2025 Focus Area Primers

Scope

The focus area primers are intended as a refresher of previously discussed topics by DRIP Collaborative members, particular issues to tackle, and prompting questions for discussion. These primers also include an abbreviated list of related and ongoing State actions related to the topic with key literature annotated and referenced. The purpose is to aid the DRIP Collaborative in defining a problem statement for the given focus area so that members may develop recommendations. These primers are not intended to be a comprehensive overview of the topics, nor will they include an exhaustive literature review or a complete state-of-the-art on related activities.

Acronyms

DWR	Department of Water Resources
CDFW	California Department of Fish and Wildlife
SWRCB	State Water Resources Control Board
CalEPA	California Environmental Protection Agency
CDFA	California Department of Food and Agriculture
SB	Senate Bill
CNRA	California Natural Resource Agency
EO	Executive Order
OPR	Office of Planning and Research
GO-Biz	Governor's Office of Business and Economic Development
LWDA	Labor & Workforce Development Agency
Flood-MAR	Flood Managed Aquifer Recharge
SGC	Strategic Growth Council
SWP	State Water Project

Reducing Ecosystem Impacts from Drought

Mitigating drought impacts on ecosystems is crucial to maintaining biodiversity and ecological resilience. Drought stresses native plants and animals, leading to a decline in biodiversity and ecosystem function. Effective drought management must adopt a holistic approach, focusing on entire ecosystems rather than single species, to support viable populations that can endure future droughts. This is essential to ensure that California's iconic biodiversity and natural systems can flourish despite the increasing frequency and severity of droughts exacerbated by climate change.

Ideas previously mentioned by DRIP Members

- Implement habitat restoration and preservation projects
- Reconnect waterways to floodplains through restoration
- Advance instream flow requirements to protect fish, wildlife, and ecological functions
- Develop environmental water plans at the watershed-scale
- Incorporate nature-based solutions in water resource planning
- Integrate climate change projections into drought planning for ecosystems
- Support multi-benefit recharge projects (including groundwater ecosystems and instream)
- Integrate fire and forest management (especially tribal knowledge) into drought planning

Potential Discussion Questions

- Where would habitat restoration most improve ecosystem resilience to drought?
- Which projects have shown success in mitigating drought and can these be scaled up?
- What partnerships are needed to coordinate drought mitigation efforts for ecosystems?
- What policies can be enforced or amended to ensure better protection of ecosystems?
- What legislative changes are necessary to improve drought mitigation for ecosystems?
- How can resources be allocated effectively to prioritize high-impact areas and actions?

Related State Bodies and Ongoing Actions, Programs, Initiatives

- 30 x 30 California: a state goal of conserving 30% of California's lands and coastal waters by 2030. The 30x30 goal is intended to help accelerate conservation of our lands and coastal waters to meet three objectives: conserve and restore biodiversity, expand access to nature, and mitigate and build resilience to climate change
- DWR - Watershed Resilience Program: offers financial and technical support to enhance watershed health, improve water quality, and increase climate resilience across California's diverse landscapes. The program is conducting five pilot planning projects to test and apply the watershed resilience approach in various representative regional settings in the state and lay the foundation for future efforts.
- Healthy Watersheds Partnership: provides objective and unbiased science and technical resources centered on watershed process and function, aquatic ecosystem biodiversity, and integrated assessment data and information.
- California Environmental Flows Framework: provides technical guidance for managers to employ a functional flows approach to develop scientifically accurate and defensible environmental water flow recommendations throughout the state.

- CDFW - Landscape Conversation Planning Program: proactively identifies priority mitigation and conservation areas before impacts occur, with the goal of preserving larger areas of higher habitat quality and increasing wildlife connectivity.
- CDFW – State Wildlife Action Plan: examines the health of wildlife and prescribes actions to conserve wildlife and vital habitat. In the latest update, the California Department of Fish and Wildlife incorporated climate change impacts and adaptation, including dozens of strategies and targets for California's ecoregions.
- Department of Conservation - Watershed Coordinator Program: supports State-funded coordinators to develop plans and projects to improve watershed health and to achieve State and local natural resources goals.
- Department of Conservation – Working Lands and Riparian Corridors Program: funds watershed restoration projects and conservation projects on agricultural lands.
- Agreements to Support Healthy Rivers and Landscapes: voluntary agreements, if approved by the State Water Board, are a means to implement an updated Bay-Delta Plan. These agreements would help restore 45,000 acres of aquatic habitat for fish and other animals.
- Forest Management Task Force - California Wildfire and Forest Resilience Action Plan: designed to strategically accelerate efforts to: restore the health and resilience of California forests, grasslands and natural places; improve the fire safety of our communities; and sustain the economic vitality of rural forested areas.
- Tahoe Conservancy - Climate Adaptation and Biodiversity Program: integrates activities to conserve biodiversity, adapt to climate change, and reduce greenhouse gas emissions via the Conservancy's Landscape Resilience Program
- CDFA – Pollinator Habitat Program: works directly with farmers and ranchers to install habitat and implement management practices that support pollinators.
- California Biodiversity Collaborative: unites key environmental experts and community leaders to conserve California's globally renowned natural heritage. This effort is a key partner of the 30x30 conservation initiative.
- California Water Commission - Water Storage Investment Program: Proposition 1 of 2014 dedicated $2.7 billion for investments in water storage projects. The California Water Commission is administering the Water Storage Investment Program to fund public benefits associated with the eight selected projects, such as flood control, ecosystem improvement, water quality improvement, emergency response, and recreation.
- California Rice Commission - Bid4Birds Program: incentivizes habitat for early migrating waterbirds this late summer and early fall.
- California Fish Passage Forum: a collaborative entity formed among federal and state agencies, and non-profits to explore, develop, and share effective methodology and resources to restore and recover anadromous fish populations by improving fish passage at man-made barriers.
- San Joaquin River Restoration Program: a comprehensive, long-term effort to restore flows to the San Joaquin River from Friant Dam to the confluence of Merced River and restore a self-sustaining Chinook salmon fishery in the river while reducing or avoiding adverse water supply impacts from Restoration Flows
- Wildlife Conservation Board

Water Resources & Operations

Considering drought in water management and operations is crucial to ensure sustainable water supply. Drought can severely reduce water availability, impacting agriculture, industry, and communities. Proactive planning helps mitigate the effects, ensuring efficient use, conservation, and allocation of water resources. It also supports ecosystem health, prevents economic losses, and ensures resilience against climate variability. Effective drought management enhances long-term water security and resilience for both human and environmental needs.

Ideas previously mentioned by DRIP Members

- Optimize reservoir operations, including FIRO, and update rule curves
- Increase groundwater recharge, from flood waters and optimized reservoir operations
- Promote integrated/conjunctive water resource management approaches
- Adopt water accounting and investigate demand management
- Promote efficient water use, including green solutions like nature-based solutions
- Identify alternative water supplies (including recycled water)
- Address water supply issues such as lack of licensed professional well drillers
- Evaluate further small water system consolidation
- Consider anticipated climate change impacts into water resource planning

Potential Discussion Questions

- What collaborations can be established to enhance regional drought resilience?
- What role can technology and data play in improving drought forecasting and response?
- How can water allocation policies be adjusted to prioritize critical needs during drought?
- How can water conservation and efficiency measures be improved? What policies/incentives?

Related State Bodies and Ongoing Actions, Programs, Initiatives

- DWR – 2024 State Water Project Long-Term Drought Plan: this plan consolidates information and actions taken during past droughts along with descriptions of the actions taken by the SWP to plan for and prepare for future droughts.
- DWR – Integrated Regional Water Management: integrated regional water management is a collaborative effort to identify and implement water management solutions on a regional scale that increase regional self-reliance and manage water to achieve social, environmental, and economic objectives.
- DWR - Watershed Resilience Program: offers financial and technical support to enhance watershed health, improve water quality, and increase climate resilience across California's diverse landscapes. The program is conducting five pilot planning projects to test and apply the watershed resilience approach in various representative regional settings in the state and lay the foundation for future efforts.
- DWR – Urban Water Management Plans: these plans support long-term resource planning to ensure sufficient water supplies to meet existing and future water needs. Information collected from these plans informs local, regional, and statewide water planning.

- DWR – Water Plan/Water Budget Team: this team works to produce a strategic water plan that meets California Water Code requirements, guides State investments in innovation, and advances integrated water management
- SWRCB – Drinking Water Partnerships and Consolidation: these partnerships include formal and informal agreements between water systems and communities that strengthen the ability of the State Water Board to ensure safe and sustainable drinking water.
- Sustainable Groundwater Management Act: this act, passed in 2014, created a framework for local agencies to form groundwater sustainability agencies that regulate groundwater consumption and mitigate overdraft. Since its passage significant progress has been made by local agencies toward the goal of ensuring sustainable groundwater conditions over the next 50 years.
- SB 659 – Water Supply Solutions Act of 2023: this law requires DWR, as part of the 2028 Water Plan Update, and each subsequent update, to provide actionable recommendations to develop additional groundwater recharge opportunities that increase the recharge of the state's groundwater basins. The bill requires the department to consult with the SWRCB, the nine regional water quality control boards, and the advisory committee. The bill also requires recommendations to identify immediate opportunities and potential long-term solutions to increase the state's groundwater supply, and include, among other things, best practices to advance all benefits of groundwater recharge.
- Association of California Water Agencies – Innovation Webpage: collection of case studies demonstrating innovative work in water agencies across California.

Infrastructure

Improving infrastructure is crucial for mitigating long-term droughts. Enhanced water storage, efficient distribution systems, and advanced treatment facilities ensure reliable water supply during dry periods. Modern infrastructure supports water conservation, reduces losses, and enables the use of alternative water sources like recycled and desalinated water. Investing in resilient infrastructure safeguards communities, economies, and ecosystems against the growing impacts of climate change.

Ideas previously mentioned by DRIP Members

- Identify and accelerate water system resiliency and actions to increase supply reliability
- Consider additional storage, both surface water storage and underground aquifers
- Upgrade systems for efficient water use
- Install interconnections and consider shared water sources
- Create incentives for green infrastructure, prioritizing for resilience and low impact
- Evaluate further small water system consolidation (physical consolidation)

Potential Discussion Questions

- How can we improve water storage to ensure supply during prolonged dry periods?
- What technologies can enhance water efficiency and reduce losses in the distribution system?
- How can alternative water sources, such as recycled or desalinated water, be integrated?

Related State Bodies and Ongoing Actions, Programs, Initiatives

- DWR - Dam Safety and Climate Resilience Local Assistance Program: provides State funding for repairs, rehabilitation, enhancements, and other dam safety projects at existing State jurisdictional dams and associated facilities that were in service prior to January 1, 2023.
- DWR - California Aqueduct Subsidence Program: this program seeks to reduce future subsidence in the San Joaquin Valley and to develop and implement the most beneficial and affordable corrective actions to mitigate the adverse effects of current and future subsidence on the California Aqueduct.
- CNRA – Interagency Infrastructure Strike Team: Created by EO N-8-23, the Strike Team works to maximize federal and state funding opportunities for California innovation and infrastructure projects.
- California Water Commission - Water Storage Investment Program: Proposition 1 of 2014 dedicated $2.7 billion for investments in water storage projects. The California Water Commission is administering the Water Storage Investment Program to fund the public benefits associated with the eight selected projects, such as flood control, ecosystem improvement, water quality improvement, emergency response, and recreation.
- California Coastal Commission – Sea Level Rise Coastal Adaptation Planning Guidance for Critical Infrastructure: this guidance addresses transportation and water by presenting six key considerations for successful adaptation planning. This guidance includes recommendations for interested parties on how to plan effectively for sea-level-rise impacts on coastal infrastructure.

- SB 659 – Water Supply Solutions Act of 2023: this law requires DWR, as part of the 2028 Water Plan Update, and each subsequent update, to provide actionable recommendations to develop additional groundwater recharge opportunities that increase the recharge of the state's groundwater basins. The bill requires the department to consult with the State Water Resources Control Board, the nine regional water quality control boards, and the advisory committee. The bill also requires recommendations to identify immediate opportunities and potential long-term solutions to increase the state's groundwater supply, and include, among other things, best practices to advance all benefits of groundwater recharge.
- SWRCB – Drinking Water Partnerships and Consolidation: these partnerships include formal and informal agreements between water systems and communities that strengthen the ability of the State Water Board to ensure safe and sustainable drinking water.
- OPR, GO-Biz, and LWDA – Community Economic Resiliency Fund: created to promote a sustainable and equitable recovery from the economic distress of COVID-19 by supporting new plans and strategies to diversify local economies and develop sustainable industries that create high-quality, broadly accessible jobs for all Californians.

Land Use Planning

Land use planning is crucial in managing droughts because it is intimately linked to water resource use and vulnerability. By holistically considering urban development, agriculture, and natural areas, planners can ensure sustainable water use, promote water-efficient practices, and protect water sources. Effective planning conserves water, and enhances resilience in communities, ensuring long-term water security and environmental sustainability.

Ideas previously mentioned by DRIP Members

- Improve how water is considered in short and long-term land use planning
- Further explore potential of MLRP (multibenefit land repurposing program)
- Increase storage in landscapes, via large scale multi-benefit recharge projects; Allocate more land for Flood-MAR (recharge basins, on-farm recharge, etc.)
- Consider new legal restrictions for well permits for agriculture or new housing
- Investigate green infrastructure's role in mitigating the impacts of droughts
- Adjust policies, such as incentives for permeable landscapes and non-functional turf bans
- Prioritize land back proposals (Tribal) to improve land management

Potential Discussion Questions

- How can zoning be adjusted to promote water-efficient landscaping and development?
- How can urban planning reduce impervious surfaces to enhance groundwater recharge?
- How can agricultural land use be managed to reduce water consumption?
- What collaboration is needed to better coordinate land use and drought mitigation?

Related State Bodies and Ongoing Actions, Programs, Initiatives

- CDFA – State Water Efficiency & Enhancement Program: Provides financial assistance in the form of grants to implement irrigation systems that reduce greenhouse gases and save water on California agricultural operations. Eligible system components include (among others) soil moisture monitoring, drip systems, switching to low-pressure irrigation systems, pump retrofits, variable frequency drives, and installation of renewable energy to reduce on-farm water use and energy.
- CDFA – Pollinator Habitat Program: works directly with farmers and ranchers to install habitat and implement management practices that support pollinators.
- CDFA – Healthy Soils Initiative: this initiative is a collaboration of State agencies and departments to promote the development of healthy soils.
- Department of Conservation – Multibenefit Land Repurposing Program: supports regions in adapting land uses to improve sustainability of groundwater basins. Regions are supported to increase capacity to repurpose agricultural land, thereby reducing reliance on groundwater and increasing groundwater sustainability.
- DWR – LandFlex Grant Program: created to provide immediate drought relief to drinking water wells in drought-stricken communities and limit unsustainable groundwater pumping in critically overdrafted (COD) basins

- DWR – Model Water Efficient Landscape Ordinance: the purpose of water efficient landscape ordinances is to not only increase water efficiency but to improve environmental conditions in the built environment. Landscaping should be valued beyond the esthetic because landscapes replace habitat lost to development and provide many other related benefits such as improvements to public health and quality of life, climate change mitigation, energy and materials conservation and increased property values.
- CDFW - Landscape Conversation Planning Program: proactively identifies priority mitigation and conservation areas before impacts occur, with the goal of preserving larger areas of higher habitat quality and increasing wildlife connectivity.
- CNRA – Natural and Working Lands Climate Smart Strategy: helps implement the governor's EO N-82-20 and expand climate action in this sector, which has been called for in California's Climate Change Scoping Plan and California's recently updated Climate Adaptation Strategy. The Climate Adaptation Strategy also identifies priorities for areas of near-term State focus to increase climate action on California's natural and working land.
- SGC – Sustainable Agricultural Lands Conservation: facilitates the purchase of agricultural conservation easements, development of agricultural land strategy plans, and other mechanisms that result in greenhouse gas reductions and a more resilient agricultural sector.
- Tahoe Conservancy – Land Resilience Program: convenes and collaboratively leads multiple landscape-wide partnerships that create efficiencies of scope and scale.
- California Rice Commission - Bid4Birds Program: incentivizes habitat for early migrating waterbirds this late summer and early fall.

Cross-cutting themes: Climate Change Adaptation

Climate change adaptation is crucial in addressing droughts, as rising temperatures and altered precipitation patterns intensify water scarcity. As climate change adaptation intersects with various sectors, including agriculture, water resources, public health, and infrastructure, it may be better suited as a cross-cutting theme to incorporate into the other focus areas. Integrating adaptation into diverse policy areas ensures comprehensive and cohesive strategies, enhancing overall resilience. By embedding climate adaptation, perhaps we can better address the multifaceted nature of climate impacts and foster collaboration across sectors.

Examples of climate change adaptation in other Focus Areas

- Integrate climate change projections into drought planning for ecosystems (Reducing Ecosystem Impacts from Drought)
- Consider anticipated climate change impacts into water resource planning (Water Resources & Operations)

Cross-cutting themes: Nature-based Solutions

Nature-based solutions (NBS) are sustainable management and use of natural processes and ecosystems to address societal challenges. These solutions harness the power of nature to provide benefits that support biodiversity, climate resilience, and human well-being. As with climate change adaptation, nature-based solutions may be better suited as a cross-cutting theme to incorporate into other focus areas. This holistic approach ensures that climate adaptation measures are not siloed but rather embedded in broader developmental goals. It promotes collaboration among different sectors, maximizes resource use, and fosters more sustainable and resilient communities.

Examples of nature-based solutions in other Focus Areas

- Incorporate nature-based solutions in water resource planning (Reducing Ecosystem Impacts from Drought)
- Create incentives for green infrastructure, prioritizing for resilience and low impact (Infrastructure)
- Investigate green infrastructure's role in mitigating the impacts of droughts (Land Use Planning)