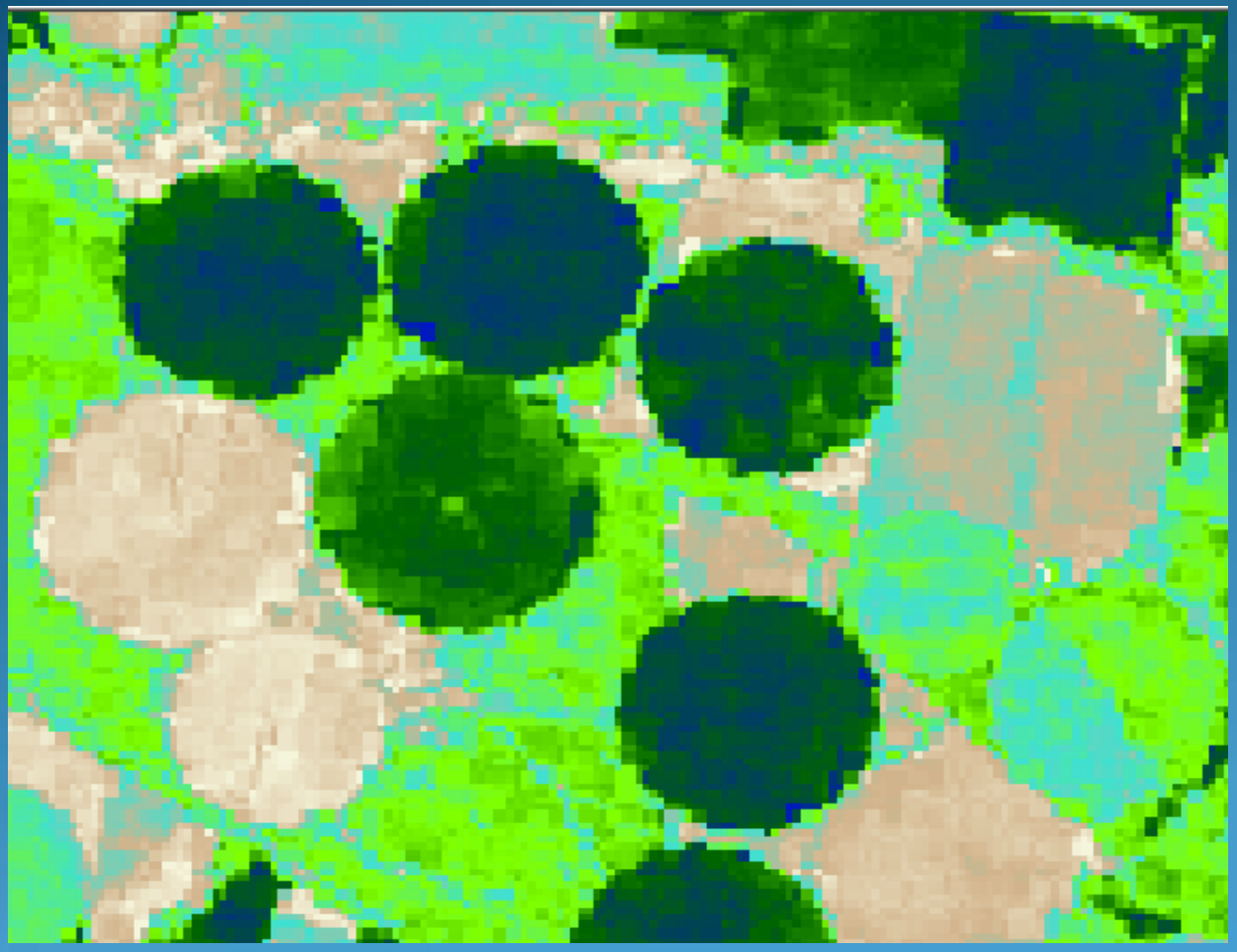
Vegetation, Water and ET are variable in space and time



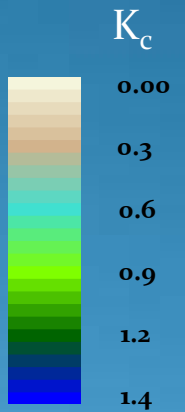
Major Irrigated areas in Idaho and areas of METRIC application


Make a Map of Idaho - Windows Internet Explorer
http://maps.idwr.idaho.gov/et/viewer.htm
Live Search
Make a Map of Idaho
Page
Tools
Idaho Department of Water Resources
Evapotranspiration
Zoom/Pan
Identify
Locate Address
Capture Screen
Print
Download
Help
Map Server Menu
Layers
Legend
Metadata
Base Map
Evapotranspiration
2003 -- P39R30
2003 P39R30 6/5, 2
2003 P39R30 7/7, 2
2003 P39R30 8/24,
2003 P39R30 6/1-9,
2003 P39R30 LAND
2000 -- Southern Idaho
2000 Snake Plain 3/
2000 P3940 LANDS
2000 -- P42R2930
2000 -- P41R30
2000 -- Lemhi
1997 -- P42R30
1985 -- P39R3031
Background Images
Active Layer
Counties
Refresh Map
Zoom In
Download GIS data from the Idaho FTP site.
Done
Internet
100%
start
Pegasus Mail
2 Firefox
Adobe Acrob...
3 Microsoft...
Microsoft Word
RickJan2007...
Norton File M...
Make a Map ...
12:27 PM
http://maps.idwr.idaho.gov/et/

Why use High Resolution Imagery?

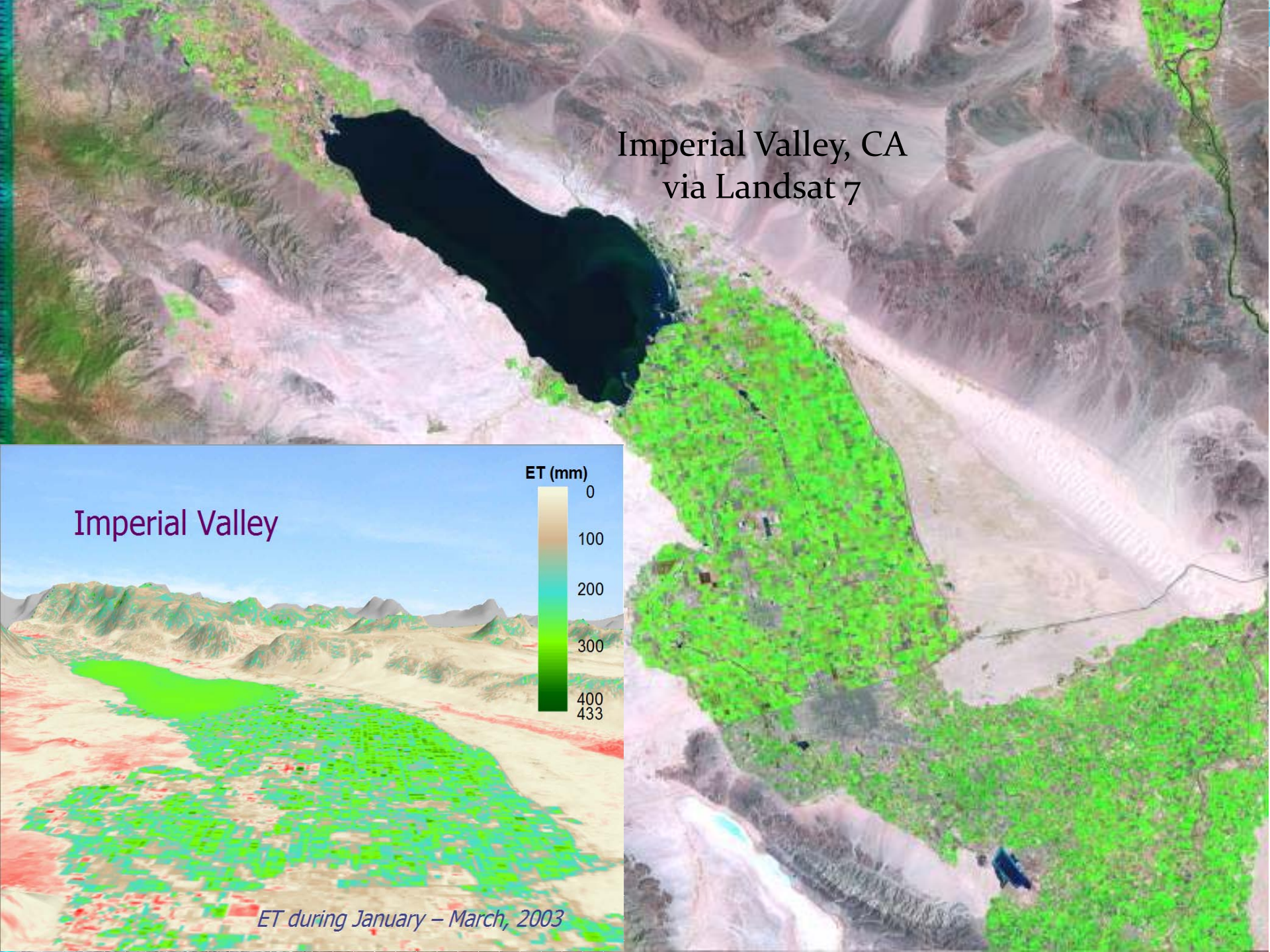


ET from Landsat 5 with thermal sharpened to 30 m

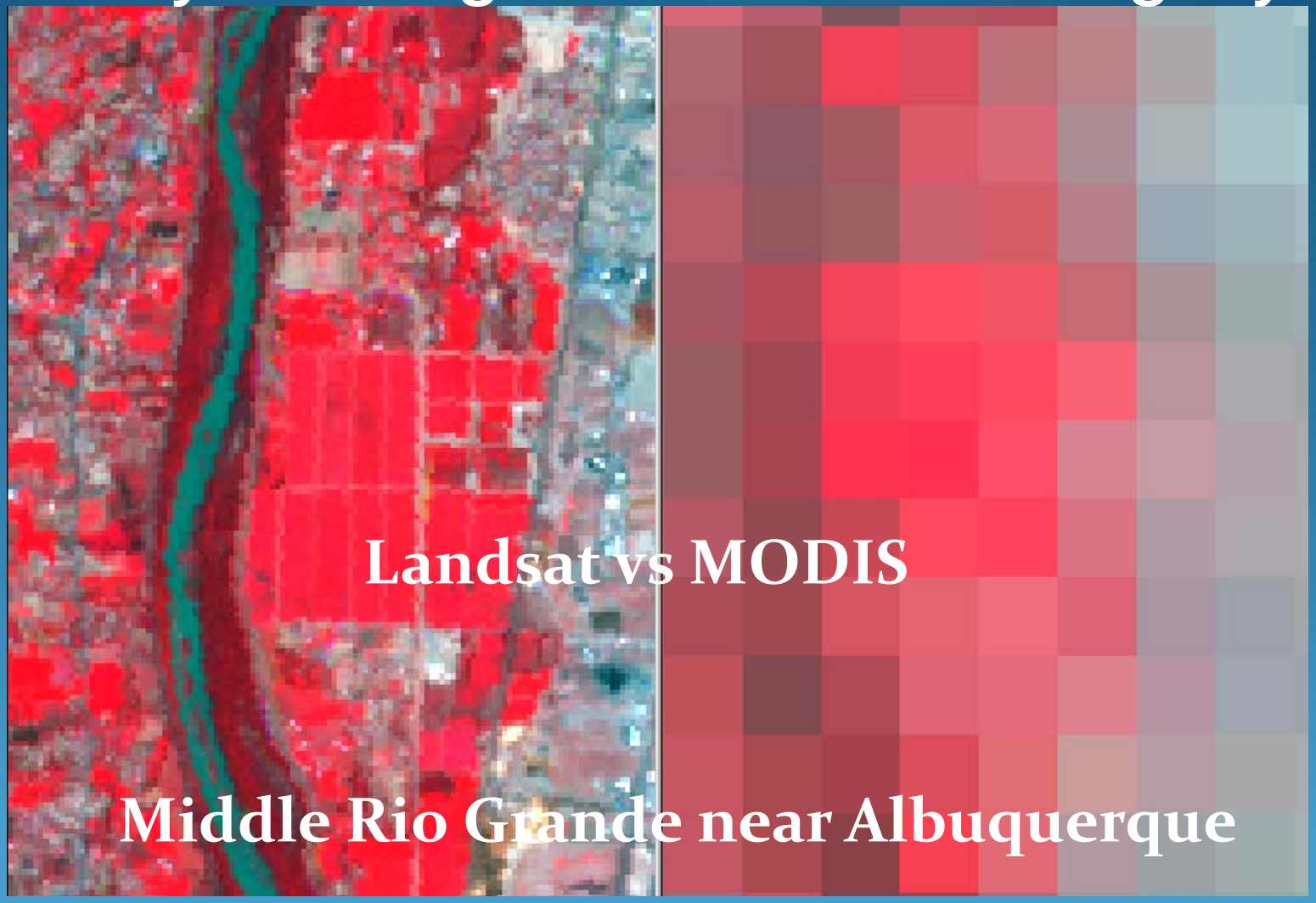


$(K_c = ET_{act} / ET_{ref})$

ET from individual fields is essential for: Water Rights, Water Transfers, Farm Water Management


Imperial Valley, CA
via Landsat 7
Imperial Valley
ET (mm)
0
100
200
300
400
433
ET during January – March, 2003

Why use High Resolution Imagery?



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

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

United States Senate

WASHINGTON, DC 20510

May 5, 2008

Senator Robert C. Byrd
Chairman
Committee on Appropriations
Washington, D.C. 20510

Senator Thad Cochran
Ranking Member
Committee on Appropriations
Washington, D.C. 20510

Senator Barbara Mikulski
Chairwoman
Subcommittee on Commerce,
Justice, Science & Related Agencies

Senator Richard Shelby
Ranking Member
Subcommittee on Commerce,
Justice, Science & Related Agencies

Dear Chairman Byrd, Chairwoman Mikulski, Ranking Member Cochran, and Ranking Member Shelby:

We are writing to request inclusion of $35 million in NASA's budget for FY 2009, to design, construct and deploy a thermal infrared (TIR) instrument on Landsat 8 that will provide data continuity consistent with that now available from Landsat 5 and Landsat 7. The total funding commitment required for a TIR instrument on Landsat 8 should be between $90 and $100 million over three years.

The future of our Nation's water resources is increasingly unclear. Conflicts over water use are growing, and the serious situation in the Southeast demonstrates that scarcity isn't just a problem in the West, where water has always been a scarce resource and roughly 80% of all consumptive water use is for irrigation. Across the U.S. water demands for agriculture, energy production, and municipal and industrial uses are rising, while reservoir and ground water levels are falling. It is clear that more data on water supplies and water uses will be needed to address present and future water problems.

Today, TIR data is essential for measuring and monitoring evapotranspiration and calculating consumptive water usage, particularly for agriculture. This data stream has been the gold standard for administration of water transfer agreements as it provides a cost effective means of determining not only present, but past consumptive use, given the U.S. Geological Survey's (USGS) archive of TIR data collected since 1982.

We are grateful that the Appropriations Committee is committed to ensuring the continuity of these unique and fundamentally valuable data streams. In particular, the FY 2008 Consolidated Appropriations Act included the following language: "NASA is directed to provide a plan on all continuity of data for the Landsat Data Continuity Mission (LDCM) to the Appropriations committees no later than 120 days after enactment of this Act. The amended bill provides $1 million above the budget request for this mission to ensure data continuity."

Unfortunately there is evidence that NASA does not share the Committee's priorities. Although NASA plans to present its report to the committees later this month, in a December 19, 2007 letter, Administrator Michael Griffin stated, "While thermal data is scientifically relevant, analysis of the mission development cost and schedule indicates that LDCM cannot be implemented with the thermal capability within the present budget constraints. Additionally, if the thermal infrared sensor were added, it is likely that NASA would be unable to maintain the current launch readiness date and, consequently, the undesirable gap in data continuity between existing Landsat capability on-orbit and the launch of LDCM would be increased."

Administrator Griffin omits the fact that a thermal infrared (TIR) instrument was included on Landsat 4 in 1982, Landsat 5 in 1984, Landsat 6 in 1993 and Landsat 7 in 1999. Without TIR on the next spacecraft, the Landsat Data Continuity Mission will not be complete, and we fear none of the TIR alternatives under NASA review will prove acceptable. A delay in the launch of Landsat 8 merits serious NASA consideration, rather than prematurely eliminating what has become an invaluable practical application of our nation's investment in NASA-pioneered research and development.

Landsat 5 and 7 TIR data has become an irreplaceable resource for a variety of applications that are increasingly important, but hampered by the uncertainty surrounding its future availability. There is no other comparable federal source of this data, a past privatization attempt proved "troublesome" in NASA's own words, and relying on limited foreign data sources would prove costly and difficult.

However, unless NASA is directed to include TIR on Landsat 8 and sufficient funds are appropriated, we will be without perhaps the single most important instrument capable of measuring by far the largest use of water in the West. While we recognize the present budget constraints, we urge you to fund a TIR instrument in NASA's LDCM budget for Landsat 8.

Sincerely,

Conclusion

- Good decisionmaking and risk management require sound science and adequate data.
- The states have a primary and critical role in western water management.
- Sustainable water use in the West will depend in large part on state initiative and innovation.
- Water resources research is critical to innovation.
- We need better tools for measuring water use and facilitating transfers between uses
- Continuing Federal and State support is essential

Tony Willardson, Executive Director
Western States Water Council
twillardson@wswc.utah.gov
801-685-2555