Meeting Summary

Drought Resilience Interagency & Partners (DRIP) Collaborative
Drought Indicators & Metrics (DI&M)
Workshop #1

On Wednesday, April 1, 2026, the California Department of Water Resources hosted the first in a series of workshops to address the DRIP Collaborative 2024 recommendation on advancing drought indicators and metrics to build drought resilience. The workshop focused on developing a shared vision, aligning on key elements of a DI&M white paper to be written in 2026, highlighting existing drought indicator initiatives, and beginning a discussion on the programmatic gaps and opportunities to strengthen current efforts.

Paul Gosselin, California Department of Water Resources and the chair of the DRIP Collaborative, provided opening remarks and expressed appreciation for participants' engagement and emphasized the importance of being able to track drought risks and impacts before, during and after droughts. He encouraged participants to harness the latest analytical approaches and data so we can better manage droughts.

Participants emphasized their own perceived importance of participating in the workshop. That included: better targeting assistance, supporting local communities and Tribes, understanding drought impacts across sectors, improving collaboration and data sharing, tracking our efficacy of response, and ensuring resilience throughout all phases of the drought cycle.

Vision Statement

Participants reacted to an initial vision statement for DI&M, which will be refined in the coming months:

> *All California **audiences** (farmers, people, local water agencies, State, NGOs, researchers) have access to the **current, historical, and upcoming risks and impacts** of drought.*
>
> *This includes knowledge at a **sector-specific level** via a Drought Early Warning System that can help inform what **actions** are required to most effectively achieve drought resilience.*

Reactions included clarifying what constitutes a drought early warning system (DEWS) specific for CA, capturing all intended audiences (including the environment and Tribes), ensuring improved use (not just access) of data/indicators, and improving understanding of when we're in and out of drought.

DI&M Whitepaper for 2026

The white paper highlighted several items that could be addressed, while acknowledging that this is not comprehensive but is intended to balance what the DRIP Collaborative could address in the year.

1. **Vision**. What is the appropriate DI&M vision for California?
2. **Current Conditions (and Audience)**. What is the current landscape of drought tools and portals? Who are the various intended end users and what are their needs?
3. **Inventory**. What are the existing indicators? Can we create a master inventory list of indicators, identify key gaps, and plan out the path forward to ensure sufficient (spatial / temporal) coverage?
4. **Datasets**. What datasets are needed to achieve those indicators? Which ones exist already? What additional data needs to be gathered?
5. **Roadmap**. What defines success in 1 year (immediate)? 3 years (short-term)? Next 5 years?
6. **Funding/Resources**. What type of investment is needed to achieve the roadmap? What types of resources and expertise is needed?
7. **Organizations and Hosting**. What organizations need to be involved? Who should lead? Who will play what role in hosting and being authoritative sources? Will there always be many tools/efforts?

Terminology and California Historical Context

Participants discussed the four main groupings of indicators: 1) risk (composed of three parts: hazards, exposure, vulnerability), 2) thresholds, 3) actions, and 4) impacts. These are highly related and ideally we would be able to map how a risk indicator is correlated to specific thresholds, actions and impacts.

A timeline from 1980 - 2025 provided context on how data and indicators have evolved in California.

Spotlight on Existing Drought Indicator Efforts ("lightning talks")

There were four presentations highlighting the latest research efforts now underway on CA specific drought indicators. That was followed by three presentations by state agencies, detailing how actual drought indicators are used by the state. All seven talks included new "innovations".

Project	Presenter	Innovation	Audience
UC Davis DEW	Alvar	• Sub-sector, sub-regional, supply mix portfolio • CA complexity, including infrastructure	State/regional/local Researchers
NOAA NIDIS SoCal Pilot	Amanda/Andy	• Sector specific (ag, utilities, public health) • Co-developed, sector engagement	Local health officials, farmers, water utilities
CWDC Drought Data	Robyn	• Link urban water data reporting and drought • User engagement (CA Water Data Summit)	Water data stakeholders, including water agencies
UC ANR / CIWR	Erik P	• Focus on financial impacts • Multi-benefit outcomes (and impacts)	State/regional/local Researchers
CA Water Watch & DWR Water Shortage Vulnerability Explorer	Julie	• Standardized, statewide for state smalls/DWs • Physical and social vulnerability. Informs CDRPs	Small Water Systems, DWs, State Small WS, Counties
SWB Outage Forecast Predictor	Eric Z	• Predictive (AI/ML), dynamic indicators • Automated data collection, open source	Div of Drinking Water, CalOES, Water System staff
LCI Drought and VCP	Ben	• Uses US Drought Monitor DSCI, Climate • VCP integrates drought with other factors	VCP: NGOs, locals, and policy makers

Participant reactions were very positive, emphasizing how these efforts were inherently complementary and that further coordination could ensure the "sum is greater than the parts".

Breakout Session and Group Discussion

Workshop participants were split into two separate groups, both discussing the gaps and opportunities related to current DI&M efforts. This is a summary of key themes that emerged:

<u>Users and What They Need</u>

- Ensure user centric. The needed drought info varies by audience. Actual needs assessment has been partially done for some users, but not all.
- Confirm the most vulnerable are getting the message in an actionable way and time. Provide locally useful info most relevant to that user.
- Address user concerns about triggers/thresholds. Some are afraid of what the State will do
- Add predictive/forward looking, not just current risk.
- Connect hazard indicators to impacts, including health, societal and economic/financial.

<u>Communication</u>

- Improve communication of indicators, especially via media (where many get their info).
- Adopt a dashboard style communication interface, accessible by everyone down to the single well owner. Assume local outreach is likely needed.

<u>Use</u>

- Ensure possible (dis)aggregation of data for each communication and sector insights. Provide easy access to underlying data used to create any summary or detailed score.
- Provide distinct clarity on level of drought and timing (where, when, who is affected).

- Address organizations with low technical capacity and build trust among stakeholders.

Coordination of Efforts

- Foster collaboration. Many disparate, but complementary efforts. Coordination is a huge opportunity. One group can't do it all.
- Think through ongoing maintenance of drought indicators and related data.

Overall, the breakout sessions emphasized a shift toward more user-centric drought indicators that balance high-level communication with actionable, sector and local level response. All grounded in full impacts (not just on water availability), including human health, community, and economic outcomes.

Priorities Going Forward

During a group discussion, participants provided guidance on what should happen next process-wise in the May/June timeframe.

- Strengthen links to impacts. It may be worth a deep dive into linking a fuller set of drought impacts (such as human health). Include vulnerability and exposure (to those impacts).
- Ensure tight scope. Manage the scope to focus on problems we know we can solve, starting with ensuring the white paper topics are prioritized.
- Be clear on the messenger. Think through the most trusted and compelling messenger for each of the intended users.
- Think through user adoption. How do we ensure drought indicators are useful (linking back to the needs assessment and possible user convenings)? Possibly chart how each user group needs to be approached and how it fits into existing practices of each user group.