

**Written Testimony of the
WESTERN STATES WATER COUNCIL**

**Submitted to the
Senate Appropriations Committee
Subcommittee on Commerce, Justice, Science, and Related Agencies**

**Regarding NASA's Applied Earth Science Research Programs
June 21, 2021**

The Western States Water Council (WSWC) is a policy advisory body representing eighteen States. Members are appointed by their respective governors. Since 1965, the WSWC has long been involved in western water conservation, development, protection, and management issues, as well as promoting development and advancement of earth science, particularly water-related data acquisition, management and dissemination.

The WSWC championed the placement of a thermal infrared (TIR) imager on Landsat 8 and the expedited construction and launch of Landsat 9 with TIR capabilities. We strongly support innovation to provide similar next generation National Land Imaging Program data – including thermal imaging capabilities – while exploring the potential for medium and longer-term advances in technology, design and future capabilities to meet existing and future uses. Landsat TIR data is used extensively by western states and others to measure and monitor agricultural and other outdoor water uses and needs. It is increasingly important for present and future management of our scarce water resources and is an excellent example of the application of basic science pioneered by the National Aeronautics and Space Administration (NASA).

In the West, the agricultural and water communities have benefited tremendously from the use of moderate resolution thermal satellite data to map out, measure and monitor consumptive water use. Agriculture is by far the largest consumer of water in the West, and better managing that use is an essential component of both water and food security, as well as sustainable economic development and environmental protection. Increasing demands for water related to growth and changing values are leading to more and more transfers of water from agriculture to other uses, with resulting challenges in maintaining viable rural agricultural communities. Many western states are using Landsat thermal data to protect water rights and manage water use.

NASA has identified the “water and energy cycle” and “water resources” as topics to support in the agency’s research and applications programs respectively. The Council strongly supports and works cooperatively to advance linkages between NASA’s capabilities and water managers’ needs, working with NASA/JPL’s Western Water Applications Office (WWAO). WWAO’s mission is to “connect the drops” and improve how water is managed in the arid western U.S. by getting NASA science, data and technology into the hands of water managers and decision makers. Connection, data and innovation are at the heart of WWAO.

The Council urges the Congress to appropriate sufficient funds to support and enhance WWAO’s and NASA’s focus on research for water resources applications, as well as to promote long-term engagement with state and regional agencies in the western United States responsible

for water management and water policy – so as to maximize benefits to the public from NASA’s existing and future investments in Earth observations, Earth system models and systems engineering.

The WSWC also calls on the Congress to plan for and provide resources for long-term continuity of observations and the transition from research to operations (R2O), such as the use of Landsat TIR sensor data. The Open Evapotranspiration (OpenET) software system and data platform is another example of the use of NASA TIRs data through an operational use partnership (<https://openetdata.org/>). OpenET is a collaboration involving scientists from federal agencies and academic institutions using satellite and weather data to map consumptive water use/evapotranspiration (ET) at the individual field scale. Interferometric synthetic aperture radar (InSAR) is another tool that NASA has used to measure land subsidence due to groundwater extraction, and its use has been demonstrated as part of NASA’s Airborne Snow Observatory (ASO) for estimating snowpack conditions. Additional airborne and spaceborne remote sensing research and observations have the potential to provide information on varied temporal and spatial scales that could with sustained engagement focus on the R2O transition and ultimately be useful for water resources planning, management and decision-making.

NASA’s work with the California Department of Water Resources on applications for use of remote sensing information has demonstrated that the potential exists for repurposing data collected from certain present NASA missions for water management applications, and that additional potential exists for research applications with sensors planned in future Decadal Survey missions such as the NASA-ISRO Synthetic Aperture Radar (NISAR), which is designed to observe and take measurements of the planet’s crust and disturbances, including subsidence due to groundwater pumping. The successful transfer of technology from the research domain to the applications domain is dependent, in part, on continuing communication between researchers and those responsible for resource management and policy decisions and a long-term commitment to maintaining such communication.

Much of the West is currently experiencing unprecedented drought conditions. Currently, nearly all of our 18 member states are suffering from severe to exceptional drought, with half afflicted by the latter, the driest condition represented on the U.S. Drought Monitor scale (www.drought.gov). Agricultural interests are hit hardest as crops, feed, and forage deteriorate and rise in cost, threatening farmers, ranchers, and dairies. In some cases, producers are culling herds. Municipal water shortages are also possible, particularly for rural communities. Dry, hot, and windy weather combined with dried out vegetation has wildfires on the rise. Western states are using NASA tools to monitor drought-related impacts and consumptive water uses and needs.

Thank you for the opportunity to express our support for various NASA programs and missions the application of which support western water management.