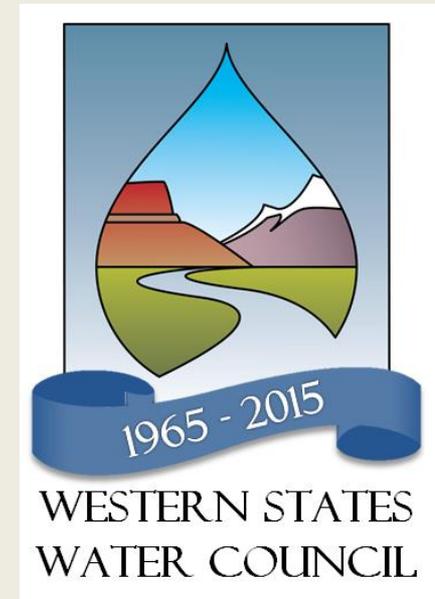


ET Mapping for Water Resources Management

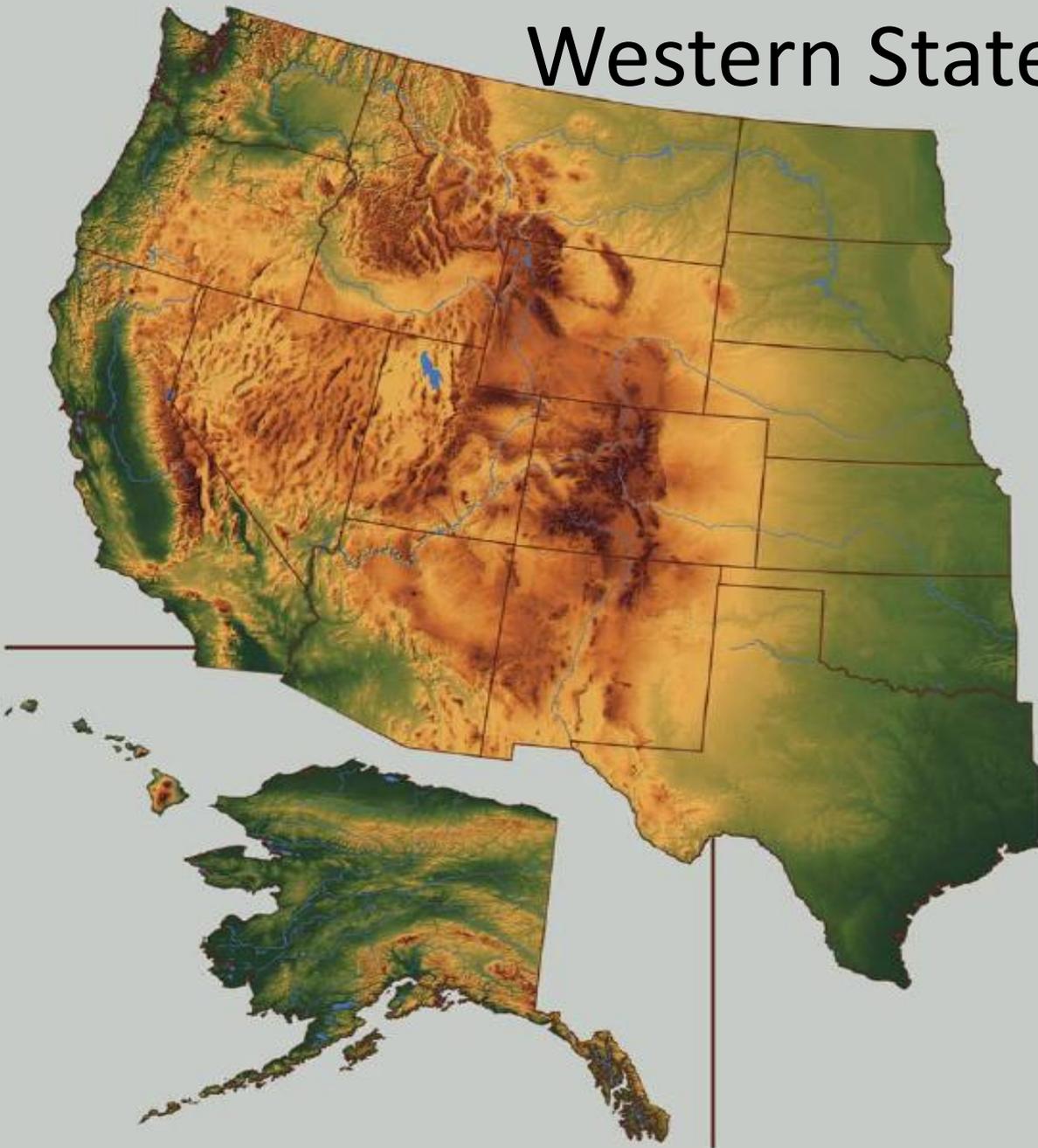
NASA/World Bank
Workshop/Webinar

September 15, 2015

Tony Willardson
Executive Director

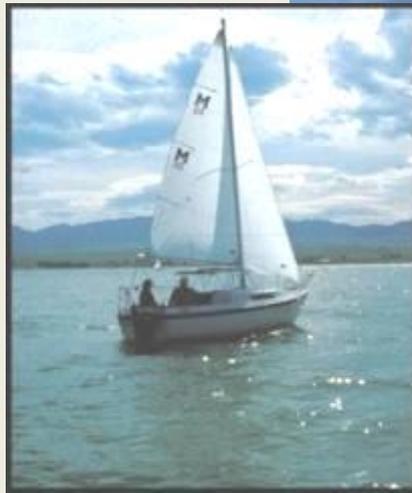
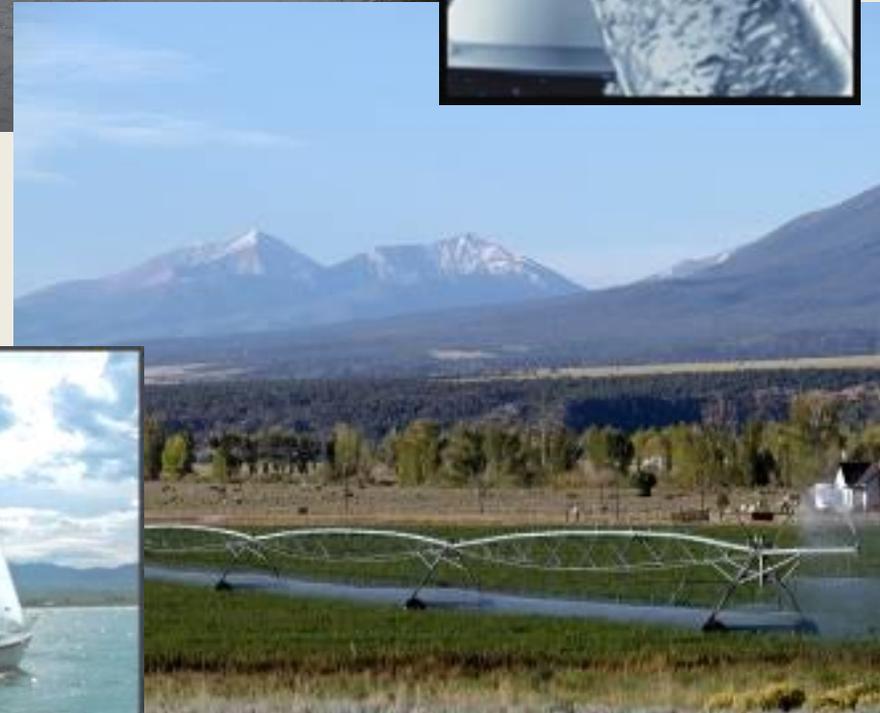
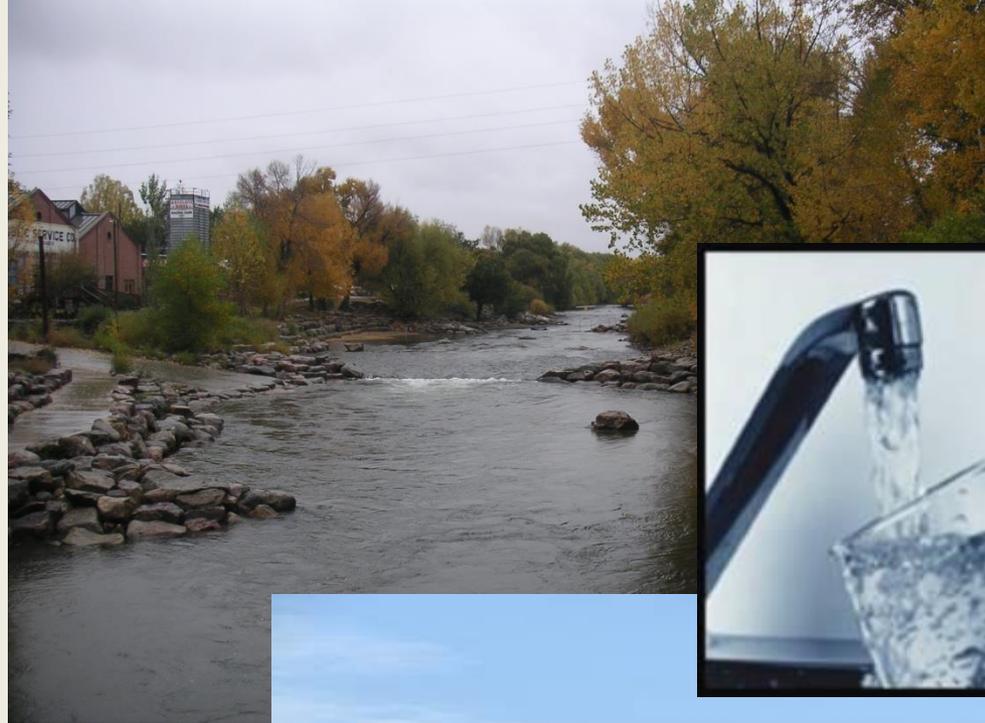


Western States Water Council



- 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
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



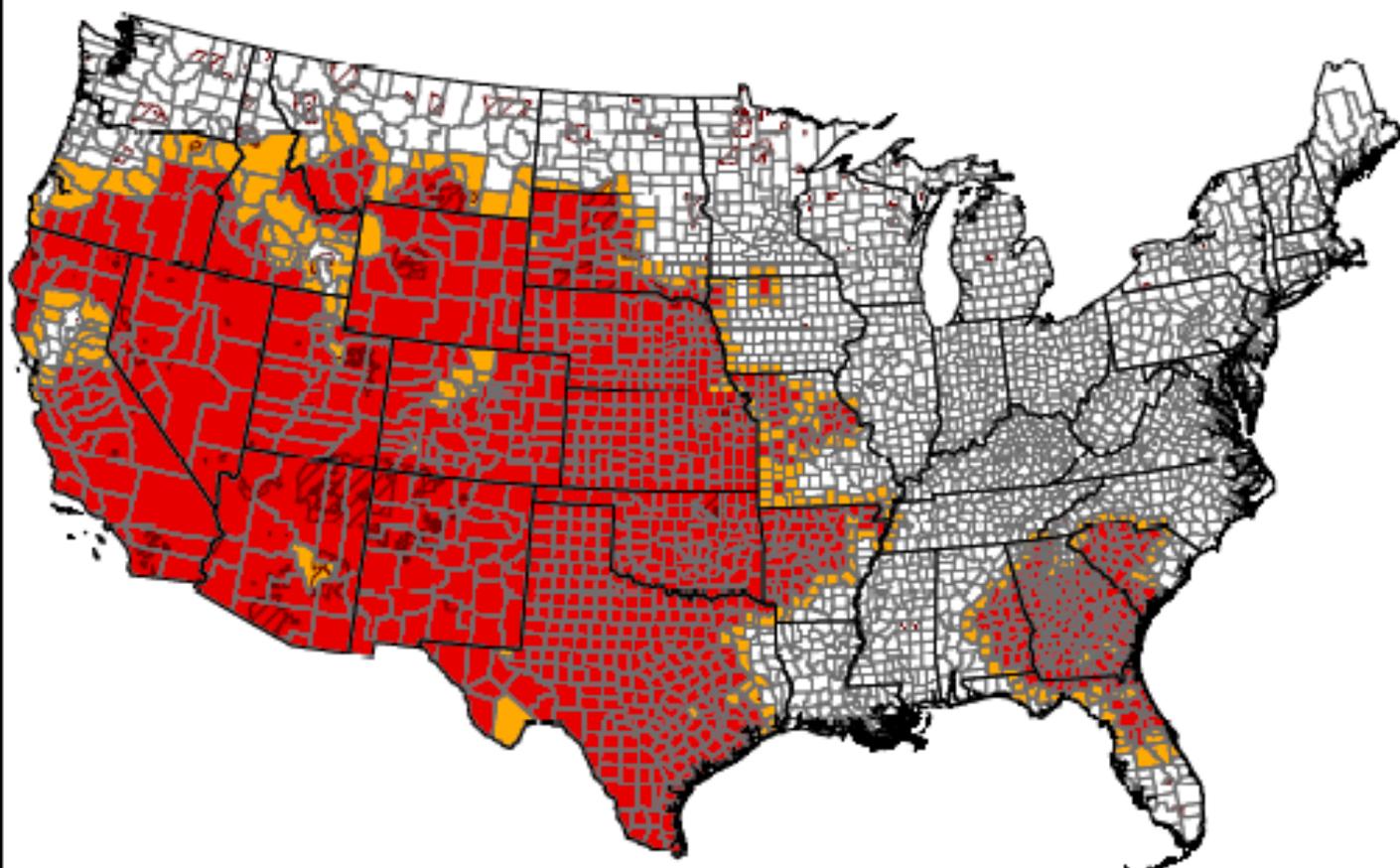
Western Governors' Association ♦ June 2006

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



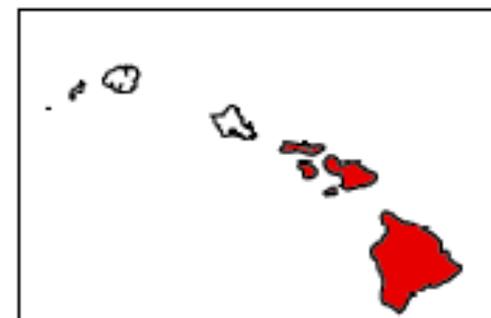
Western Governors' Association ♦ June 2008

2013 Secretarial Drought Designations - All Drought



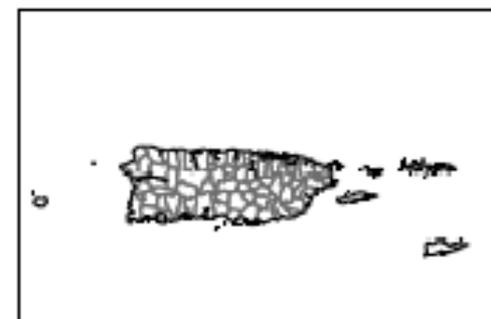
Alaska

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



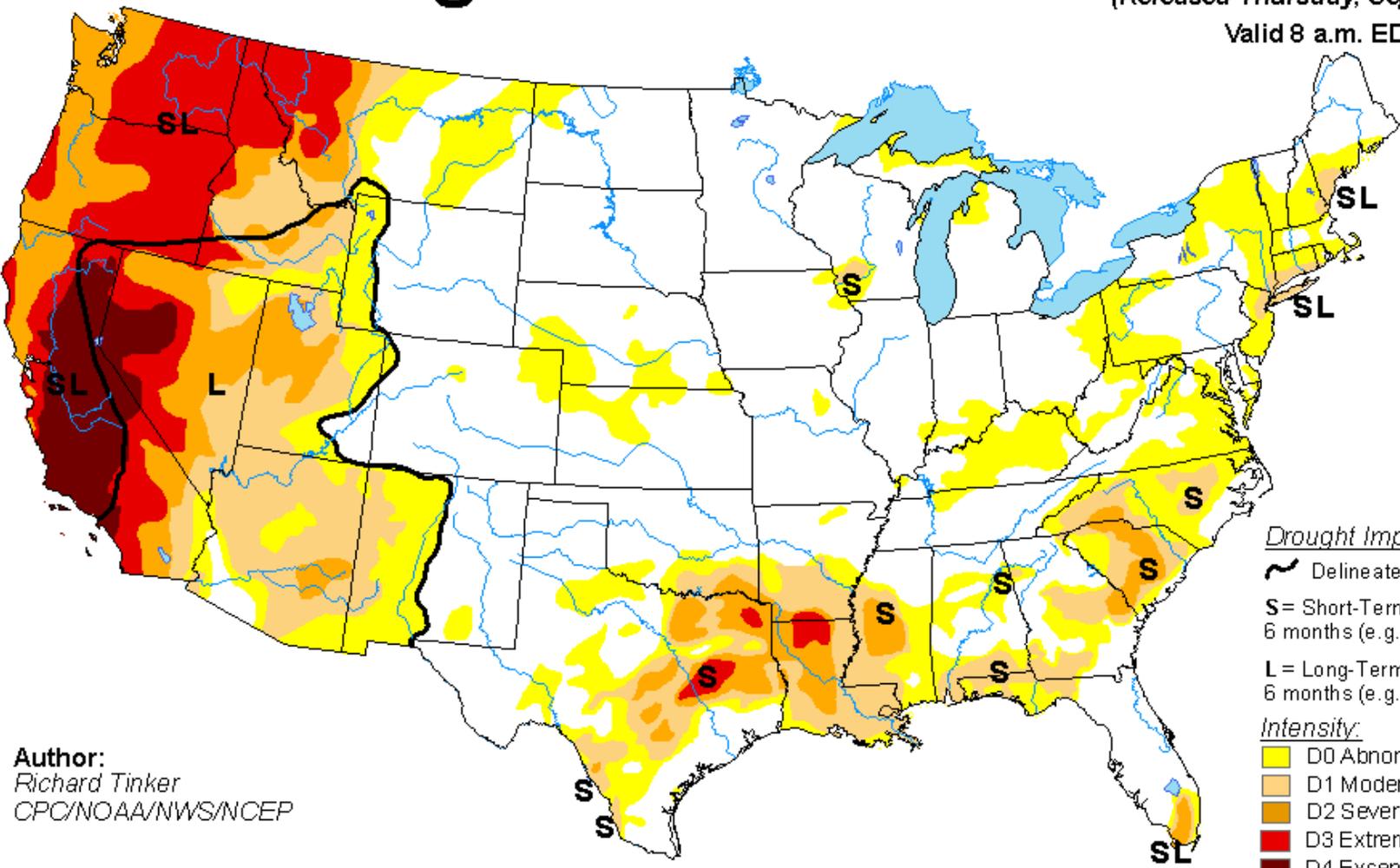
USDA Farm Service Agency
Production, Emergencies and Compliance Division
Washington, D. C.
August 14, 2013

1:23,721,366

U.S. Drought Monitor

September 8, 2015
(Released Thursday, Sep. 10, 2015)

Valid 8 a.m. EDT

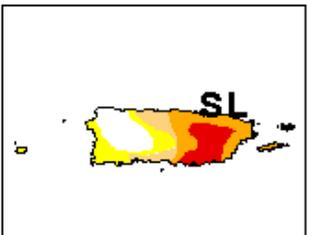
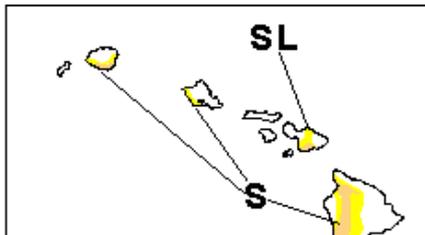
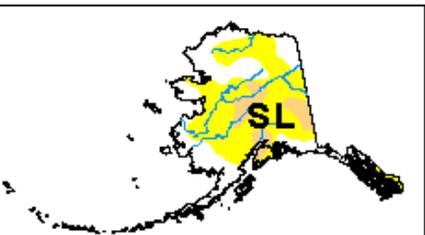


Author:
Richard Tinker
CPC/NOAA/NWS/NCEP

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/>

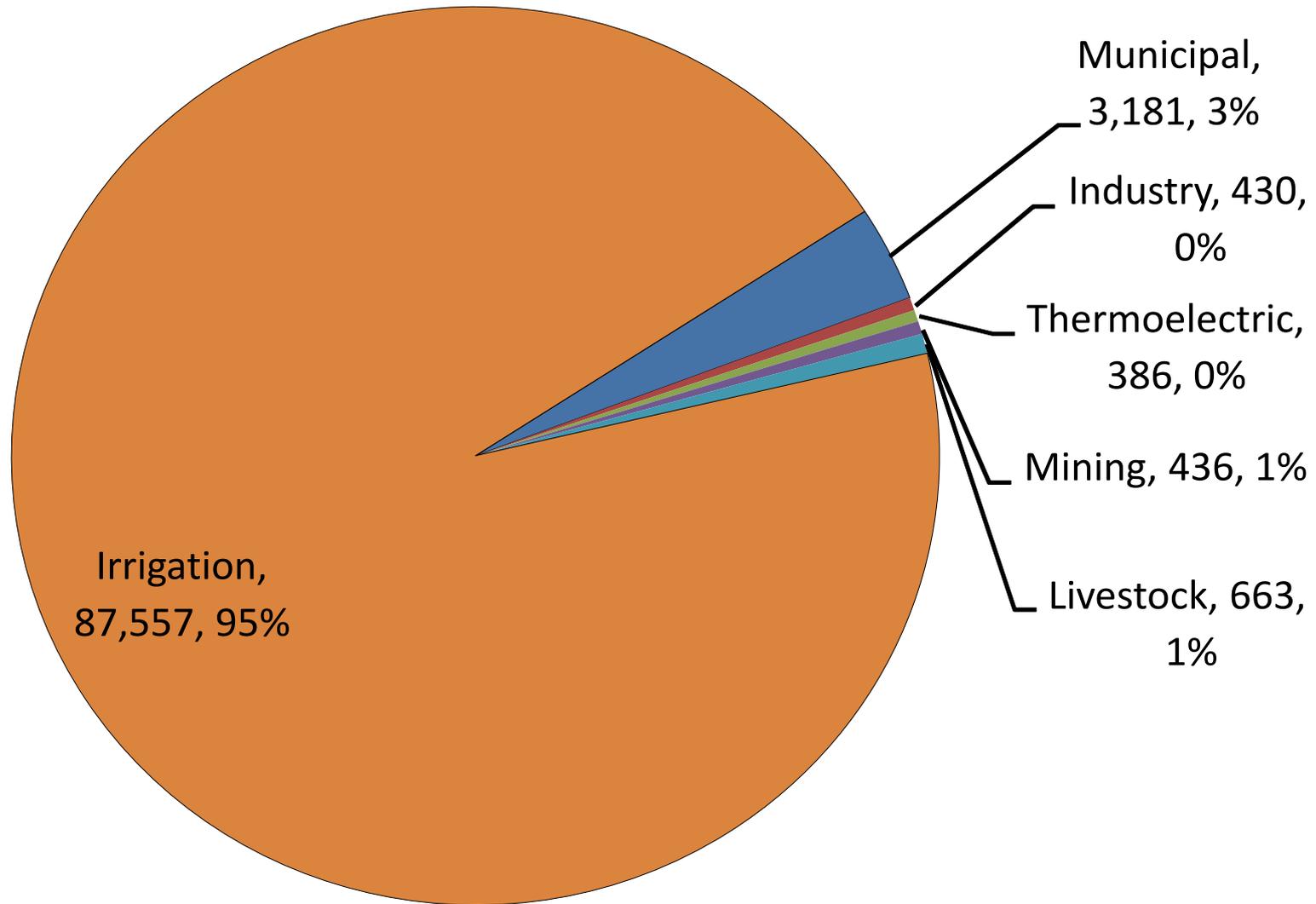
Water Law 101

- Law of Prior Appropriation (surface/groundwater)
- Water is a complex public/private good
- Establish a private right to use a public resource
- Origin in western mining/agricultural practices
- Developed to promote orderly development of the arid West by allowing the movement of water
- Abandoned common law and riparian law
- Intended to provide certainty given significant uncertainty regarding annual water supplies
- Provides for economic development and markets while also considering the public interest
- Accepted institution for over 150 years

Priority Dates and Water Duties

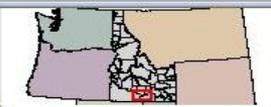
- Priority based on date water is first put to use
- Generally requires diversion out of stream
- Permit applications and vested rights
- Period of time allowed to perfect rights
- Once vested becomes private right to use
- Water duties for irrigation generally 2-4 acre feet per acre annually
- Based on consumptive use, not diversions or withdrawals

2010 Water Consumption (MGD)





Idaho Department of Water Resources Evapotranspiration



Zoom/Pan

Identify

Locate Address

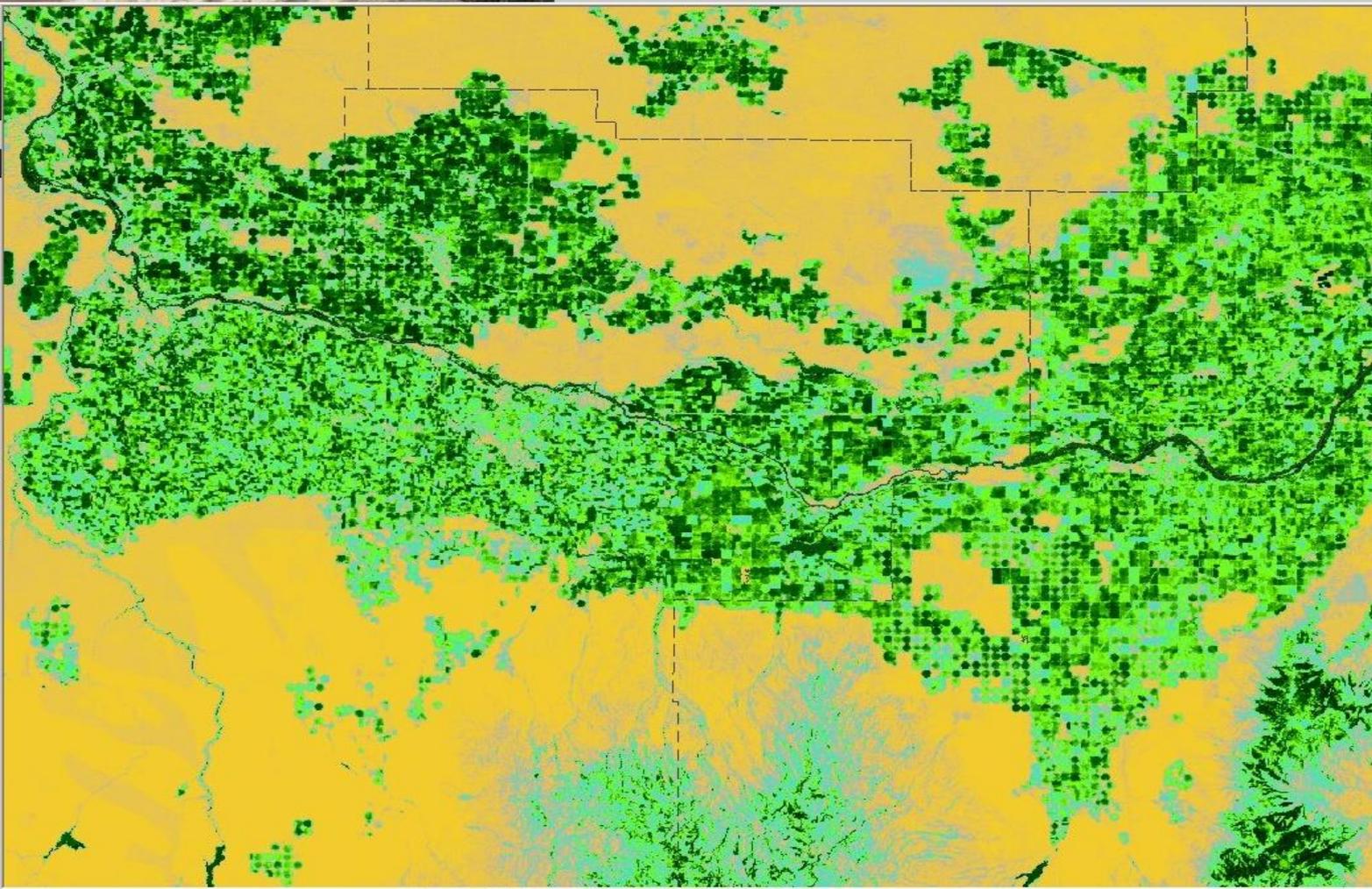
Capture Screen

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

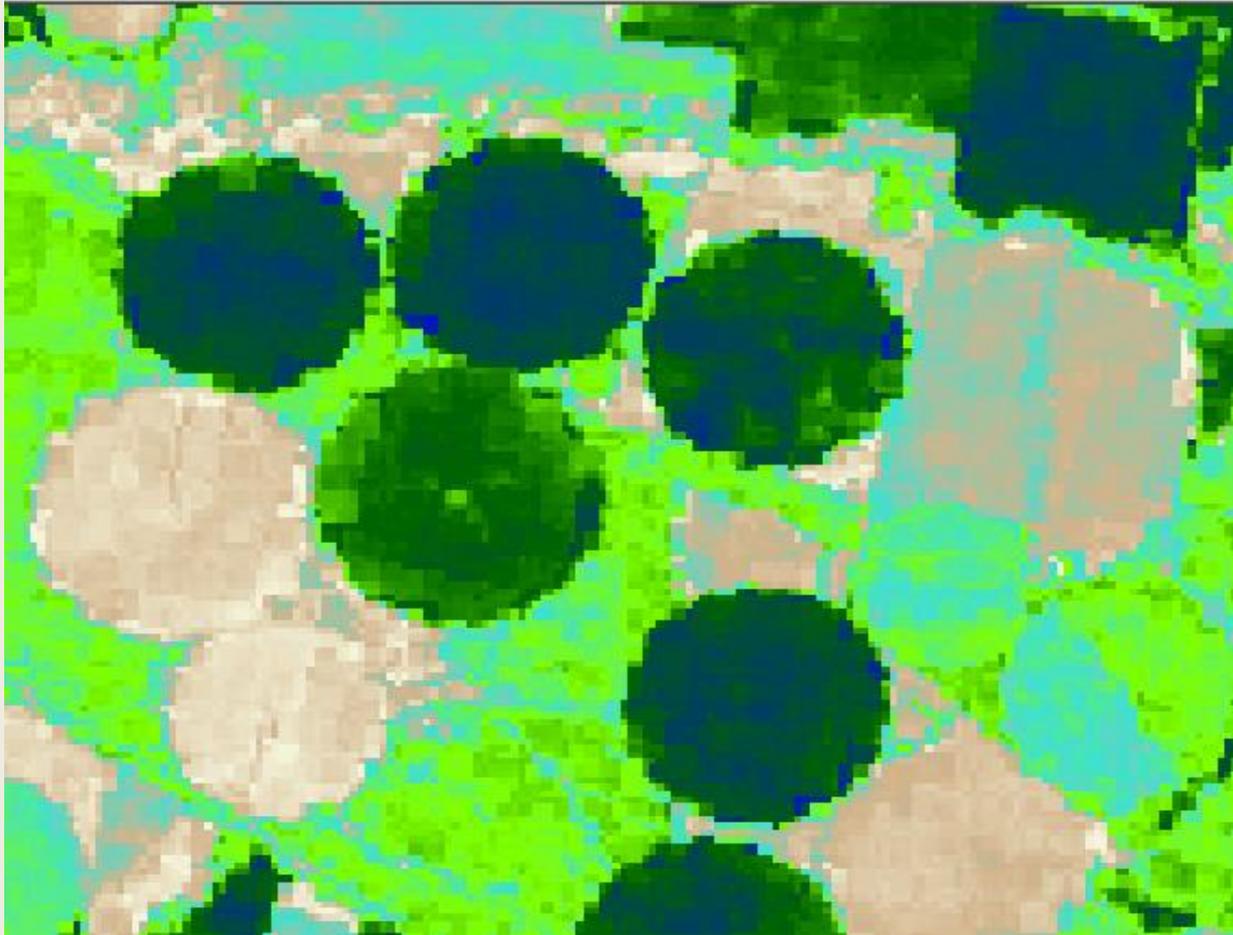
Active Layer

Counties

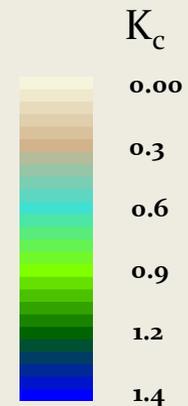
Refresh Map

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

Why use High Resolution Imagery?



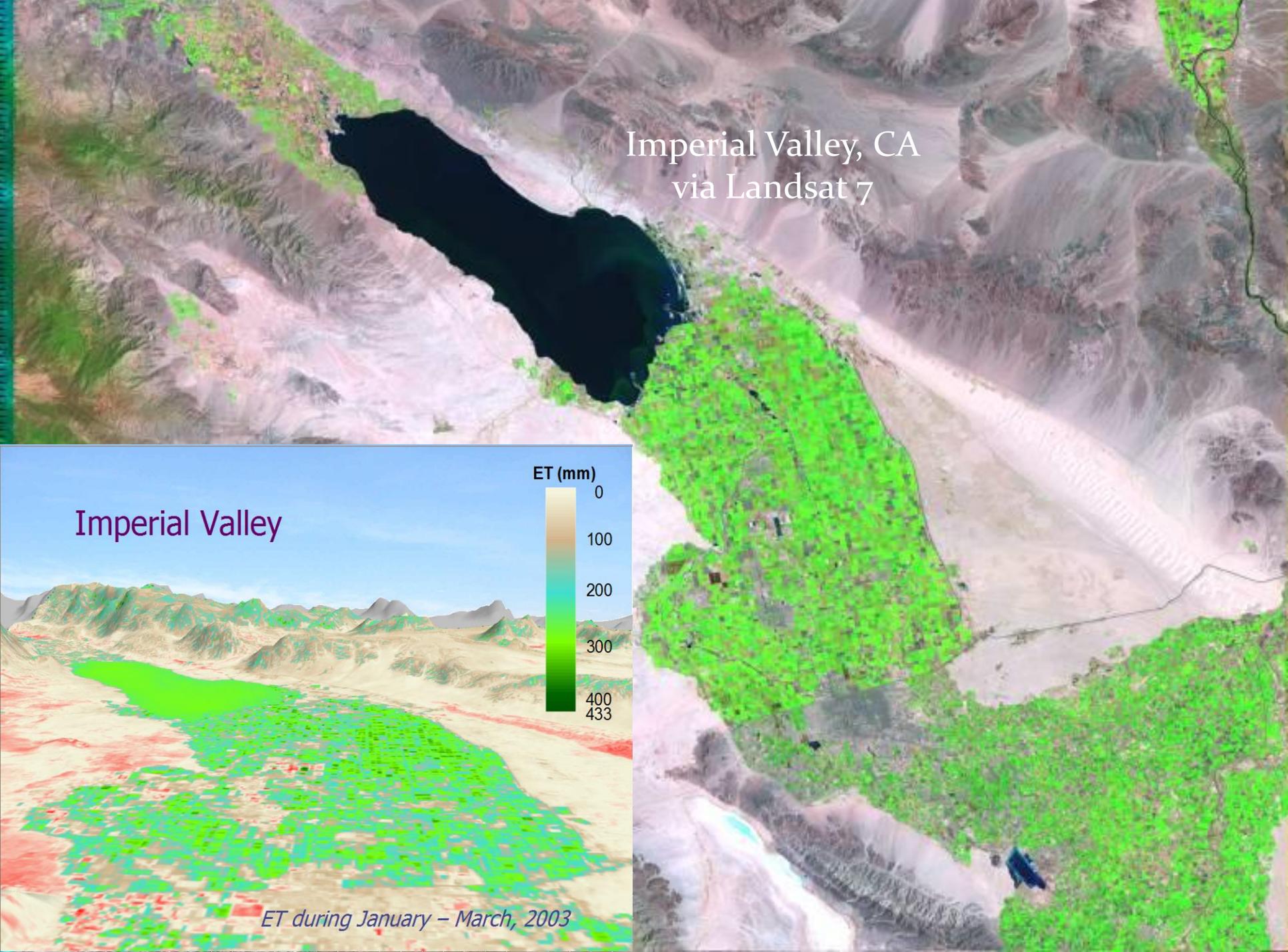
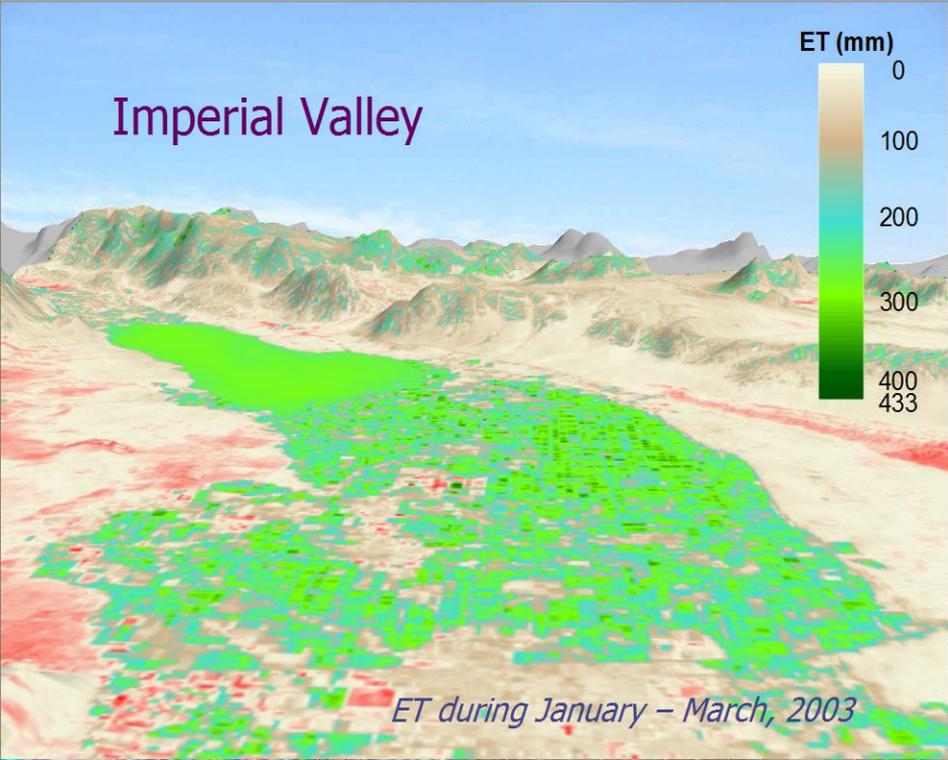
ET from
Landsat 5
with thermal
sharpened to
30 m

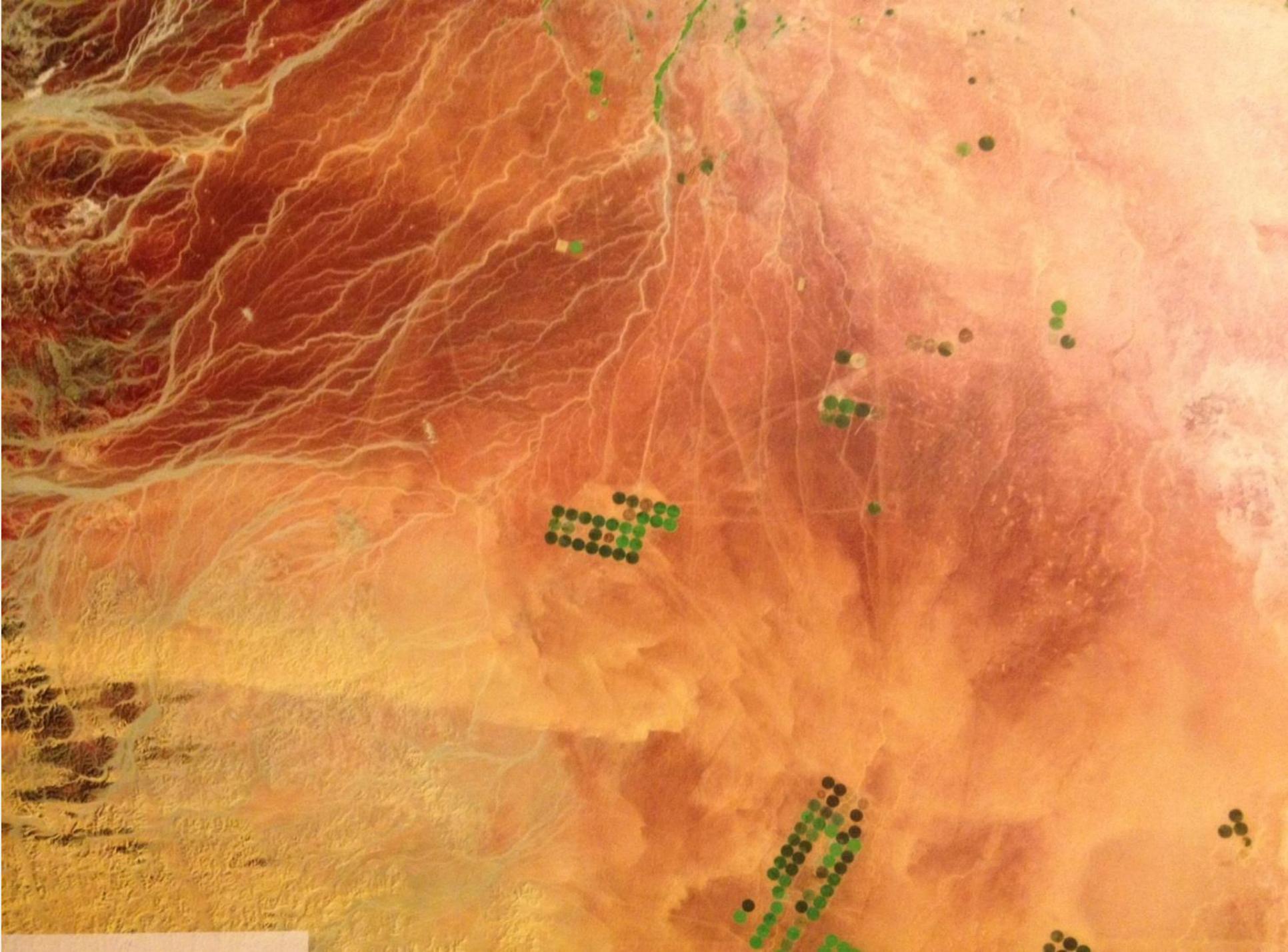


$$(K_c = ET_{act} / ET_{ref})$$

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

Imperial Valley, CA
via Landsat 7





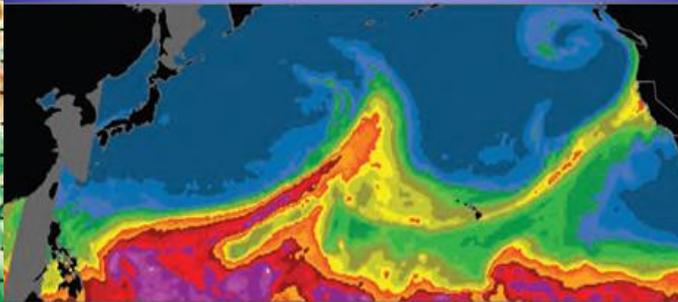


Priority State & Federal Actions

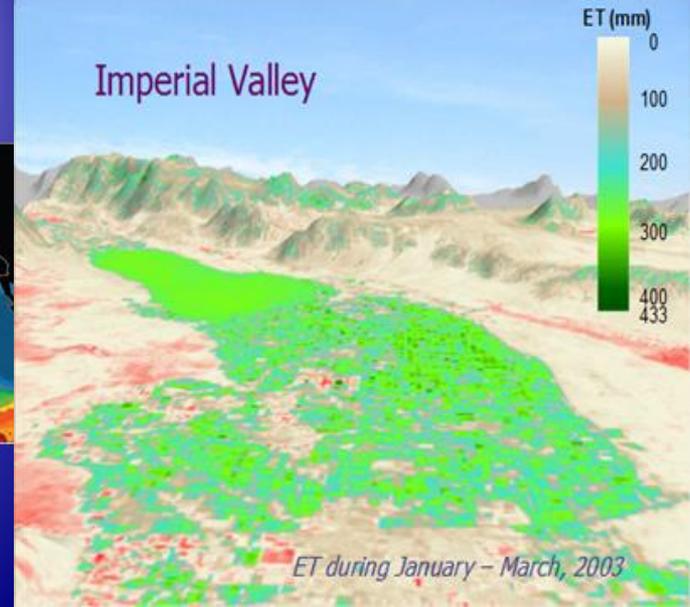
- Increase support/funding for data
- Identify and close data gaps
- Gather/disseminate real-time data
- Foster remote sensing capabilities
- Reduce costs through innovation



Atmospheric Rivers



Imperial Valley



NASA/VSOE
Landsat Satellite



NWS
Co-Co Program
Rain Gauge



NCEC
Snow Pillow



NOAA
Snow Level
Radar



NOAA
Atmospheric
River
Observatory



VSOE
Monitoring
Radar



VSOE
Streamgauge



NWS
Respiration
Pa



NOAA
TAO Array Buoy
(Tropical Atmosphere Ocean)





ERDS • GSFC • KSC



LDCM

LANDSAT
Data Continuity Mission
NASA • USGS