Ventura River Watershed Resilience Pilot Project

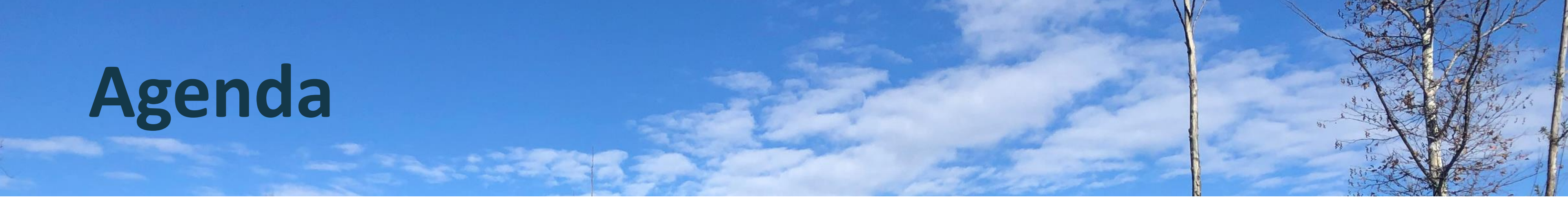
Advisory Group Meeting #2
May 19, 2025

Ventura River Watershed
Water Resilience for a Changing Climate

Department of Water Resources
State of California

Ventura County
Resource Conservation District

Ventura River Watershed Council



Agenda

1. **Welcome and Introductions**
2. **Recap AG Meeting** #1 – March 17th
3. **Vision Forum Review and Reflections**
4. **Update on Network Assessment Survey**
5. **Planned Engagement with Frontline Communities**
6. **Technical Update – Water Budget**
7. **Technical Update and Questions for the AG – Climate Scenarios**
8. **Next Meeting Date: July 21st 2:00 pm**

Ventura River Watershed
Water Resilience for a Changing Climate

Recap Last Advisory Group Meeting

March 17, 2025 Key Outcomes:

- Finalized Advisory Group roles and responsibilities with unanimous approval.
- Discussed the importance of networks for watershed resilience, focusing on collaboration and distributed leadership.
- Introduced the Network Assessment Survey to identify and assess existing watershed stewardship networks. Survey is now underway!
- Initiated planning for the watershed-wide Water Budget, consolidating existing hydrologic data to document baseline conditions.
- Started logistics planning for the Vision and Goals Workshop (April 30, 2025), with a focus on broad community engagement.

Recap Vision Forum

- Forum # 1 held on Wednesday, April 30th at Camp Arnaz
- More than 35 people attended representing diverse watershed interests as well consultant team
- Substantial amount of feedback received through 3 interactive activities
- Results of activities being processed and will inform development of the WRP vision and the chapter devoted to Watershed Problems and Challenges

- Forum # 2 – proposed date July 30th

Vision Statement Update

Draft Vision Statement Activity – Key Themes Heard in Feedback Received

- **Incorporating Community and Cultural Values:** Emphasis on maintaining community connection to the river, the importance of local water sources, and preserving cultural values. We will explore revising the first sentence to better reflect these aspects.
- **Emphasizing Ecosystem Resilience and Stewardship:** Strong desire to prioritize natural functions, ecosystem resilience, and the biosphere. We can consider strengthening the language around this - framing ecosystem resilience as the primary pathway to climate adaptation and resilience.
- **Addressing Length and Clarity:** Several participants noted the statement might be too long or feel like a "word soup." We should be mindful of conciseness as we integrate new elements and look for opportunities to streamline the language.

Next Steps:

- The Vision Statement will be revised based on the feedback and further engagement activities, including CAUSE's work with low-income/frontline communities this summer.
- The final draft will be presented to the Advisory Group and Council in the fall.
- The revised draft may be shared with AG members for additional input before finalization.

Network Assessment Survey

Task 3: Identify and Assess Regional Networks

Identify and assess existing regional networks, evaluating **participant engagement and contribution, inclusivity, and health of the networks**. Include regional water management groups, groundwater sustainability agencies, regional climate collaboratives, regional flood management groups, environmental groups, regional forest and fire capacity program groups, and other relevant water and resource management groups. Identify and engage **vulnerable communities**, **California Tribes**, and watershed participants not previously included in water-related decision-making and **assess their capacity and interest in contributing to this process**.

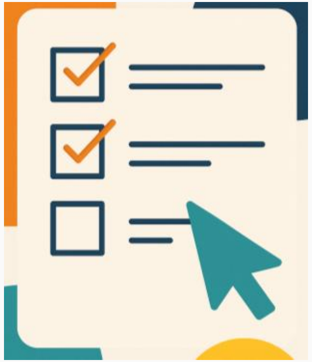
Watershed Network Assessment Survey

Ben Chou
Project Manager
Center for Geospatial Science & Technology (CGST)
California State University, Northridge

VRWRP Advisory Group Meeting
May 19, 2025

Community Partner Survey

- **Survey Topics**
  - Organization Information
  - Existing Networks and Collaboration
  - Water & Climate Resilience

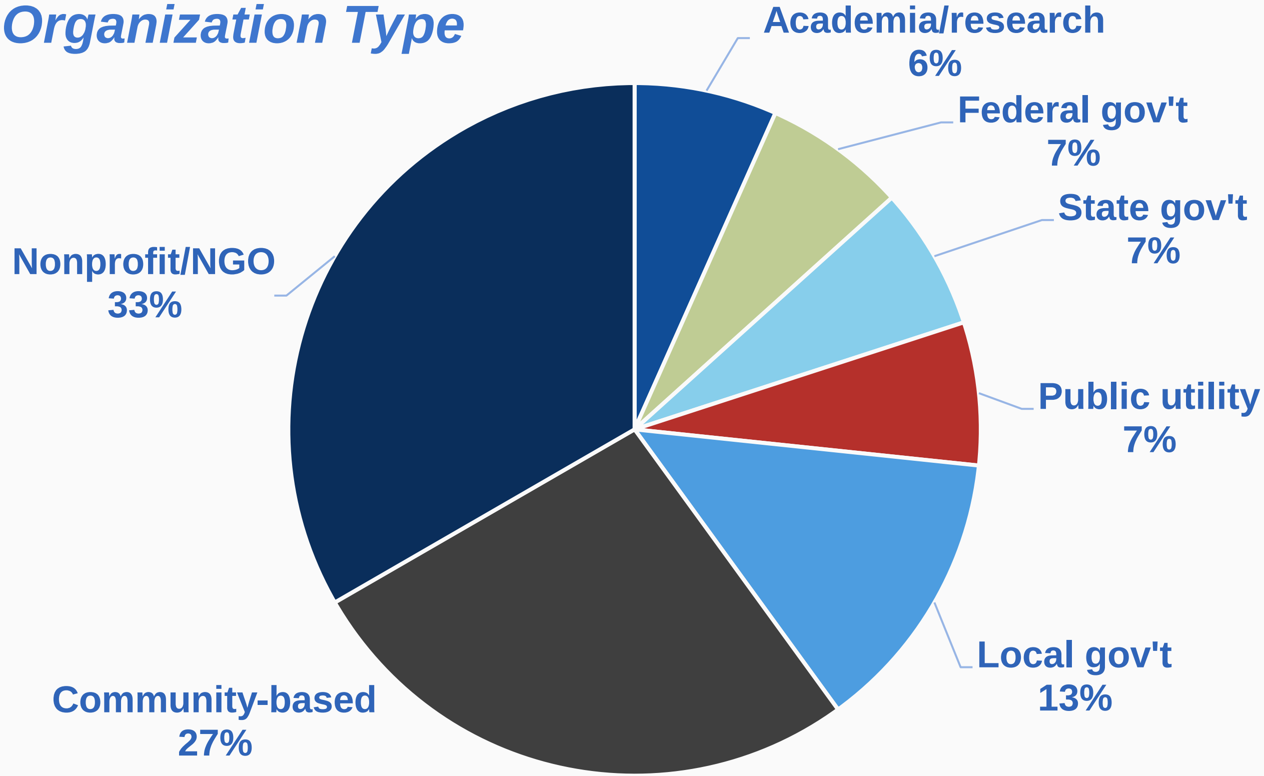


- **Survey Launch – May 9**
  - **Deadline – May 23**

Survey Response Summary

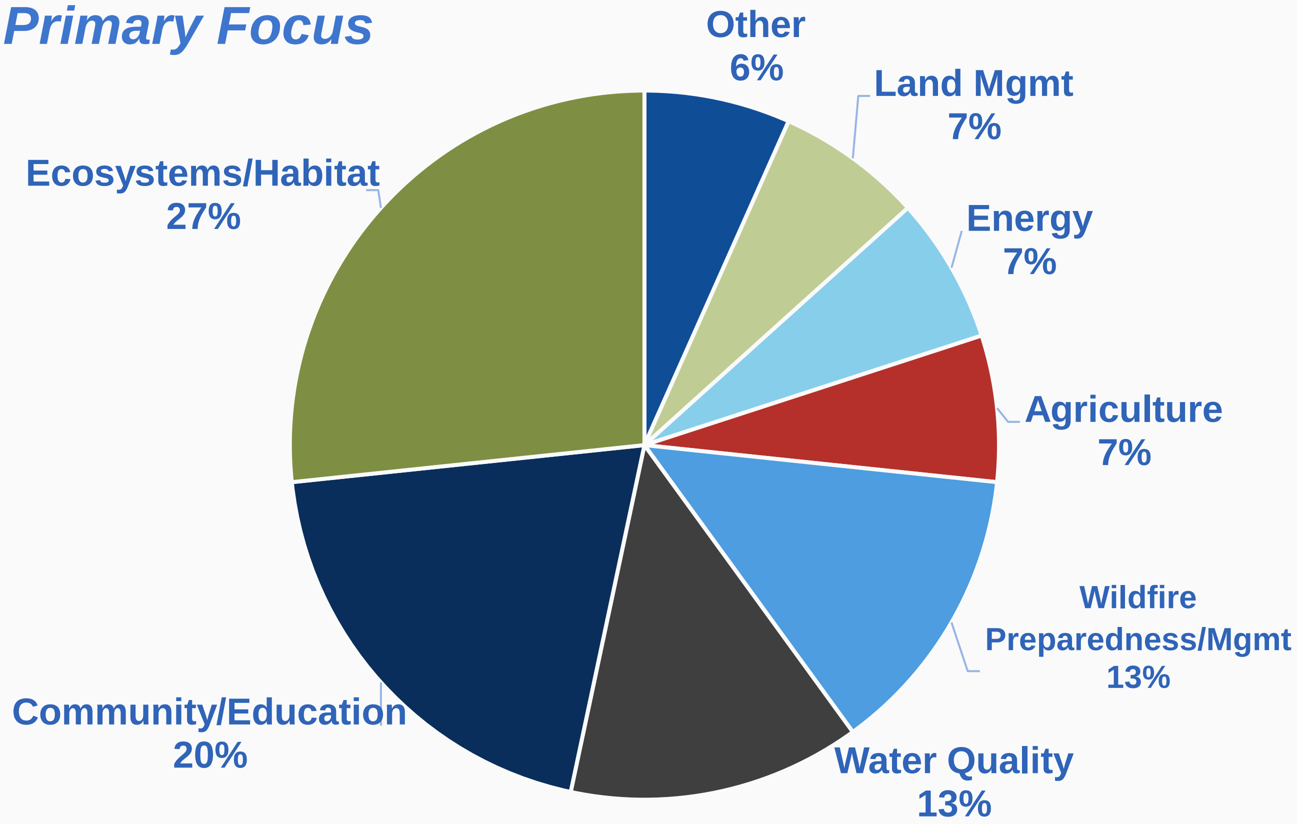
Survey Response Summary

Organization Type

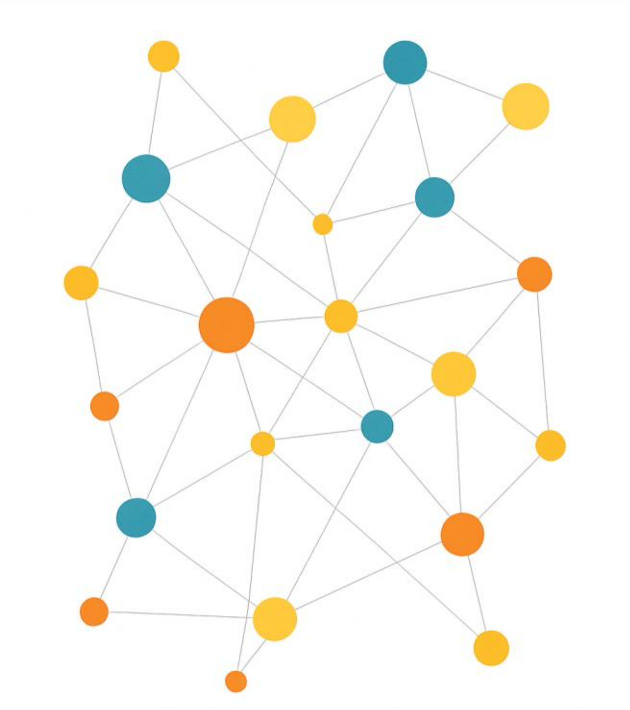


Survey Response Summary

Primary Focus



Next Steps



- **Data Cleanup**
- **Data Analysis**
  - Spatial
  - Network
  - Climate/Water Resilience
- **Preliminary Draft Results**
  - July 21 AG Meeting

Reminder

Please fill out the survey.

Survey Questions or Issues?

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Engaging with Frontline Communities

Cameron Yee

CAUSE

Central Coast Alliance United for a Sustainable Economy

Engaging with Frontline Communities

CAUSE
Central Coast Alliance United for a Sustainable Economy

CAUSE tasks focus on getting input from the Ventura Westside community

- Survey development and implementation to identify community-perceived climate hazards, inform prioritized vulnerabilities, and gather initial suggestions for potential adaptation strategies.
- Conduct two focus groups, one with Spanish-speaking adults and one with English-speaking Latinx youth on the Westside of Ventura. Possible focus is on the Initial Adaptation Strategies.

Water Budget Update

Preview of July AG Meeting

Grant Task:
Prepare Updated Watershed Water Budget

Purpose

- Support vulnerability assessments
- Prepared using methods, as indicated in DWR's Handbook for Water Budget Development.
- Provide about the historical water supply and uses within the watershed

Methods

- Use available model data to generate water budget
- Primary window of work
  June – August 2025

Progress:

- Completed desktop review of available models
- Initiated engagement with Points of Contact (POCs) to obtain data, discuss assumptions, and receive guidance

In-Progress Activities

Engagement with State Water Resources Board on California Water Action Plan/ Instream Flows activities for Ventura River and review of data

- Hydrologic analysis – Groundwater-Surface Water Model for the Ventura River Watershed (VRW GW-SW Model)
  - GSFLOW model
  - Simulation Period 1993-2019

- Water allocation modeling – Ventura Water Allocation Model (VWAM) (*<u>under development</u>*)
  - WEAP model
  - Estimates monthly water use for every water right in watershed.

In-Progress Activities

Next Steps

- Coordinate with DWR on water budget analysis completed for future scenarios project, California Water Plan Update 2023N
  - New statewide model with relatively coarse (HUC-8 scale) data
  - Currently undergoing calibration
  - POC: Paul Shipman

- Coordinate with local agencies and districts with recent water budgeting or modeling for review and comparison to State Water Board data analysis
  - Advisory Group – Thank you for info!
  - Not started

More in July!

Historical Water Budget check-in at mid-point of task

- Share results of preliminary historical water budget based on State Water Board's VRW GW-SW Model) for simulation period 1993-2019
- Solicit feedback

Discuss major uncertainties

Discuss representation of recent hydrologic variability

- 2020-2022 – Drought conditions (2020-2021 record dry year
- 2023 – high flows/flood condition

Global Warming Level and Climate Hazard Metric Overview

May 19, 2025

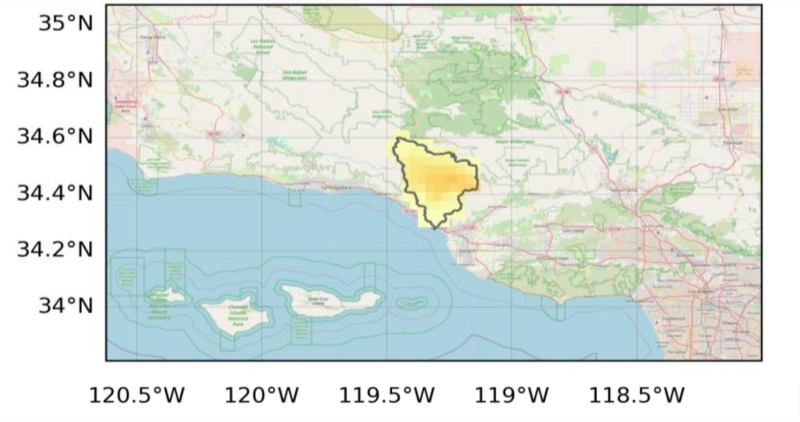
EAGLE ROCK
ANALYTICS

Global Warming Levels

EAGLE ROCK ANALYTICS

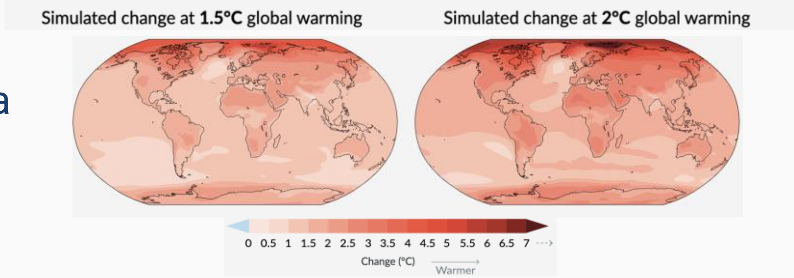
Overview of Methods & Data

- Climate data from 15 climate models and 137 climate simulations
- LOCA2 statistical & WRF dynamical downscaling to 3km resolution
- Extract over the Ventura study area (right)

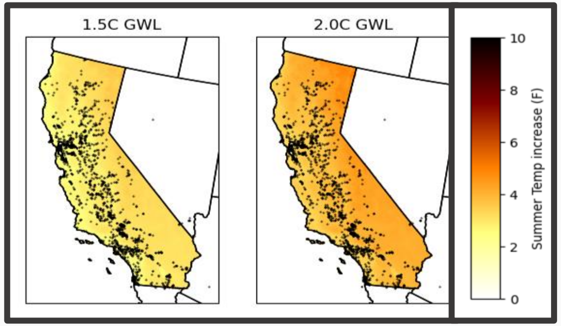


Global Warming Levels (GWL): What is it?

- Global Warming Level (GWL) approach: Group climate simulations by **how much global warming has occurred** instead of by a specific year or timeframe.
- Global warming is calculated relative to pre-industrial conditions (1850-1900)
- GWLs align with familiar international targets for climate change mitigation (e.g. 1.5 °C and 2.0 °C)
- *"What will climate impacts in California look like when the world reaches 2.0 °C of warming?"*



https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM.pdf



GWL: Why?

Major benefits to GWL approach

- Removes uncertainty from models that warm unrealistically quickly
- Allows the use of simulations from multiple Shared Socio-economic Pathways (SSP) scenarios for additional statistical robustness
- Aligns with IPCC, national, state climate planning processes

GWL gives a **clearer picture of how climate impacts could evolve** with continued greenhouse gas emissions

	Global Warming Level	Best estimate year
Historical baseline	0.8 °C	2002
Recent historical	1.0 °C	2010
"Present day"	1.2 °C	2020
Next 10 years	1.5 °C	2031 (SSP 3-7.0)
Mid-Century	2.0 °C	2047 (SSP 3-7.0)
Next 50 years	3.0 °C	2075 (SSP 3-7.0)

What is your baseline?

- Options:
  - 0.8, 1.0 or 1.2 as baseline

What is your planning horizon?

- ***Recommendation:***
  - 1.5 for near-term planning
  - 2.0 for mid-century planning
  - 3.0 for long-term planning

Proposed Metrics for Climate Hazards

EAGLE ROCK ANALYTICS

eaglerockanalytics.com

Selected Climate Hazards

- Drought**
- Wildfire**
- Extreme Heat*
- Extreme Precipitation/Flooding*
- Marine Stratus**
- Sea Level Rise

*Studied in the 2019 Ventura County Climate Report
**Discussed in the 2019 Ventura County Climate Report

Questions to think about

- How would you use these metrics to make informed planning decisions?
- Is there something missing?
- Are there critical thresholds for these climate hazards that directly impact your operations?

Drought

What:

- Extended periods of drier than normal conditions.

Threats:

- Impacts both society and ecosystems spanning timescales ranging from weeks to years.

Why:

- Because water supplies are local and the amount of rainfall received annually is highly variable, supplies must be managed with caution.

Drought

- **Recommended Metric:** SPI (24/36 months)
- **Metric Description:**
  - The Standardized Precipitation Index, based on deviations of precipitation from the long-term mean, is representative of long-term drought conditions more relevant to hydrological drought.
  - First developed by T. B. McKee, N.J. Doesken, and J. Kleist in 1993 (McKee et al. 1993).
- **Thresholds**

SPI	SPI < -2	-2 < SPI < -1.5	-1.5 < SPI < -1.0	-1.0 < SPI < 1.0	1.0 < SPI < 1.5	1.5 < SPI < 2.0	SPI > 2.0
Interpretation	Extremely Dry	Severely Dry	Moderately Dry	Near Normal	Moderately Wet	Very Wet	Extremely Wet

Wildfire

What:

- Destructive fires that can start in wildland and spread quickly into urban areas.

Threats:

- Causes widespread destruction impacting various sectors; threatens local water quality and supply by damaging assets, interrupting power supply and using up water supplies.

Why:

- Identifying high wildfire risk regions is critical for proactive management and adaptation planning.

Wildfire

- **Recommended Metric:** Average number of high fire risk (Fosberg Fire Index) days.
- **Metric Description:**
  - Calculate Fosberg Fire Index
    - This index assesses the impacts of small-scale/short-term weather variations on fire potential and is highly sensitive to changes in fine fuel moisture
  - Count the number of days where the fire risk is high (threshold).
  - Compare the frequency across GWLs.
  - Easy to interpret metric providing the count of high fire risk days and can relate to current frequency of high fire risk days to provide context.
- **Thresholds**
  - Threshold from SPC

Fosberg Index	< 50	50-70	70-90	90-100
Interpretation	Okay	High	Very High	Extreme

Extreme Temperature & Heat

What:

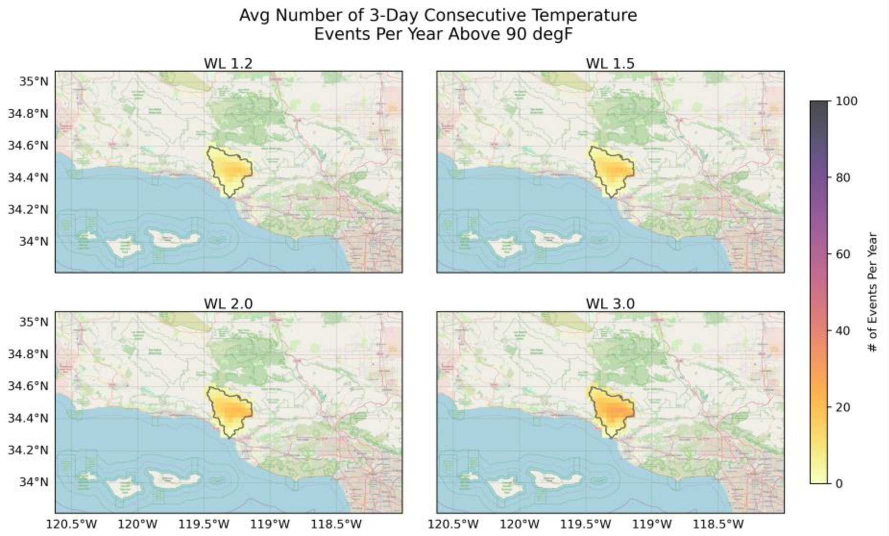
- High temperatures (day and/or night) and/or humidity for extended periods of time.

Threats:

- Impacts human health, heat-sensitive industries (e.g., agriculture), and infrastructure especially when observed over long durations. Higher temperatures can threaten the biological diversity and viability of the watershed's ecosystems.

Why:

- Increases in the duration and intensity of temperature will enhance needs for cooling, increase energy demands, and severely impact human health/productivity; disproportionately impacting disadvantaged communities.



Extreme Temperature & Heat

- **Recommended Metric:** Extreme Temperature Events (Intensity and Frequency) & Heat Index (Intensity and Frequency)
- **Metric Description:**
  - Calculate the intensity and/or the number of days above a threshold for a specific duration.
  - Calculate the Heat Index
    - Commonly known index that describes the heat stress (temperature and humidity).
    - Show changes in intensity and frequency above threshold.
  - Both are easy to interpret metrics
- **Thresholds**
  - *Are there specific temperature thresholds and/or event durations that are critical to known assets or planning strategies?*
  - Other suggested thresholds:
    - 90 degrees after 3 days (FEMA)
    - National Definitions for Heat Index

Classification	Heat Index	Effect on the body
Caution	80°F - 90°F	Fatigue possible with prolonged exposure and/or physical activity
Extreme Caution	90°F - 103°F	Heat stroke, heat cramps, or heat exhaustion possible with prolonged exposure and/or physical activity
Danger	103°F - 124°F	Heat cramps or heat exhaustion likely, and heat stroke possible with prolonged exposure and/or physical activity
Extreme Danger	125°F or higher	Heat stroke highly likely

Extreme Precipitation/Flooding

What:

- Intense periods of heavy rain (or no rain) extending multiple days.

Threats:

- Impacts water supplies, can result in compounding events (such as mudslides), and impact water quality.

Why:

- The sequencing of storms and length of dry periods between precipitation events is important to water resource and flood management.

Extreme Precipitation/Flooding

- **Recommended Metric:** Precipitation events over/under critical thresholds (intensity/frequency)
- **Metric Description:**
  - Calculate the frequency of precipitation above (below) a threshold.
  - Compare precipitation intensity from baseline to near-term and mid-century.
  - Break into season, percentiles.
  - Event durations (dry and wet)
- **Thresholds**
  - *Are there specific thresholds (intensity and duration) we should consider that are known stressors?*
  - Alternatively, we can develop thresholds based on baseline GWL.

Marine Stratus

What:

- Low altitude marine stratus clouds - commonly called coastal fog.

Threats:

- Influences irrigation demand for crops, moderates coastal heat waves and greatly impacts the local ecosystems.

Why:

- Confirming suggested declines in marine stratus is critical to guiding planning and mitigation of impacts related to changes in evaporative demand (increases), which could increase drought stress, and changes in coastal heat waves due to changes in moderation of temperatures.

Marine Stratus

- **Recommended Metric:** Change in low-cloud fraction along coastline (using a proxy for marine stratus)
- **Metric Description:**
    - Calculate time-delta changes in low-cloud fraction across GWLs
    - Require a bit of analysis

Sea Level Rise

What:

- Coastal flooding due to future sea level rise, coastal storms, and long-term topographic change.

Threats:

- Sea level rise threatens the Ventura River Watershed's coastal areas with increased tidal flooding, saltwater intrusion, and habitat loss, particularly near the estuary and low-lying infrastructure.

Why:

- Modeling sea level rise is critical to identify vulnerable assets, inform land use decisions, and prioritize adaptive infrastructure investments before impacts become irreversible.

Sea Level Rise

- **Recommended Metrics:** Flooding, groundwater, and shoreline position
- **Metric Description:**
  - Flooding
    - Evaluated on a sunny day and 100-year storm:
      - 25cm SLR (~2050; intermediate - intermediate/high scenario)
      - 50cm SLR (~2060; intermediate/high - high scenario)
      - 75cm SLR (~2070; intermediate/high - high scenario)
  - Groundwater Hazard
    - 25cm, 50cm, and 75cm SLR
  - Shoreline Position
    - 25cm, 50cm, and 75cm SLR

25cm SLR during 100-year storm

Source: CoSMoS Tool -- https://ourcoastourfuture.org/hazard-map/

Metrics for Climate Hazards

Climate Hazard	Metric	Addresses	Depends On	Thresholds
Drought	SPI (24/36 months)	Long-term drought conditions more relevant to hydrological drought	Precipitation	> 0 = Wet Conditions < 0 = Dry Conditions
Extreme Precipitation and Flooding	Precipitation events over threshold (Intensity and Frequency)	Larger scale inundation events	Precipitation	***Need to Establish***
Wildfire	Average number of high fire risk (Fosberg Fire Index) days (i.e. over critical threshold)	The Fosberg Fire Index assess the impacts of small-scale/short term weather variations on fire potential	Temperature, Humidity, Wind speed	SPC Fosberg Fire Index threshold
Extreme Temperature & Heat	Extreme Temperature Events (intensity and frequency)	Exposure to heat across a range of durations looking at a wide range of heat stressors on assets	Temperature	Frequency of 10 degrees above regional average for a duration of 24 hours or ## of weeks; ***Need to Establish***
	NWS Heat Index	Exposure to apparent temperature (temperature feels like to the human body)	Temperature, Relative Humidity	Nationally Established
Marine Stratus	Change in low-cloud fraction along coastline	Proxy for marine stratus which regulates temperature and evapotranspiration demand in the future.	Low cloud fraction	N/A
Sea Level Rise	Flooding	Coastal flooding due to future sea level rise, coastal storms, and long-term topographic change	Total water level	25cm SLR (~2050); sunny day & 1% storm 50cm SLR (~2060); sunny day & 1% storm 75cm SLR (~2070); sunny day & 1% storm
	Groundwater	How easily groundwater can move through connected subsurface openings.	Hydraulic conductivity	25cm SLR; 50cm SLR; 75cm SLR
	Shoreline Position	Shore profile changes over time	Land-water boundary at the Mean High Water line	25cm SLR; 50cm SLR; 75cm SLR

Wrap Up and Next Steps