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STATE OF NEVADA

Department of Conservation and Natural Resources

OFFICE OF THE DIRECTOR

December 15, 2008

The Honorable Harry Reid
United States Senate
528 Hart Senate Office Building
Washington, D.C., 20510

Re: Request to Support NASA Budget Augmentation for the Continuation of Landsat Thermal Data Acquisition

Dear Senator Reid:

The Nevada Department of Conservation and Natural Resources is requesting your support for an augmentation to NASA's budget of $90 million over FY09, FY10, and FY11 ($30 million per FY) to design, construct, and include a thermal sensor for the Landsat Data Continuity Mission's (LDCM) planned 2011 or 2012 launch. The current operating Landsat satellite, Landsat 5, which has a thermal sensor on board, is 20 years beyond its design life and could fail at any time. The thermal sensor on board Landsat provides the ability for mapping several environmental variables including water use and water availability at a spatial scale useful for decision making. With the State of Nevada's new municipal and industrial water supplies largely being obtained through the conversion of agricultural water rights, the continuation of acquiring Landsat thermal data is critical for mapping how much water is consumed and is available from irrigated areas and urban-suburban development. Significant research advancements have been made in the past few years for developing defensible methods for estimating water use using Landsat's thermal data. The spatial resolution of the Landsat satellite being 30 x 30 meters allows for individual fields to be resolved, providing the critical information needed for evaluating the actual consumptive use of an individual irrigation water right, which is otherwise largely unknown. In addition to irrigated agriculture applications, the Landsat thermal sensor provides the potential to estimate the amount of groundwater discharge occurring from native vegetation, thus providing a basis for updating basin water budgets and perennial yield estimates throughout Nevada.

Given demands on the existing NASA budget, it is apparent that NASA is not in a position to fund a thermal sensor by diverting dollars from existing programs. As of October 15, 2008,

NASA has been directed to develop a plan for ensuring the continuity of Landsat thermal data acquisition[1], the Western States Water Council[2] and Western Governors' Association[3] have expressed written support for continuation of Landsat thermal data acquisition, and recently, 9 western Senators have written Senators Byrd, Cochran, Mikulski, and Shelby asking for appropriation of funds for this purpose.[4] Representatives from resource agencies in the states of California, Colorado, Idaho, Kansas, Nebraska, New Mexico, Montana, Oklahoma, Utah, and Wyoming as well as many U.S. and foreign scientists from government agencies and universities have also expressed written support.[5]

The Landsat thermal sensor can provide critical information on Nevada's water resources because it provides the only efficient and accurate way to map how much and where water is being consumed. This technology will be extremely useful for addressing the challenges brought about by the current and future water issues in the Truckee, Carson, and Walker River basins. The use of this technology could enable the Nevada Department of Conservation and Natural Resources to determine water use much less expensively and more efficiently than the standard methods of employing multiple staff to conduct crop inventories, pumping inventories, and application of dated consumptive use estimates. Nevada's current approach for estimating water use is very labor intensive, and to obtain reliable estimates requires measuring devices on all surface-water diversions and pumping wells, and requires a vast network of weather stations in irrigated settings that currently do not exist. In the near future, the Nevada Department of Conservation and Natural Resources plans on utilizing new methods and advancements brought about by the application of Landsat thermal data.

The application of Landsat thermal data also provides a potentially efficient and inexpensive way for mapping the spatial distribution of groundwater discharge occurring from native vegetation. Current standard methods for estimating groundwater discharge from native vegetation are very costly and time consuming, requiring expensive micrometeorological weather stations, which only yield point measurements of groundwater discharge that have to be spatially distributed using numerous ill posed empirical relationships. The use of Landsat thermal data provides a more physically based approach and has been proven to provide both financial and scientific advantages over current methods.

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[1] 2008. H.R. 6063. Section 205 of the NASA Act of 2008. http://www.idwr.idaho.gov/gisdata/ET/thermal-band-issues/nasa-authorization-act-2008.pdf

[2] 2006. D.A. Smith. Letter from the Western Water Council to J.H. Marbuger, Director of the President's Office of Science and Technology Policy.

[3] 2006. Rounds, M.M. and Freudenthat, D. Letter from the Western Governors' Association to J.H. Marburger, Director of the President's Office of Science and Technology Policy. http://www.idwr.idaho.gov/gisdata/ET/thermal_band_issues/wga-landsat-letter-2.pdf

[4] 2007. Letter from 9 western senators to Chairman Byrd, Chairwoman Mikulski, Senator Cochran, and Senator Shelby. http://www.idwr.idaho.gov/gisdata/ET/thermal-band-issues/letter-to-appropriations-committee.pdf

[5] 2006. Letter from NASA, USDA and university scientists to the Panel of the Decadal Survey of the National Research Council. http://www.idwr.idaho.gov/gisdata/ET/thermal_band_issues/nrcds_tir_letter_final.pdf

In order to advance Nevada's water management objectives in the future, I urge you to support an augmentation to the NASA budget to assure that the next generation of Landsat will have the important thermal capability for the planned 2011 or 2012 LDCM launch.

I am happy to answer any questions your staff might have, and to provide any additional material. I can be reached at abiaggi@dcnr.nv.gov, or at 775-684-2700. A further description of the specific needs for the thermal sensor aboard the next Landsat mission and numerous letters of support from state and government agencies are located at www.idwr.idaho.gov/gisdata/landsat-thermal-band.htm.

Thank you for considering this important matter.

Sincerely,

Allen Biaggi
Director, Nevada Department of Conservation and Natural Resources

cc: Michael Griffin, Administrator, NASA
Mark Myers, Director, US Geological Survey
Michael Freilich, Director, NASA Earth Science Division
Bryant Cramer, Acting Associate Director, Geography, US Geological Survey
Stephen Voltz, CALIPSO Program Executive, NASA
John Marburger, Director, Office of Science and Technology Policy
Stephen Wells, President, Desert Research Institute
John Warwick, Executive Director, Desert Research Institute