



Western Water Action Office

Snow Needs: Western Snow Conference

Connecting the Drops Webinar, August 2025

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Metropolitan Group



Background

- WWAO's mission and NASA Earth Science to Action
- Western Snow Conference
- Basin Assessments



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1. snowpack and snowmelt runoff simulation



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2025 Western Snow Conference Short Course Attendee Packet

NASA Western Water Action Office Snow Workshop
Monday, May 19, 2025 | 9:00-3:00p

About NASA's Western Water Action Office (WWAO)
WWAO is a program of NASA's Earth Science Division, based out of the Jet Propulsion Laboratory in Pasadena, California. Compelled by urgent challenges to our nation's Western water supply, WWAO harnesses the power of NASA to drive innovative solutions that benefit people, the environment, and the economy. WWAO forges deep relationships with end users, puts the power of NASA in the hands of water decision-makers, and brings the needs and knowledge of its partners back to NASA to shape future innovation. For more information on WWAO, see their website.

Short Course Objectives

1. Strengthen relationships between WWAO, snow sector stakeholders, and the WSC.
2. Gather information from end users to improve NASA's future science endeavor.
3. Help WWAO understand how water management challenges intersect with snow-related challenges and inform decision making.
4. Generate use cases within the topic areas.
5. Share out findings from the workshop with the wider WSC and WWAO communities.

Short Course Agenda

- Block 1: Opening (8:00-9:45)
- Block 2: NASA Snow and Ice (9:45-10:30)
- Block 3: Use Case Refinement Guide

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Facilitator Guide for WSC Short Course
Last revised: May 16, 2025

Workshop Preparation

- Interviews and survey
- Topic Areas
 1. Data fusion for snowpack monitoring
 2. Model-driven snowpack and snowmelt runoff simulation, data assimilation, and forecasting
 3. Snow impacts: water resources, snowmelt/rain-on-snow flooding, hydropower, water quality, snow-influenced ecosystems
 4. Data access, integration and visualization



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Workshop Structure

- 1 full-day workshop
- Agenda overview



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SnoW⁵: A Data Fusion Model for Filling in the Data Gap

Use Case #1

- **Challenge:** Water management decision-making and data products are currently siloed. Spatiotemporal observational gaps in high impact areas limit broad utility of the data products.
- **Desired Result:**
 - Efficient collaboration of stakeholder organizations
 - More robust and representative in-situ network
 - Ability to see between the in-situ measurement sites.



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Building Trust in New and Existing Forecast Models for Water Management

Use Case #2

- **Challenge:** Operational decision-making often lacks technical integration and trust in new data sources and forecasts. Compounding this challenge, decision-makers frequently have competing objectives that complicate data adoption and coordination.
- **Desired Result:**
 - Technical improvement: Hybrid, physically-informed models; Integration and weighing of different models (decision support tools to integrate information)
 - Trust facilitation: Improved process for relationship building based on end user needs; More reliable operations and research cycle



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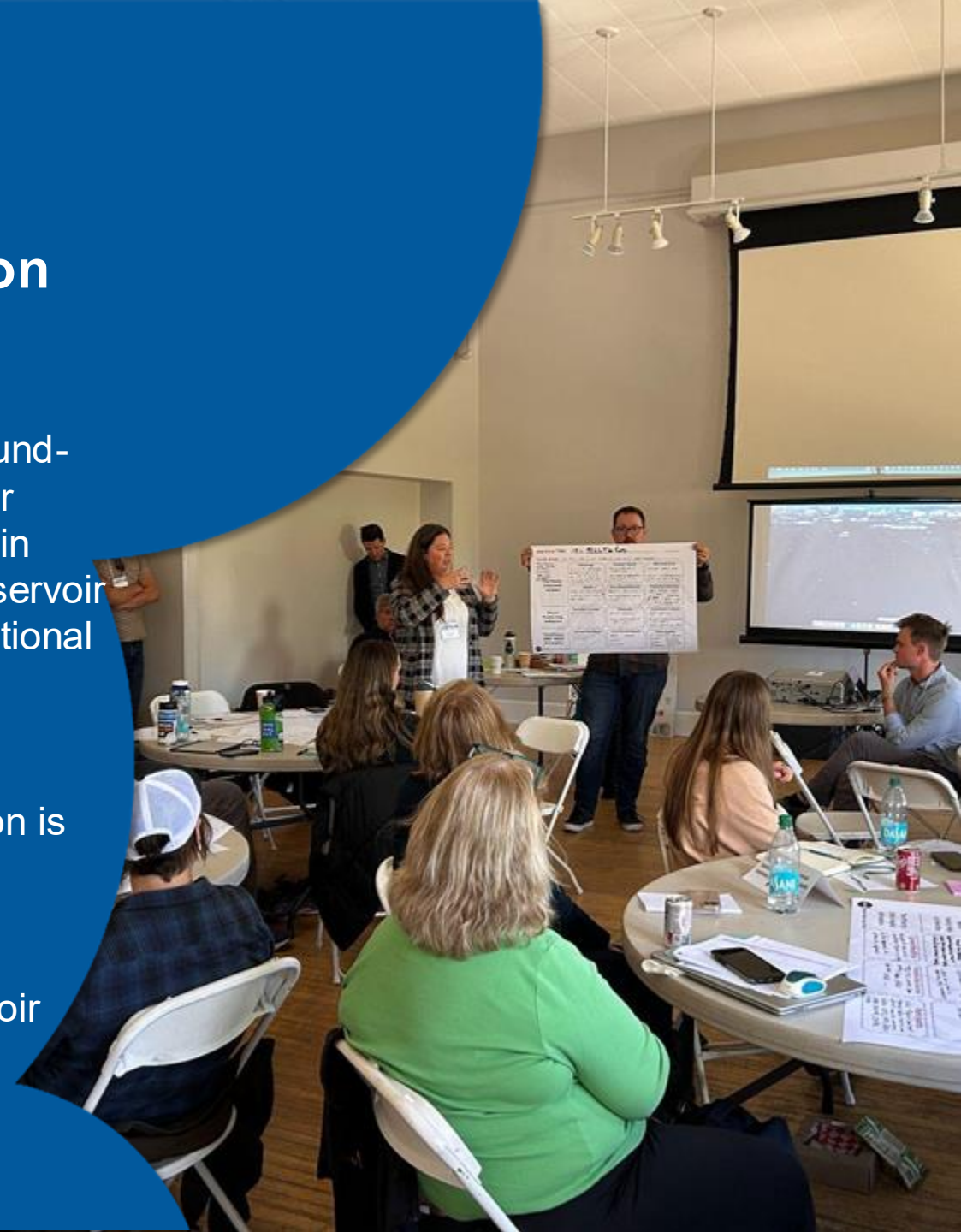
Improving Reservoir Management with Better Rain and Snow Phase Information

Use Case #3

- **Challenge:** An imperfect system of forecasts and ground-based observations often results in inefficient reservoir releases. A key challenge is the inability to determine in near real time whether precipitation falling above a reservoir is rain or snow—information that directly affects operational decisions.
- **Desired Result:**
 - Improved ability to determine whether precipitation is falling as rain or snow and where it occurs
 - A collection of observations to improve a model
 - Reduced water loss through more precise reservoir releases during severe storms.



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Quantify Impacts of Forest Change on Hydrologic Cycle

Use Case #4

- **Challenge:** Limited modeling capabilities and understanding of how landscape changes are impacting hydrologic systems. Example: the relationship between forest thinning projects for wildfire prevention and future impacts to snow runoff.
- **Desired Result:**
 - Improved and accurate predictions of water resource availability post change
 - Limit gap between the resetting of model parameters



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User Friendly Water Reporting

Use Case #5

- **Challenge:** Water reporting often lacks clear interpretation and is not easily accessible to end users; Users struggle to navigate the overwhelming volume of available water information
- **Desired Result:**
 - Within 1 year: Snow community coalesces around the need for user friendly water reporting; a solution is proposed; and currently available data is identified. Snow community leads the charge.
 - Within 5 years: A fully built water data summary tool that is AI-powered, signed off by experts, and tailored to individual users' needs, providing accessible summaries for all.



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Successes & Next Steps

"I really enjoyed the workshop portion of breaking into smaller teams and working through a challenge/opportunity. It showed me that I am not alone with the challenge we discussed in my group!"

"I greatly appreciated the opportunity to connect with operations folks. As a student in engineering, I want my research to be as applicable and useful as possible, and talking to water managers in person is invaluable."

"There is a lot of value to helping shape the vision of research directions, especially in the Intermountain West. Often, ideas that originate from urban centers on the coast do not address the real needs of the folks who live in these areas."



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Thank you!





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