Drought Resilience Interagency and Partners Collaborative Progress Report

February 2025

California
DRIP Collaborative

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Acronyms and Abbreviations

DRIP	Drought Resilience Interagency and Partners
DWR	California Department of Water Resources
NBS	nature-based solutions
SB	Senate Bill
SWP	State Water Project

Executive Summary

The following report outlines the significant strides made by the Drought Resilience Interagency and Partners (DRIP) Collaborative, established under Senate Bill (SB) 552 of 2021 to enhance California's drought resilience. The DRIP Collaborative's work centered around three focus areas in 2024: drought-relevant data, drought preparedness for domestic wells, and drought definition and narrative.

Key accomplishments include the development and approval of six actionable recommendations:

1. **Indicators and Metrics to Improve Drought Decisions, Actions, and Resilience:** Establishing a practical drought early warning system to enhance decision-making and response.
2. **Rapid Inventory of Drought-Related Tools and Resources Relevant to California:** Cataloging existing drought management tools to improve efficiency and coordination.
3. **Empowering County Drought Resilience Planning for Domestic Wells and State Smalls:** Strengthening county-level planning for domestic wells and small water systems through best practices, collaboration platforms, and financial support.
4. **Voluntary Community-Based Well Monitoring Program:** Engaging communities in groundwater data collection and education to improve sustainability.
5. **Roles and Responsibilities:** Analyzing and optimizing the roles of various entities in managing domestic wells.
6. **Drought Definitions and Case Studies:** Developing case studies to foster a cohesive understanding of drought impacts and resilience strategies.

In addition to approving recommendations, the DRIP Collaborative initiated discussions for 2025 focus areas, including land use planning for drought resilience, water infrastructure and planning, and reducing ecosystem impacts of drought. Climate change adaptation and nature-based solutions for drought resilience have been preliminarily designated as cross-cutting themes for integrated planning.

Introduction

Foundational Purpose of the DRIP Collaborative

The Drought Resilience Interagency and Partners (DRIP) Collaborative was established in 2023 under California Water Code Section 10609.80(b)(1), enacted by Senate Bill (SB) 552 (2021), which mandates the California Department of Water Resources (DWR), in partnership with the State Water Resources Control Board and other key State agencies, to "establish a standing interagency drought and water shortage task force" that proactively supports statewide drought resilience planning and coordination.

The task force membership "shall include representatives from local governments, community-based organizations, nonprofit technical assistance providers, the public, and experts in land use planning, water resilience, and water infrastructure." The current DRIP Collaborative membership expands beyond these requirements to include Tribal, environmental, agricultural, and public water system representatives, as outlined in the 2024 membership list in Appendix A.

DRIP Collaborative Structure

The structure of the DRIP Collaborative continued as a 26-member body, meeting in-person three times per year, with the addition in 2024 of three ad hoc workgroups formed to further discuss recommendation ideas. The membership voted to create the initial workgroups to support developing and refining the recommendations. Upon approval of the recommendations, the workgroups disbanded. This allowed for new workgroups to form for 2025. Workgroup membership is detailed in Appendix B.

Report Purpose

The purpose of this report is to provide a public document summarizing the DRIP Collaborative's achievements, challenges, and decisions from the meetings over the past year. This report will be published publicly and shared with the Governor's Office and heads of State agencies and departments involved in water resource management, aiming to guide the State's planning and preparedness for future droughts and water supply shortages.

Recommendations

The key accomplishment of 2024 for the DRIP Collaborative was its development and approval of recommendations. Starting in 2023, the DRIP Collaborative's foundational year, members focused on defining priority areas for 2024 and beyond. The process began with more than 100 ideas, which were refined into a reference list for future use. The DRIP Collaborative advanced three initial high-impact focus areas: drought-relevant data, drought preparedness for domestic wells, and drought definition and narrative. Problem statements — defining specific challenges, guiding research, and informing solutions — were developed for each focus area.

In 2024, the DRIP Collaborative built on this foundation, developing specific and actionable recommendations to address a subset of the problems outlined in the problem statements. It is important to note that given the complexity of the challenges highlighted under each of the focus areas, the recommendations that were developed, and are described below, address only a subset of the identified problems and challenges that require ongoing attention. Members first proposed the recommendations in April 2024, which were further developed and refined in July 2024, and presented for approval in October 2024. Refer to Appendix C for a high-level recap of these three DRIP Collaborative meetings. Throughout the year, in preparation for the DRIP Collaborative meetings, focus areas workgroups met to develop and refine each recommendation’s description and consider potential impacts (e.g., benefits and challenges) as well as implementation considerations (e.g., estimated cost, potential implementers, and key implementation steps). Figure 1 provides a timeline of the recommendation process used. The process includes key milestones such as introducing the framework, identifying and refining recommendations, conducting reviews by workgroups and subject matter experts, and finalizing the approved recommendation to include in the 2024 DRIP Collaborative Report.

Figure 1 Timeline of the 2024 DRIP Recommendation Process

In the following sections, the problem statements for each focus area are presented, followed by a summary of the associated recommendations. The full recommendation texts, including implementation considerations, are available on DWR's website.

Drought-Relevant Data

As California faces a hotter, drier future, the absence of clearly defined, actionable drought metrics and indicators poses a significant challenge in prioritizing drought actions effectively and understanding their full effects. To ensure adaptive and localized strategies through all phases of the water cycle, it is crucial to bridge data gaps, ensure data accessibility and interoperability, and support modeling for climate-ready decision-making across the state. These challenges are interconnected and comprise four key subtopics, each building upon the other.

- **Drought Indicators and Metrics:** There is a need to define indicators for risk and outcome metrics to prioritize drought management actions and to identify which actions are most critical, assess their effectiveness, and understand their impacts at a regional and sector-specific level.
- **Coordination and Data Sharing:** It is essential to improve coordination and data-sharing and provide the opportunity to align with existing metrics tracked by various agencies and organizations (local, State, Tribal, and federal) and address disjointed efforts and data silos.
- **Data Gaps and Data Quality:** Prioritizing specific data gaps and quality issues will allow efficient enhancement of the reliability and

completeness of data for informed decision-making at an integrated watershed level.

- **Incorporating Data Analytics and Forecasting Techniques:** Adding predictive elements to drought indicators is required to enable a shift from reactive to proactive drought management, allowing more pre-emptive actions to mitigate the impacts of drought in a changing climate.

Recommendation 1: Indicators and Metrics to Improve Drought Decisions, Actions, and Resilience

Problem Addressed

This recommendation proposes that a practical drought early warning system in California could inform and improve drought management actions — both proactive mitigation measures and effective emergency responses — to minimize drought impacts. Current efforts to link drought conditions with expected impacts lack specificity and actionability. Given the complexity of California's water system, it is not straightforward to understand the potential impacts of different sectors and develop drought responses. Existing dashboards, such as the U.S. Drought Monitor and California Water Watch, contain useful information but lack integration and specificity, preventing effective coordination and resilience planning. Measuring or quantifying drought resilience is needed to support efficient decision-making and adequate responses based on drought severity and impacts, particularly for vulnerable communities and sectors. Aligning metrics and indicators could be the foundation for improved drought communication and narratives.

Recommendation

Develop a practical drought early warning system in the form of an online dashboard or web application. The system will integrate data across surface and groundwater supplies, reflect geographic and sectoral nuances, and provide actionable metrics tailored to State and local needs. This includes:

- **Water Supply Portfolio:** An integrated view of surface water and groundwater, including complex water supply portfolios (e.g., storage, conveyance, and imports), with detailed data on each element, such as expected deliveries.
- **High Spatial Resolution:** Data at finer geographic scales, ideally at the sub-hydrologic region level.

- **User and Sectoral Impacts:** Addressing distinct needs and effects on cities, small communities, irrigated agriculture, and freshwater ecosystems.

Metrics will track resilience, inform policies, and improve communication among interested parties.

Anticipated Benefits

This platform would improve drought planning, mitigation, and response by offering centralized, real-time, actionable data. Increased collaboration and transparency will empower agencies to provide targeted assistance, reduce vulnerabilities, and enhance public understanding. Ultimately, the system would bolster California's drought resilience, mitigate economic and social impacts, and promote sustainable environmental management.

Recommendation 2: Rapid Inventory of Drought-Related Tools and Resources Relevant to California

Problem Addressed

Because of drought's prominence in California's climate, many drought-related tools and resources have been developed for different uses, though with often limited cohesion or awareness of one another, and this sometimes leads to duplicative efforts or creating different messaging based on similar data. This fragmentation hinders effective decision-making, alignment of efforts, and identification of critical gaps in drought management resources. A clear inventory of these tools could reduce future redundancy and inefficiencies so that limited resources can support more alignment across tools and resources.

Recommendation

Conduct a rapid inventory of drought-related tools and resources relevant to California. This inventory will:

- Identify and catalog existing resources by key attributes (e.g., geography, timescale, and sectoral focus).
- Highlight gaps in the existing tool landscape that must be addressed to improve decision-making.

- Promote existing resources by providing use-case guidance and ensuring alignment with State, regional, and federal efforts.

This process involves collaboration with State and non-state drought technical experts, leveraging the Vulnerable Communities Platform and other relevant efforts. Outputs will include a structured summary and schema of resources to inform future initiatives and support ongoing evaluations.

Anticipated Benefits

The rapid inventory will enhance California's drought resilience by reducing redundancies and ensuring efficient use of existing tools and resources, providing a baseline for evaluating and addressing gaps in drought management tools and supporting better alignment across agencies and interested parties to improve resource-sharing and decision-making. It also aims to elevate useful tools with clear guidance, empowering local and State agencies to make informed drought-related decisions. By creating a centralized reference of tools and resources, this effort lays the foundation for improved drought planning, response, and communication across California.

Drought Preparedness for Domestic Wells

As California faces a hotter, drier future marked by intensified water shortages, building the resilience of domestic wells and state small water systems should be a high priority. No long-term water supply reliability nor water shortage contingency plan has been in place for these systems, leading to significant impacts during recent dry periods. The SB 552 framework passed in 2021 mandates proactive planning and specific actions to safeguard these critical water sources throughout the state. Fragile water supply systems can lead to a cascade of public health crises and economic instability, exacerbating inequities. Three critical subtopics capture the challenges faced in enhancing drought preparedness for domestic wells and state small water systems:

- **Responsibility and Accountability:** The preparedness and resilience of domestic wells and small systems depend on clearly defined responsibilities and authority across jurisdictions, including local groundwater sustainability agencies, private property owners, county governments, and the State.

- **Funding and Financing:** The current mechanisms for funding and technical assistance are insufficient, with long lead times for emergency funding and disparities in the capacity of counties to address the needs of domestic wells. Equity issues infuse drought vulnerability, with differences between high-income and low-income residents and between tenants and landowners.
- **Coordination and Information Flow:** There is an urgent need for enhanced coordination and information sharing among federal, State, local, Tribal, non-state, and community organization players. This coordination and flow are crucial for enhancing education on the resilience of existing wells and for preventing the drilling of new, unsustainable wells.

Recommendation 3: Empowering County Drought Resilience Planning for Domestic Wells and State Smalls

Problem Addressed

The passage of SB 552 in 2021 mandates proactive drought planning for domestic wells and state small water systems by county governments. But challenges in implementation persist. These include:

- **Lack of Guidance:** Counties face inconsistent planning processes because of unclear structures, timelines, and standards for drought plans.
- **Limited Collaboration:** The absence of a centralized platform prevents knowledge-sharing among counties.
- **Resource Constraints:** Many counties struggle with insufficient staffing and financial resources to develop and sustain effective drought task forces.
- **Task Force Challenges:** Counties need adaptable solutions for integrating drought resilience into existing frameworks.

Recommendation

The recommendation proposes actionable strategies to address these issues:

- **Best Practices Development:** Regular updates to drought planning guidelines, including integration with local plans and timelines for review.

- **Knowledge-Sharing Platform:** A centralized hub to share plans, best practices, and progress, fostering inter-county collaboration.
- **Financial and Technical Support:** Creation of grant programs and technical assistance to support counties, especially rural and underserved areas.
- **Flexible Task Force Structures:** Allowing counties to tailor task forces or adapt existing groups to SB 552 goals, supported by State-level liaisons.

Anticipated Benefits

The recommendation is expected to enhance preparedness by establishing clearer frameworks and plans that ensure consistent and robust drought resilience across counties. Collaboration and learning will be strengthened through a shared repository, allowing counties to exchange knowledge and improve statewide drought preparedness. Equity will also improve as additional resources and standardized plans provide better support for vulnerable communities, particularly those relying on domestic wells, to access funding and assistance. This approach focuses on flexibility, collaboration, and sustainable support mechanisms to achieve comprehensive drought resilience across California.

Recommendation 4: Voluntary Community-Based Well Monitoring Program

Problem Addressed

The recommendation addresses two critical issues of insufficient groundwater data and community engagement concerning domestic wells. Many areas in California face water shortages and dry wells because of drought and competing water demands, exacerbated by limited resources for monitoring and management by resource management agencies. These challenges will persist without intervention, leading to increased reliance on emergency response measures and missed opportunities for proactive drought resilience.

Recommendation

The recommendation proposes to address these critical gaps in groundwater monitoring by fostering community engagement, enhancing data collection,

and building collaborative partnerships. The main components of this recommendation include the following:

- **Establish Voluntary Community Well Monitoring Networks:** Groups of domestic well owners voluntarily monitor water levels and quality, sharing data to improve local and statewide understanding of groundwater conditions.
- **Provide Resources and Training:** Offer monitoring equipment, technical assistance, and training to empower well owners.
- **Pilot Program:** Launch a pilot network to demonstrate benefits, refine implementation strategies, and evaluate scalability.
- **Collaborative Implementation:** Engage partners such as DWR, groundwater sustainability agencies, local authorities, non-governmental organizations, and community organizations for technical and logistical support.
- **Public Outreach and Education:** Raise awareness about groundwater management, promote personal responsibility, and incentivize participation through rebates or water-saving equipment.

Anticipated Benefits

Implementing the recommendation is anticipated to enhance data availability through increased monitoring, which will improve drought preparedness and support sustainable groundwater management. Educating domestic well owners fosters a shared understanding of water resource challenges, while encouraging better maintenance, conservation practices, and greater participation in local planning. The program supports proactive drought resilience by mitigating water shortages, reducing reliance on emergency measures, and aligning with statewide drought planning efforts, including SB 552. The pilot program also offers scalability, serving as a model for broader implementation and influencing land-use policies to promote sustainable development. By addressing critical gaps in groundwater monitoring and community engagement, this approach strengthens drought resilience and sustainable water management across California.

Recommendation 5: Roles and Responsibilities

Problem Addressed

California faces critical challenges in ensuring safe drinking water for households relying on domestic wells, particularly during droughts. The State needs a comprehensive policy for addressing urgent needs and preventing well failures. Overlapping, unclear, or absent roles and responsibilities among agencies hinder timely and effective responses to domestic well outages, leaving affected communities without adequate water access.

Recommendation

The proposal calls for an independent entity (e.g., the Legislative Analyst Office or academic researchers) to analyze and clarify the roles and responsibilities of State, local, and other entities managing domestic wells. This analysis should include:

- **Current Roles:** Assess existing responsibilities in managing domestic wells across the drought-risk management cycle.
- **Identified Gaps:** Highlight inefficiencies in authority, funding, and coordination.
- **Gap Prioritization:** Focus on addressing the most critical gaps affecting drought resilience.
- **Proposed Solutions:** Provide recommendations for funding mechanisms and long-term planning to mitigate risks.

The findings will serve as the DRIP Collaborative's foundation for developing recommendations and best practices for improving domestic well management.

Anticipated Benefits

Implementing the proposed recommendation will establish clearer roles and responsibilities, reducing delays in emergency responses and improving coordination across agencies and organizations. The approach aligns more closely with California's Human Right to Water law, supports proactive measures to limit new development in areas with failing wells, and enhances drought preparedness, ultimately saving time and resources during crises. Without this effort, confusion over responsibilities will continue, leading to

delays, inefficient resource use, and ongoing risks to vulnerable communities' access to safe drinking water.

Drought Definition and Narrative

Although drought is a natural component of the Southwestern United States' climate, California lacks a cohesive, strategic drought resilience plan. The lack of a unified understanding of water shortage impacts across sectors hinders the State's ability to respond to and prepare for drought effectively. A multitude of drought definitions and the way drought impacts vary by sector and geography leads to fragmented responses and impedes the development of true drought resilience. A comprehensive, shared understanding of drought and water shortage conditions — including physical indicators and environmental, economic, and social impacts at the regional and local level — is essential for enabling cohesive, strategic management of water shortages.

This shared understanding relies on a clear definition of the legal and institutional aspects and knowledge of the narratives and interpretations of these definitions across sectors. The DRIP Collaborative's goal is not to redefine drought but to articulate the State's vulnerabilities and opportunities for resilience in the face of water shortages, thereby clarifying the rationale for specific State responses and fostering a common purpose among various sectors. Reframing drought as a water shortage issue based on conditions can shift the narrative to prompt the most effective action, focusing on strategic needs for drought resilience. This collective understanding is crucial in improving coordination and decision-making, leading to effective actions that bolster drought resilience. With aligned perspectives, California can adopt a more unified and informed approach to managing its water resources during prolonged dry periods.

Recommendation 6: Drought Definitions and Case Studies

Problem Addressed

Drought in California poses diverse and complex challenges across communities, sectors, and ecosystems. Current terminology and narratives often fail to capture the nuanced effects of water scarcity, including how drought is experienced differently across geographies, demographics, and industries. Without a cohesive understanding, efforts to address drought risk

and resilience remain fragmented, limiting the effectiveness of preparation, response, and recovery measures.

Recommendation

The recommendation proposes creating a suite of drought-related case studies to better frame and understand drought in California by highlighting the varied experiences and impacts across California. These case studies would include the following:

- **Terminology Review:** Examine existing drought definitions, response triggers, and associated impacts to clarify terminology.
- **Diverse Perspectives:** Compile case studies from urban, rural, agricultural, environmental, and Tribal contexts to capture a range of drought impacts and solutions.
- **Resilience Focus:** Highlight successful resilience practices and identify gaps in current approaches.
- **Accessible Formats:** Use multimedia formats, such as hosting summaries on platforms like the Integrated Climate Adaptation and Resiliency Program's Adaptation Clearinghouse, or creating videos, to ensure broader accessibility and engagement.

The case studies will draw from existing tools and resources, including the Rapid Inventory of Drought-Related Tools and Resources Relevant to California (Recommendation 2), to ensure they reflect current knowledge while filling gaps in understanding. Outreach and partnerships with State agencies, non-profits, and academic institutions are central to implementation.

Anticipated Benefits

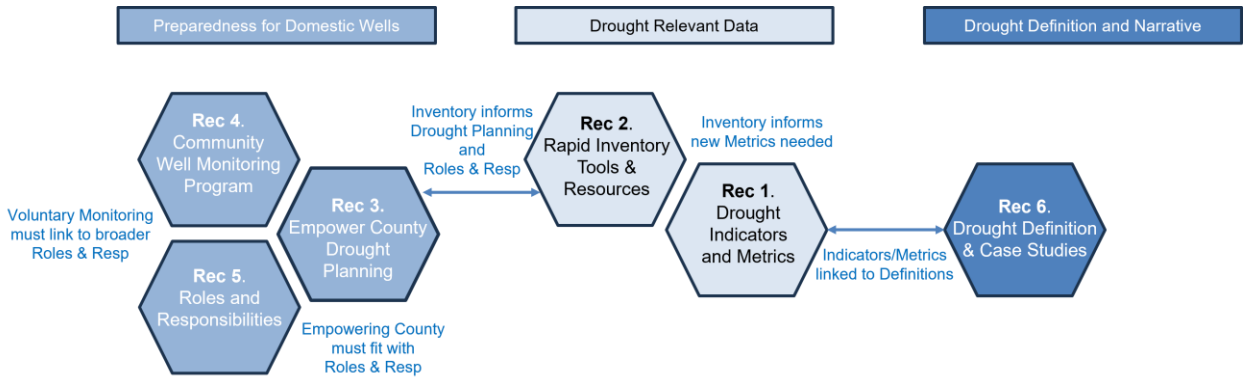
The recommendation aims to improve drought resilience by fostering a shared understanding of drought impacts and solutions across sectors, enabling more proactive and equitable decision-making for drought preparation and response. It also seeks to showcase successful strategies while identifying areas for improvement to inspire statewide action. Without this initiative, California risks perpetuating inconsistent narratives, which would hinder effective responses to future drought challenges.

Connections Between Recommendations

The approved recommendations were developed to address specific challenges, but they are deeply interconnected. For example, the ways certain drought definitions influence management decisions also need to be reflected in a drought indicator-based early warning system. To leverage these connections and promote a unified approach, the DRIP Collaborative identified key relationships so the envisioned recommendations could build off one another. Figure 2 provides a schematic illustration of the connections between the recommendations.

The inventory of drought-related tools and resources (Recommendation 2) informs drought indicators and metrics (Recommendation 1), which guide drought definitions and case studies (Recommendation 6) as well as the defined roles and responsibilities (Recommendation 5) and future county drought planning efforts (Recommendation 3). Community well monitoring (Recommendation 4) could provide real-time information to support efficient implementation of a county's drought resilience plan (Recommendation 3). Empowering county drought planning (Recommendation 3) depends on clear roles and responsibilities (Recommendation 5), ensuring alignment across efforts.

Figure 2 Interconnectedness of the DRIP Collaborative Recommendations for Enhancing Drought Resilience



DRIP Collaborative members expressed interest in tracking the extent to which recommendations are implemented over time. In 2025 and subsequent years, notable progress will be summarized and shared with the Collaborative and the public at appropriate times.

2025 Focus Areas

As outlined in the 2023 DRIP Collaborative inaugural report, the original three focus areas — drought-relevant data, drought preparedness for domestic wells, and drought definition and narrative — were developed through a collaborative and structured process. More than 130 potential ideas were initially identified and refined through virtual meetings, breakout sessions, and feedback from members. This process culminated in actionable problem statements that guided the process for 2024. This year, a similar approach was used to develop the next set of focus areas. Discussions at the 2024 DRIP Collaborative meetings built understanding and interest. In April, the DRIP Collaborative discussed sequencing the development of the next focus areas and agreed to spend part of the 2024 meetings to determine which next focus areas should be the focus of 2025. Subject matter expert presentations in July deepened members' knowledge of key topics, which informed the problem statement drafts presented at the October meeting. Members then voted to form workgroups in 2025 to further refine the problem statements, ensuring a collaborative and actionable pathway. The subsequent sections will briefly describe the identified problems and opportunities for each focus area and then describe the plan going forward to finalize the problem statements.

Communication Program

The 2024 workgroup for the drought definition and narrative recommendations is being restructured as the Communication Program workgroup to continue the development of the Communication Program Recommendation (7), which was not finalized in 2024. In 2025, the restructured workgroup will focus on developing a clear, actionable framework for an effective drought communications strategy. This includes addressing public awareness, enhancing engagement, and identifying opportunities to leverage and build on existing tools for consistent messaging on drought impacts and preparedness.

Reducing Ecosystems Impacts of Drought

Even during wetter periods, water management in California is often challenged to prioritize ecosystem health. This makes it harder for the state’s native species, which have adapted to the state’s arid Mediterranean

climate, to recover from water shortages and climate-change-related impacts. The key challenges identified as part of this focus area include freshwater ecosystem decline, river flow disruption, effect on biodiversity, and climate change exacerbation. The opportunities to address these challenges include wetland and riparian zone restoration, river flow improvements via the *California Environmental Flows Framework*, and enhancing habitat quality and preservation of biodiversity.

Land Use Planning for Drought Resilience

If past patterns of California land-use and water demands continue, future water needs will increase over time beyond current supply and cause greater stress to California's water resources. The key challenges identified as part of this focus area include projected water demand exceeding supply and fragmented planning across local jurisdictions leading to a potential increase in water shortage. Opportunities to address these challenges include the new optional water element of the general plan guidance that comes out of the Governor's Office of Land Use and Climate Innovation (formerly known as the Governor's Office of Planning and Research) and establishing stronger collaborations between land use planners and water managers.

Water Infrastructure and Planning

Improving infrastructure is crucial to meeting future water supply needs and mitigating long-term droughts. Enhanced water storage, efficient distribution systems, and advanced treatment facilities ensure reliable water supply during dry periods. Modernizing infrastructure and water management supports water conservation, reduces losses, provides system flexibility, and enables the use of alternative water sources such as recycled and desalinated water. Investing in resilient infrastructure safeguards communities, economies, and ecosystems against the growing effects of climate change. Please note that the key challenges for this focus area have not yet been identified by the DRIP Collaborative.

Climate Change Adaptation for Drought Resilience

Climate change adaptation refers to the proactive measures and processes taken to manage the risks of climate change impacts. Some adaptation strategies include expanding new water sources, upgrading infrastructure resilience and flexibility, and restoring ecosystems. The subject matter expert presentation during the July meeting highlighted the *California*

Climate Adaptation Strategy; from this document, 25 actions, many with supporting success metrics, were identified as being of potential interest to the DRIP Collaborative. Please see the following section for details on the workgroup for this topic.

Nature-Based Solutions for Drought Resilience

Nature-based solutions (NBS) refer to strategies that use natural processes and ecosystems to address societal challenges. These solutions leverage the resilience and adaptability of natural systems to provide benefits such as enhanced biodiversity, flood control, and carbon sequestration. The NBS potentially most beneficial for enhancing drought resilience include wetland restoration, flood-managed aquifer recharge (Flood-MAR), headwaters protection, and soil health. The subject matter expert presentation during the July 2024 meeting highlighted the California Natural Resources Agency's Priority Nature-Based Climate Solutions document; from this list, seven priorities were identified as being of potential interest to the DRIP Collaborative.

During the October 2024 meeting, the members voted to create a workgroup to define what cross-cutting themes mean for this group and to discuss the current set of cross-cutting themes (nature-based solutions and climate change adaptation in drought preparedness) to (1) further refine their purpose statements, and (2) consider whether they should continue to be labeled as a cross-cutting theme.

Closing

The DRIP Collaborative made significant progress in 2024, developing recommendations to address drought challenges while fostering a collaborative and inclusive environment. During the October 2024 meeting, members highlighted the group's adaptability and efficiency, noting that the collaborative approach supported diverse perspectives and quickly turned ideas into actionable plans. Many members described the experience as positive and productive, with some appreciation expressed on the group's openness to feedback and its ability to achieve consensus efficiently.

Looking ahead to 2025 and beyond, recent State budgetary constraints will affect how the DRIP Collaborative operates and develops recommendations on drought and water supply shortage planning and preparedness. As the lead agency, host, and chair of the DRIP Collaborative, DWR will prioritize evaluating the DRIP Collaborative's processes to adapt to these fiscal limitations. Anticipated changes include adjustments to the frequency and structure of the in-person and workgroup meetings, as well as reductions to resource allocations supporting these efforts. The emphasis will be on maintaining efficiency and effectiveness while meeting the mandates set upon the DRIP Collaborative. The modified process for 2025 is expected to be made public during the first quarter of the year.

Appendix A. DRIP Collaborative Membership 2024 and Alternates

The DRIP Collaborative membership consists of 26 individuals, comprised of eight State agency members and an additional 18 non-state agency representatives. In 2023, following a letter of invitation from California Department of Water Resources (DWR) Director Karla Nemeth, the relevant State agencies each appointed a delegate to serve as their agency representative. The State agency members are annually reappointed by that agency's director. Members may designate an alternate to attend meetings on their behalf. The selected members and their alternates are listed in Table A-1.

Table A-1 State Agency Members of the DRIP Collaborative, 2024

Agency	Member	Alternate(s)
California Department of Fish and Wildlife	Joshua Grover	—
California Department of Food and Agriculture	Virginia Jameson	Carolyn Cook
California Department of Water Resources	Karla Nemeth	John Andrew, Tom Gibson
California Environmental Protection Agency	Anna Naimark	Katy Landau
California Natural Resources Agency	Nancy Vogel	—
California Office of Emergency Services	Christina Curry	Nate Ortiz
Governor's Office of Planning and Research	Saharnaz Mirzazad	Elea Becker Lowe[a] Ben McMahan
State Water Resources Control Board	Joaquin Esquivel	Andrew Altevogt

Table A-1 Note:
[a] Elea Becker Lowe transitioned to being the member representative for the Governor's Office of Land Use and Climate Innovation (formerly named the Governor's Office of Planning and Research).

The non-state agency representatives were selected in 2023 following DWR's public call for applications. As required by the California Water Code Section 10609.80(b)(2), membership must include representation for non-profit technical assistance providers, community-based organizations, the public, local government, and experts in land use planning, water resilience, and

water infrastructure. To consider all water users, membership categories were expanded to include Tribal representatives, the environment, agriculture, and public water systems, while also trying to cover the diverse geography of California. The non-agency representatives and their alternates are listed in Table A-2.

As of the end of 2024, the non-state agency representatives have completed their second year of membership as originally committed. To accommodate a smooth transition of knowledge between the current and future non-agency representatives, the DRIP Collaborative Development Team invited the members for an additional commitment of one or two years. Members then selected their commitment extension.

Table A-2 Non-State Agency Members of the DRIP Collaborative

Rep	Organization	Region	Member	Alternate(s)
Ag	Agricultural Council of California	Statewide	Emily Rooney	Tricia Geringer
Ag	Jay Colombini Ranch, Inc.	SJV, Sierras	Jason Colombini	Joshua Rahm
CBO	California Association of Mutual Water Companies	Southern	Tim Worley	Karina Cervantez
CBO	Community Water Center	SJV, Central Coast	Justine Massey	Kyle Jones[a]
Envi	California Trout, Inc.	Statewide	Redgie Collins	Analise Rivero
Envi	Environmental Defense Fund	Statewide	Anna Schiller	Robyn Grimm
Expert	California Water Institute at Fresno State	SJV	Laura Ramos	—
Expert	University of California Los Angeles	Statewide	Alvar Escriva-Bou	—
Local Gov	Santa Cruz County	Central Coast	Sierra Ryan	—
Local Gov	California State Association of Counties	Statewide	Catherine Freeman	Amber Garcia Rossow

Rep	Organization	Region	Member	Alternate(s)
Public	Domestic Well Planning Group South American Subbasin	Central Valley	Suzanne Pecci	—
Public	Plumas Lake Self Storage, Owner	Northern	Brent Hastey	—
PWS	California Urban Water Agencies	Statewide	Katie Ruby	—
PWS	Los Angeles County Public Works	Southern	Carolina Hernandez[b]	Ramy Gindi
TA	CivicWell	Statewide	*Vacant*	—
TA	Self Help Enterprises	SJV	Tami McVay	—
Tribal	Buena Vista Rancheria of Me-Wuk Indians	North Central	Matessa Martin[b]	Petra Silverman
Tribal	Yurok Tribe	Northern	Louisa McCovey[b]	—

Table A-2 Notes: Ag = agriculture, CBO = community-based organizations, Envi = environment, Expert = expert in land use planning, water resilience, or water infrastructure, Public = general public, PWS = public water systems, small water suppliers or urban water agencies, Rep = representative water user group, State = State agency, SJV = San Joaquin Valley, TA = nonprofit technical assistance providers

[a]Kyle Jones transitioned to being the member representative for the Community Water Center.
[b]Carolina Hernandez, Matessa Martin, and Louisa McCovey joined the DRIP Collaborative in 2024, replacing the originally selected representative for their respective categories.

Appendix B. Workgroup Membership and Recommendation Lead Recognition

In April 2024, the DRIP Collaborative voted to create three workgroups to support the development of recommendations. Each workgroup was centered on one of the three focus areas, either drought-relevant data, drought preparedness for domestic wells, or drought definition and narrative. The workgroups met in the months between the in-person meetings (June and September 2024) to refine the recommendations associated with their focus area. The members of each workgroup are listed in Table B-1.

Table B-1 Workgroup Membership, 2024

Drought-Relevant Data Workgroup	Drought Preparedness for Domestic Wells Workgroup	Drought Definition and Narrative Workgroup
Alvar Escriva-Bou	Andrew Altevogt	Elea Becker Lowe
Elea Becker Lowe	Carolina Hernandez	Katie Ruby
Katie Ruby	Catherine Freeman	Laura Ramos
Laura Ramos	Jason Colombini	Matessa Martin
Robyn Grimm	Kyle Jones/Justine Massey	Nate Ortiz
—	Sierra Ryan	Redgie Collins
—	Suzanne Pecci	Suzanne Pecci
—	Tami McVay	Tim Worley

As stated, the purpose of each workgroup was to develop and refine the recommendations associated with the workgroup's focus area. The recommendation leads were responsible for drafting the text of their recommendations, incorporating feedback from the in-person larger membership DRIP Collaborative meetings and from the workgroup meetings, and presenting on their respective draft recommendations. The recommendation leads are listed in Table B-2.

Table B-2 Recommendation Leads and their Workgroup or Focus Area

Recommendation	Recommendation Lead	Workgroup/Focus Area
Recommendation 1: Indicators and metrics to improve drought decisions, actions, and resilience	Alvar Escriva-Bou	Drought-Relevant Data
Recommendation 2: Rapid Inventory of Drought Related Tools and Resources Relevant to California	Elea Becker Lowe, Ben McMahan	Drought-Relevant Data
Recommendation 3: Empowering County Drought Resilience Planning for Domestic Wells and State Smalls	Justine Massey/Kyle Jones, Sierra Ryan	Drought Preparedness for Domestic Wells
Recommendation 4: Voluntary Community-Based Well Monitoring Program	Suzanne Pecci	Drought Preparedness for Domestic Wells
Recommendation 5: Roles and Responsibilities	Justine Massey/Kyle Jones, Sierra Ryan	Drought Preparedness for Domestic Wells
Recommendation 6/8: Drought Definitions and Case Studies	Katie Ruby, Elea Becker Lowe	Drought Definition and Narrative
Recommendation 7: Communication Program[a]	Tim Worley, Laura Ramos	Drought Definition and Narrative

Table B-2 Note:
[a] The DRIP Collaborative agreed to continue work on Recommendation 7: Communication Program, into 2025.

In October 2024, the Drought-Relevant Data and Drought Preparedness for Domestic Wells workgroups were disbanded because they completed their task in getting their associated recommendations approved by the broader DRIP Collaborative. The Drought Definition and Narrative workgroup has been re-established as the Communications Program workgroup to continue developing the recommendation beyond 2024 and into 2025.

Appendix C. Meeting Themes and Discussions

This section summarizes the three in-person meetings conducted in 2024. These meetings drove the development and refinement of the proposed recommendations in 2024 and the future focus areas for 2025. The meeting agendas, summaries, presentations, and recordings are available on the DRIP Collaborative website.

In addition, this section summarizes the smaller virtual meetings that took place between the in-person meetings. Each meeting brought together the members most interested in a particular focus area to ideate on potential recommendations, receive comments, and then refine them. The purpose of these meetings was to maintain momentum and allow interested members to continue to discuss, develop, and refine the idea.

Recommendation and Future Focus Area Identification: Meeting 4, April 26, 2024

In late February and early March, members could attend three virtual meetings to introduce participants to the recommendation development process and prepare for an in-person meeting in April. These meetings aimed to identify potential recommendations and assign recommendation leads; the recommendation leads were responsible for drafting Part 0 of a template to declare intent to propose recommendations. Recommendations were grouped by focus area, as categorized below:

- Drought-Relevant Data.
    - Recommendation 1: Drought Indicators and Metrics.
    - Recommendation 2: Program and Information/Tools Evaluation.
- Drought Preparedness for Domestic Wells.
    - Recommendation 3: SB 552 Language Updates.
    - Recommendation 4: Community Well Monitoring Program.
    - Recommendation 5: Roles and Responsibilities.

- Drought Definition and Narrative.
    - Recommendation 6: Drought Definition White Paper.
    - Recommendation 7: Communication Program.
    - Recommendation 8: Drought Case Studies.

The recommendation leads presented draft recommendations to the larger DRIP Collaborative membership, which agreed to proceed with all eight recommendations. The members voted to establish three voluntary, member-driven workgroups to refine recommendations, each aligned with a focus area. The purpose of the workgroups was to prepare and refine Parts I and II templates for review at the July and October in-person DRIP Collaborative meetings.

Sandi Matsumoto from the California Water Commission presented the paper *Potential State Strategies for Protecting Communities and Fish and Wildlife in the Event of Drought*, outlining four key strategies: scaling up groundwater recharge, watershed-level planning, positioning communities for drought emergencies, and enhancing coordination and communication. Major takeaways from this presentation included (1) doing recharge in the right places, (2) need to build a decision-tree for who will do what when a drought emergency is declared, and (3) DRIP Collaborative members are invited to present recommendations and progress with the commission.

Identifying 2025 focus areas was also initiated, with discussions to continue in the July and October meetings. Of the many focus areas previously identified, the next round of potential focus areas include:

- Integrating climate change adaptation into drought resilience.
- Implementation of nature-based solutions for drought resilience.
- Reducing ecosystem impacts of drought.
- Water resources and operations.
- Infrastructure and planning.
- Land use planning.

Note that some focus area names have been changed to reflect the content of its problem statement. In this discussion, members emphasized strong

support for land use planning, particularly in the context of housing, and suggested that climate change adaptation and nature-based solutions should be cross-cutting themes rather than standalone focus areas. For the remaining 2024 meetings, climate change adaptation and nature-based solutions were re-designated as cross-cutting themes.

Recommendation and Future Focus Area Knowledge Development: Meeting 5, July 12, 2024

Following the April 2024 meeting, the recommendation leads and workgroups completed Part I and Part II of the recommendation template, defining the recommendation by providing a title, description, anticipated impacts, potential implementing parties and partners, implementation timeframe, and alignment with ongoing initiatives. During the July 2024 meeting, the recommendation leads presented the refined Part I of their respective recommendations to the entire DRIP Collaborative membership to collect feedback. Through a straw poll, the DRIP Collaborative reached a consensus to advance seven recommendations while deciding to rework Recommendation 3 (SB 552 Update) rather than proceed with it as written.

To support the development of potential focus areas in 2025, primer documents were developed and distributed before the meeting. These documents summarized key issues, ongoing State actions, and relevant literature to help define problem statements for each potential focus area. Subject matter experts delivered presentations to expand the DRIP Collaborative's knowledge development to aid discussions.

- **Water Resources and Operations, and Infrastructure and Planning:** Molly White (DWR) discussed State Water Project (SWP) activities, including drought water supply planning, forecast-informed reservoir operations, and infrastructure initiatives such as the Delta Conveyance project and the California Aqueduct Subsidence Program. Additional topics included a multi-agency drought toolkit and *The SWP Delivery Capability Report 2023*.
- **Reducing Ecosystem Impacts of Drought:** Sandi Matsumoto (The Nature Conservancy) emphasized building ecosystem resilience and taking emergency actions during drought. She suggested leveraging lessons from recent and past drought-response programs.

- **Land Use Planning:** Eric Chu (Governor's Office of Planning and Research) presented updates to the State *General Plan Guidelines*, including an optional water element. The DRIP Collaborative could contribute by providing best practices in water conservation, groundwater recharge, and drought-tolerant landscaping to inform the development of the State *General Plan Guidelines*.
- **Climate Change Adaptation:** Lindsay Correa (DWR) highlighted California's climate adaptation strategies and resources, including the *California Climate Adaptation Strategy*.
- **Nature-Based Solutions:** Clessi Bennett (California Natural Resources Agency) discussed nature-based solutions and targets established under Assembly Bill 1757 (2022), focusing on improving natural system resilience and achieving acreage-based targets by 2045.

Recommendation Determination and Future Focus Area Refinement: Meeting 6, October 18, 2024

After the July 2024 meeting, the three workgroups met to refine Part I and complete Part II for each recommendation, highlighting key considerations for implementation. Based on the input from the July and workgroup meetings, the recommendation leads made several updates to the initial list of eight recommendations. Notably, the Communication Program recommendation (Recommendation 7) was split, with some of its symbology and dashboard development objectives incorporated into the Drought Indicators and Metrics Recommendation (Recommendation 1). As a result, the Communications Program recommendation will be revisited and further developed in 2025. The Drought Definitions White Paper recommendation (Recommendation 6) and Drought Case Studies recommendation (Recommendation 8) were combined, and the SB 552 Language Update Recommendation (Recommendation 3) was reframed as Empowering County Drought Resilience Planning for Domestic Wells and State Small Water Systems.

In the October 2024 meeting, the DRIP Collaborative conducted a final review of the recommendations, where each recommendation lead presented key components and how they addressed feedback in the

recommendation text. The DRIP Collaborative members voted to approve six recommendations.

- Recommendation 1: Drought Indicators and Metrics.
- Recommendation 2: Rapid Inventory of Drought-Related Tools and Resources.
- Recommendation 3: Empowering County Drought Resilience Planning for Domestic Wells and State Smalls.
- Recommendation 4: Voluntary Community-Based Well Monitoring Program.
- Recommendation 5: Roles and Responsibilities.
- Recommendation 6: Drought Definitions and Case Studies.

The Communication Program recommendation will continue to be developed by its leads in 2025. The workgroups established to support the 2024 recommendations were disbanded, while the Drought Definition and Narrative workgroup was reformed into the Communication Program workgroup to continue that work.

Four new workgroups were established to continue developing the potential 2025 focus areas and cross-cutting themes. A review of the potential 2025 focus areas took place, including brief presentations on problem statements for focus areas reducing ecosystem impacts of drought, and land use planning for drought resilience. For each topic, respective workgroups were formed to refine their problem statements further and identify potential recommendations. A problem statement for the water infrastructure and planning focus area was not prepared ahead of this meeting. Subsequent discussions and support for this topic led to its addition as a potential focus area for 2025. In addition, a workgroup for Water Infrastructure and Planning was formed to develop a problem statement and identify potential recommendations.

The meeting also covered cross-cutting themes, which were defined as affecting multiple focus areas and potentially influencing overall approaches of draft recommendations. Presentations on the purpose statements for climate change adaptation in drought preparedness and nature-based solutions in drought preparedness led to the formation of a workgroup on

cross-cutting themes. This workgroup will refine the purpose statements for these cross-cutting themes and decide whether to continue labeling them as cross-cutting or treat them as focus areas.

Useful Web Links

2023 DRIP Collaborative inaugural report
https://water.ca.gov/-/media/DWR-Website/Web-Pages/Water-Basics/Drought/Files/Drought-Resilience-Interagency-and-Partners-Collaborative/2023-Inaugural-Report.pdf

California Climate Adaptation Strategy
https://climateresilience.ca.gov/

California Environmental Flows Framework
https://ceff.ucdavis.edu/

California's Human Right to Water
https://water.ca.gov/Programs/All-Programs/Human-Right-to-Water

California Water Watch
https://cww.water.ca.gov/

Delta Conveyance
https://water.ca.gov/Programs/State-Water-Project/Delta-Conveyance

DRIP Collaborative website
https://water.ca.gov/drip

Integrated Climate Adaptation and Resiliency Program's Adaptation Clearinghouse
https://resilientca.org/

Potential State Strategies for Protecting Communities and Fish and Wildlife in the Event of Drought
https://cwc.ca.gov/-/media/CWC-Website/Files/Documents/2024/01_January/Drought-Strategies-White-Paper_Final.pdf

Priority Nature-Based Climate Solutions and Cross-Cutting Priorities
https://resources.ca.gov/-/media/CNRA-Website/Files/Initiatives/Expanding-Nature-Based-Solutions/2022_Priority-_NBS_CCP.pdf

Recommendation texts, including implementation considerations
https://water.ca.gov/-/media/DWR-Website/Web-Pages/Water-Basics/Drought/Files/Drought-Resilience-Interagency-and-Partners-Collaborative/FinalApprovedPacket_ADA.pdf

The State Water Project Delivery Capability Report 2023
https://data.ca.gov/dataset/final-state-water-project-delivery-capability-report-2023

U.S. Drought Monitor
https://droughtmonitor.unl.edu/CurrentMap.aspx

Vulnerable Communities Platform
https://vcp.opr.ca.gov/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