BRIC 2022

Drought Mitigation

Cal OES
GOVERNOR'S OFFICE OF EMERGENCY SERVICES

September 12, 2022

www.caloes.gov

Webinar Overview

Place yourself on mute

Slides will be available on the Cal OES website

During the presentation, use the chat feature to ask questions

Q and A will occur at the end

BRIC Overview

Drought Project Types

Cost-Effectiveness

Case Studies

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Q/A

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FY BRIC 2022 - 2023 Timeline

2022

AUGUST

- FY 2021 competitive project selections are announced
- FEMA NOFO **8/12/2022**
- Issue 2 CFR 200 compliant RFPs for subapplication support if needed

SEPTEMBER

- Cal OES BRIC NOI period opens from **9/1/2022 to 9/16/2022**
- FEMA GO opens **9/30/2022**

OCTOBER - DECEMBER

- Cal OES provides technical assistance and webinars to subapplicants with approved NOIs
- Develop subapplications **(due to OES on December 2, 2022)**
- Respond to Cal OES RFIs as needed

2023

JANUARY

- Cal OES finalizes subapplications to be submitted to FEMA by **January 25, 2023**

MARCH - MAY

- Allocation (C&CB) Rd I announced
- FEMA reviews subapplications for eligibility / technical scoring criteria
- National Technical Review (NTR) reviews competitive subapplications
- Qualitative review panels are convened

AUGUST

- BRIC 2022 competitive projects adjudicated, and selections are announced
- FEMA NOFO for BRIC 2023 expected in **mid-August**

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Building Blocks of BRIC

1. Eligible subapplicant
2. FEMA approved mitigation plan
3. No construction or groundbreaking before grant award
4. Approved Notice of Interest (NOI)
5. Scope of Work with a clear level of protection increase
6. Benefit Costs Analysis (BCA)
7. Local Match and/or overmatch
8. Period of Performance (POP) of 36 months (or longer with reasonable justification)
9. Not dependent on other projects or funding sources (standalone mitigation solution)
10. Must comply with 2 CRF 200 and National Environmental Policy Act (NEPA)
11. Reimbursement based grant with eligible grant management costs and pre-award costs

Eligible:

Local governments, State agencies, cities and townships, counties, special districts, and tribal governments

Not Eligible:

Businesses, individuals, and Private Non-Profits (PNPs)

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Eligibility

- Must result in an increased level of protection.
  - Avoid using terms/phrases like "repair," "old infrastructure that has exceeded useful life," "unmaintained," "replacement of outdated assets," "result of damage or deferred maintenance.'
- Drought projects should enhance and/or enable the availability of potable water to a community.
- Must demonstrate that the project is an independent solution—projects must be wholly inclusive of all elements necessary to provide the benefits described in the subapplication and quantified in the benefit cost analysis
- The project should not exacerbate the ongoing drought.
- Must be a long-term solution—temporary measures are ineligible.
- Identify any other federal or state funding for the project to avoid a Duplication of Programs (DOP)
- Clearly identify the project benefitting area and service area though maps / GIS.

Eligibility Continued

- Explain in the problem to be mitigated/scope of work what the hazard problem is and what the impacts are.
  - Quantify increase in water to be provided, people served
  - Specifically note how the project will mitigate drought impacts and benefit the community
- Explain if there are any secondary hazards being mitigated, such as flooding or seismic risks. Note any ancillary project benefits like water quality.
- Provide documentation that indicates that the proposed project will not have adverse upstream or downstream impacts.
- Provide documentation to support that the project will be designed and built in compliance with all applicable federal and local standards.

Eligibility – Water Rights

Subapplicant must demonstrate that it has clear jurisdiction over water rights in the immediate project area and the project influence area

- FEMA may choose not to fund projects subject to ongoing litigation if such litigation may affect eligibility of the project or delay implementation.
- Include documentation in your subapplication to demonstrate water rights adjudication.

The Owens River near Mammoth Lakes, Los Angeles Times, July 2021

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Feasibility

- Engineering designs must be certified by a Professional Engineer or other qualified design professional.
- Designs must meet applicable codes and industry & construction standards.
- Scopes of work should reference the applicable design and engineering codes/standards
- Establish the level of protection provided by the project.
- For retrofit of existing facility or infrastructure, subapplicant must include a professional assessment of the existing vulnerabilities of the facility and/or infrastructure.
- Discussion of remaining risk after the mitigation has been implemented.
- Include schematic drawings or designs, if available.

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Drought – Project Types

Clearly explain the type of drought mitigation project being implemented, for example:

- Aquifer storage and recovery (ASR)
- Nature-Based Solutions/Green Infrastructure
- Floodwater diversion and storage
- Any other variations or combinations of these activities

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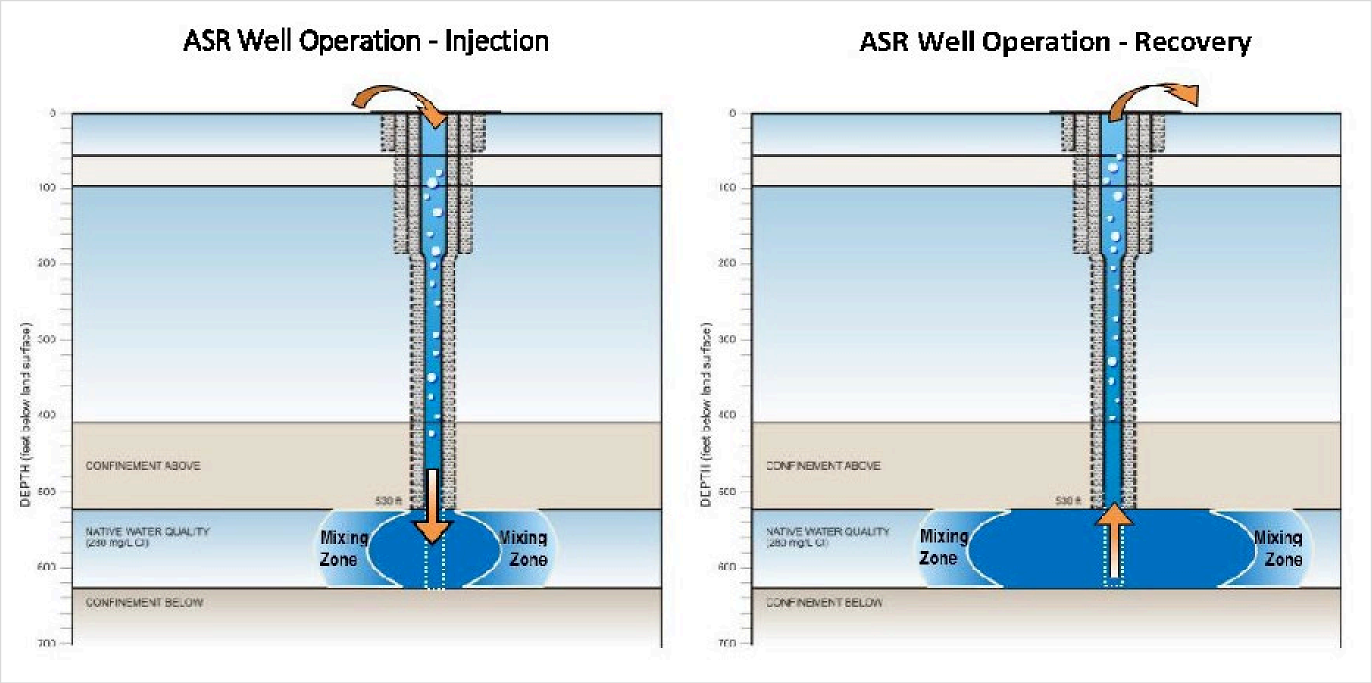
Project Types – Aquifer Storage and Recovery (ASR)

- Injecting surface water or groundwater into an aquifer through a well.
- Water stored until needed and recovered for use through same well.
- Increases climate resiliency for periods of low rainfall or extended drought by taking advantage of seasonal variations in surface water runoff or groundwater surplus.



Project Types – Nature Based Solutions

- Emphasizes conservation and use of onsite natural features integrated with engineered, hydrologic controls to more closely mimic predevelopment hydrologic functions.

- Infiltration of stored waters can mitigate the effects of drought by replenishing water supply aquifers and enhancing.

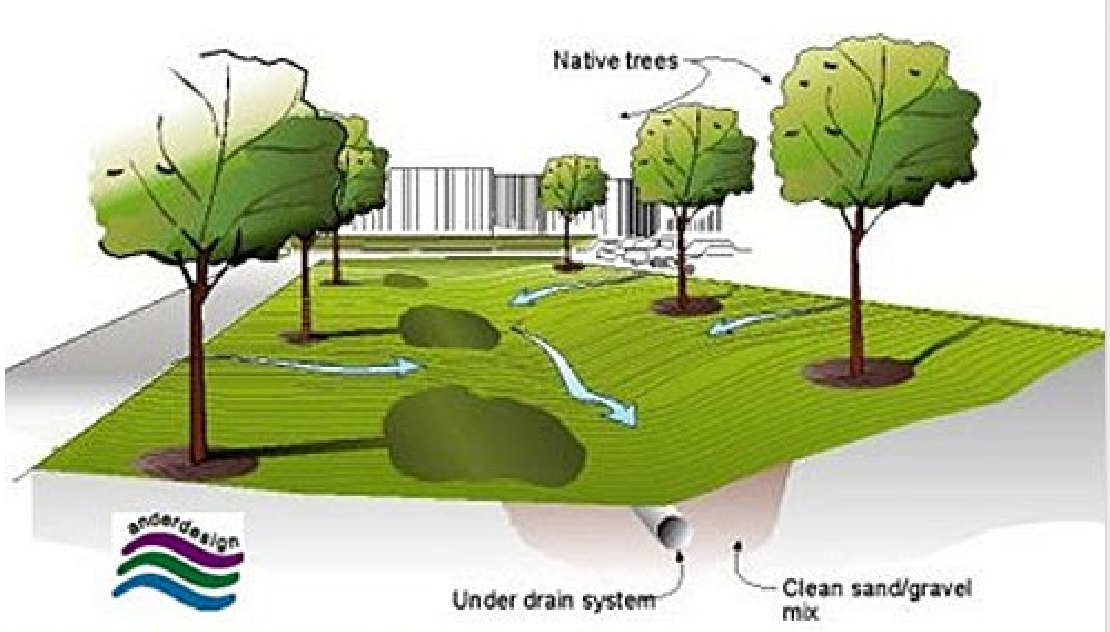


Figure 1: Bio-swale schematic

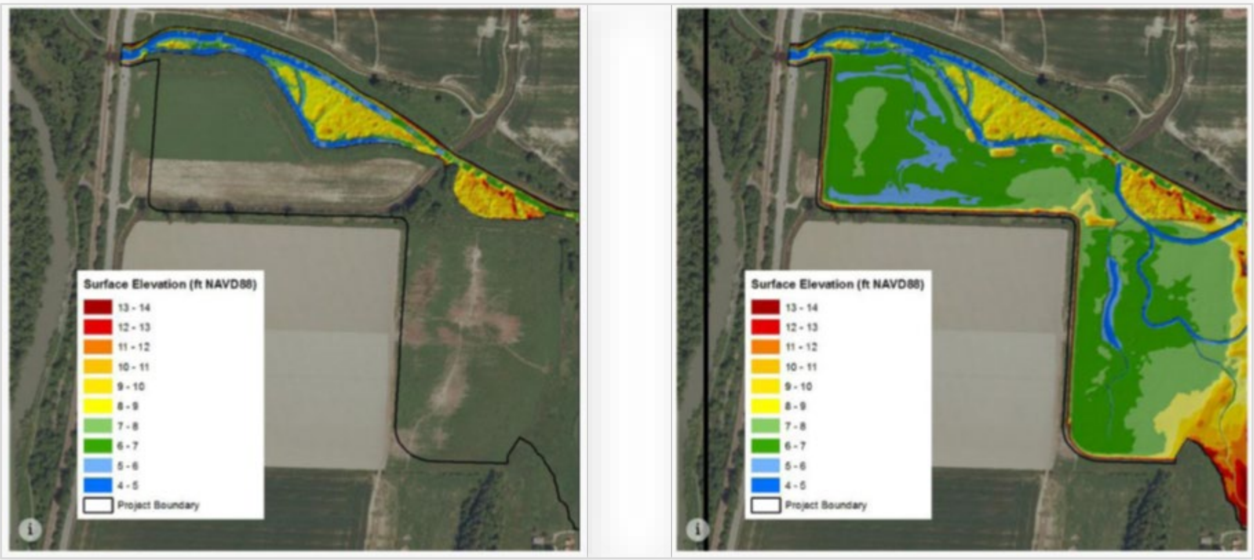
Courtesy Pierce County, Washington / WSU Extension

Whole Building Design Guide

Project Type – Floodwater Diversion and Storage

- Includes the transfer of floodwater from a stream, river, or other body of water into a wetland, floodplain, canal/ditch, pipe, or other conduits
- Storage of floodwaters provides for a controlled base flow release and reduces downstream peak flows, stages, velocity
- Water can be impounded in surface reservoirs, floodplains, and wetlands along with retention and detention basins and recharge aquifers

The Fisher Slough, WA



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Drought Mitigation – Benefit Cost Analysis

- Drought is a specific type of natural hazard, for which the benefits cannot be calculated the conventional way.
- For floods, power loss, earthquakes etc., functionality of the affected utilities is in binary mode (on/off).
- Drought is specific in the way that it reduces the water supply, while it simultaneously increases the demand (due to higher temperatures, drier antecedent conditions etc.).
- These two opposing trends become more pronounced with the increased severity (greater RI) of the drought event.
- The BCA approach is performed either through conventional approach or using specialized application for ASR projects.

BCA Methodology – Drought

Key data inputs:

Refer to the Cal OES Drought BCA one-pager for more detailed descriptions.

- Mitigation Project Type
- Mitigation Project Cost
- Annual Maintenance Cost
- Structure information
  - Utilities
  - Residential
  - Non-residential
  - Other
- Project Useful Life
- Drought event frequencies (i.e., recurrence intervals)
- Damage information

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BCA Methodology – Drought

1

Damage-Frequency Assessment (DFA)

- DFA is based on establishing a series of at least two points where there is a known or calculated relationship between event frequencies and damages

2

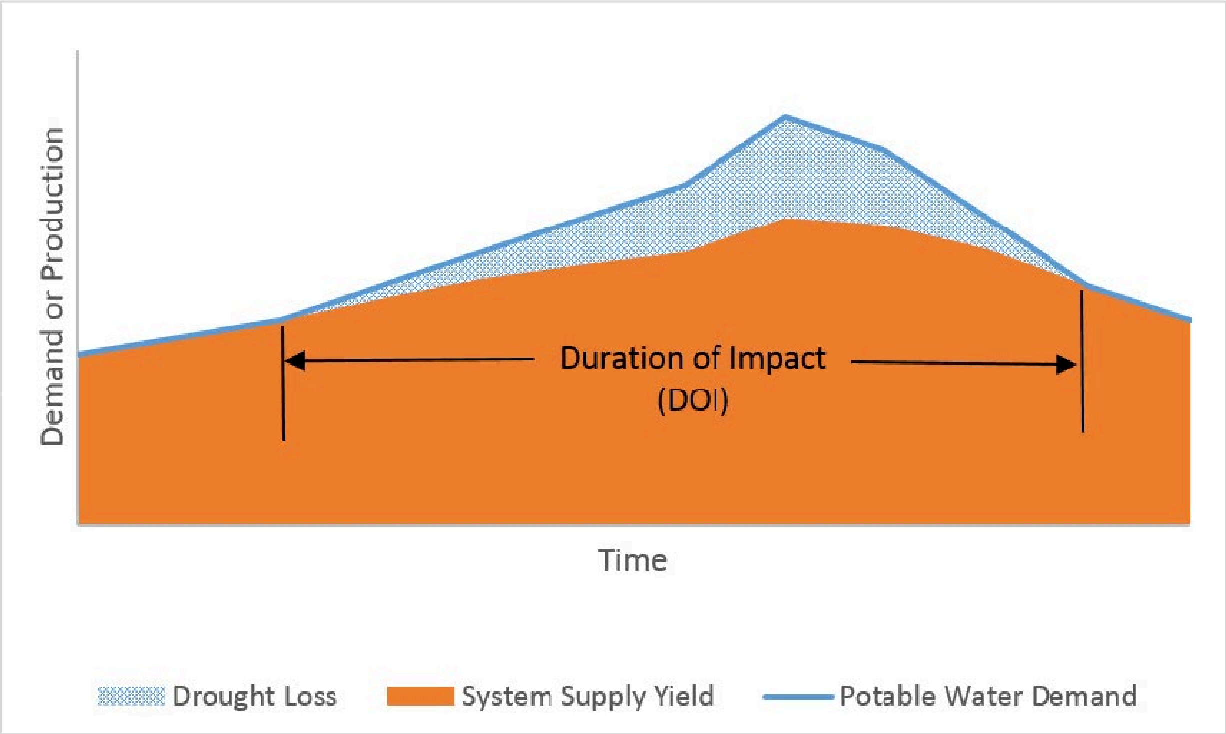
Modeled

- Modeled approach is only available when the subapplicant selects "Utilities" for Property Structure Type and "Aquifer Storage and Recovery" as the Mitigation Action Type (see below) ↓

Property Structure Type	Utilities
Hazard Type	Drought
Mitigation Action Type	Aquifer Storage and Recovery
Property Title	Aquifer Storage and Recovery @
Damage and Frequency Relationship based on:	(●) Modeled Damages ( ) Historical Damages ( ) Professional Expected Damages

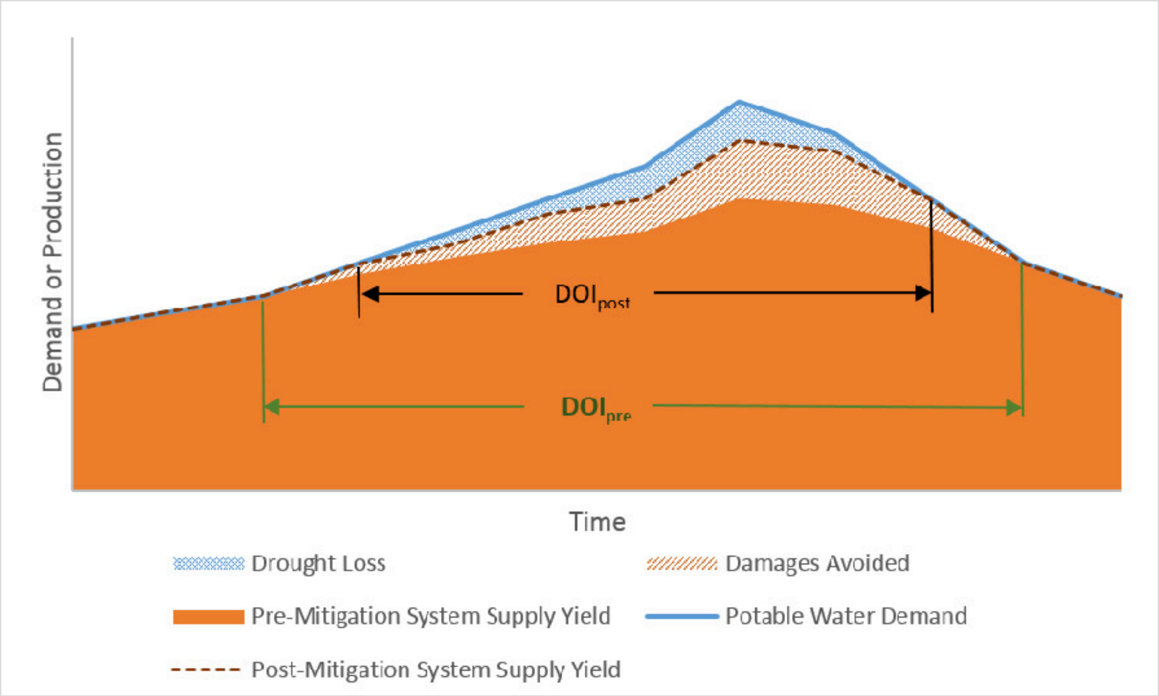
Drought Duration of Impact

- The drought event does not eliminate the water supply altogether
- Reduces water supply over a period of time, known as Duration of Impact (DOI)
- DOI may not coincide with the drought beginning and end



Drought Duration of Impact

- Effect of mitigation on Duration of Impact
- Drought mitigation will reduce the initial duration of impact
- DOI_{PRE} and DOI_{POST} are two of the important input parameters for ASR approach



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Modeled Approach – Aquifer Storage and Recovery

Property Configuration	
Property Title:	Aquifer Storage and Recovery @ 30068, Marietta, Georgia
Property Location:	30068, Cobb, Georgia
Property Coordinates:	33.9684181, -84.4093525
Hazard Type:	Drought
Mitigation Action Type:	Aquifer Storage and Recovery
Property Type:	Utilities
Analysis Method Type:	Modeled Damages

Cost Estimation			
Project Useful Life (years):	30		
Project Cost:	$3,000,000		
Number of Maintenance Years:	30	Use Default:	Yes
Annual Maintenance Cost:	$100,000		

Modeled Approach – Aquifer Storage and Recovery

ASR-specific input information:

1. Water demand during drought [mgd]
2. Pre-mitigation:
   - System supply yield [mgd]
   - Duration of impact DOI_{PRE} [days]
3. Post-mitigation:
   - System supply yield [mgd]
   - Duration of impact DOI_{POST} [days]
4. The water supply/demand information are usually provided by the utilities.

Recurrence Interval (years)	Water Demand (mgd)	Pre-Mitigation System Supply Yield (mgd)	Pre-Mitigation Duration of Impact (days)	Post-Mitigation System Supply Yield (mgd)	Post-Mitigation Duration of Impact (days)
25	13.1	12.47	30	13.13	0
50	13.8	11.7	45	12.8	35
100	14.4	10.8	60	12.3	45

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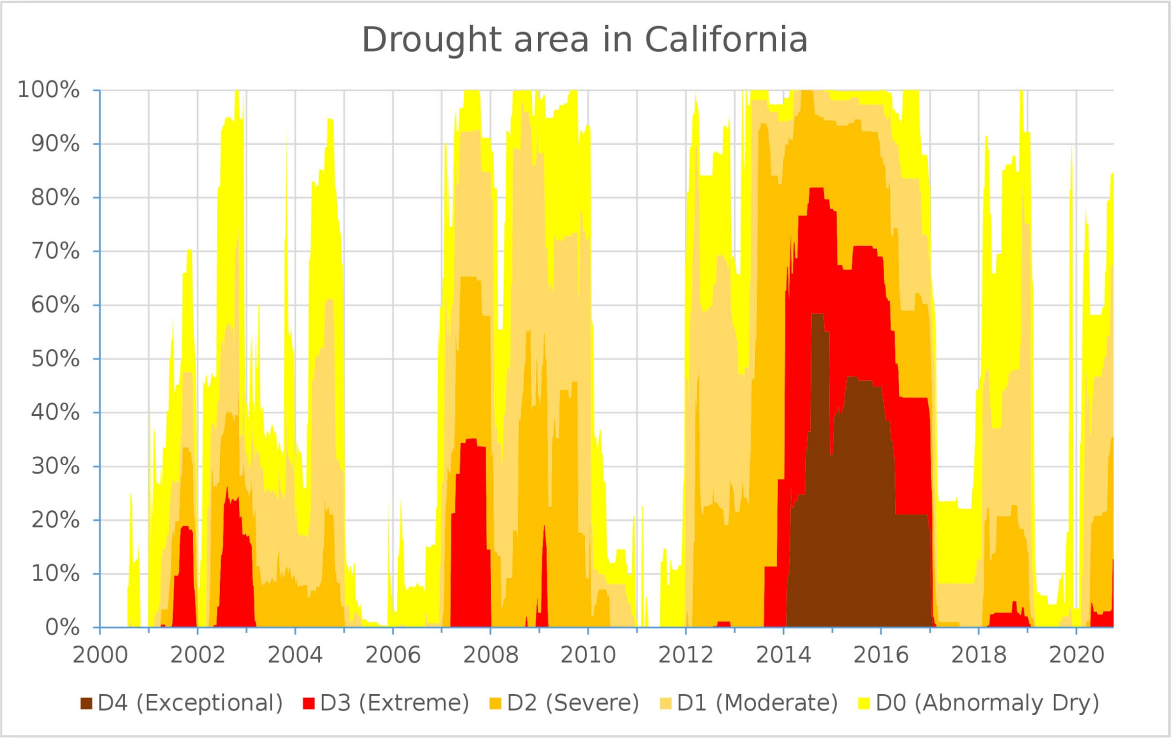
Drought Recurrence Intervals

- BCA requires subapplicant to determine the recurrence interval associated with the severity of each scenario of drought event.
- Recurrence of drought is complex, involving the variables discussed in the previous slide.
- Subapplicant should use best available data and methodology deemed appropriate by a licensed professional engineer or similarly qualified professional.



Percent area in drought by intensity, California, US Drought Monitor data

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Case Study: Kern County, California

Project Title: Enhancing Drought Management with Groundwater Storage

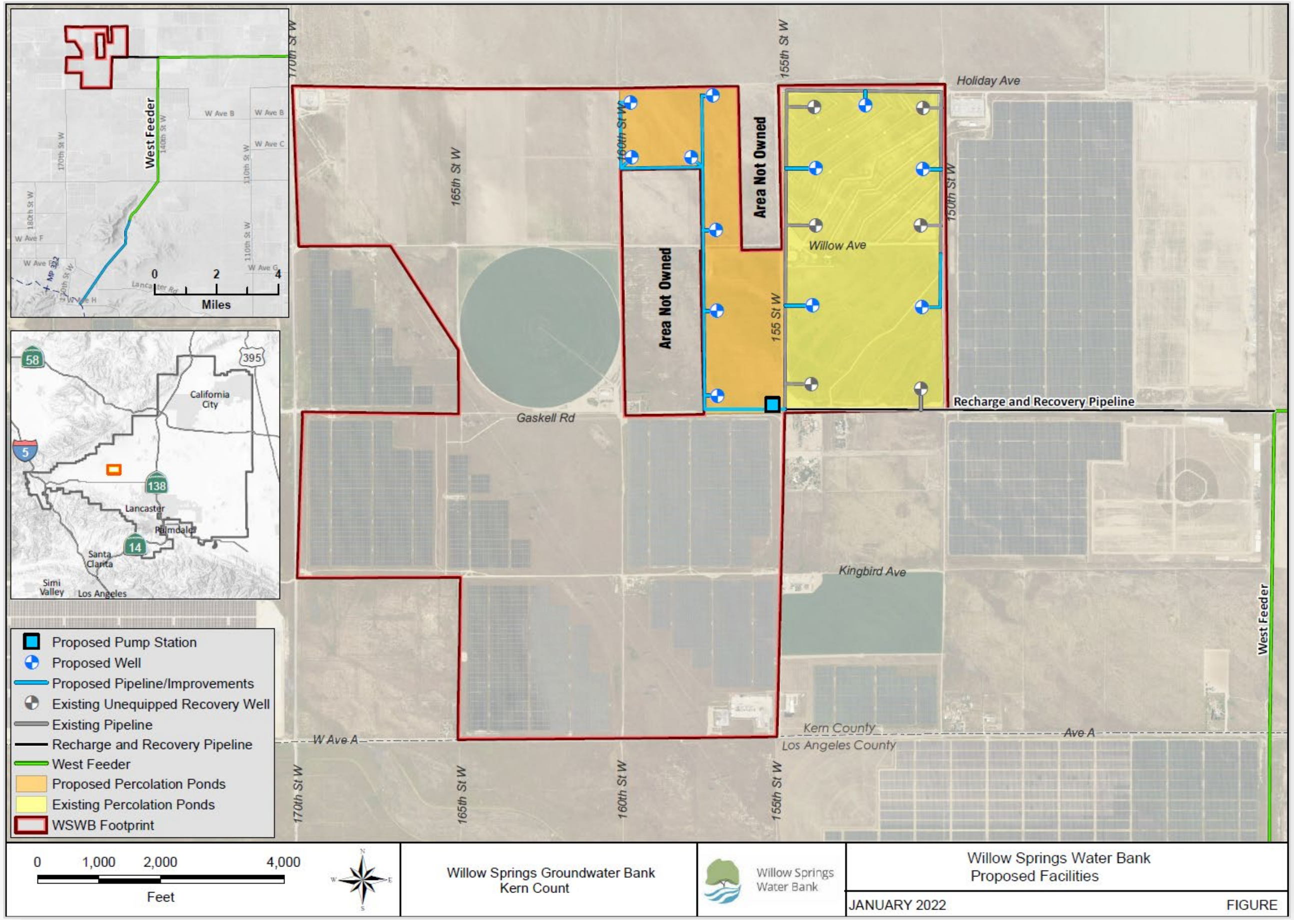
Municipality: Kern County, California

Amount of Award: $39.5 million

Program: BRIC 2021

Scope of Work: This project will add storage for 30,000 acre-feet of potable water in a naturally occurring aquifer located below ground and will add production wells for water extraction during droughts. This project combines flood diversion and storage with aquifer storage and recovery to combat climate change, reduce flood risk, improve water quality, support disadvantaged communities, restore an over-drafted aquifer and improve local habitats.

Persistent drought in Kern County has impacted agriculture and fishing, affecting recreational activities and putting the community at risk during fire season.



Case Study: Provo, Utah

Project Title: Improving Drinking Water Standards and Drought Mitigation by Improving Water Treatment Infrastructure

Municipality: Provo, Utah

Amount of Award: $51 million

Program: BRIC 2021

Scope of Work: The city of Provo's project will draw water from the Provo River, which will be treated to drinking water standards and pumped into the city's culinary water distribution system. This infrastructure project leverages existing pipes to be used to transmit water up to a point near Rock Canyon at the perimeter of the distribution system.

Some additional piping will be added to a main trunk of the distribution system to facilitate the transmission of the increased total volume of water needed for the project. In addition, piping will be added to convey the treated water from the perimeter of the distribution system to the proposed infiltration site, which is an ephemeral stream. From there, the water will infiltrate into the ground and recharge the aquifer. The water will be recovered when needed using existing wells.

Severe drought in Utah forces larger cities to look at drinking water quality and preservation.

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Case Study: Hillsborough, North Carolina

Project Title: Resilient Regional Water Supply Project

Municipality: Hillsborough, North Carolina

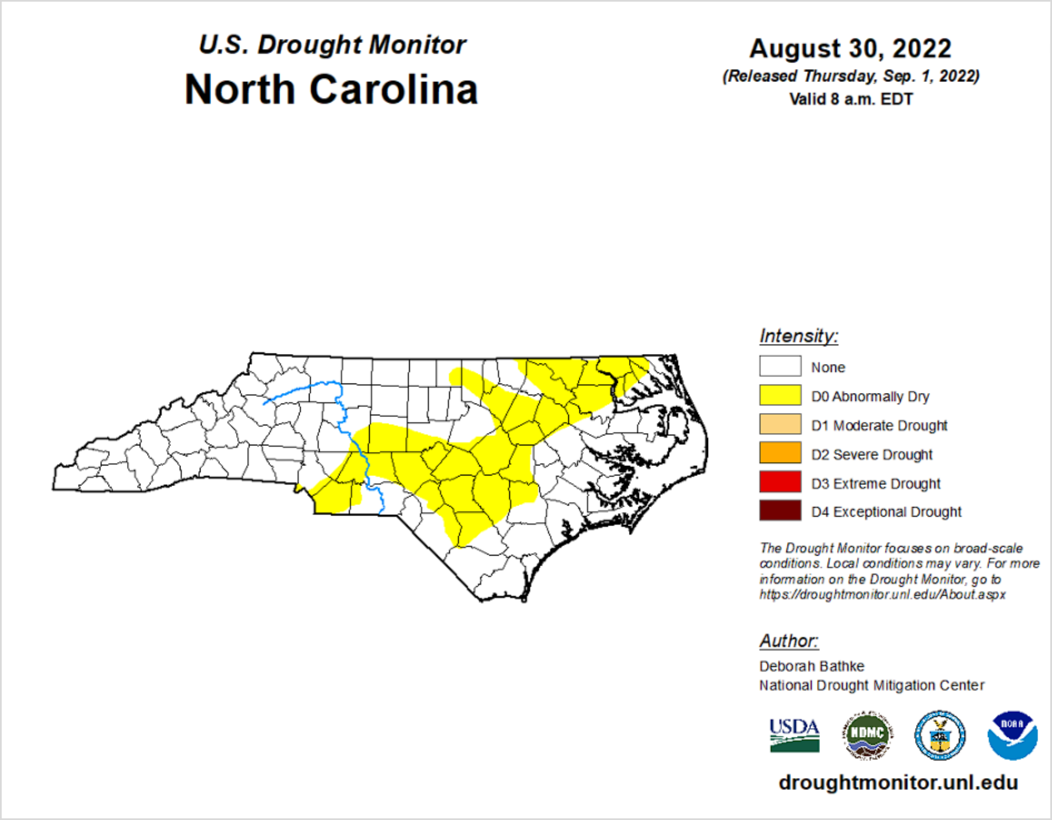
Amount of Award: $1 million

Program: BRIC 2021

Scope of Work: To address drought and unforeseen outage or contamination events, the Town of Hillsborough proposes to build a water booster pumping station to allow for potable water interconnection with a neighboring water provider to provide redundancy and resiliency to the Town's potable water supply. Over the past few years, the town has experienced droughts that have impacted its ability to withdraw water as well as potential contamination in the Eno River, where the city draws its water.

The proposal aims to build a water booster pumping station at a key location to allow for potable water to connect with the Orange Water and Sewer Authority (OWASA), providing insurance and resiliency to the city's potable water supply. Because OWASA draws from different watersheds than Hillsborough, their water supply may not be as heavily impacted by the same drought event.

A diverse Piedmont community bolsters its water protection as it deals with persistent drought.



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- Hazard Mitigation Assistance (HMA) Guidance and Addendum
- FEMA Benefit-Cost Analysis
- HMA Job Aids
- Cal-Adapt, Sea Level Rise
- Cal OES Hazard Mitigation guidance materials and BCA one-pagers →

FEMA BCA Helpline:

Email: bchelpline@fema.dhs.gov

Phone: 1-855-540-6744

Benefit Cost Analysis

- BCA for Acquisition/Demolition and Relocation Projects
- BCA for Drainage Improvement
- BCA for Drought Programs
- BCA for Elevation Projects
- BCA for Floodproofing Projects
- BCA for Generator Projects
- BCA for Landslide Mitigation and Slope Stabilization Projects
- BCA for Mitigation Reconstruction Projects
- BCA for Safe Room Projects
- BCA for Seismic Infrastructure Mitigation Projects
- BCA for Seismic Non-Structural Projects
- BCA for Seismic Structural Retrofit Projects
- BCA for Tsunami Vertical Evacuation Projects
- BCA for Wildfire Projects
- BCA for Aquifer Storage and Recovery (ASR) Projects

FEMA BCA 6.0 Software

Download from the FEMA website:
fema.gov/grants/guidance-tools/benefit-cost-analysis

- Any technical or installation issues, contact the FEMA BCA Helpline
- Software runs via excel, with a plug in
- Depending on the methodology, the software has various default data that applies to specific hazards and project types

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Additional Resources – Drought Projects

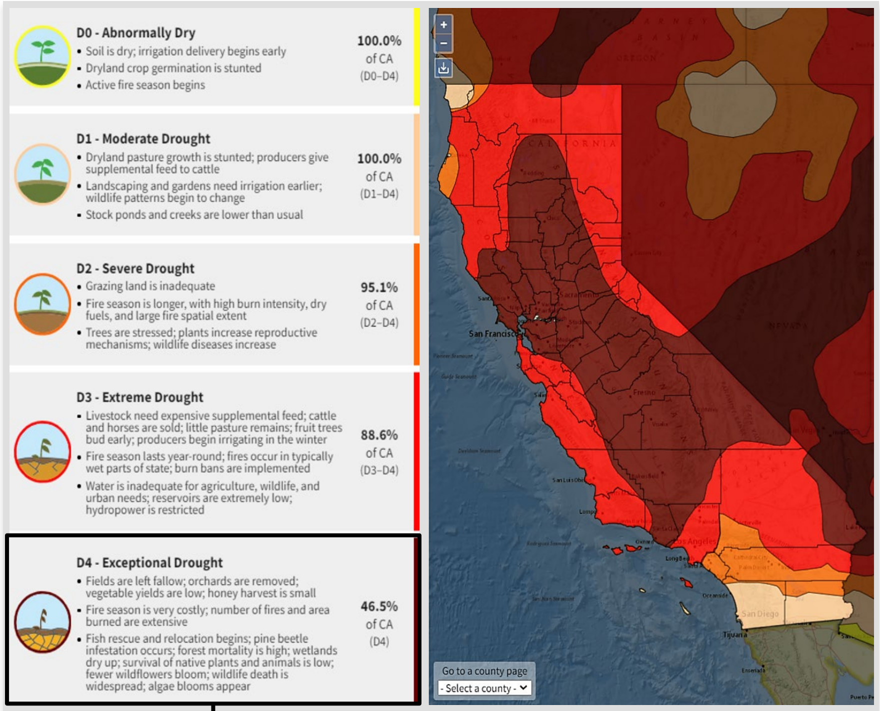
Drought Data Sources:

[U.S. Department of Agriculture (USDA)]

[NOAA Drought.gov]

[U.S. Drought Monitor]

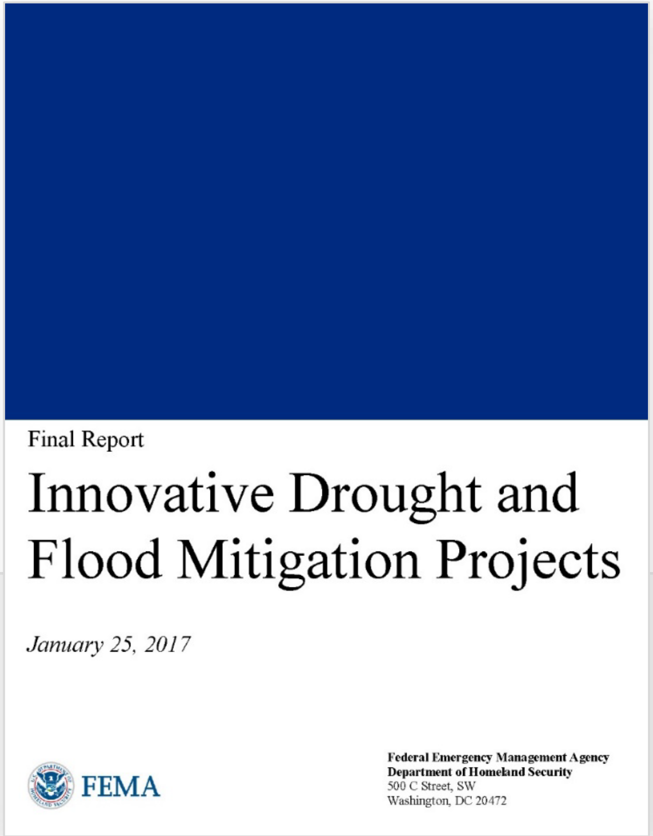
[Palmer Drought Severity Index (PDSI)]



45.6% of California is experiencing Exceptional Drought (Nov. 2021)

Additional Resources – Drought Projects

FEMA Drought BCA and Program Resources:


Final Report

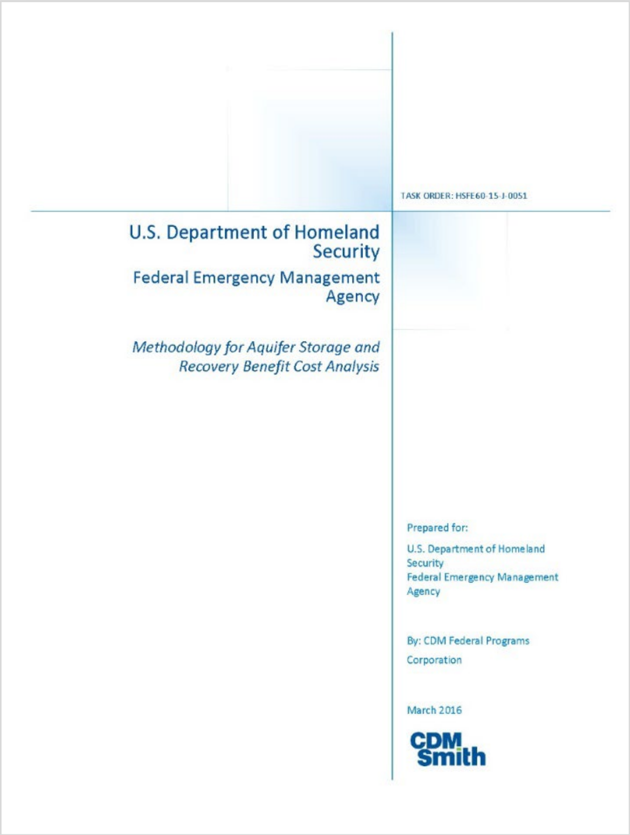
Innovative Drought and Flood Mitigation Projects

January 25, 2017

FEMA

Federal Emergency Management Agency
Department of Homeland Security
500 C Street, SW
Washington, DC 20472

[FEMA, 2017]


TASK ORDER: HSFE60-15-J-0051

U.S. Department of Homeland Security
Federal Emergency Management Agency

Methodology for Aquifer Storage and Recovery Benefit Cost Analysis

Prepared for:
U.S. Department of Homeland Security
Federal Emergency Management Agency

By: CDM Federal Programs Corporation

March 2016

CDM Smith

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Next Steps

- Go to the Cal OES BRIC **website**
- **Complete a NOI (period opens on 9/1/2022 and closes on 9/16/2022)**
- Read the **FEMA BRIC NOFO**
- Obtain your **BCEGS rating**
- Obtain Unique Entity Identifier **(UEI)**
- Register in the System for Award Management **(SAM)**
  - Entities registering in SAM.gov are assigned a Unique Entity ID as a part if the registration process
  - Existing SAM account holders, ensure account is **ACTIVE**
- Register for a **FEMA GO account**

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Q&A

Send all additional project scoping, TA, and other questions to Cal OES Hazard Mitigation Assistance at:

HMA@caloes.ca.gov

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