Improving Sub-Seasonal to Seasonal (S2S) Precipitation Forecasting

Western States Water Council
and
California Department of Water Resources

May 17-19, 2017

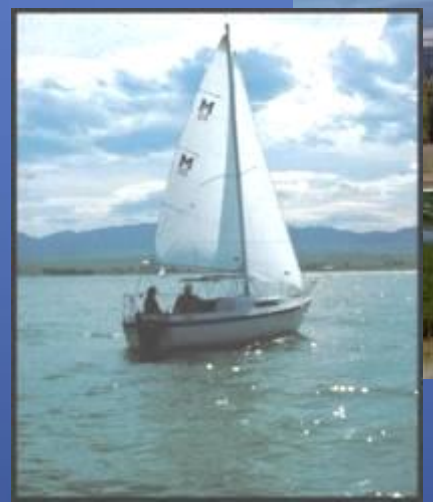
Tony Willardson
Executive Director

WESTERN STATES
WATER COUNCIL

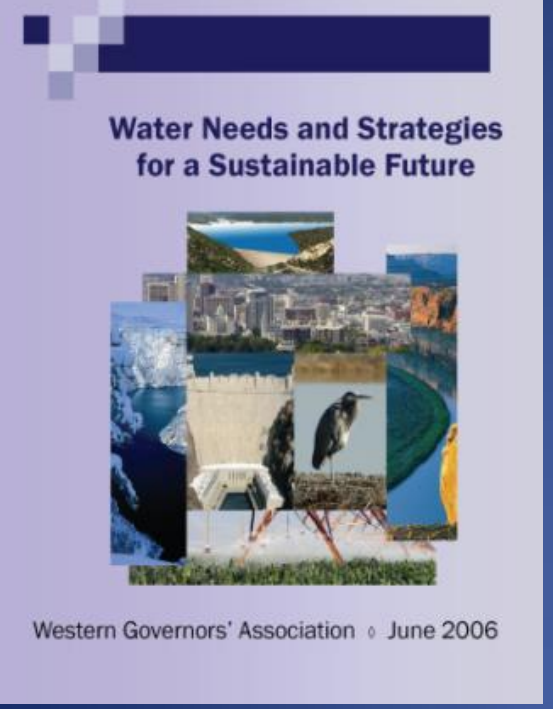
Western States Water Council

- Advisory body to 18 western Governors on water issues
- Provides states collective voice
- Fosters state/state and federal/state collaboration
- Works with the Western Governors' Association (WGA)
- Western Federal Agency Support Team (WestFAST)

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



There is a need for an accurate and unbiased appraisal of present and future water supplies and demands for each area of the West and for the orderly and optimum development of water resources in the western states.



2006 WSWC-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.

WGA Policy Resolution 2015-8

- Collect, maintain & enhance use of basic data
- Support critical federal programs that provide important basic water supply information – snow, precipitation, streamflow, groundwater, evapotranspiration, 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

WESTERN GOVERNORS' ASSOCIATION

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

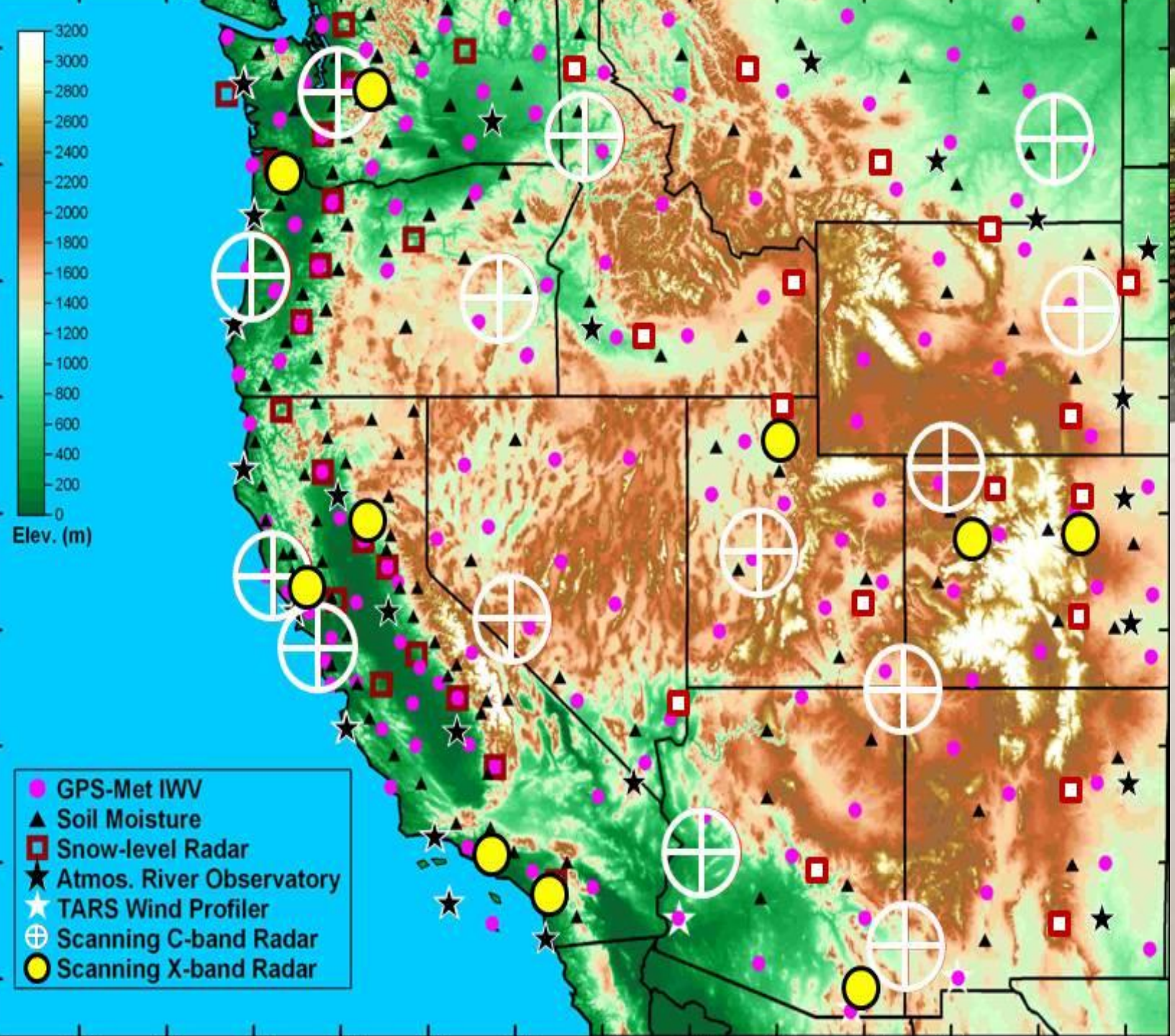
U.S. Department of Energy

National Aeronautics and Space Administration

U.S. Dept. of Defense

National Park Service

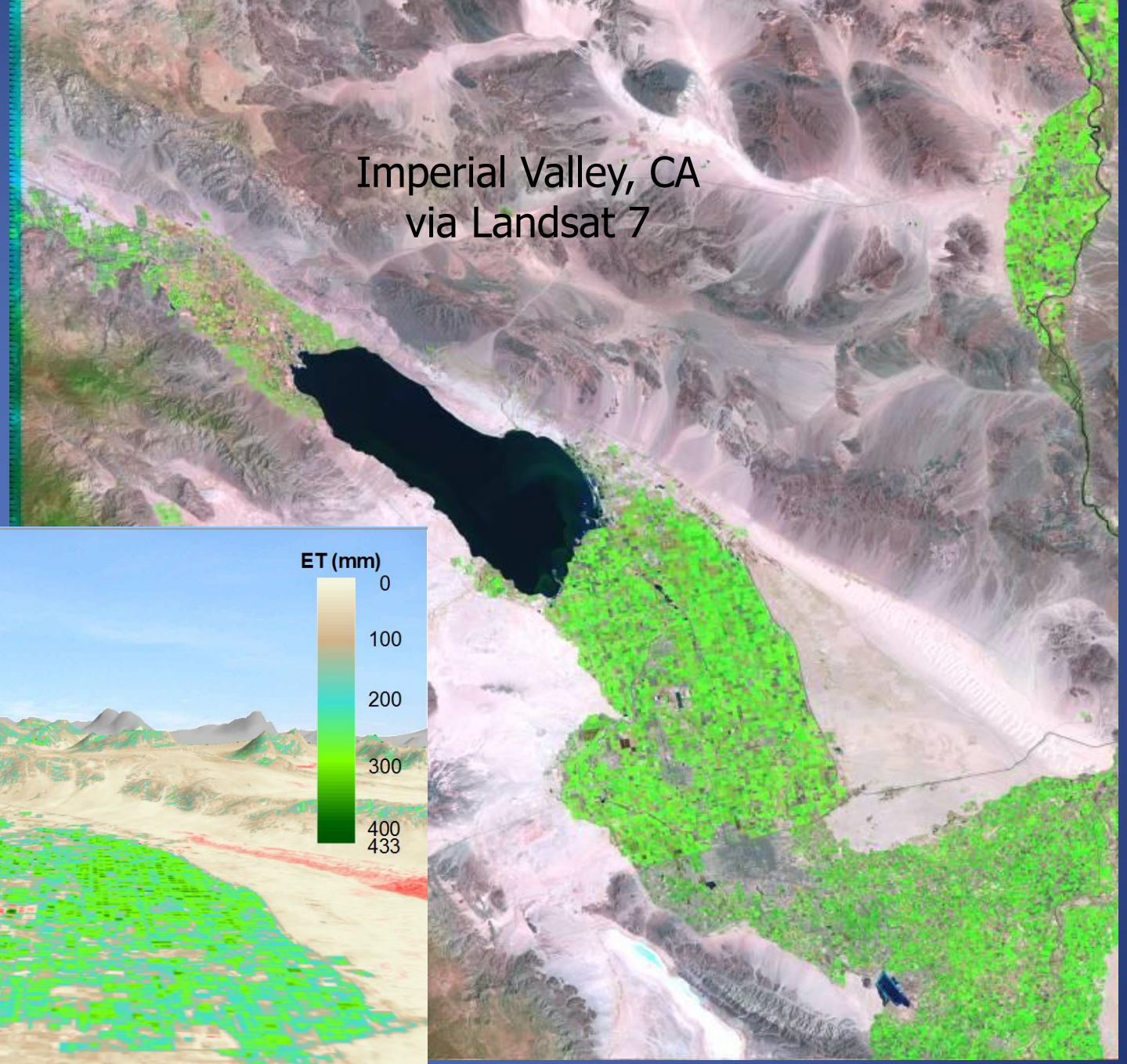

NASA/USGS
Landsat Satellite
NWS
Weather Satellite
NWS
Co-Op Program
Rain Gauge
NRCS
Snow Pillow
NOAA
Snow-Level
Radar
NOAA
Atmospheric
River
Observatory
USGS
Monitoring Well
USGS
Streamgage
NWS
Evaporation Pan
NOAA
TAO Array Buoy
(Tropical Atmosphere Ocean)

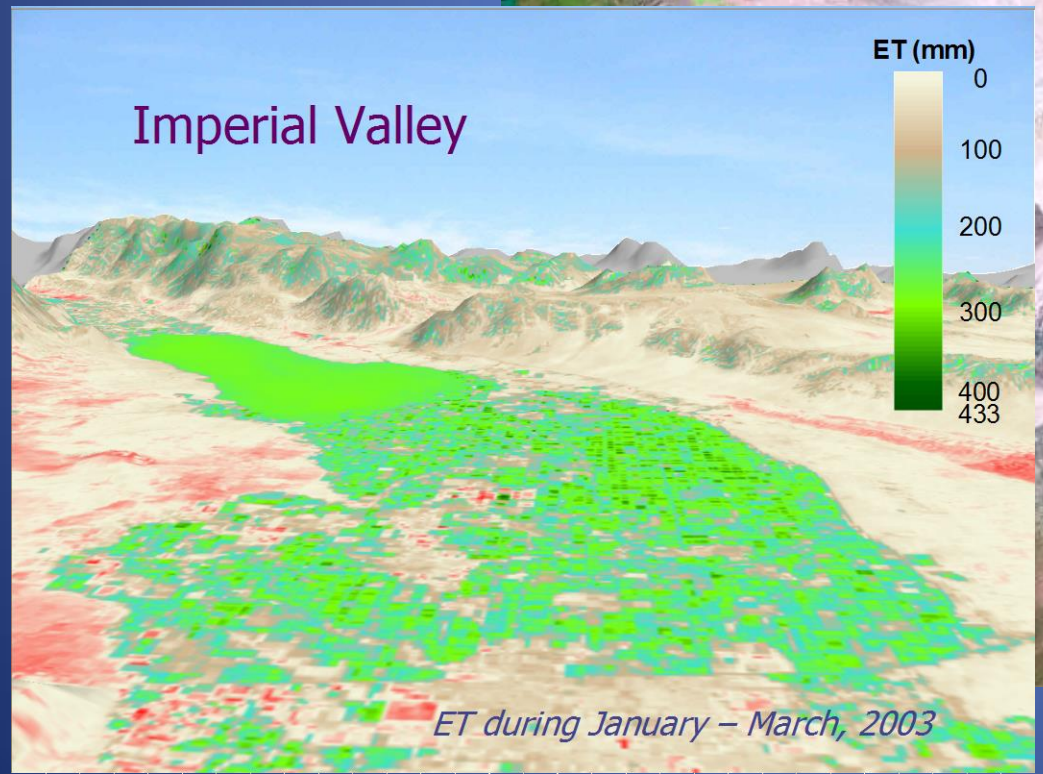


IRRIGATION MANAGEMENT INFORMATION SYSTEMS IN THE WEST: CAPABILITIES AND CHALLENGES

October 2016

Shortage Sharing and Intentionally Created Surplus (ICS) Water





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.

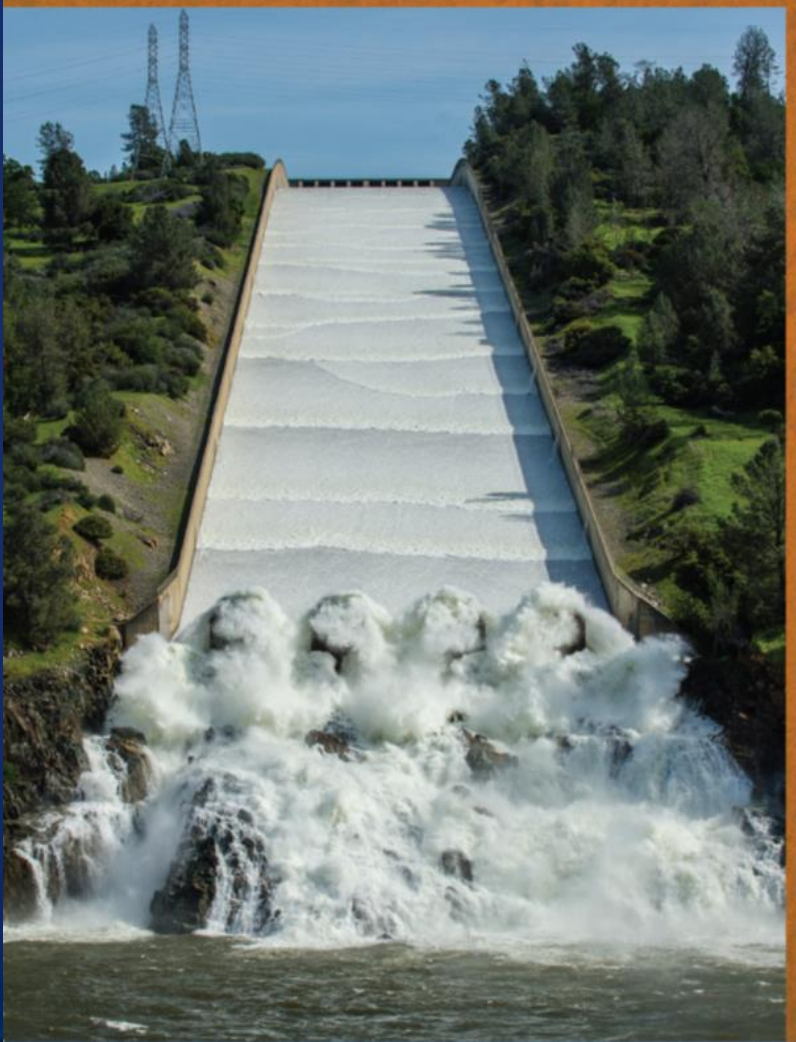
However, unless NASA is directed to include TIR on Landsat 8 and sufficient funds are appropriated, we will be without perhaps the single most important instrument capable of measuring by far the largest use of water in the West. While we recognize the present budget constraints, we urge you to fund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

Sincerely,

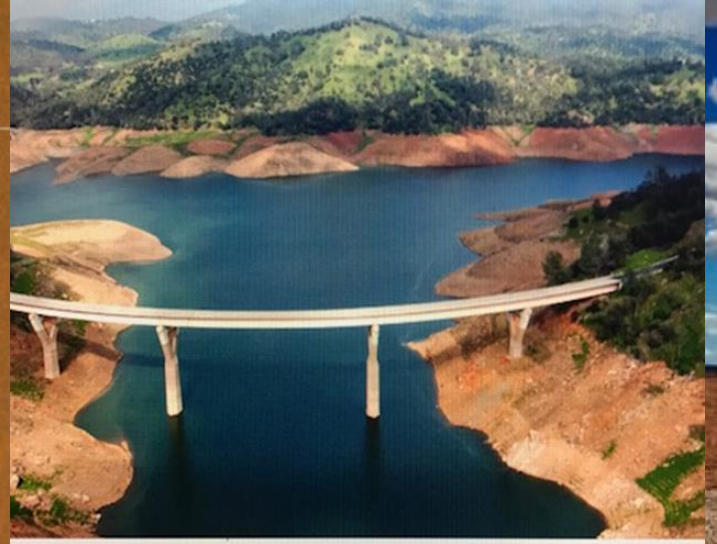
S2S Precipitation Forecasting

Western Governors urge Congress and the Administration to work closely with states and other resource managers to improve predictive and adaptive capabilities for extreme weather variability and related impacts. We specifically urge the federal government to place a priority on improving the sub-seasonal and seasonal precipitation forecasting capabilities that could support water management decision-making.

Improving
Sub-Seasonal to Seasonal
Precipitation Forecasting for
Water Management



WESTERN
STATES
WATER
COUNCIL

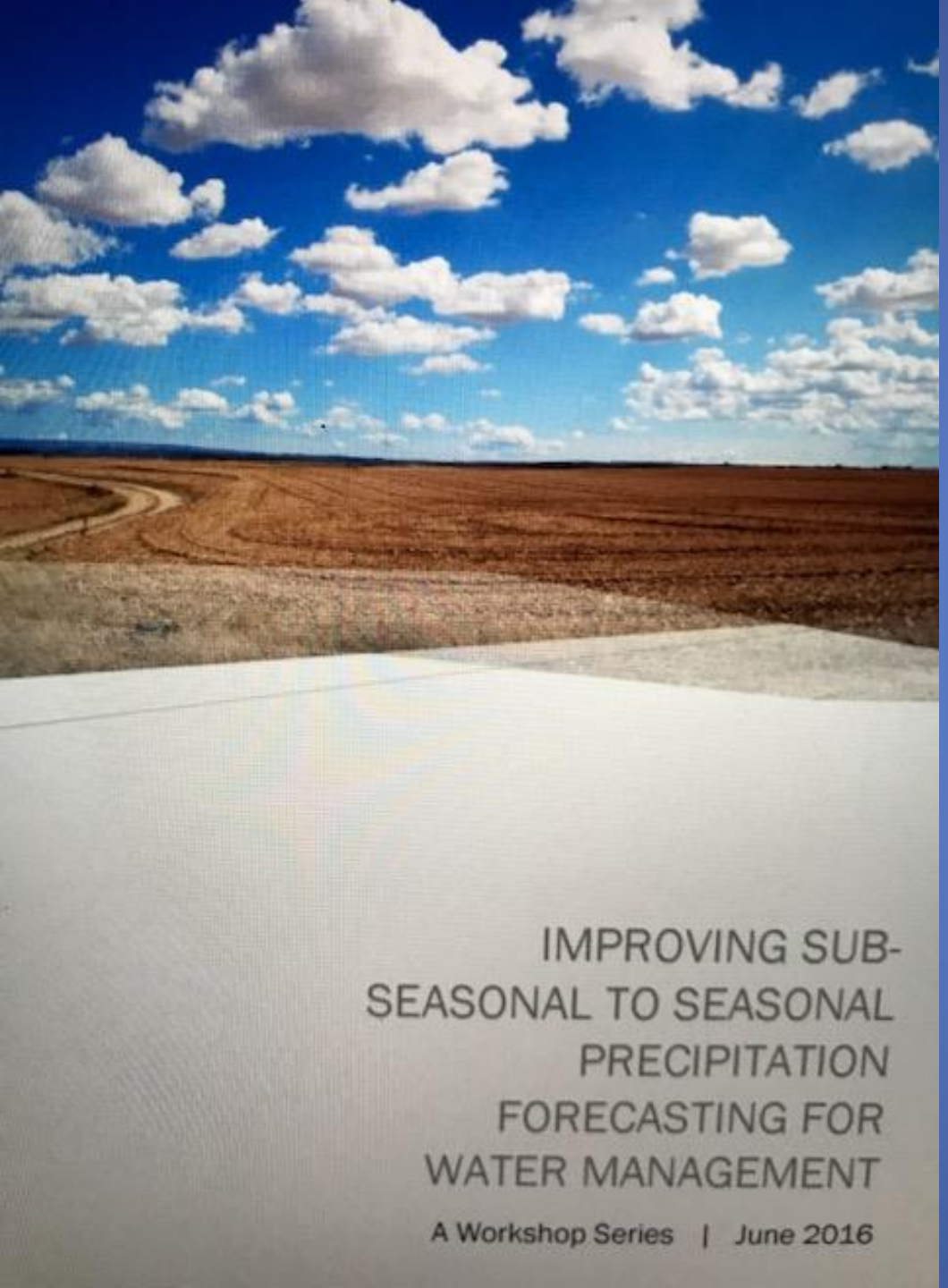


Workshop on Improving Sub-Seasonal and Seasonal Precipitation Forecasting for Drought Preparedness

May 2015 | San Diego

IMPROVING SUB-SEASONAL TO SEASONAL PRECIPITATION FORECASTING FOR WATER MANAGEMENT

A Workshop Series | June 2016



- Minimize loss of life and property
- Improving collaboration and coordination among agencies and organizations at all levels
- Increasing consultation with state, local and tribal governments
- Maintaining and enhancing data gathering and monitoring, and communication capabilities; identifying and addressing gaps and overlap
- Identifying and addressing federal agency responsibilities, and regulatory and other preparedness and response barriers
- Recognizing and addressing regional differences; and
- Advancing research within the physical sciences, and dynamical and statistical modeling to improve our S2S forecasting capabilities.

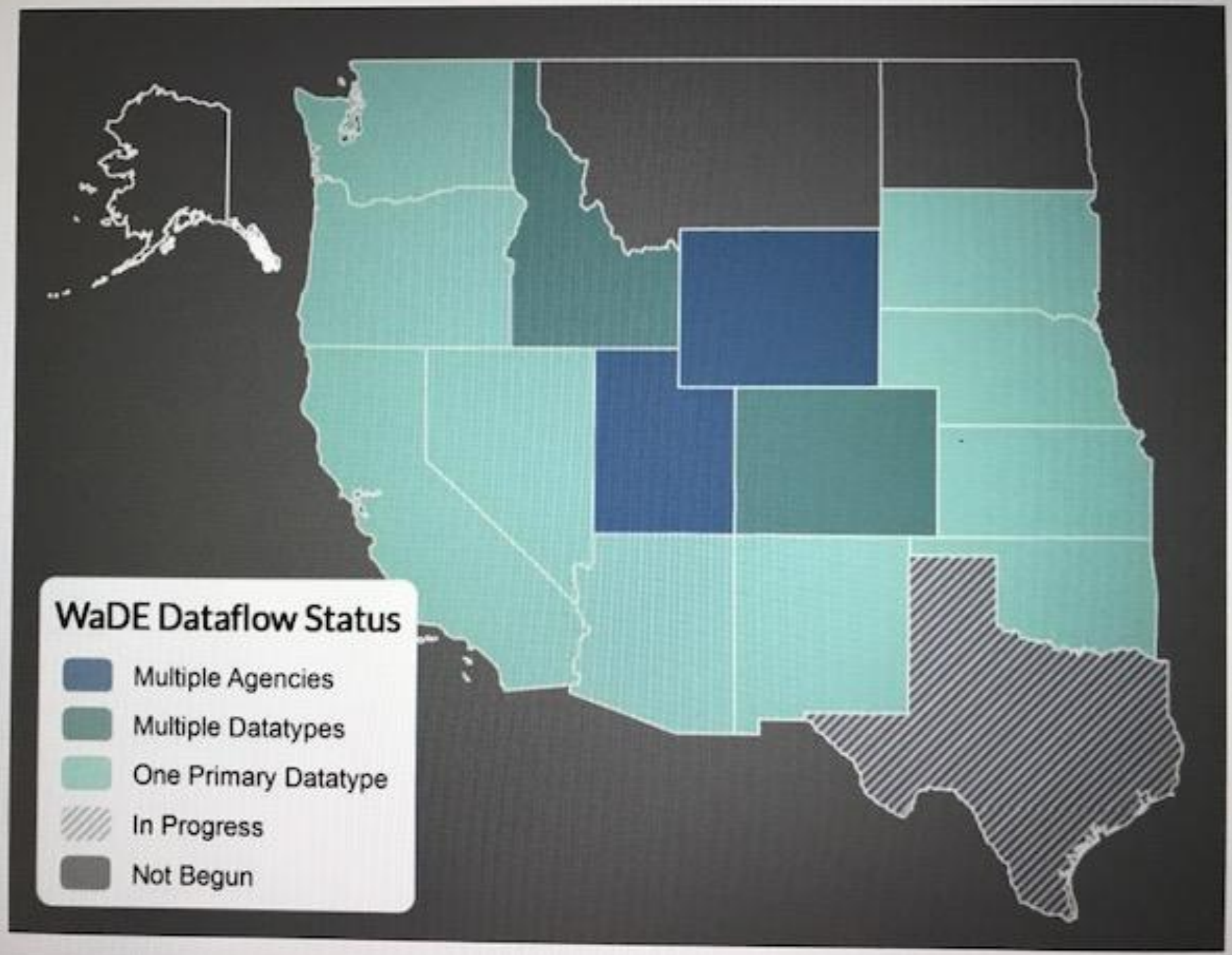
WSWC Water Data Exchange (WaDE)

The Western States Water Council has worked together with state and federal agencies to create the Water Data Exchange, an online portal that will enable states to share their water data with each other, federal agencies, and the public via a common platform. The Governors encourage the use of state water data in planning for both the public and private sectors.

HOW DOES IT WORK?

Representational State Transfer (REST) Endpoint

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



Fourteen states flow some data in WaDE, but more work needs to be done to include more states and additional data that can be shared. Most partners are sharing one targeted WaDE datatype.

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http://wade.westernstateswater.org/