NASA Western Water Applications Office Overview

*Accelerating the application of NASA observations and scientific analysis techniques to tangible, important, and timely water management problems*

Southern California Water Dialogue
2/28/2018
19 NASA Earth Observing Satellite Missions, many collaborations with other federal agencies such as USGS or NOAA, or international collaborations with JAXA (Japanese Aerospace Exploration Agency)

GRACE (Gravity Recovery and Climate Experiment) ended in October 2017 but GRACE-FO scheduled to launch 4/14/18 from Vandenberg AFB
GRACE-FO Launching 2018

- Gravity Recovery and Climate Experiment (GRACE) mission active March 2002 – October 2017
- GRACE Follow-On (GRACE-FO) launching April 14, 2018 from Vandenberg AFB
- Twin satellites measuring Earth’s gravity field anomalies

California Drying
Cumulative water storage changes from NASA GRACE (2002-2014)

June 2002  June 2008  June 2014
• **UAVSAR**: Uninhabited Aerial Vehicle Synthetic Aperture Radar

• **Instrument**: L-band Synthetic Aperture Radar

• **Products**: Polarmetric (PolSAR) and interferometric (repeat-pass InSAR) products highlight features and show changes in the earth over time

• **Current Platform**: Gulfstream III with precision autopilot to fly same path within 5 m (16 ft)

• Also serves as a radar technology platform for future space-borne imaging radar missions such NASA ISRO Synthetic Aperture Radar (NISAR) mission (expected launch 2020)

UAVSAR Sacramento Delta High Tide Flight Lines https://uavsar.jpl.nasa.gov/cgi-bin/report.pl?planID=PLAN_11061#map

Flight Line detail: https://uavsar.jpl.nasa.gov/cgi-bin/product.pl?jobName=SDelta_33502_11062_004_110829_L090_CX_01#data
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**Airborne Snow Observatory**

- **ASO:** Airborne Snow Observatory
- **Instruments:** Near-Infrared Scanning Lidar, Multi-spectral Imaging Spectrometer
- **Products:** Basin-wide, spatially distributed measurements of snow depth, snow albedo, snow water equivalent
- **Platform:** King Air A90
- **Regular flights in California & Colorado**

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<table>
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<tr>
<th>Topical Area</th>
<th>NASA Remote Sensing Instrument or Platform</th>
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<tr>
<td>Agriculture &amp; Evapotranspiration (ET)</td>
<td>MODIS, Landsat, VIIRS, ECOSTRESS (2018), ASTER, SMAP, AIRS, HyTES</td>
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<td>Snow (SWE, Depth, Cover, Albedo)</td>
<td>MODIS, ASO</td>
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<td>Groundwater</td>
<td>UAVSAR, GRACE-FO, NISAR (2020)</td>
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<td>Forecasting &amp; Precipitation</td>
<td>SWOT (2020), JASON-2, JASON-3, AIRS, GPM, IceSat-2</td>
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<td>Subsidence &amp; Infrastructure Monitoring</td>
<td>UAVSAR, NISAR (2020)</td>
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<td>Water Quality</td>
<td>MODIS, Landsat, VIIRS, AVIRIS, PRISM, HICO, HSI, PACE (2022)</td>
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<td>Land Use</td>
<td>MODIS, Landsat, VIIRS</td>
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NASA Western Water Applications Office
Emphasize not trying to reinvent wheel or displace anyone
27 federal agencies that have a mandate related to water
We want to learn more bc we want to be sensitive to the mandates of our federal partners.
We want to work with agencies, not against
Focus on local, state, and Federal stakeholders and data users
Don’t reinvent the wheel.

Success Strategy

• The WWAO will maintain an awareness of Western water challenges and where NASA may have a unique ability to make an impact.

• Match “needs” to NASA capabilities.
• Develop and maintain “WWAO Core Capabilities”.
  • “Effective and sustained” stakeholder engagement.
  • Unique “application transition” support.

**WWAO plans to develop projects using a variety of approaches.**

• Directed, “pull”, and innovative project development

WWAO management and SEWG 33 stakeholder meetings throughout the year.
By meetings, we’ve invited folks to JPL for in-depth meetings, we held focused meetings at stakeholder institutions, we’ve presented at workshops, forums, meetings. DEWS, WSWC, ASCE…
Boundary orgs like USDW and DEWS
Ten Academic institutions throughout the U.S
Some basins may need more love and attention.
Extreme events are a big concern. What are the trends? Resources. CA big bucks, AK no bucks.

USDA, NOAA RISAs, CADWR, USGS, Marty Ralph,
Guiding Philosophy: Understanding decision needs & contexts is critical to project formulation & implementation.

**ACTION:** Conduct Rapid Needs Assessment and Colorado Basin Market Survey. Annual updates for other regions or topics.

**GUIDING PHILOSOPHY:** Long-term relationships with water management community are essential to develop trust.

**ACTION:**
Develop and maintain sustained engagement
Assess outcomes and impacts
Without the decision context we did not get to the level of specificity we needed to develop requirements.

What are the needs? Without preconceived notions. Trying desperately not to get to solutions.
CA program to fallow land during the drought. Needed a way to assess effectiveness of the program.
S
Airborne Snow Observatory -
Ways to work with WWAO

• How can my agency work with WWAO?
  – Participate in a WWAO Needs Assessment workshop
  – One-on-one meetings with the Stakeholder Engagement team
  – Develop WWAO project concepts in conjunction with the WWAO team

WWAO Stakeholder Engagement Team

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