

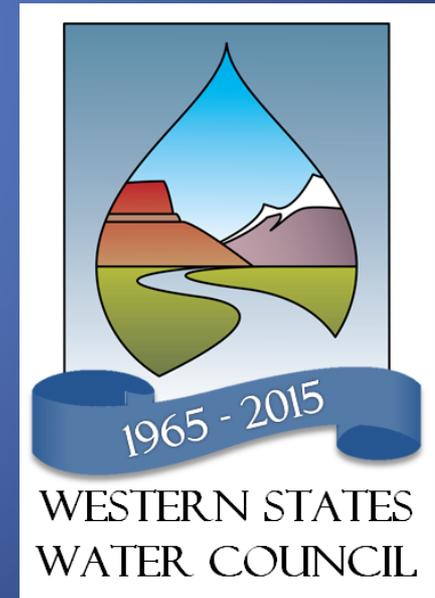
Water Resources Management The Future of the West

Sustainable Water Resources Roundtable



July 19, 2016

Tony Willardson
Executive Director

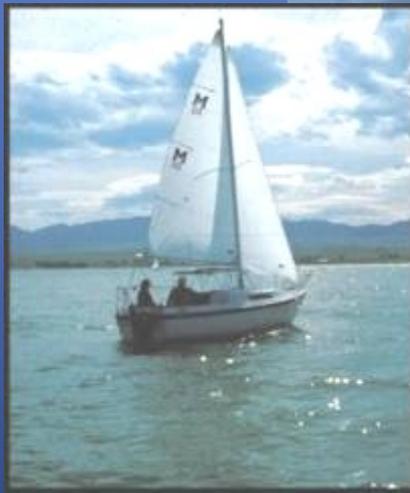
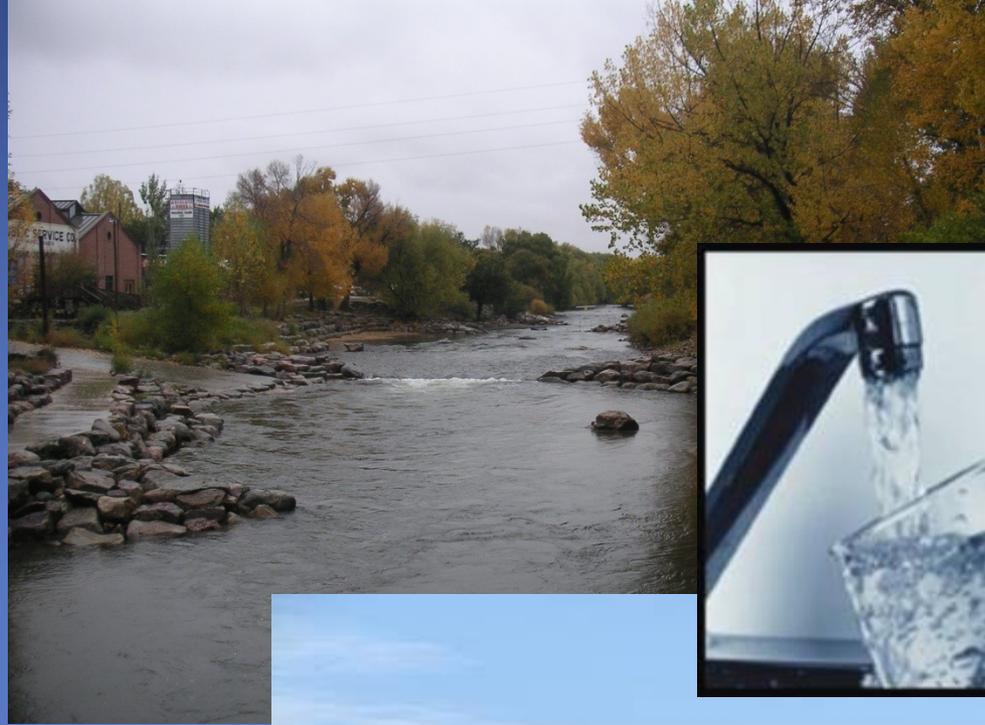


Western States Water Council



- Advisory body to 18 western Governors on water policy issues
- Provides states collective voice
- Fosters collaboration
- Working with the Western Governors' Association (WGA)

The future growth and prosperity of the western states depend upon the availability of adequate quantities of water of suitable quality



Water Needs and Strategies for a Sustainable Future



1. Growth and Water Policy Nexus
2. Meeting Future Water Demands
3. Water Infrastructure Needs and Strategies
4. Resolution of Indian Water Rights Claims
5. Climate Change – Drought/Floods
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.

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. Geological Survey
U.S. Department of Energy
National Aeronautics and
Space Administration
U.S. Department of Defense
National Park Service

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







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.

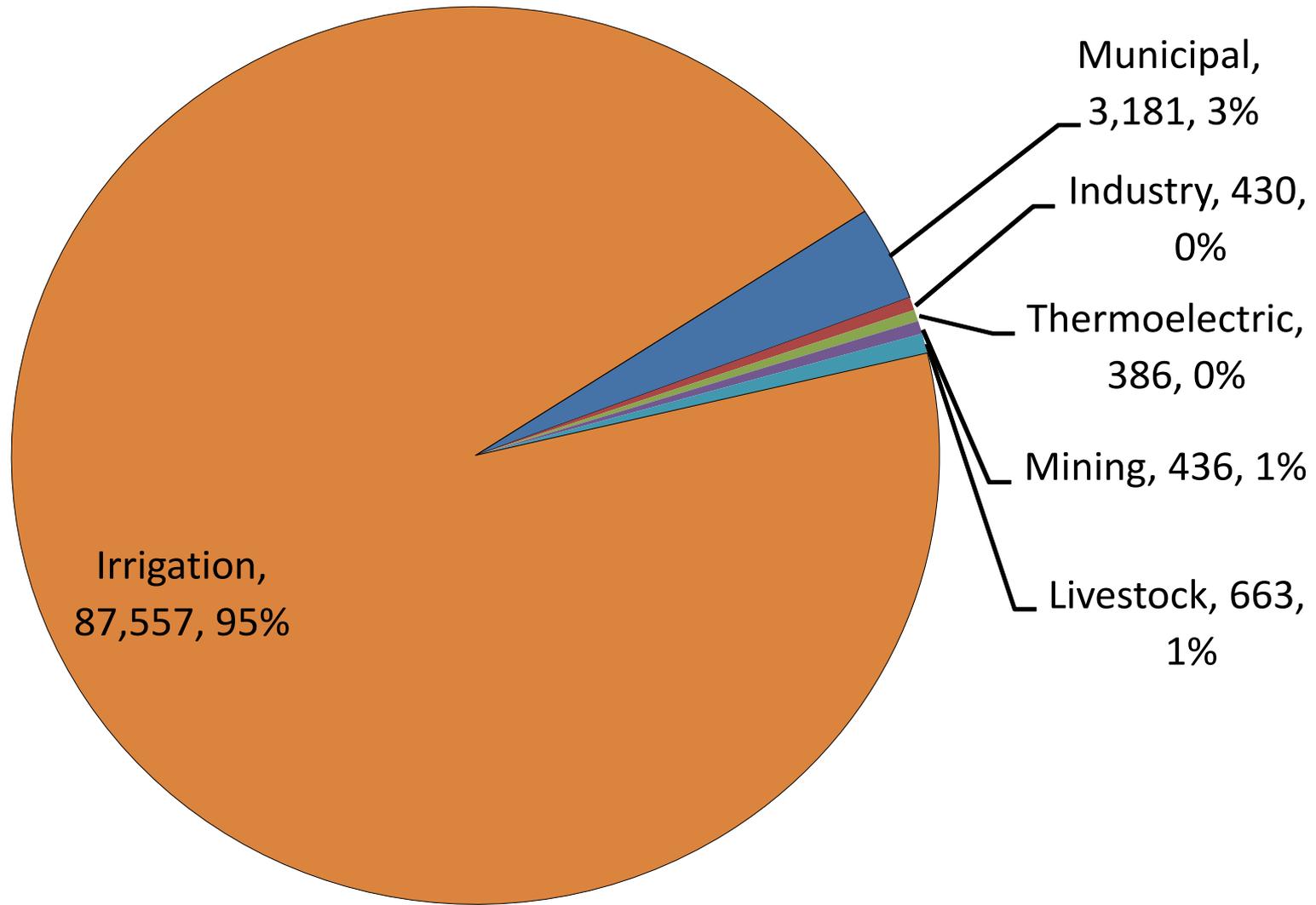
In the future, we may not be able to sustain unlimited growth and still maintain our current quality of life. Difficult political choices will be necessary....

It is obvious that changing demographics and values placed on various water uses is transforming the future of water management.

New uses to accommodate growth must largely rely on water obtained from changes to existing uses of surface and ground water, with limited opportunities to develop new supplies.

In many instances, this will result in the reallocation of water to “higher valued uses.”

2010 Water Consumption (MGD)

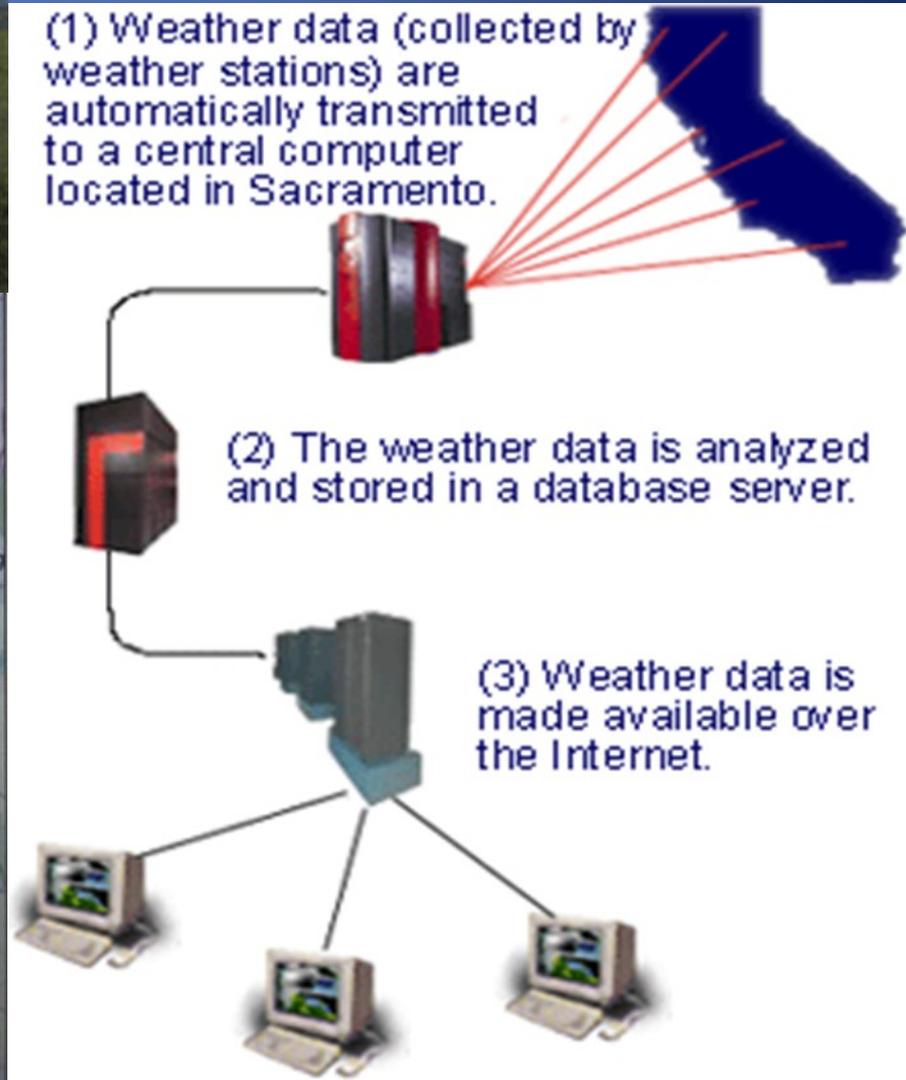


IRRIGATE LIKE A PRO

California Irrigation Management Information System



(1) Weather data (collected by weather stations) are automatically transmitted to a central computer located in Sacramento.





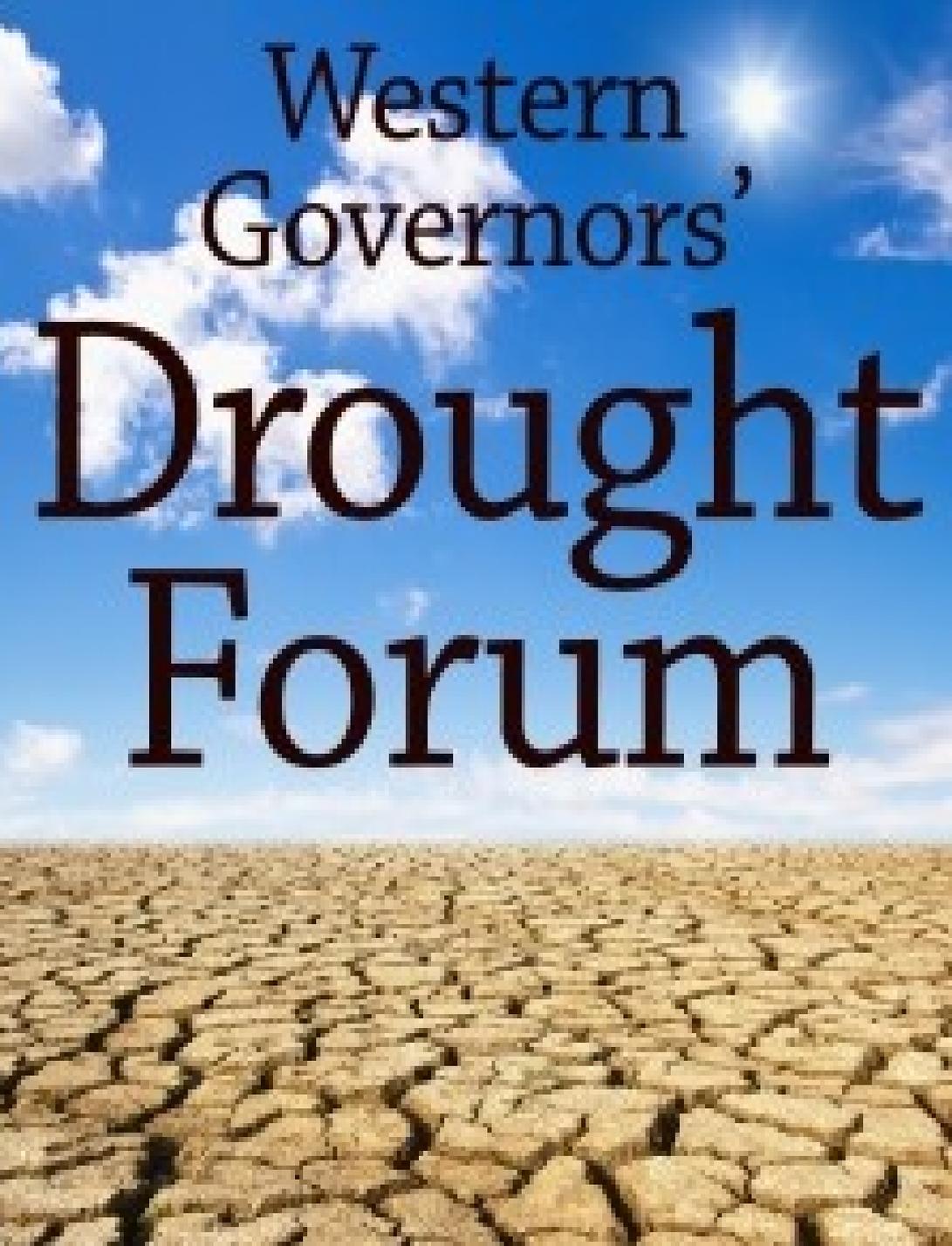
Water Transfers in the West



PROJECTS, TRENDS,
and LEADING PRACTICES in
VOLUNTARY WATER TRADING

DECEMBER 2012





Western Governors' Drought Forum

- KEY THEMES
- Data and Analysis
- Produced, Reused and Brackish Water
- Forest Health and Soil Stewardship
- Water Conservation and Efficiency
- Infrastructure and Investment
- Working within Institutional Frameworks
- Communication and Collaboration

WGA Policy Resolution 2015-8

Western Governors:



- Collect, maintain & enhance use of basic data
- Support critical federal programs that provide important basic water supply information – snow, precipitation, streamflow, groundwater, ET, etc.
- Recognize the essential role of federal partnerships and need for coordination on water data.
- Potential water impacts of extreme weather events
- Communicate & share best management practices

Comparative variability of Western precipitation

Coefficient of Variation, Water Year 1951-2008

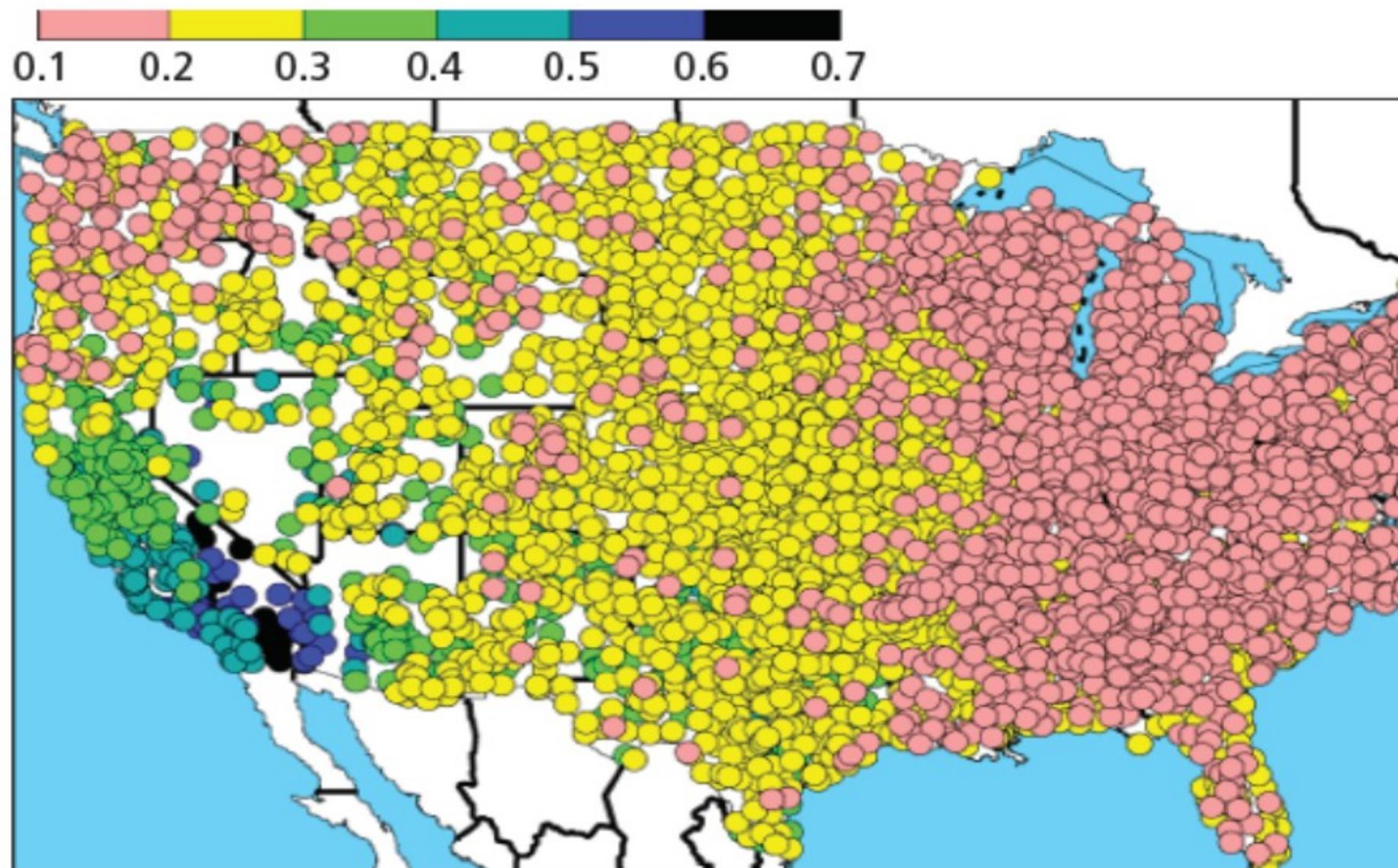


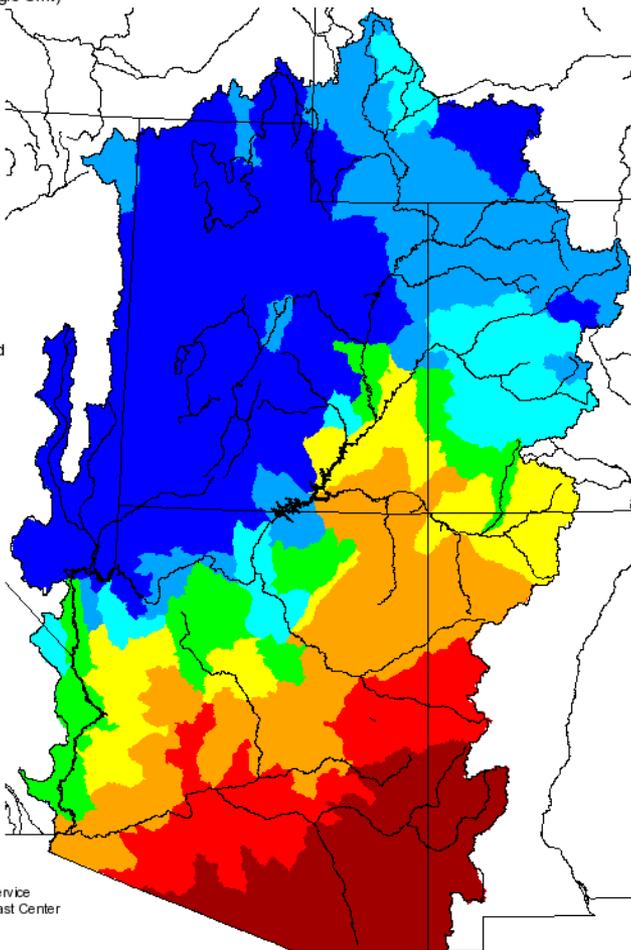
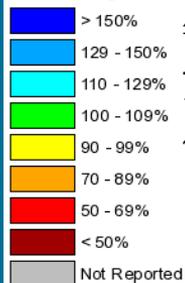
Figure provided courtesy of Mike Dettinger, USGS

Very wet to very dry year...

Seasonal Precipitation, October 2010 - May 2011

(Averaged by Hydrologic Unit)

% Average

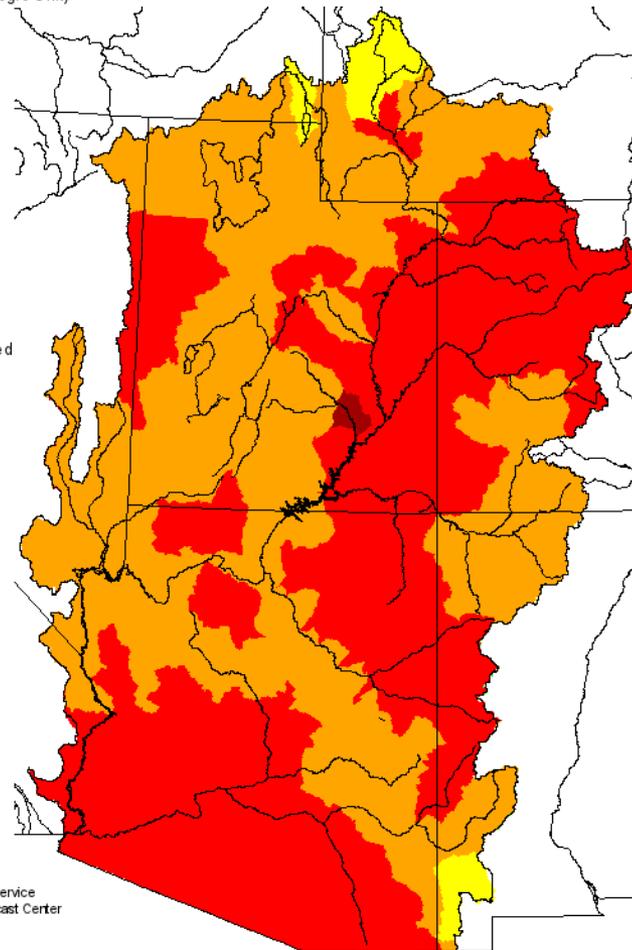
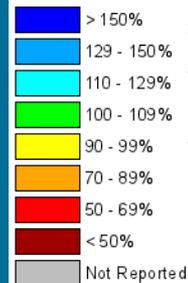


Prepared by
NOAA, National Weather Service
Colorado Basin River Forecast Center
Salt Lake City, Utah
www.cbafc.noaa.gov

Seasonal Precipitation, October 2011 - May 2012

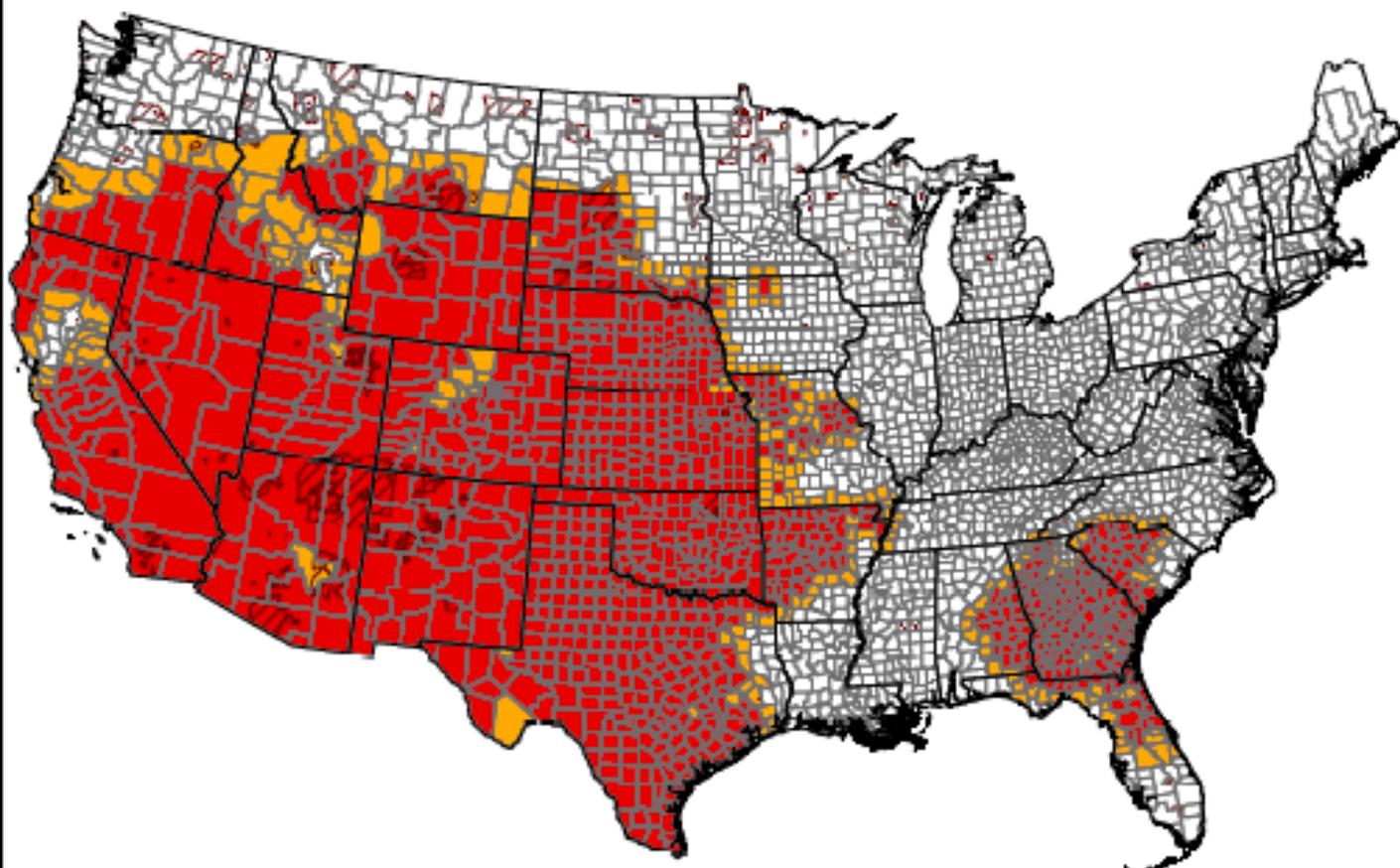
(Averaged by Hydrologic Unit)

% Average



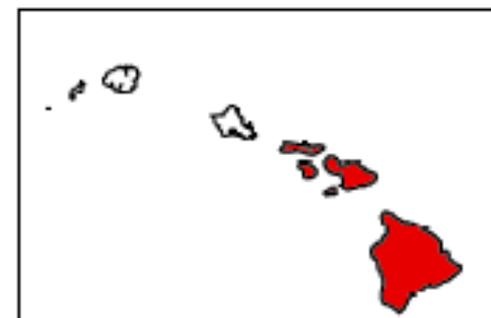
Prepared by
NOAA, National Weather Service
Colorado Basin River Forecast Center
Salt Lake City, Utah
www.cbafc.noaa.gov

2013 Secretarial Drought Designations - All Drought



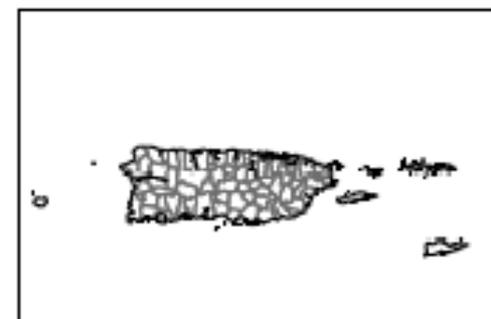
Alaska

1:51,251,424



Hawaii

1:10,497,969



Puerto Rico

1:5,962,550

Secretarial Drought Designations for 2013

Disaster Incidents as of August 14, 2013

-  State Boundary
-  County Boundary
-  Tribal Lands
- August 14, 2013
-  Primary Counties: 1037
-  Contiguous Counties: 280



USDA Farm Service Agency
Production, Emergencies and Compliance Division
Washington, D. C.
August 14, 2013

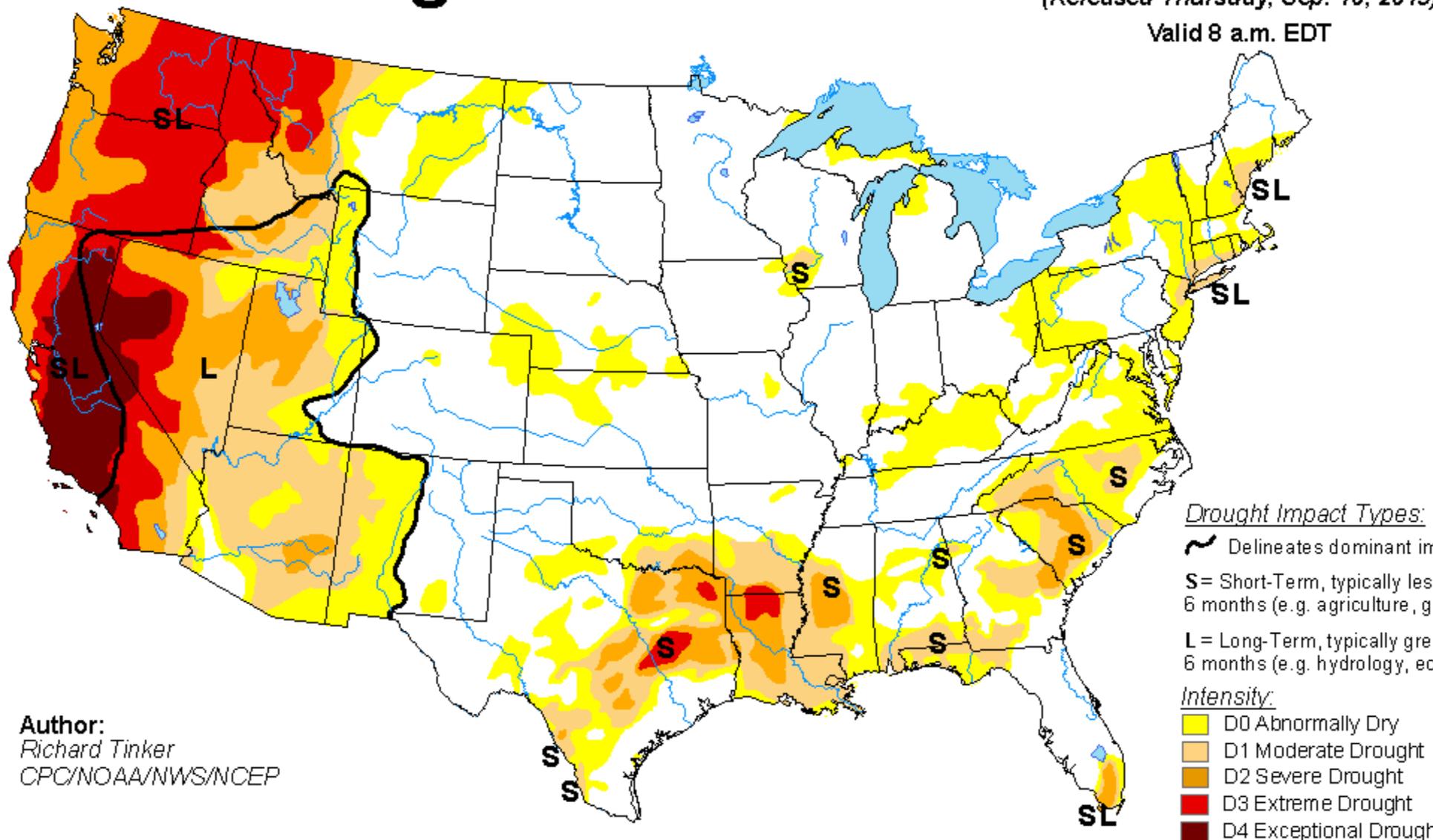
1:23,721,366

U.S. Drought Monitor

September 8, 2015

(Released Thursday, Sep. 10, 2015)

Valid 8 a.m. EDT



Author:
Richard Tinker
CPC/NOAA/NWS/NCEP

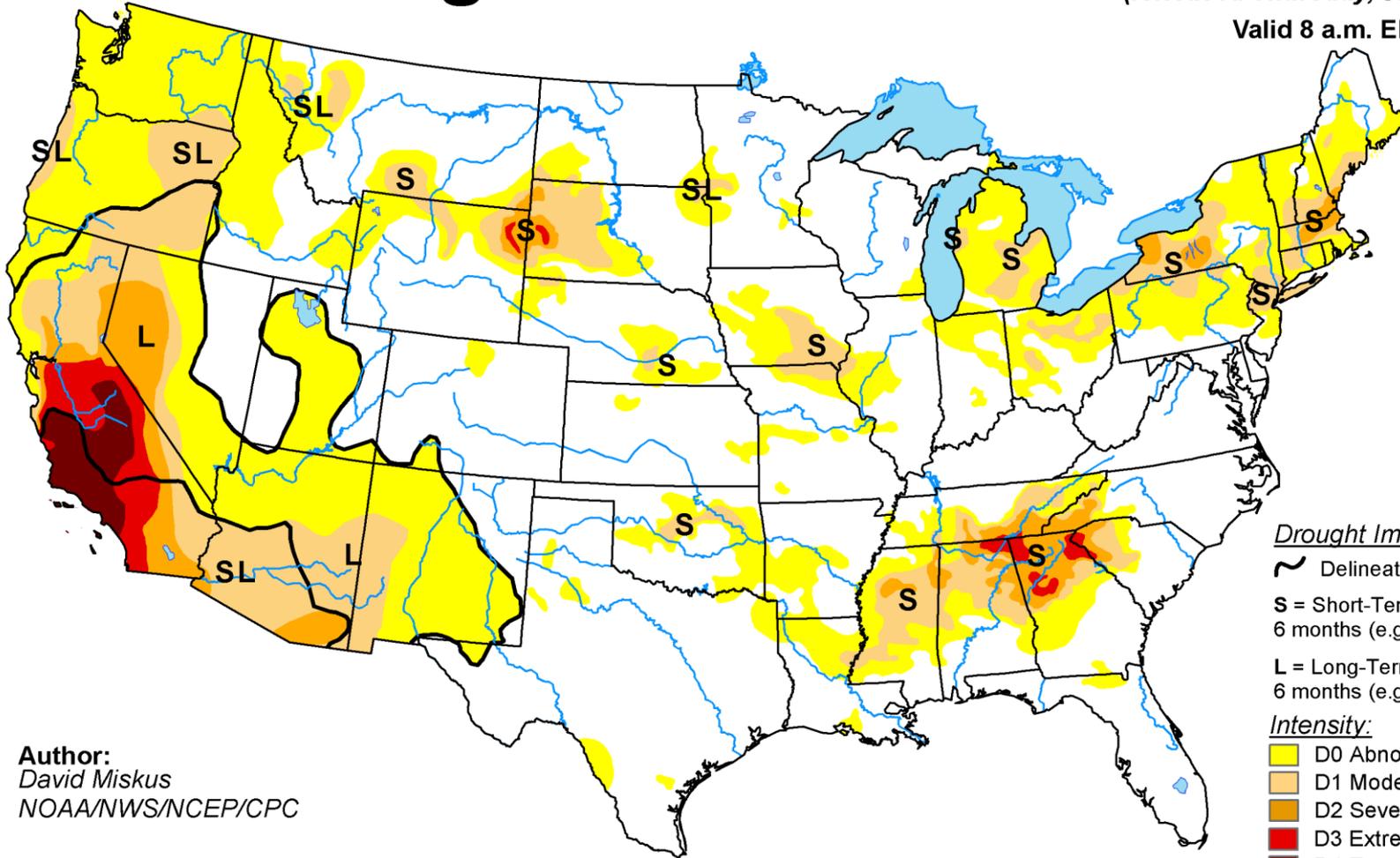
The Drought Monitor focuses on

U.S. Drought Monitor

July 12, 2016

(Released Thursday, Jul. 14, 2016)

Valid 8 a.m. EDT



Author:
David Miskus
NOAA/NWS/NCEP/CPC

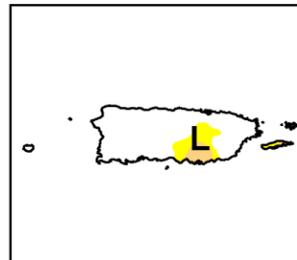
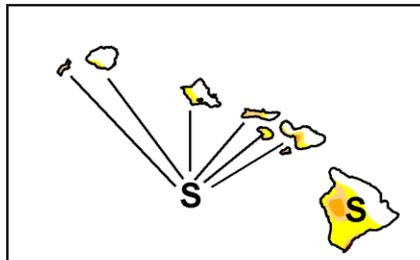
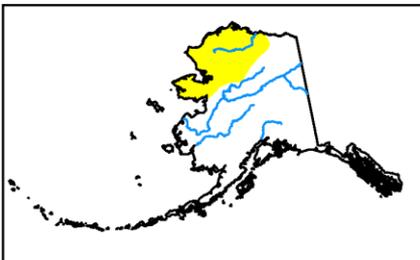
Drought Impact Types:

- ~ Delineates dominant impacts
- S = Short-Term, typically less than 6 months (e.g. agriculture, grasslands)
- L = Long-Term, typically greater than 6 months (e.g. hydrology, ecology)

Intensity:

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.



<http://droughtmonitor.unl.edu/>

Improving
Sub-Seasonal to Seasonal
Precipitation Forecasting for
Water Management



WESTERN
STATES
WATER
COUNCIL

Will this year be dry/wet?

Is there enough water to
meet current demands?

Should we curtail use?

Do we raise rates?

Can we buy supplemental
supplies from water bank?

How much precipitation is
needed to end the drought?

Can we store more water for
next year? How? Where?

Can we use the flood pool?

Should we release water?

What should the public
know?

What do we need to know to balance our short/long term water budget?

- What's our income?

Precipitation

Streamflow

Ground water recharge

- How much is in savings?

Snowpack

Groundwater

Soil moisture

SW/GW storage & capacity

- How much is my net worth?

- What are your fixed costs?

Water rights

Priority uses

Tribal/Federal water rights

- Who's writing checks?

Agriculture

Municipal & Industrial

Energy

Environment

Recreation

Risk and Uncertainty

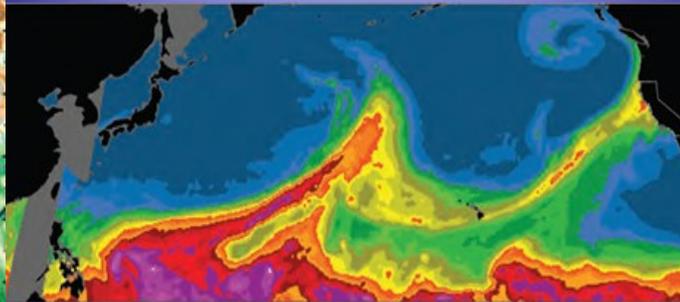
- General lack of data on water needs and past, present and future uses
- Increasing population & energy needs
- Climate change and variability
- Endangered species' and other instream uses and outflows to bays and estuaries
- Unquantified Native American water rights

Priority State & Federal Actions

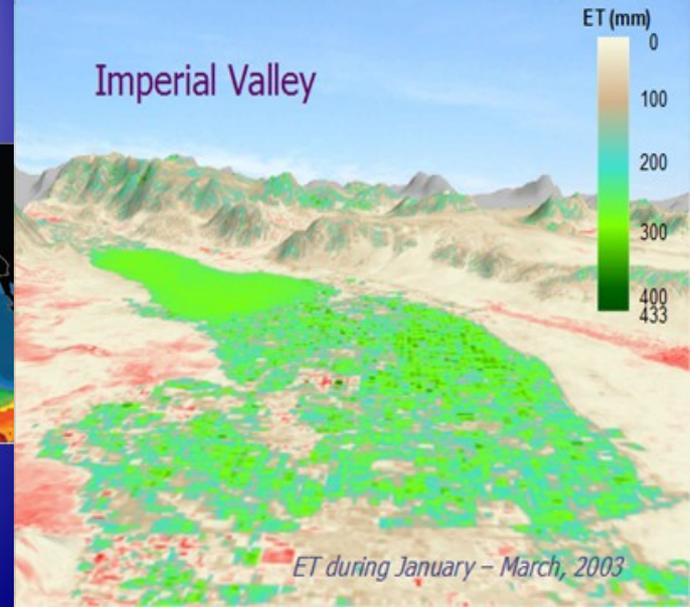
- Increase support/funding for data
- Identify and close data gaps
- Gather/disseminate real-time data
- Foster remote sensing capabilities
- Reduce costs through innovation



Atmospheric Rivers



Imperial Valley





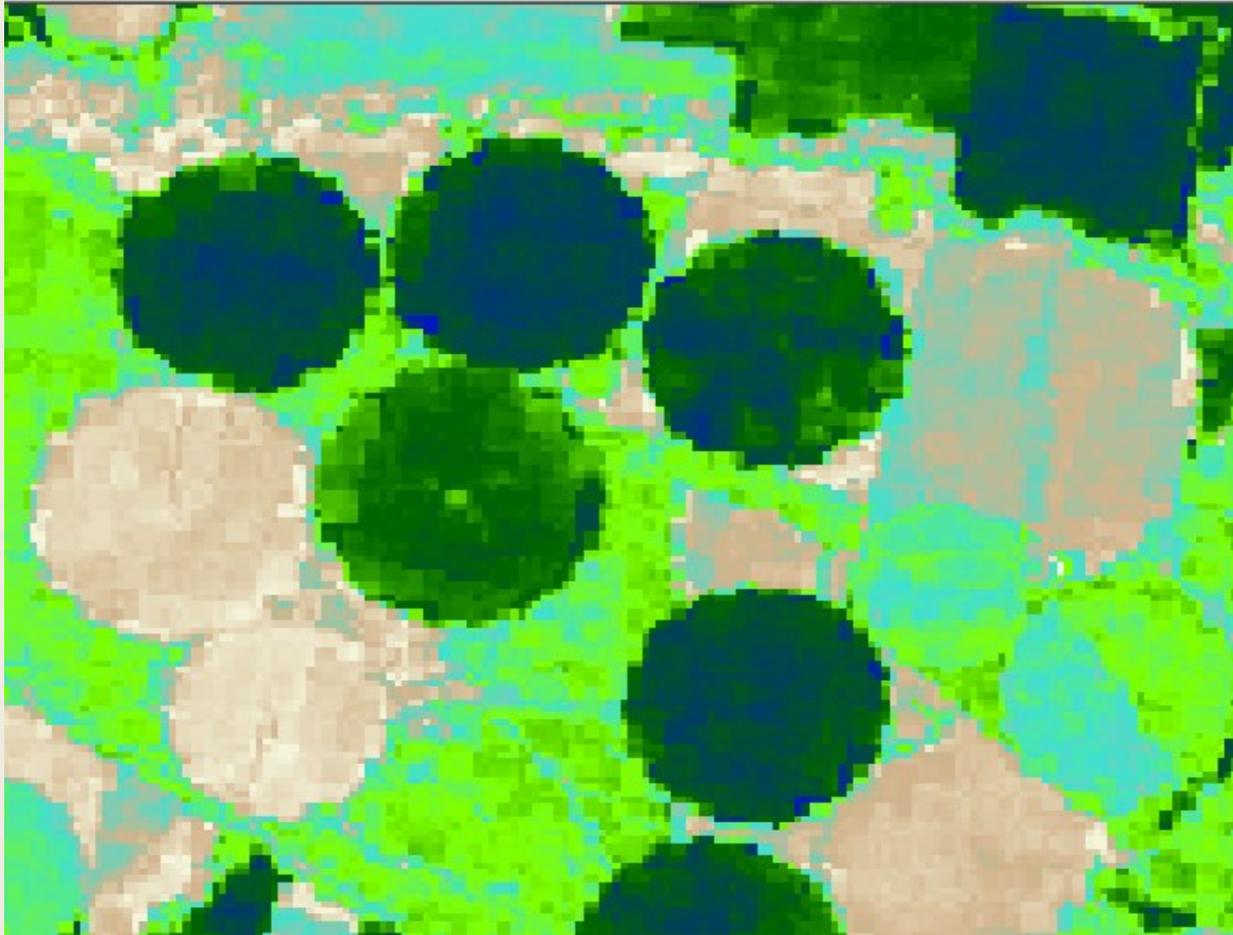
EROS • GSFC • KSC



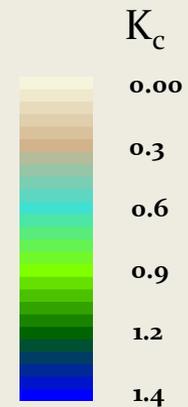
LDCM

LANDSAT
Data Continuity Mission
NASA • USGS

Why use High Resolution Imagery?



ET from
Landsat 5
with thermal
sharpened to
30 m

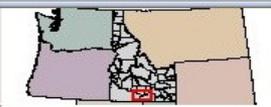


$$(K_c = ET_{act} / ET_{ref})$$

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



Idaho Department of Water Resources Evapotranspiration



Zoom/Pan

Identify

Locate Address

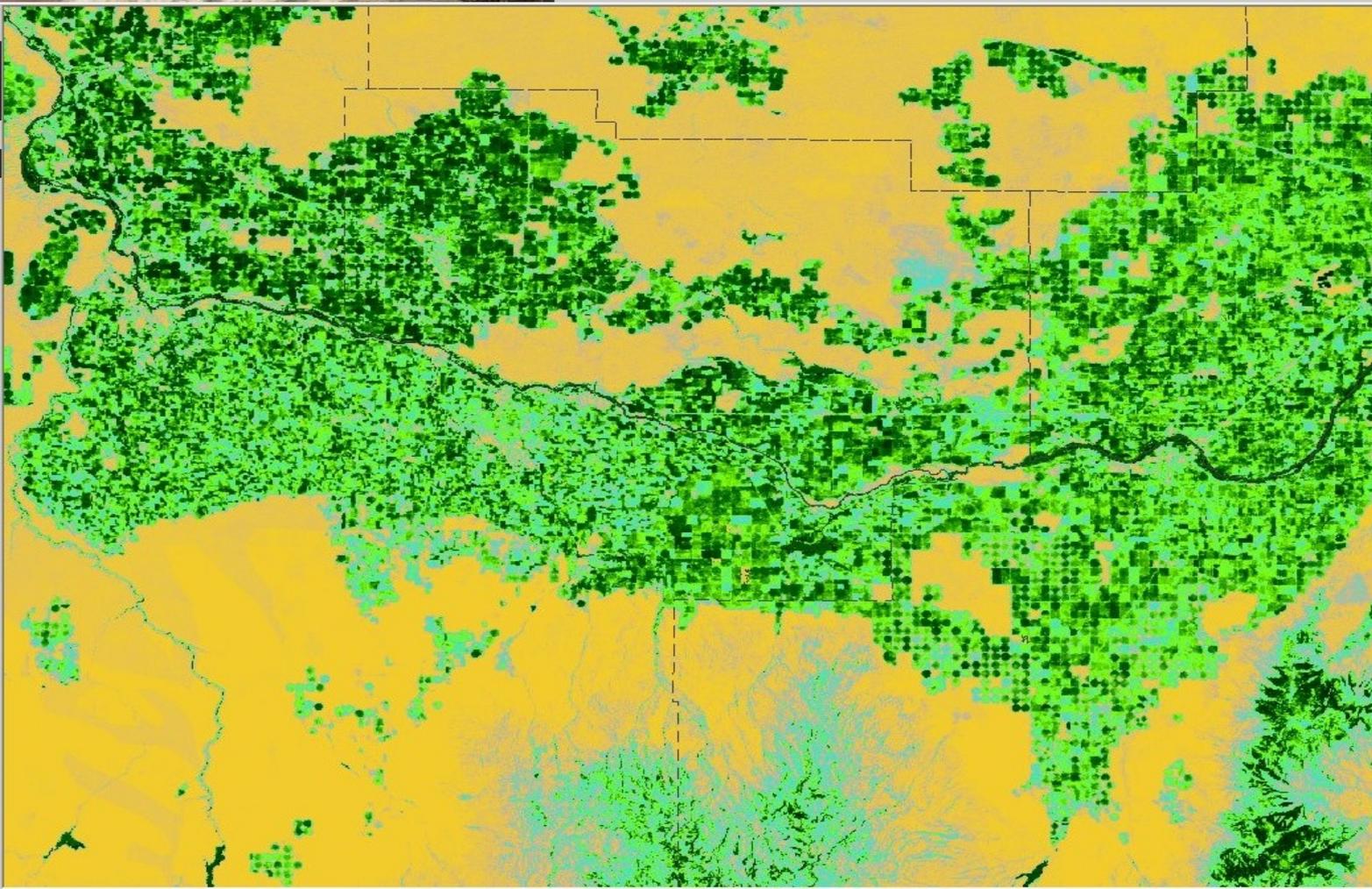
Capture Screen

Print

Download

Help

Map Server Menu



Layers | Legend | Metadata

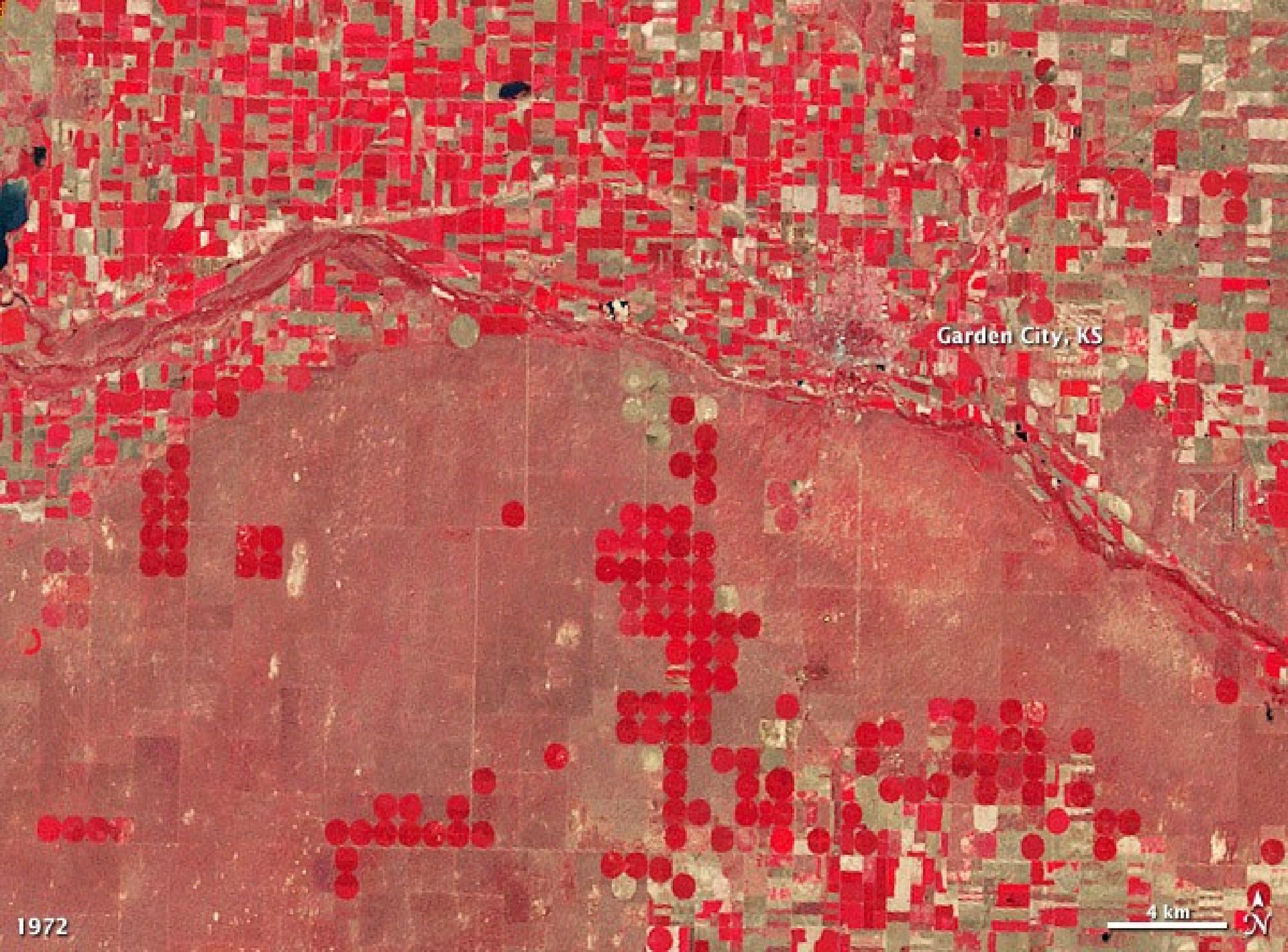
- Base Map
- Evapotranspiration
 - 2003 -- P39R30
 - 2003 P39R30 6/5, 2
 - 2003 P39R30 7/7, 2
 - 2003 P39R30 8/24,
 - 2003 P39R30 6/1-9,
 - 2003 P39R30 LAND
 - 2000 -- Southern Idaho
 - 2000 Snake Plain 3/:
 - 2000 P3940 LANDS
 - 2000 -- P42R2930
 - 2000 -- P41R30
 - 2000 -- Lemhi
 - 1997 -- P42R30
 - 1985 -- P39R3031
- Background Images

Active Layer

Counties

Refresh Map

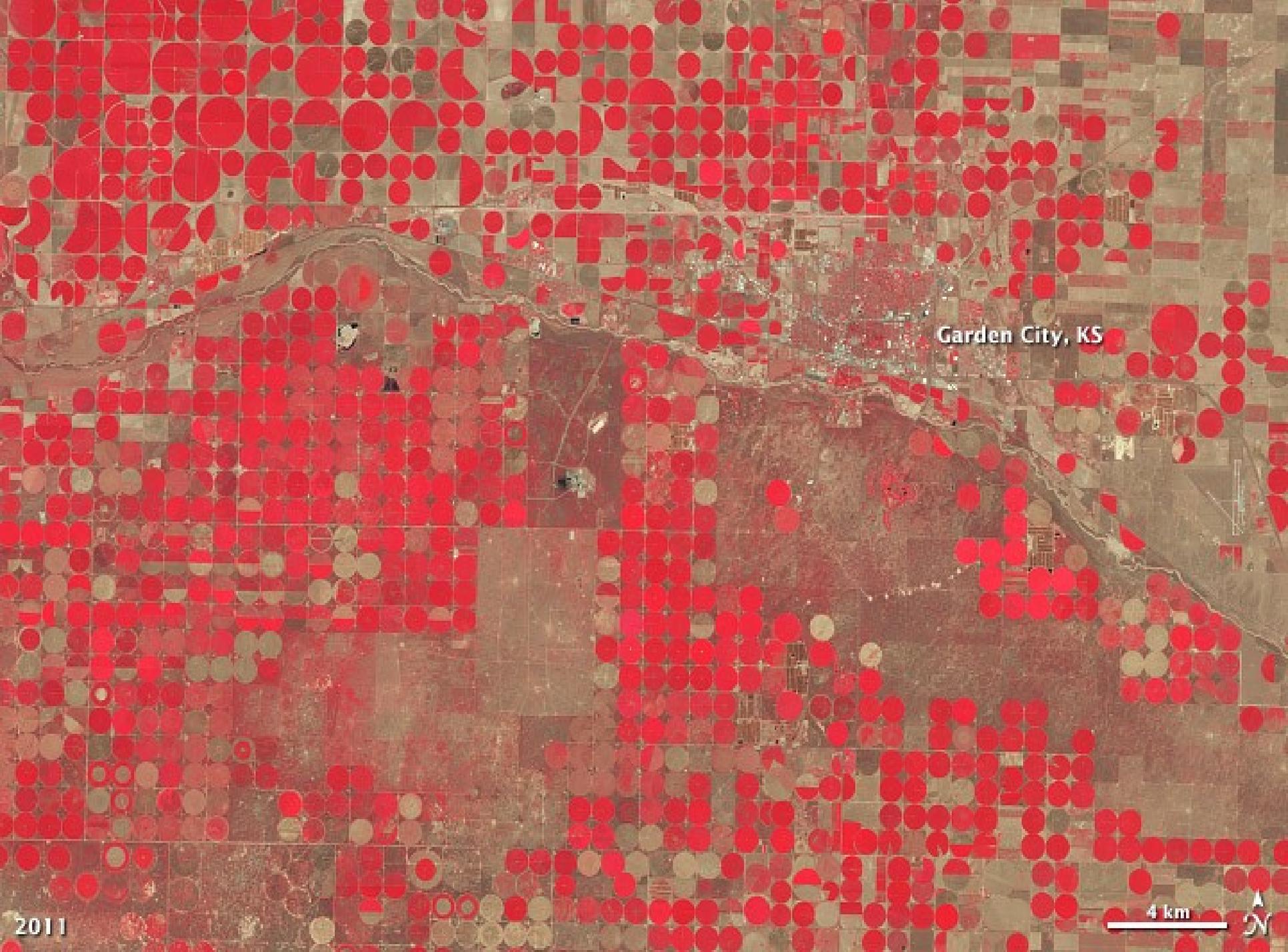
Zoom In [Download GIS data from the Idaho FTP site.](#)



Garden City, KS

1972





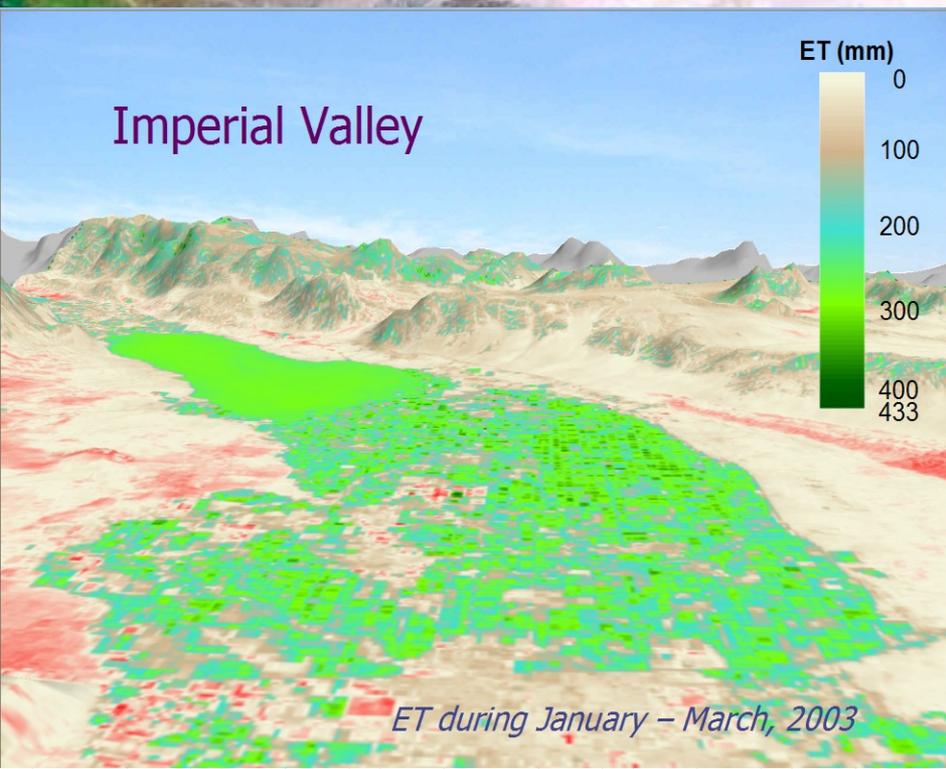
Garden City, KS

2011

4 km



Imperial Valley, CA
via Landsat 7



NASA/USGS
Landsat Satellite



NOAA
Atmospheric
River
Observatory



NWS
Co-Co Program
Rain Gauge



NCEC
Snow Pillow



NOAA
Snow Land
Radar



USGS
Monitoring Well



USGS
Streamgauge



NWS
Evaporation Pan



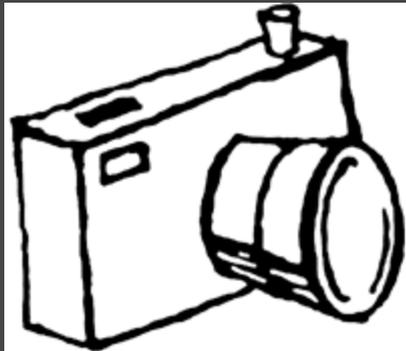
NOAA
TAO Array Buoy
(Tropical Atmosphere Ocean)





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

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).

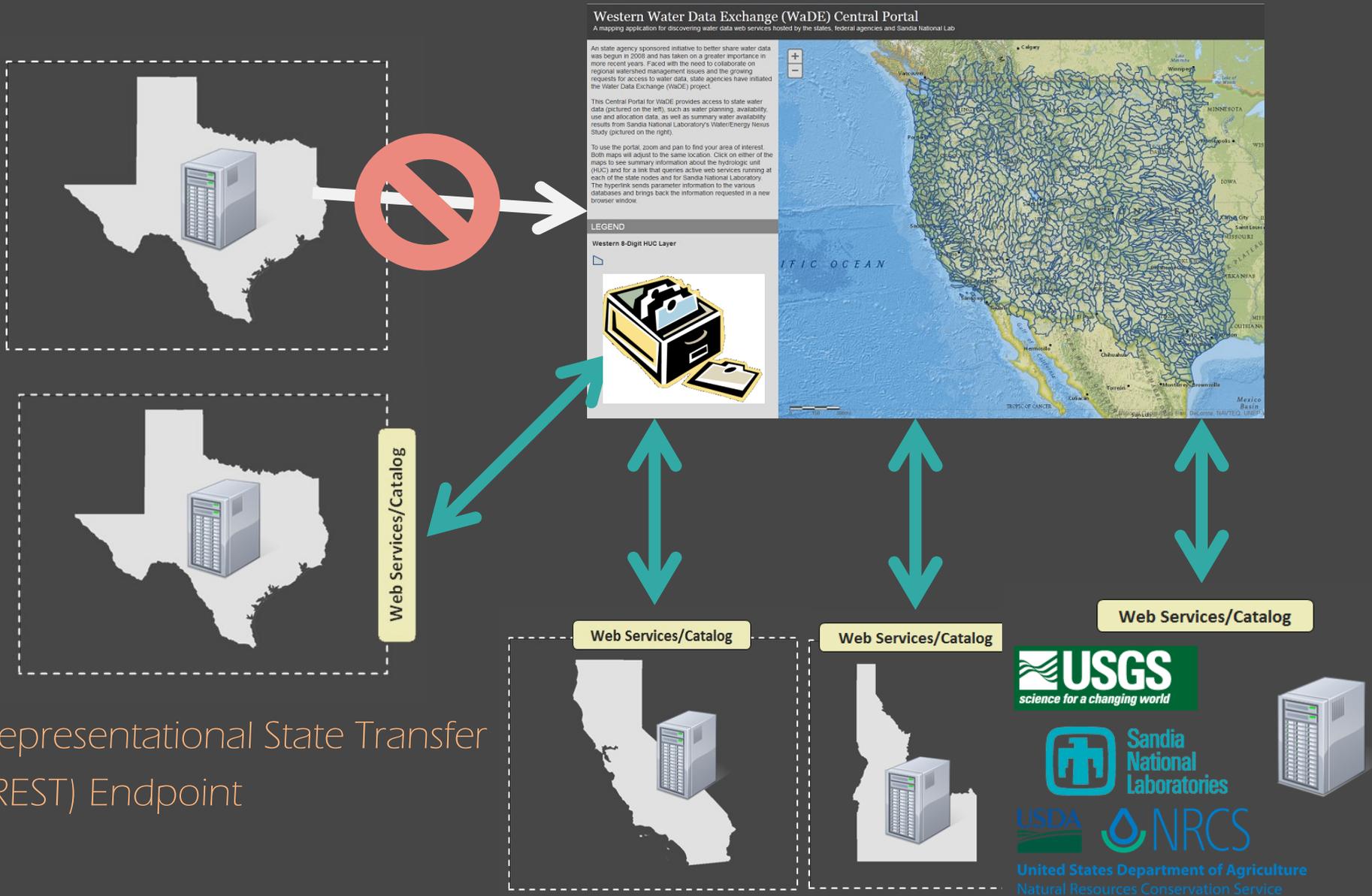
To use the portal, zoom and pan to find your area of interest. Both maps will adjust to the same location. Click on either of the maps to see summary information about the hydrologic unit (HUC) and for a link that queries active web services running at each of the state nodes and for Sandia National 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



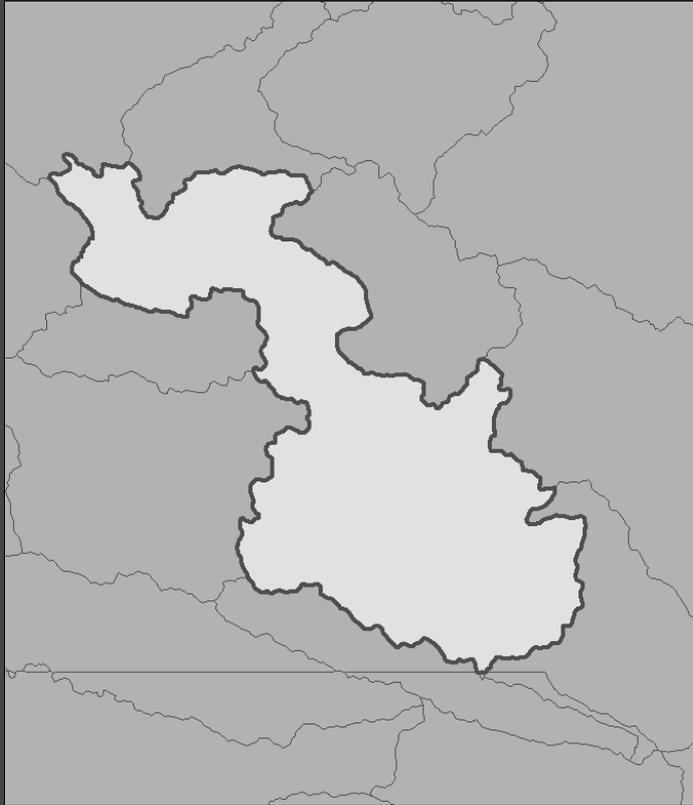
HOW DOES IT WORK?



Representational State Transfer (REST) Endpoint

<http://www.state.us/webservices/GetSummary>

WHAT WILL IT PROVIDE?



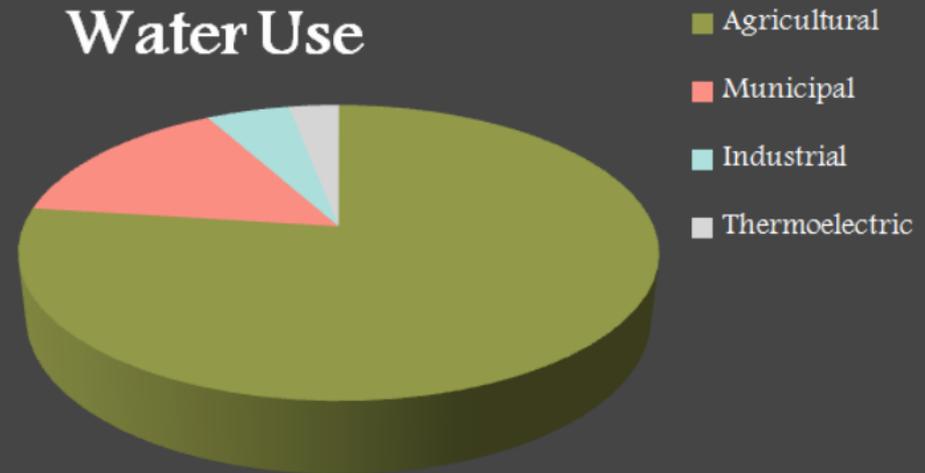
Summaries of Data

7,550 acre-feet

Water Availability



Water Use



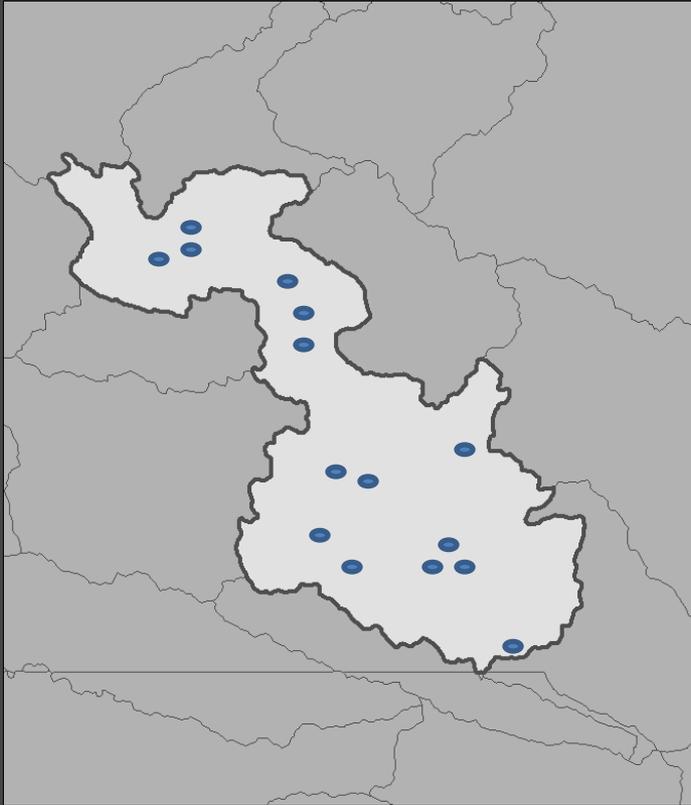
Water Supply Summary: 24,000 acre-feet

Regulatory & Allocation Summaries:

- Groundwater Management Areas
- % of Allocations by Beneficial Use Category

2,850 acre-feet

More Detailed Data



Allocation Data

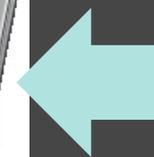
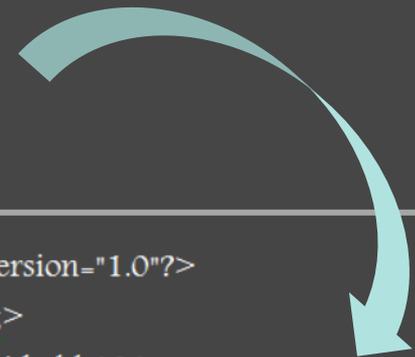
- Owner
- Beneficial Use
- Status
- Priority Data

Diversions

Uses (withdrawn)

Return Flows

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with XML.</description>
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    <description>A former architect battles corpor.
an evil sorceress, and her own childhood to bec
```



FUTURE STEPS:
States plugged in,
grants, accessing
federal data too

QUESTIONS?

Tony Willardson

Executive Director

Western States Water Council

twillardson@wswc.utah.gov

801-685-2555