

# The Future of Water in the West

## Mountain West Water Institute Workshop

Salt Lake City, Utah  
June 18-19, 2011

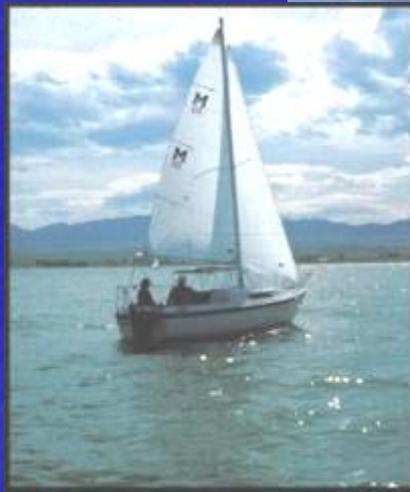


Tony Willardson, Executive Director  
Western States Water Council



Uncertain!

*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.*



A REVIEW OF  
INTER-REGIONAL AND INTERNATIONAL  
WATER TRANSFER PROPOSALS





SMITH

## Water Needs and Strategies for a Sustainable Future



Western Governors' Association ♦ June 2006

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



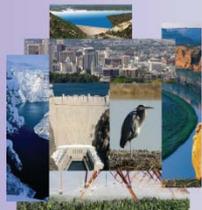
Western Governors' Association ♦ June 2008

## 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



# 2006 WGA Water Report

To encourage sustainable growth policies and plans, states should identify the water demands and impacts associated with future growth.

Additionally, states should develop integrated growth and water resource scenarios so that the consequences of various growth scenarios can be evaluated for both the near and long term.

# Risk and Uncertainty

- General lack of data on water needs and past, present and future uses
- Increasing population & energy needs
- Quantifying/financing infrastructure needs
- Climate and water availability/quality impacts
- Endangered species' and other instream uses and outflows to bays and estuaries
- Unquantified Native American water rights

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



# Quantifying Supplies & Demand



Income

+

Assets

Expenses

-

Liabilities

Earnings

=

Net Worth

Supply  
(Paycheck)



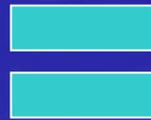
Storage  
(Savings)

Demand  
(Checks)



Uses

Availability



Reserves

# Water Demands & Supplies

- USGS Water Availability & Use Assessment  
(authorized by SECURE Water Act)
- Key Federal Water Data Resources
  - NRCS Snow Survey Program
  - USGS Streamgaging Programs
  - Landsat Thermal Infrared for ET
  - USGS Ground Water Monitoring
  - EPA/USGS Water Quality Monitoring

Supply



Precipitation  
Snowpack  
Streamflow  
Groundwater  
Reservoirs  
Wastewater  
Saline Waters

A diagram illustrating the components of demand. On the right, a large teal rounded rectangle contains a list of demand categories: Agricultural, Municipal, Industrial, Energy, Environment, Recreation, and Evapo-transpiration. A teal arrow points from this list to a smaller teal box on the left with a slanted top edge, labeled 'Demand'.

Demand

Agricultural  
Municipal  
Industrial  
Energy  
Environment  
Recreation  
Evapo-  
transpiration

A diagram with a teal background. On the right is a large teal rounded rectangle containing the text: Physical, Economic, Legal, Environmental, and Social. On the left is a teal oval containing the text: Availability. A teal arrow points from the rounded rectangle to the oval.

Physical  
Economic  
Legal  
Environmental  
Social

Availability



Supply



Precipitation  
Snowpack  
Streamflow  
Groundwater  
Reservoirs  
Wastewater  
Saline Waters

Drought

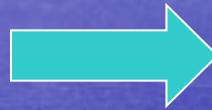


Demand

Drought

Agricultural  
Municipal  
Industrial  
Energy  
Environment  
Evapo-  
transpiration

Drought



Physical  
Economic  
Legal  
Environmental  
Social

Availability



# Drought Impacts & Vulnerability



Plant Vulnerabilities

- o Physical factors,
- o Water rights,
- o Environmental constraints



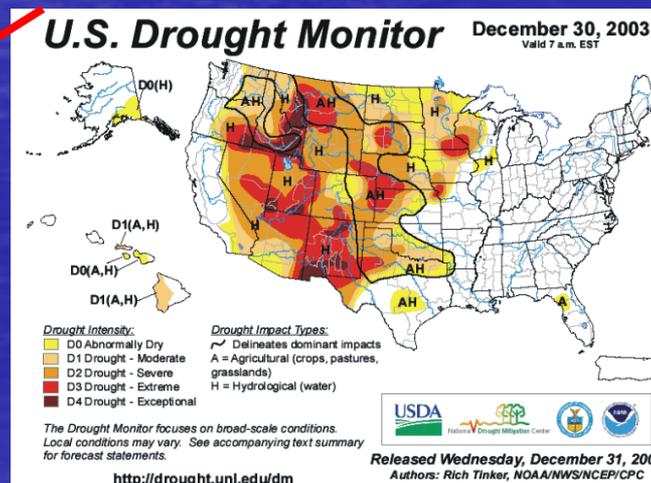
Increased Power Demand



Reduced Streamflow  
Reduced Supply

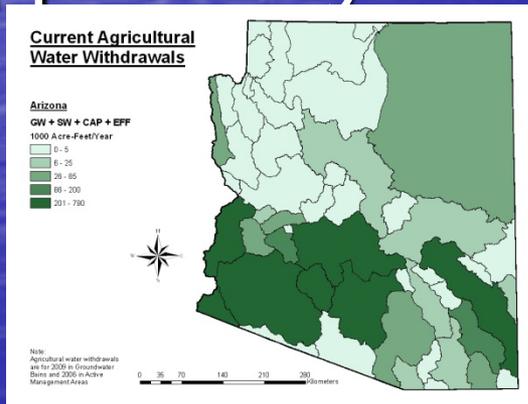


Decreased Hydropower



# The Value of Water

- Production and conveyance costs of water
- Historic value of leased and sold water rights
- Cost of alternative supply/backstop technology
- Opportunity costs



# To Foster Sustainable Growth Policies

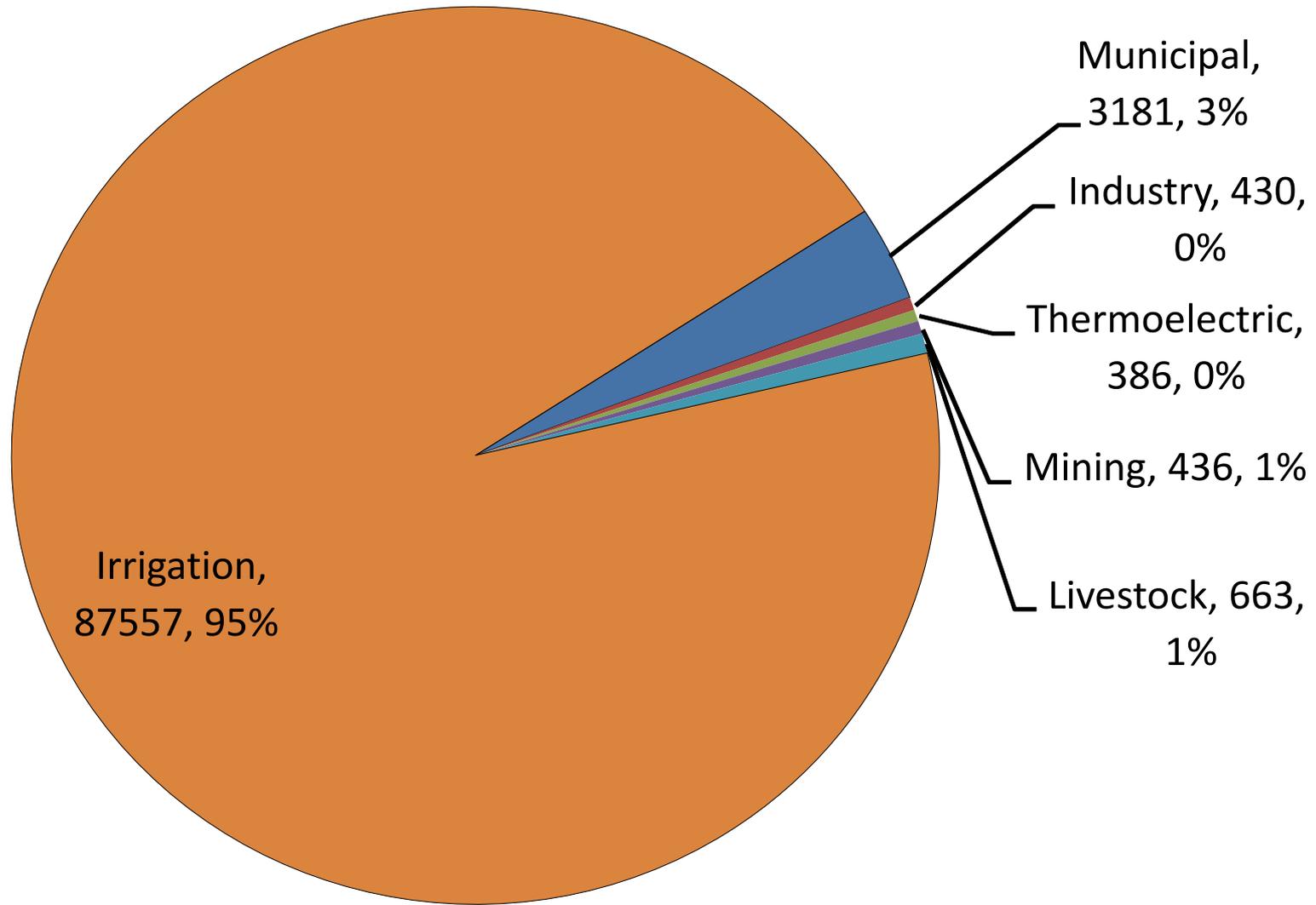
1. Recognize all uses and needs
2. Develop integrated growth impact scenarios (water & energy)
3. Identify present/future water supplies and water use requirements
4. Increase availability & storage capacity
5. Encourage water use efficiency
6. Place an appropriate value on water
7. Facilitate voluntary water transfers, water markets and water banking



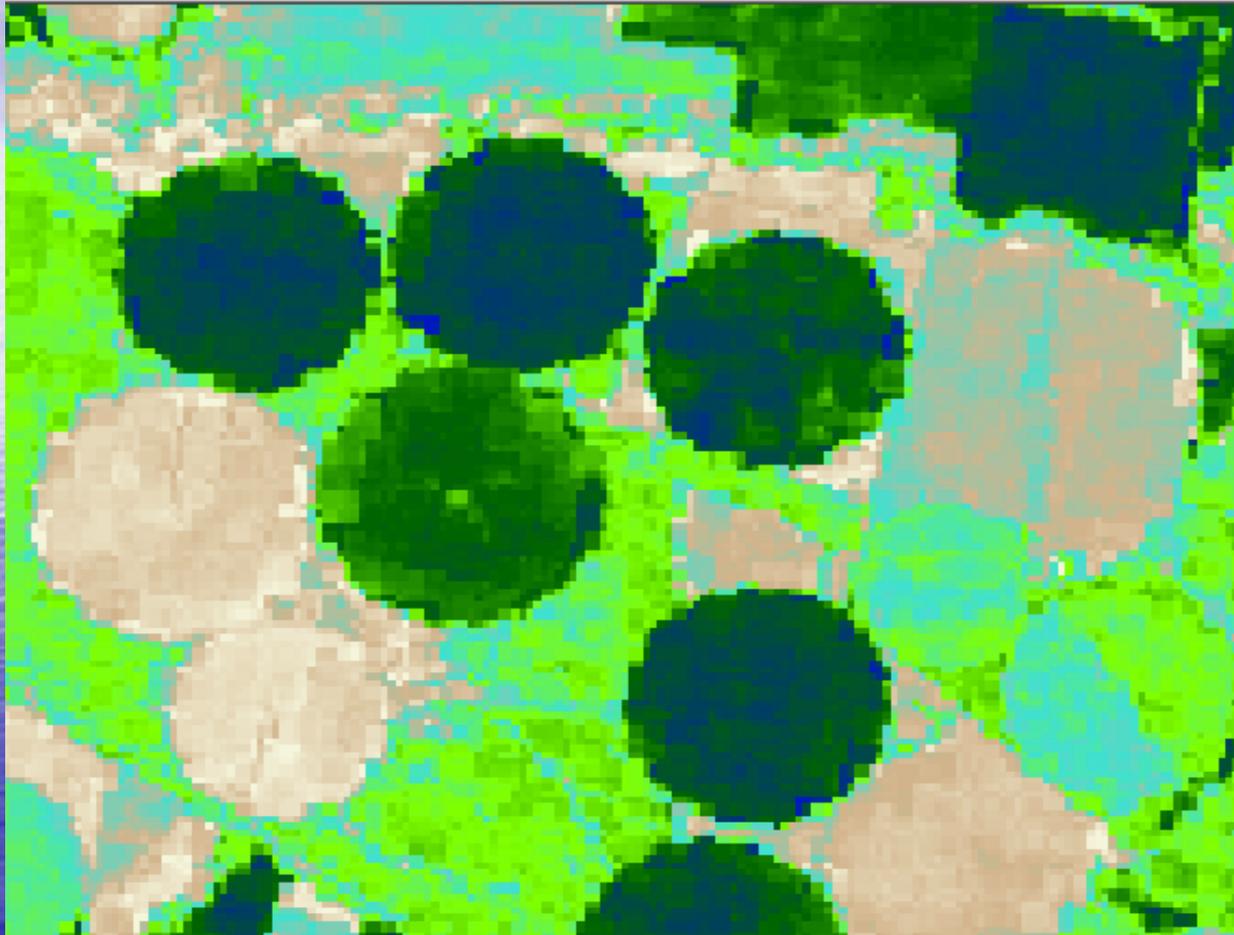
# 2008 WGA Water Report Executive Summary

States (who have the legal responsibility associated with the resource), working with interested stake-holders, should identify innovative ways to allow water transfers from agricultural to urban uses while avoiding or mitigating damages to agricultural economies and environmental values.

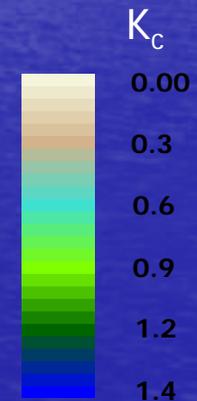
# 2010 Water Consumption (MGD)



# Why use High Resolution Imagery?

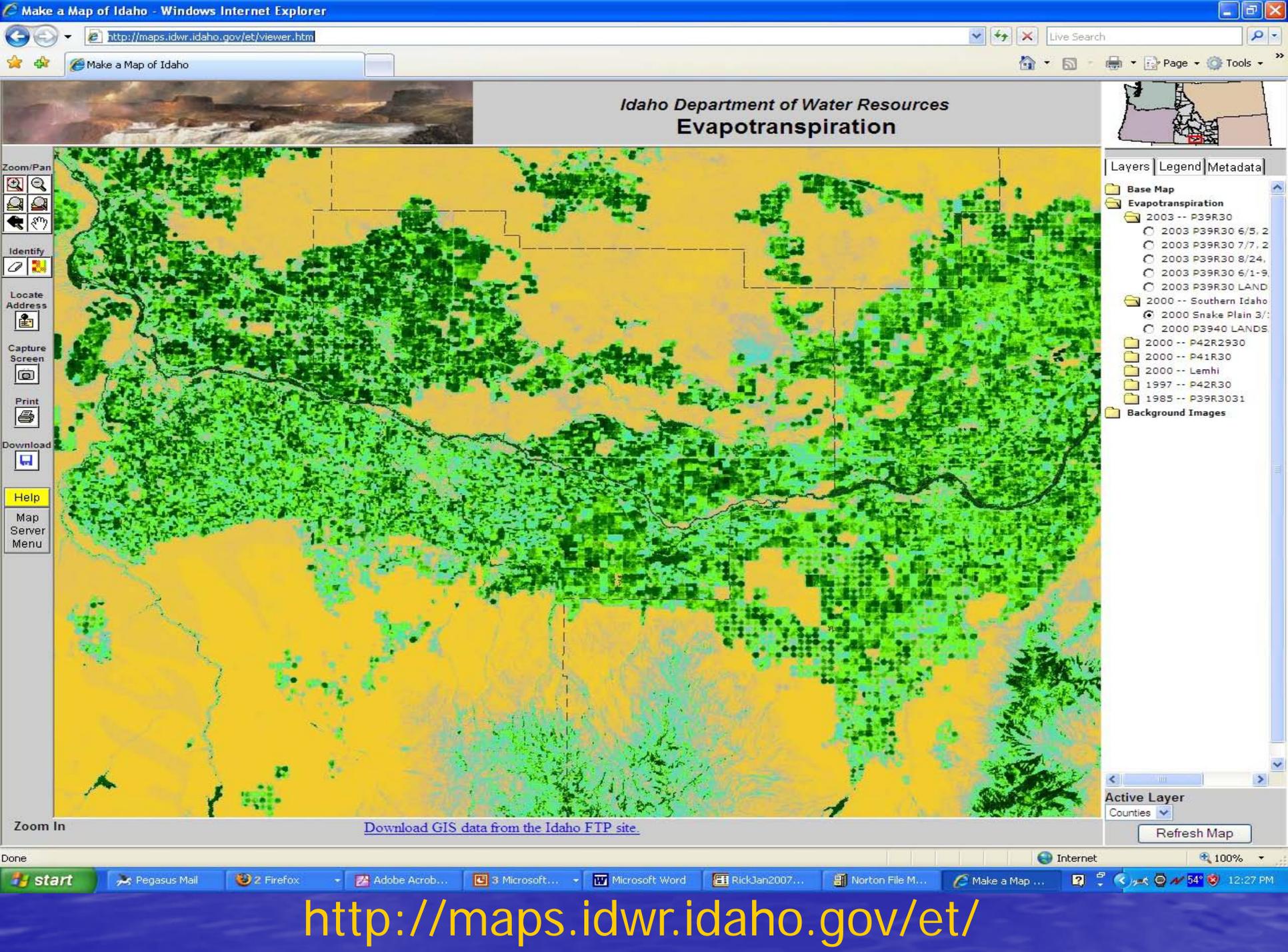


ET from  
Landsat 5  
with thermal  
sharpened to  
30 m

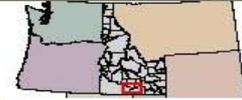


$$(K_c = ET_{act} / ET_{ref})$$

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



# Idaho Department of Water Resources Evapotranspiration



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

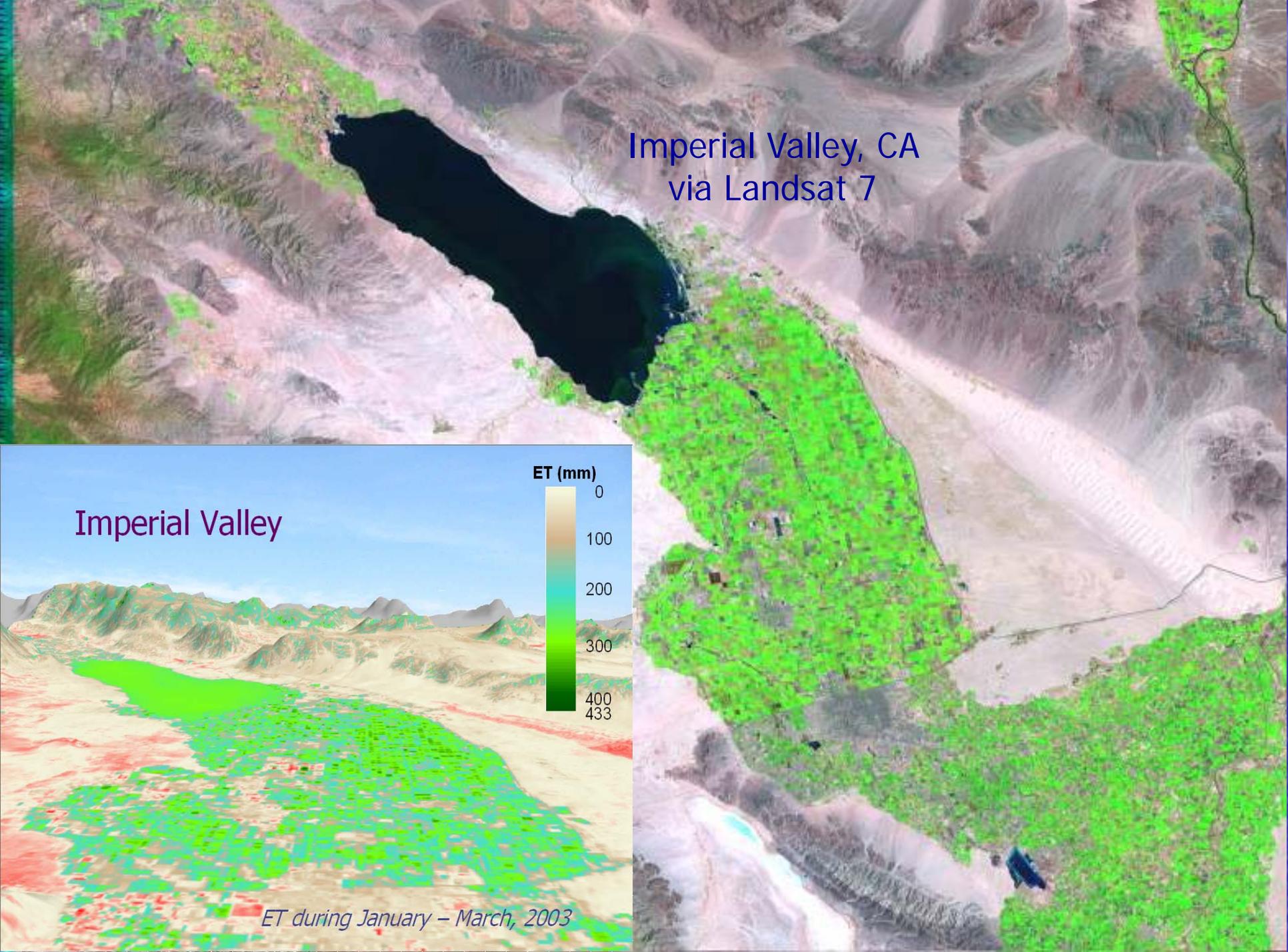
Counties

Refresh Map

[Download GIS data from the Idaho FTP site.](#)

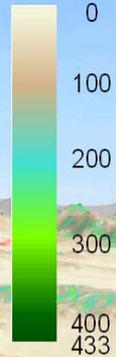
<http://maps.idwr.idaho.gov/et/>

Imperial Valley, CA  
via Landsat 7



Imperial Valley

ET (mm)



*ET during January – March, 2003*

# Successful & innovative water sharing strategies

1. **Agricultural rotational fallowing** for urban supply through leases
2. **Leasing of interruptible supplies** for urban drought relief
3. **Split year leases** between agriculture and environmentalists to keep late season water in the stream for fish
4. **Conjunctive use of groundwater and surface water** for maximum beneficial use for agriculture and cities
5. **Improvements in irrigation efficiencies** to produce conserved water that can be transferred to urban areas.

**Ag-Urban Water Transfers Work Group**

# Successful & Innovative Water Sharing Strategies

6. **Development of collaborative stakeholder processes** to help review and speed processing of temporary transfers
7. **Groundwater banking and recharge**
8. **Creation of new institutional and business forums** to facilitate temporary transfers
9. **Storage projects to provide multi-use benefits and flexibility**
10. **Development of a "best management practices" template** to guide agricultural transfers
11. **State funding for research** and experimentation of transfer methods alternative to permanent dry up of agriculture.

# Infrastructure Needs/Strategies



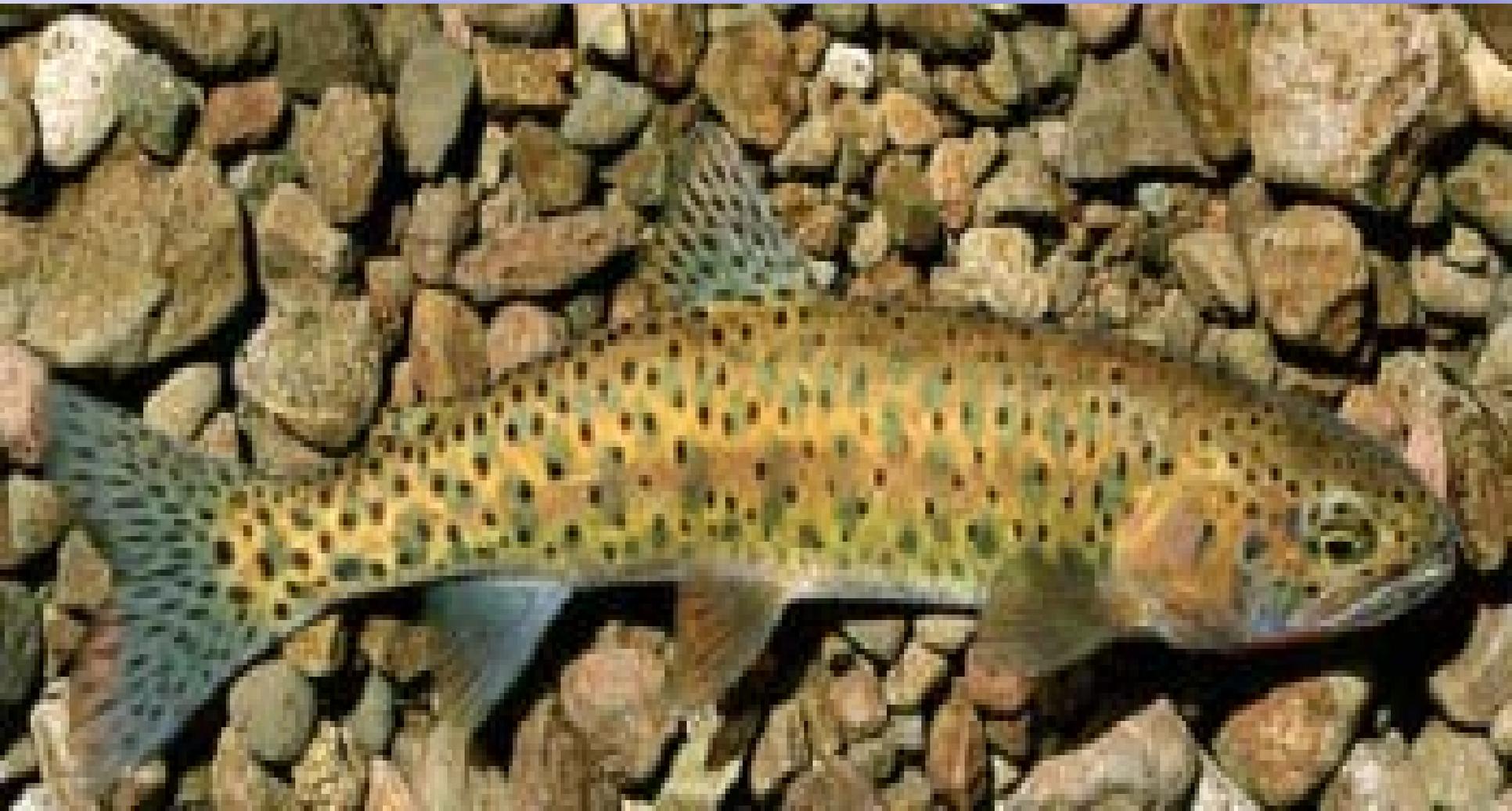
# Augmenting Water Supplies

- Surface Water Storage
- Ground Water Recharge & Conjunctive Use
- Wastewater Reuse
- Desalination (Brackish & Sea Water)
- Weather Modification /Snowpack Augmentation
- Use of Produced Waters/Energy Production

# Water Infrastructure Needs/Strategies

- Identify, prioritize and financing needs
- Water stress as an investment factor
- Quantify risks to human health and safety
- Sound basis for economic growth and environmental improvement
- Long-term asset management and capital budgeting efficiencies
- Public-private partnerships and alternative project services w/returns on investment

# Water Quality Issues



# Water Quality Issues

- Arsenic
- Nutrients
- Sedimentation
- Confined Animal Feeding Operations
- Salinity Control
- Wastewater Treatment (POTWs)
- Pharmaceuticals & Personal Care Products
- Stormwater and Urban Runoff

# Indian Water Right Claims

- Ad Hoc Indian Water Rights Group
- Claims Resolution Act of 2010
- 29 Tribal Water Settlements in 30 years
- 19 DOI Negotiation Teams
- 16 Implementation Teams
- DOI Quarterly Conference Calls
- Settlement Criteria and Standards
- Water Rights Settlement Funding
- Economic Impact/Benefits of Settlements

# WSWC/NARF Settlement Symposium Billings, Montana – Aug. 23-25, 2011



# Climate Change Adaptation

Need for more –

- Applied science to support decisionmaking
- National and regional impact assessments
- Better, more robust forecasting models
- Watershed scaled climate model outputs
- Agreed upon data standards and protocols
- Better understanding of climate drivers
- An internet portal for public/decisionmakers
- Practical climate adaptation strategies



# Aquatic Resources Protection

- Endangered species habitat needs
- Invasive species impacts/costs
- Recreation and aesthetics
- Instreamflow
- Wetlands
- Bays and estuaries
- Environmental services/quantification



## 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 & Atmo-  
spheric Administration  
Natural Resources  
Conservation Service  
U.S. Fish & Wildlife Service  
U.S. Forest Service  
U.S. Geological Survey  
  
U.S. Department of Energy  
National Aeronautics and  
Space Administration

# Building Partnerships

- Western States Federal Agency Support Team (WestFAST)
- Local Government/Conservation Districts
- Western Farming/Water Organizations
- Academic and Research Community
- Private Industry
- Environmental Community
- Native American Community

# The Future of Water in the West?



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