Pajaro River Watershed Resilience Plan

Greater Monterey County IRWM Group

April 15, 2026

Pajaro Valley Water Management Agency
40 YEARS SINCE 1984

RINCON CONSULTANTS

Agenda

Resilience Program Summary

- Pajaro River Watershed
- Watershed Resilience Program
  - Background
  - What's the value?
- Integrated Approach: Engagement, Science, Planning
  - Resilience Vision
  - Water Resource System Climate Vulnerabilities
  - Adaptation Strategies and Actions
- Next Steps to Implementation

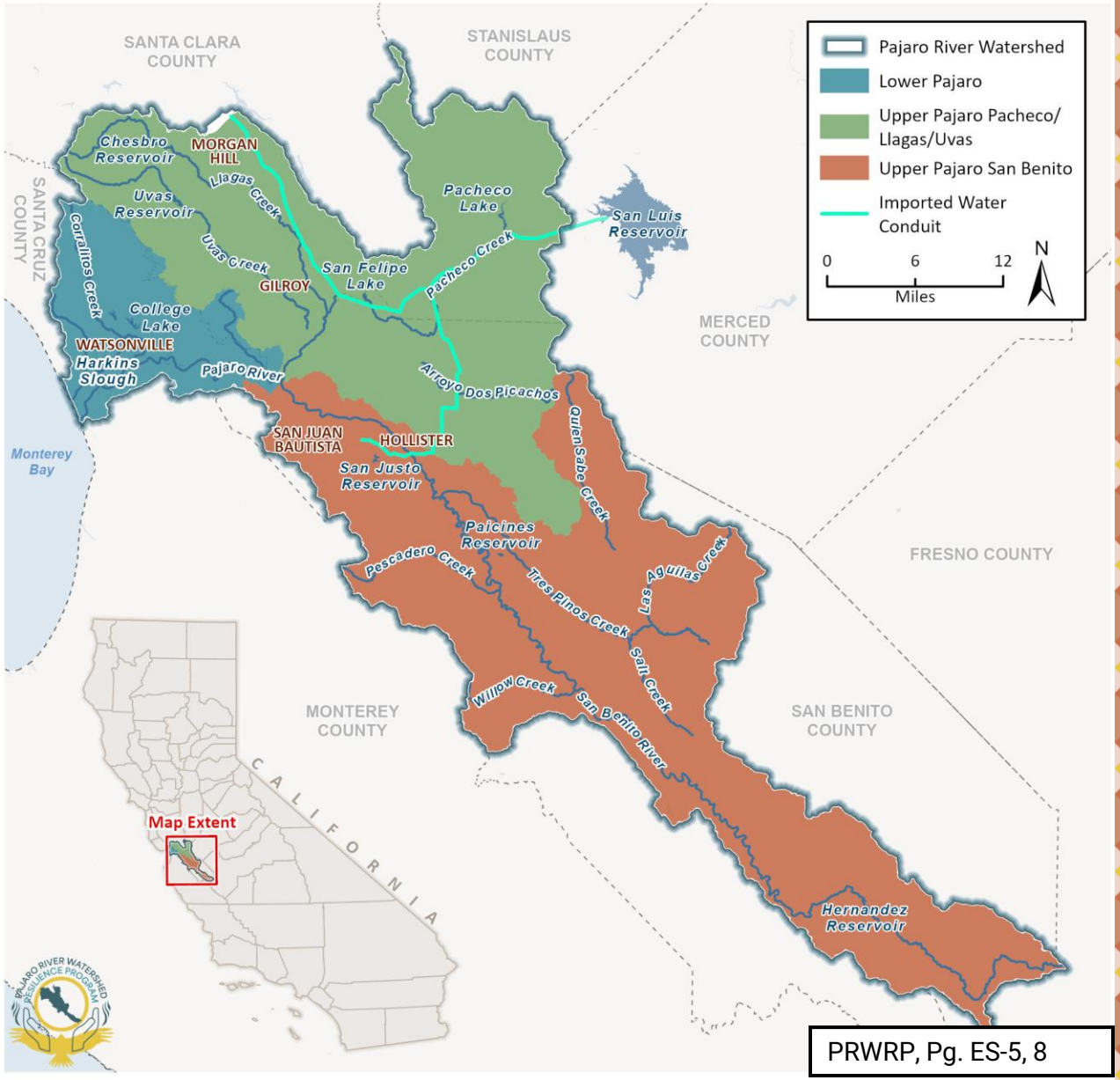
Deep Dive Topics

- Governance and Strategic Coordination
- Funding Approach
- Historic Watershed-wide Water Budget
- Climate Change Data
  - Future exposures
- Climate Vulnerability Assessment
  - Qualitative
  - Quantitative
- Adaptation Strategy Development

Study Area

Pajaro River Watershed

- Pajaro River watershed drains 1,300 square miles into Monterey Bay, with 1,843 linear miles of rivers, streams, and creeks
- 3 distinct sub-watersheds and groundwater basins
- 84 percent of the watershed's water supply is used for agricultural purposes
- 90 percent of total water supply comes from groundwater
- 4 Counties and 5 Cities (plus communities)
- Imported water to upper watersheds



Basemap provided by Esri and its licensors © 2026. Additional data provided by CPAD, 2024; NHD, 2024; DWR, 2024; US Bureau of Reclamation, 2024.

24-16204 WRP Synthesis
Fig 5.1 Project Area

Watershed Resilience Pilot Program

- Funded by Budget Acts of 2022
- Builds upon/aligns with:
  - Governor's Water Resilience Portfolio (2020)
  - California Water Supply Strategy (2022)
  - California Water Plan Update (2023)
- Five pilots were funded, $2 million per pilot:
  - **Pajaro Valley Water Management Agency (Pajaro River Watershed)**
  - Regional Water Authority (American River Watershed)
  - Sonoma County Water Agency (Russian River Watershed)
  - Stockton East Water District (Calaveras River Watershed)
  - Ventura County Resource Conservation District (Ventura River Watershed)

Watershed Resilience Pilot Program

Watershed-based Solutions

Shift from “region” to “watershed”

Managing water from headwaters to outflow

Performance metrics, tracking, and demonstrated resilience benefits

Climate Resilience

Analyzing climate risks and adaptations at the watershed level

Collaborating across water, flood, groundwater, quality, forest/fire, ecosystem, and land use sectors

Equity through Collaboration with Local Partners

Equity built into governance, not added later

Prioritizing equity and inclusiveness, with Tribal emphasis

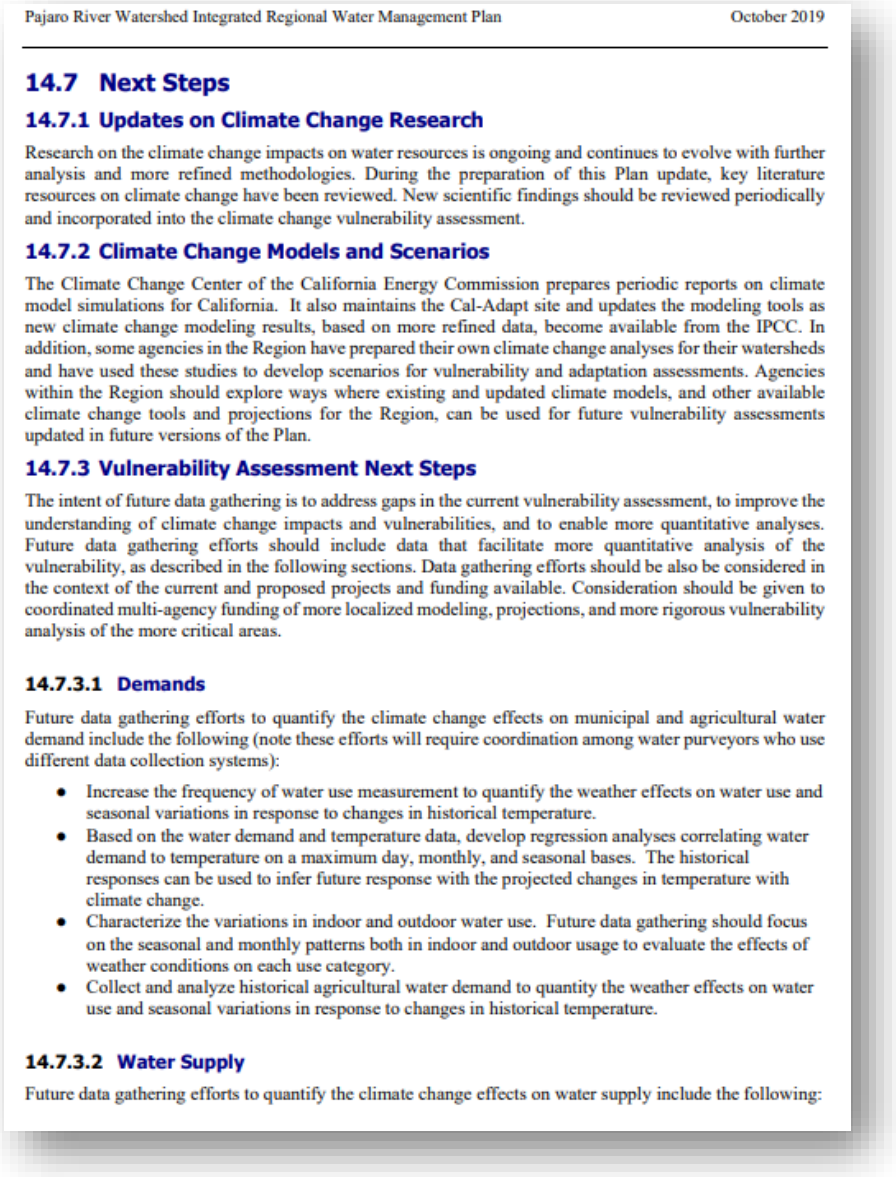
Advancing IRWM

Delivers on IRWM Next Steps

- *"IRWM 2.0"*
- Updates on climate change research using the best available science
- Climate change models and scenarios from downscaled GCMs for varying global warming levels
- Climate vulnerability assessments and historic water budget to evaluate water supply, water quality, flooding, and ecosystems and habitat

IRWM Evolution, not Replacement

Page 229 from Pajaro River Watershed IRWM:



Pajaro River Watershed Integrated Regional Water Management Plan October 2019

14.7 Next Steps

14.7.1 Updates on Climate Change Research

Research on the climate change impacts on water resources is ongoing and continues to evolve with further analysis and more refined methodologies. During the preparation of this Plan update, key literature resources on climate change have been reviewed. New scientific findings should be reviewed periodically and incorporated into the climate change vulnerability assessment.

14.7.2 Climate Change Models and Scenarios

The Climate Change Center of the California Energy Commission prepares periodic reports on climate model simulations for California. It also maintains the Cal-Adapt site and updates the modeling tools as new climate change modeling results, based on more refined data, become available from the IPCC. In addition, some agencies in the Region have prepared their own climate change analyses for their watersheds and have used these studies to develop scenarios for vulnerability and adaptation assessments. Agencies within the Region should explore ways where existing and updated climate models, and other available climate change tools and projections for the Region, can be used for future vulnerability assessments updated in future versions of the Plan.

14.7.3 Vulnerability Assessment Next Steps

The intent of future data gathering is to address gaps in the current vulnerability assessment, to improve the understanding of climate change impacts and vulnerabilities, and to enable more quantitative analyses. Future data gathering efforts should include data that facilitate more quantitative analysis of the vulnerability, as described in the following sections. Data gathering efforts should be also be considered in the context of the current and proposed projects and funding available. Consideration should be given to coordinated multi-agency funding of more localized modeling, projections, and more rigorous vulnerability analysis of the more critical areas.

14.7.3.1 Demands

Future data gathering efforts to quantify the climate change effects on municipal and agricultural water demand include the following (note these efforts will require coordination among water purveyors who use different data collection systems):

- Increase the frequency of water use measurement to quantify the weather effects on water use and seasonal variations in response to changes in historical temperature.
- Based on the water demand and temperature data, develop regression analyses correlating water demand to temperature on a maximum day, monthly, and seasonal bases. The historical responses can be used to infer future response with the projected changes in temperature with climate change.
- Characterize the variations in indoor and outdoor water use. Future data gathering should focus on the seasonal and monthly patterns both in indoor and outdoor usage to evaluate the effects of weather conditions on each use category.
- Collect and analyze historical agricultural water demand to quantity the weather effects on water use and seasonal variations in response to changes in historical temperature.

14.7.3.2 Water Supply

Future data gathering efforts to quantify the climate change effects on water supply include the following:

Value of WRP

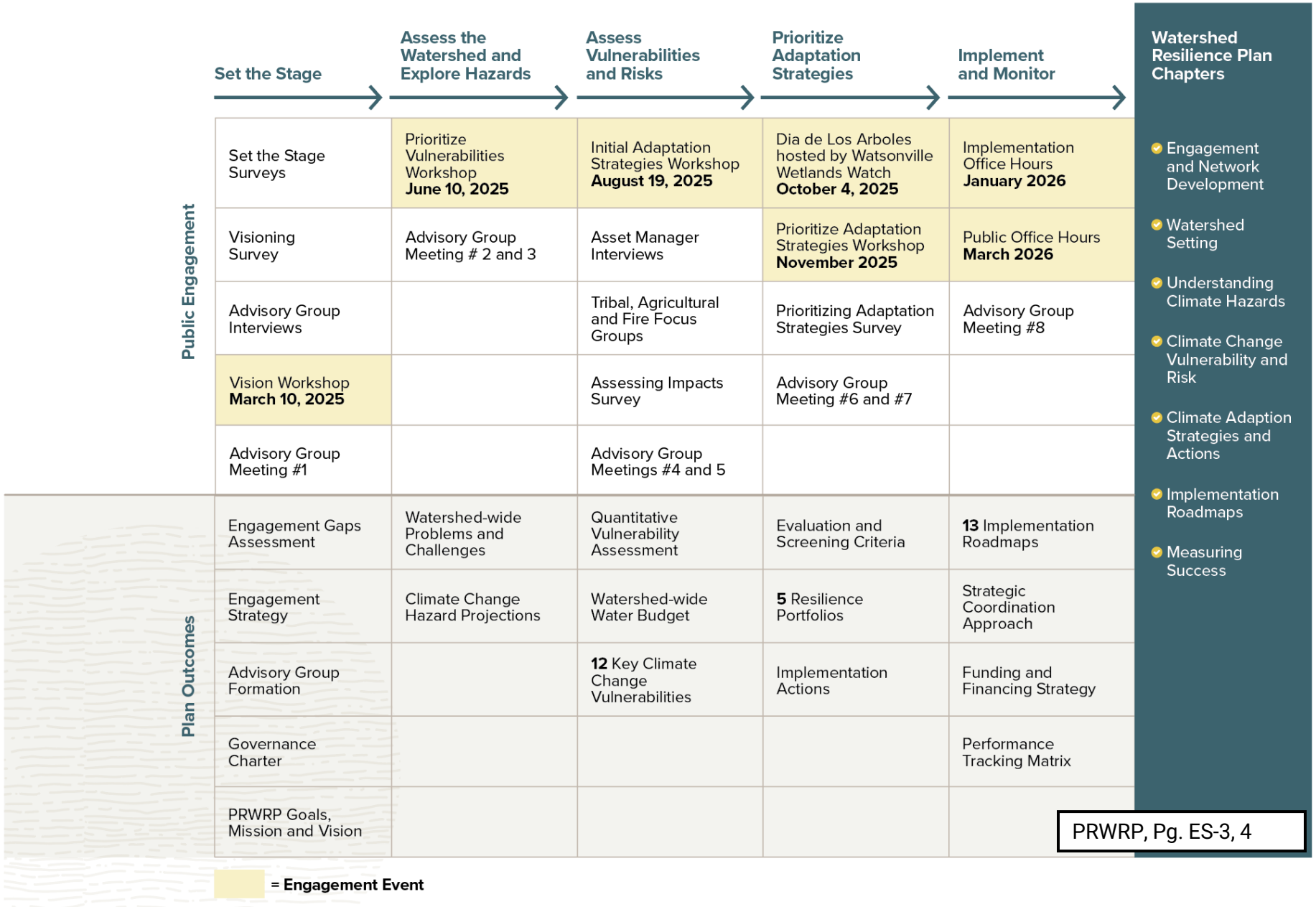
What's in it for watershed groups?

- ✓ Identifies and addresses climate vulnerabilities
- ✓ Advances multi-benefit collaboration
- ✓ Opens pathways for nature-based solutions
- ✓ Distributes and shares responsibility for watershed-scale action
- ✓ Elevates projects from other plans as a bridging document
- ✓ Positions for future funding from various sources

> ***There's such a wide list of potential project types I think Pajaro might be eligible for just about every Proposition 4 program out there.*** *- DWR Staff Feedback*

Integrated Approach

- Outreach, Engagement, and Research
- Prioritize Vulnerabilities
- Develop Initial Adaptation Strategies
- Prioritize Adaptation Strategies
- Develop Implementation Strategies



	Set the Stage	Assess the Watershed and Explore Hazards	Assess Vulnerabilities and Risks	Prioritize Adaptation Strategies	Implement and Monitor
Public Engagement	Set the Stage Surveys	Prioritize Vulnerabilities Workshop **June 10, 2025**	Initial Adaptation Strategies Workshop **August 19, 2025**	Dia de Los Arboles hosted by Watsonville Wetlands Watch **October 4, 2025**	Implementation Office Hours **January 2026**
	Visioning Survey	Advisory Group Meeting # 2 and 3	Asset Manager Interviews	Prioritize Adaptation Strategies Workshop **November 2025**	Public Office Hours **March 2026**
	Advisory Group Interviews		Tribal, Agricultural and Fire Focus Groups	Prioritizing Adaptation Strategies Survey	Advisory Group Meeting #8
	Vision Workshop **March 10, 2025**		Assessing Impacts Survey	Advisory Group Meeting #6 and #7	
	Advisory Group Meeting #1		Advisory Group Meetings #4 and 5		
Plan Outcomes	Engagement Gaps Assessment	Watershed-wide Problems and Challenges	Quantitative Vulnerability Assessment	Evaluation and Screening Criteria	**13** Implementation Roadmaps
	Engagement Strategy	Climate Change Hazard Projections	Watershed-wide Water Budget	**5** Resilience Portfolios	Strategic Coordination Approach
	Advisory Group Formation		**12** Key Climate Change Vulnerabilities	Implementation Actions	Funding and Financing Strategy
	Governance Charter				Performance Tracking Matrix
	PRWRP Goals, Mission and Vision				

= Engagement Event

Watershed Resilience Plan Chapters

- Engagement and Network Development
- Watershed Setting
- Understanding Climate Hazards
- Climate Change Vulnerability and Risk
- Climate Adaption Strategies and Actions
- Implementation Roadmaps
- Measuring Success

Watershed-Wide Implementation

PRWRP, Pg. ES-3, 4

Engagement

Community Engagement

4 Workshops
1 Pop-Up Community Event

- Visioning" (March 10, 2025) – *59 attendees*
- "Prioritize Vulnerabilities" (June 10, 2025) – *67 attendees*
- "Initial Adaptation Strategies" (August 19, 2025) – *69 Attendees*
- "Prioritize Adaptation Strategies" (November 6, 2025) – *47 attendees*
- Dia De los Arboles (Hosted by Watsonville Wetlands Watch on October 4, 2026) – *150 attendees*
- Public Office Hours (Fall/Winter 2025)

9 Surveys

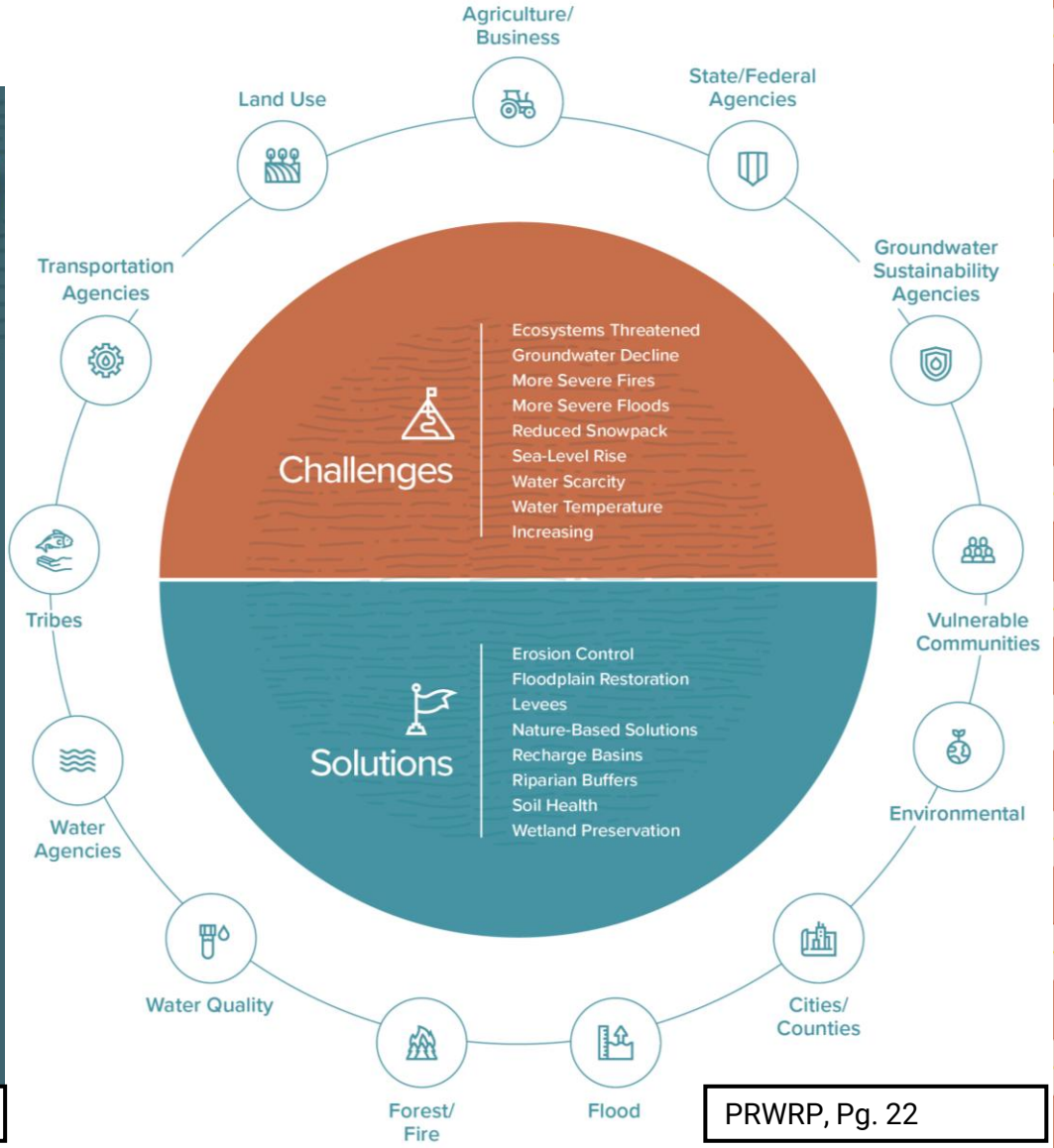
- "Set the Stage" with Advisory Group – *5 responses*
- "Set the Stage" with Watershed Network – *72 responses*
- "Visioning" with the Advisory Group – *8 responses*
- "Assessing Impacts" with the Watershed Network – *35 responses*
- "Prioritizing Adaptation Strategies" with the Watershed Network – *7 responses*
- Post-Workshop Exit Surveys – *95 responses*

28 Interviews and Focus Groups

- Advisory Group Interviews (January 2025) – *11 Interviewees*
- Vision Interviews (February 2025) – *12 interviewees*
- Tribal Focus Group (May 2025) – *5 interviewees*
- Interview Sessions with Asset Managers (July 2025) – *21 interviewees*
- Agriculture Focus Group (October 2025) – *8 interviewees*
- Fire Focus Groups (October 2025) – *11 interviewees*

PRWRP, Pg. 25

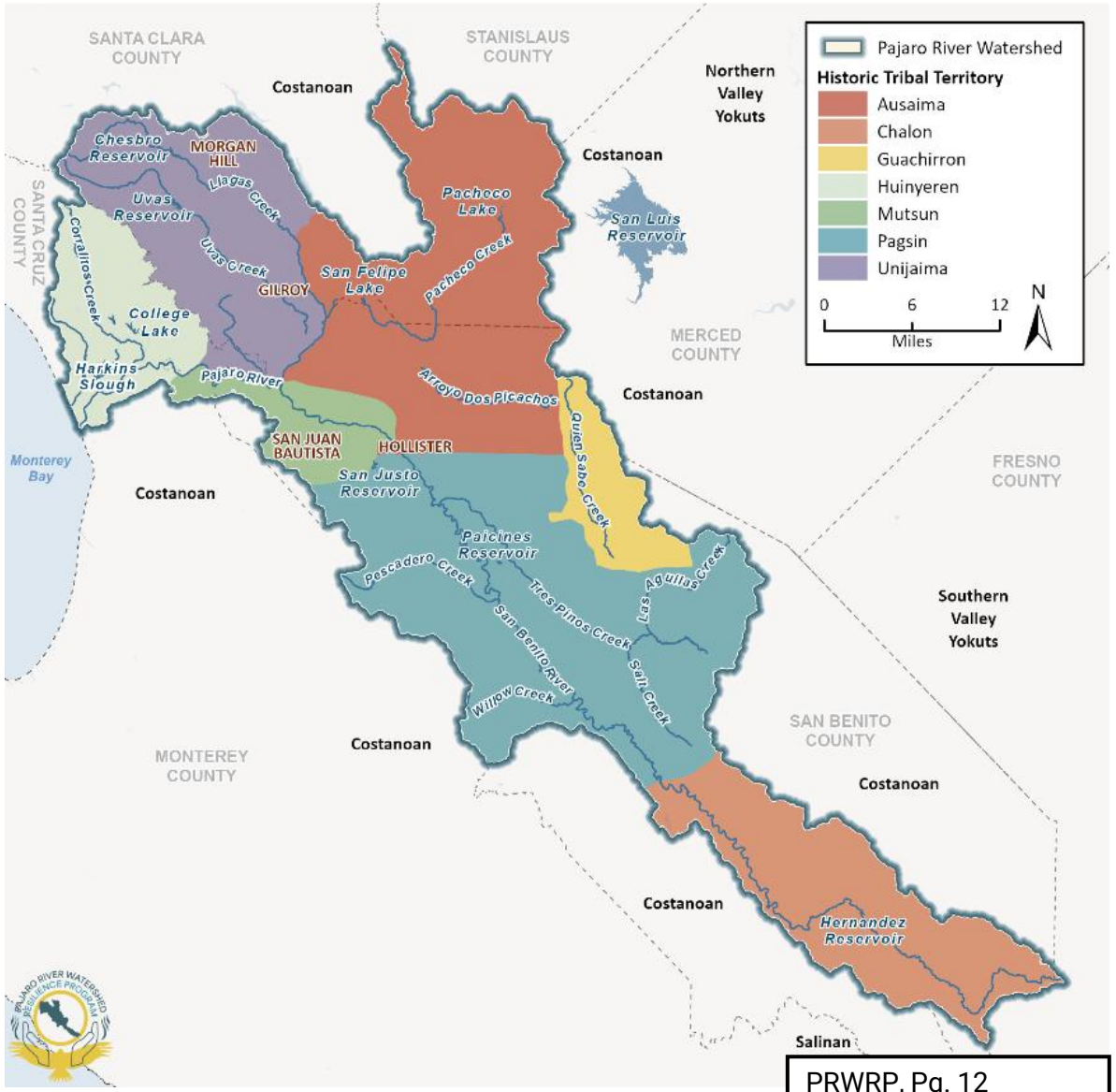
Pajaro River Watershed Network



PRWRP, Pg. 22

Tribal History and Connection

- Tribal groups have stewarded these landscapes, waterways, and ecosystems for millennia and continue to hold deep cultural significance for many Tribal groups today.
- The watershed spans areas traditionally inhabited by many groups who were often consolidated under the names “Ohlone” or “Costanoan” by non- Indigenous settlers.
- Traditional Ecological Knowledge, expressed through the deep connection to land and water offers climate resilience strategies.



PRWRP, Pg. 12

Historic Tribal Territories are approximate representations outlined by Amah Mutsun Tribal Historian and Chair Ed Ketchum based on data from Milliken and digitized by Rincon Consultants, 2026.

Pajaro River Watershed's Climate Resilience Vision

The Watershed Network envisions a resilient future that protects our people, water resources, and ecosystems most vulnerable to climate extremes. Our watershed, from summit to sea, has reliable clean water for people, habitat, and working landscapes to thrive while our living water systems expand and contract to adapt to climate extremes through thoughtful sustaining solutions.

Program Focus

Climate Hazards

Drought

Drought is defined as an extended period of dryness caused by low precipitation that negatively impacts soil moisture and water availability for some activity, group, or environmental sector.

Extreme Precipitation and Flooding

Extreme precipitation refers to instances where the amount of rain experienced in an area exceeds what is normal, either in frequency, magnitude, or both, while flooding is a temporary condition in which normally dry land is partially or completely inundated.

Extreme Heat

Extreme heat is a prolonged period of high temperature that is much higher than expected for a region and/or time of year. Extreme heat can be an acute hazard (i.e., short-term) or a chronic hazard (i.e., long-term).

Wildfire

A wildfire is defined as any unwanted and uncontrolled fire that burns a natural or developed area.

Sea Level Rise and Storm Surge

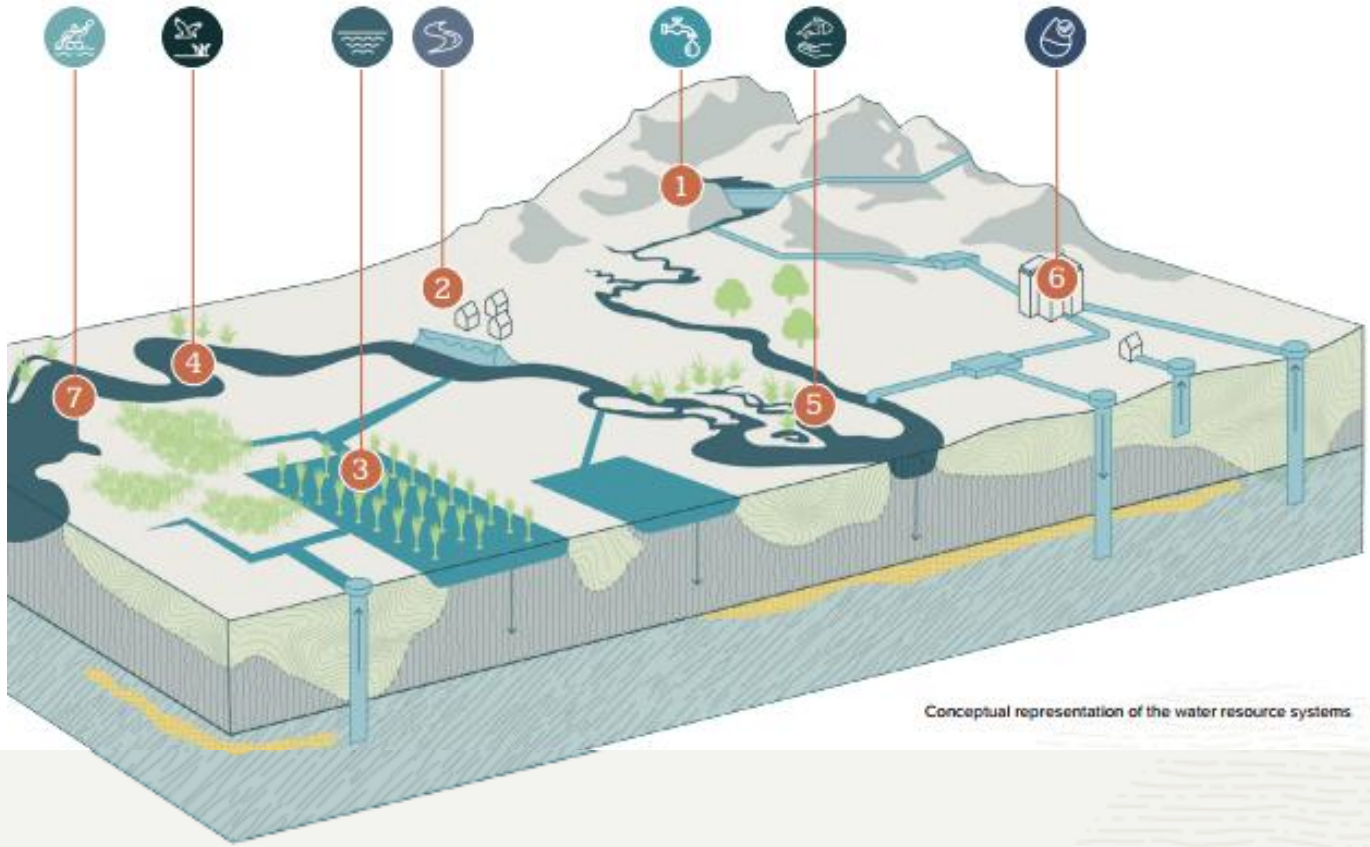
Sea level rise is the long-term increase in the average water surface elevation of the ocean, while storm surge is the abnormal rise of water elevations generated by a storm over and above predicted tides.

PRWRP, Pg. 10

Climate Hazards can compound, leading to greater impacts to water resource systems as exposures of assets/features can occur sequentially. For example, sea level rise and drought can drive seawater intrusion as groundwater pressure gradients change and communities rely on groundwater supply.

Program Focus

Water Resources



Conceptual representation of the water resource systems

1 Water Supply

The sources of local and imported water and the network of infrastructure that collects, treats, stores, and distributes water to meet water demand.

2 Flood Management

The network of natural and engineered structures that conveys high flows or prevents inundation of land with the intent of reducing the impacts of flooding on communities, infrastructure, and sensitive biological communities.

3 Groundwater Management

Water stored in aquifers (i.e., groundwater basins or subbasins) and the collection of natural and engineered infrastructure, natural processes, and management practices that contribute to recharge, storage, and withdrawal.

4 Ecosystems

A complex network of interconnected and interdependent natural systems, which includes physical (e.g., soil, air, water, climate, topography) and biological (e.g., plants, animals, fungus, algae, bacteria) features.

5 Indigenous Cultural Resources

The lands, waters, species, places, and practices that support ancestral and contemporary uses, including subsistence and cultural practices, traditional ecological knowledge, and culturally important landscape features.

6 Water Quality

The set of parameters and properties measurable in natural water bodies, aquifers, and associated built infrastructure that makes water usable for different purposes.

7 Recreation

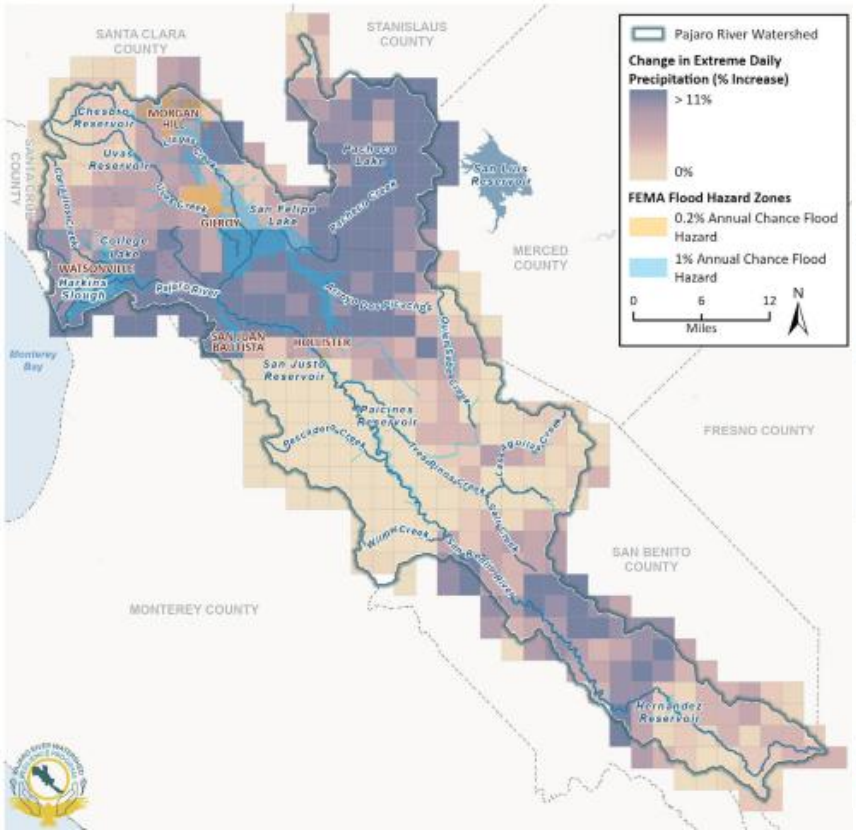
Uses of and access to parks, open spaces, trails, lakes, reservoirs, rivers, creeks, and coastal areas through activities such as boating, hiking, biking, fishing, and wildlife viewing.

PRWRP, Pg. 9-10

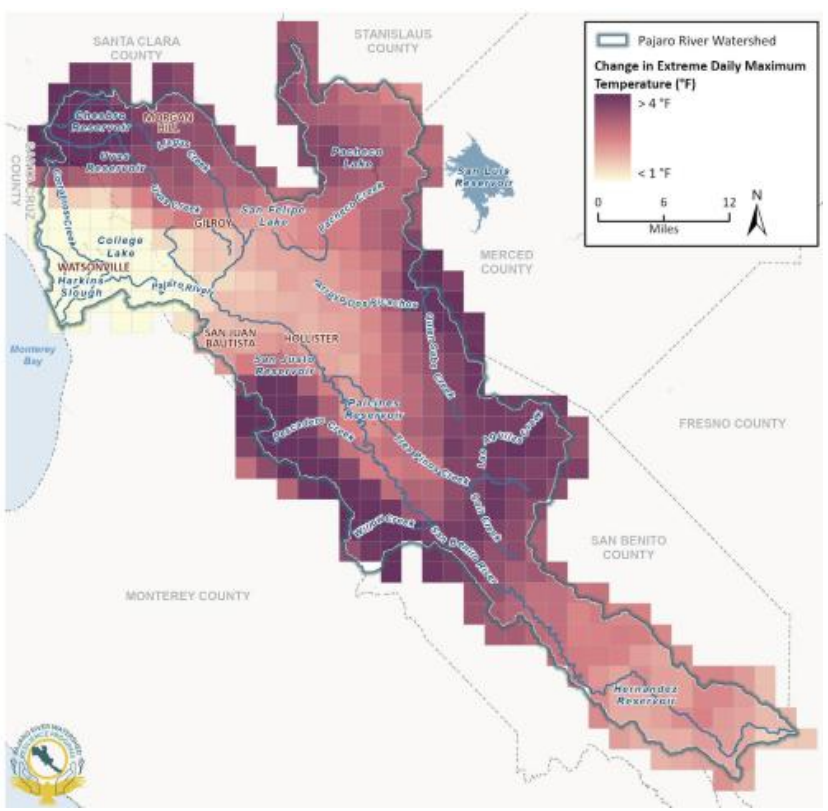
Future Climate Conditions

Climate simulations from the latest model projections used for the California Fifth Climate Change Assessment

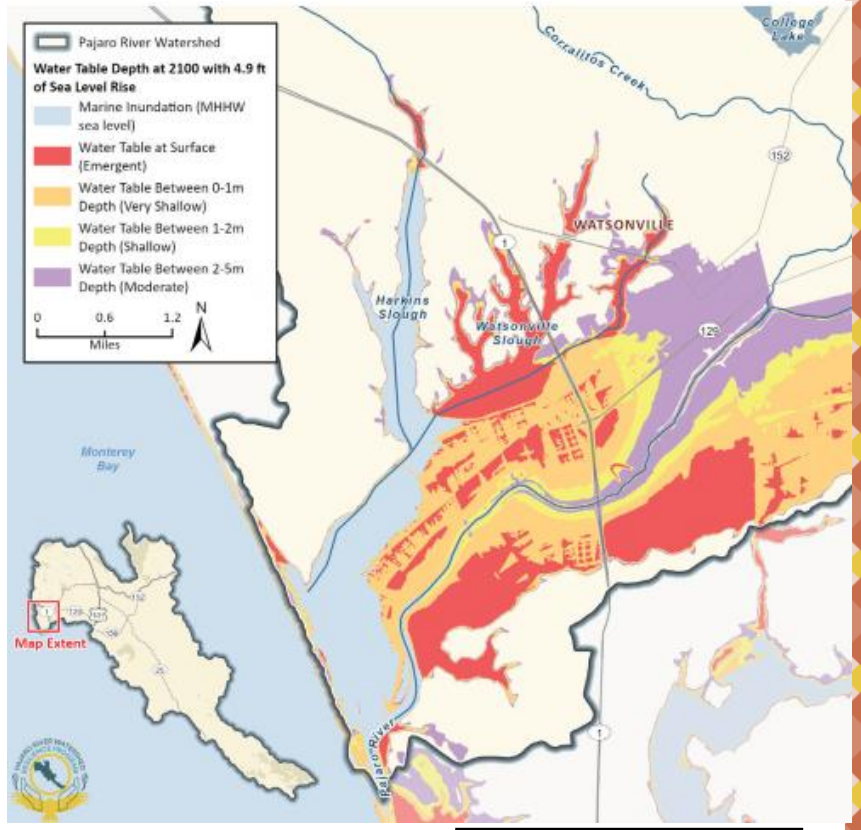
Extreme Precipitation and Flooding



Extreme Heat



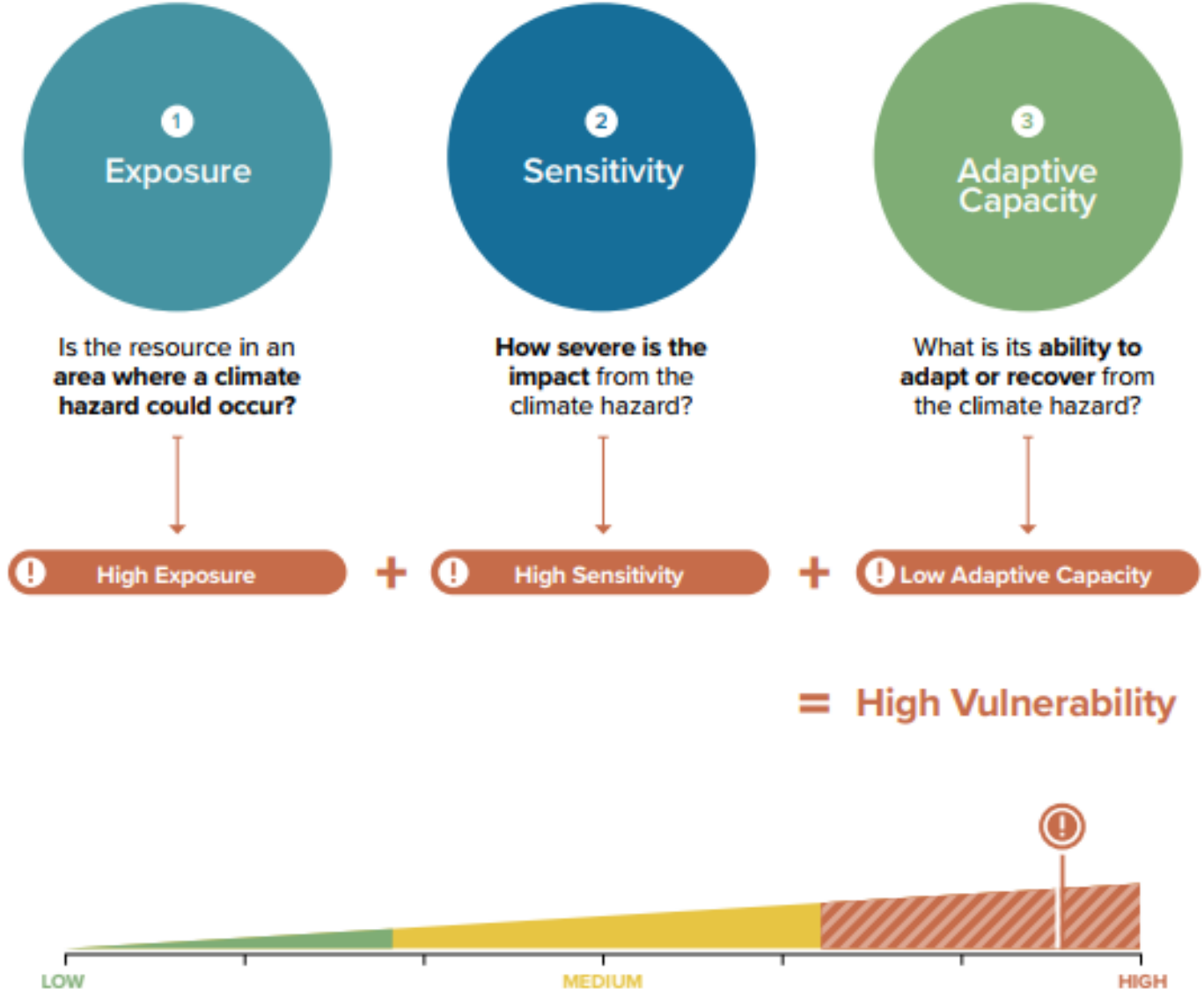
Sea Level Rise and Storm Surge



PRWRP, Chapter 4

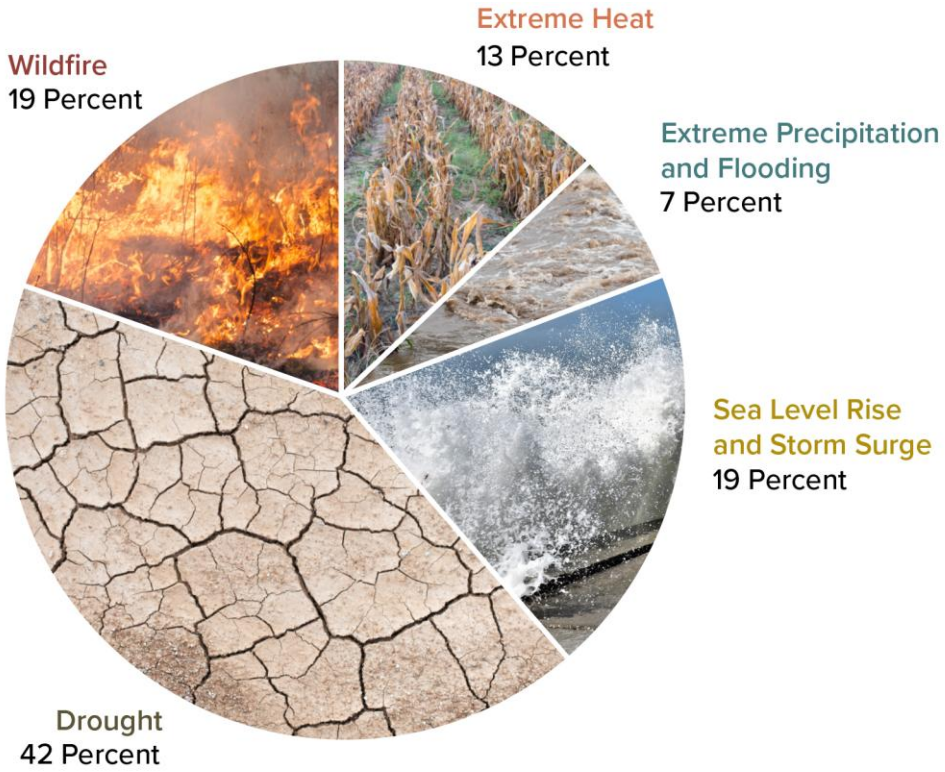
Climate Vulnerability Assessment

- Identify Assets
- Assess Vulnerability
- Ground-truth with Asset Managers
- Prioritize Risks as Key Vulnerabilities
- Address via Adaptation Strategies/Actions



PRWRP, Pg. 81

Climate Vulnerabilities



PRWRP, Pg. ES-8, 83

What Are the Issues in the Watershed?

Summary of Key Vulnerabilities

- Reliance on imported water and groundwater under intensifying drought.
- Risk of flooding to communities, infrastructure, and farmland—especially in the lower watershed.
- Wastewater and stormwater systems requiring maintenance and improvement
- Degradation of Tribal cultural landscapes and sensitive ecosystems and habitat.
- Damage from wildfires in uplands and foothills causing downstream effects.
- Degradation of water quality due to seawater intrusion and increased runoff.
- Limited institutional capacity and fragmented governance.
- Risk to agricultural and ranching lands and local economies.
- Disruption to ecological communities, biodiversity loss and habitat degradation

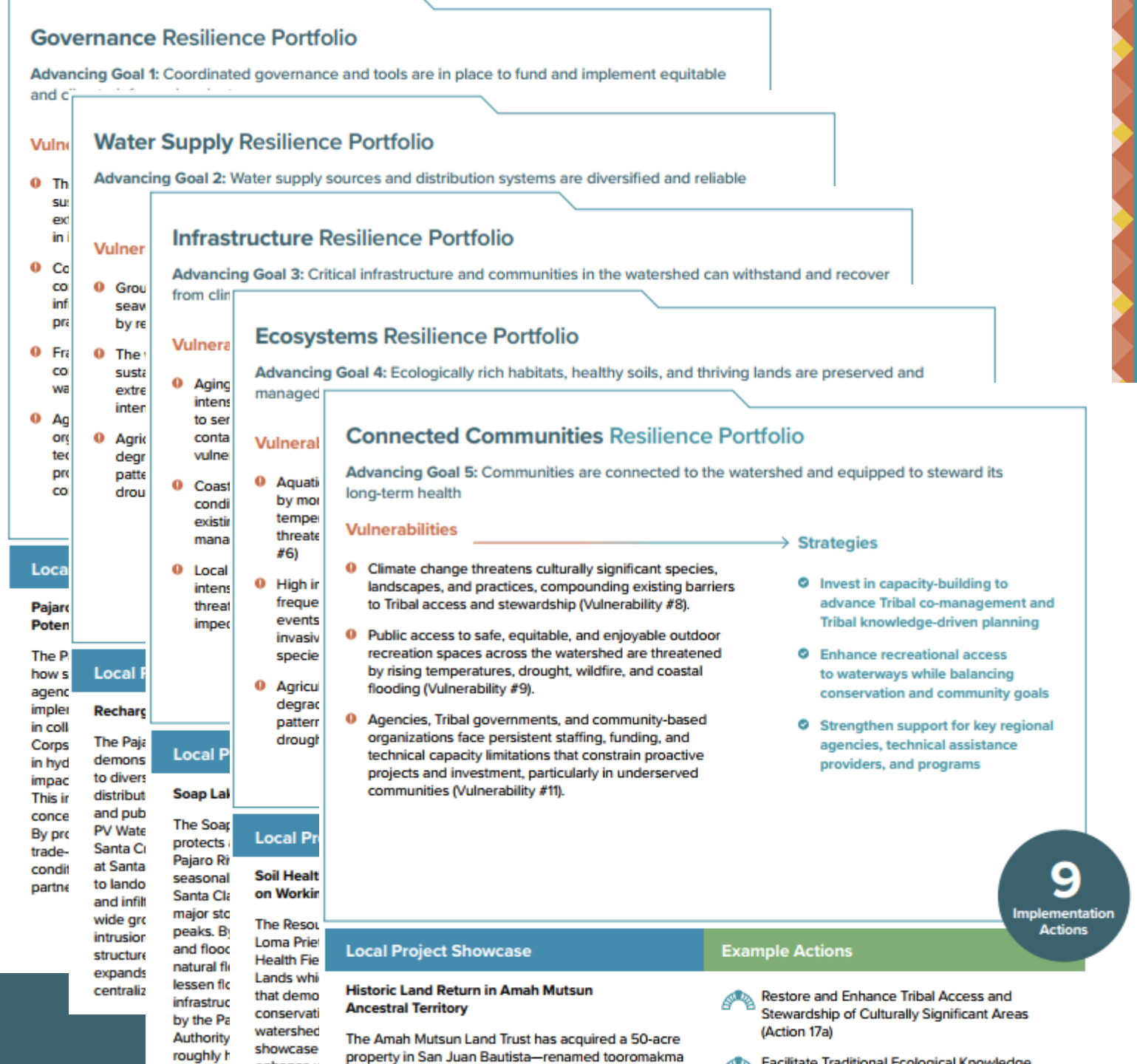
PRWRP, Pg. ES-10

Resilience Portfolios

Aligning Strategies and Actions to Climate Resilience Goals

- 5 Resilience Portfolios
- 23 Adaptation Strategies
- 70+ Implementation Actions
- 13 Keystone Actions

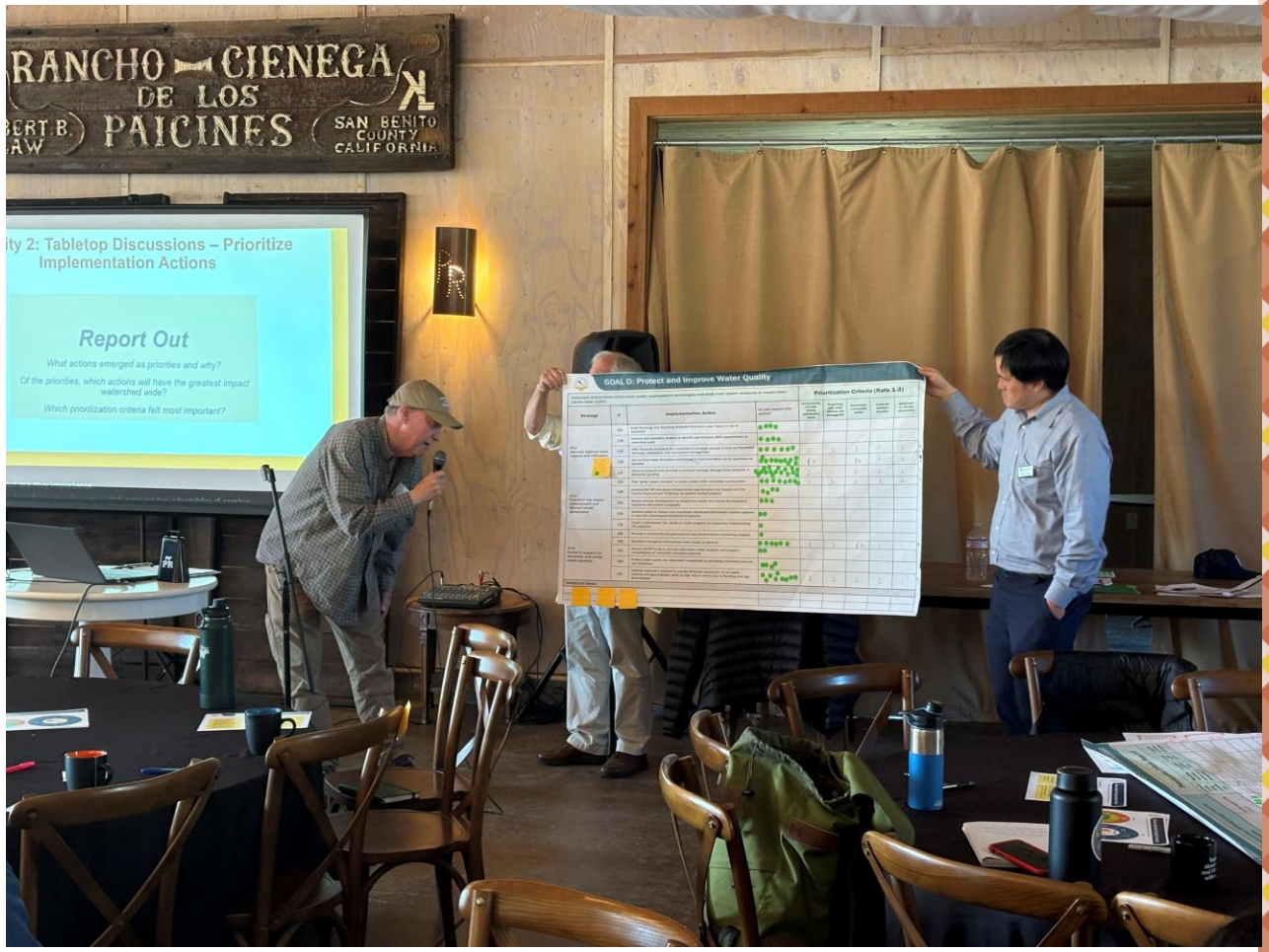
PRWRP, Chapter 6



Keystone Actions

Prioritization for Implementation

1. Address key climate vulnerabilities across the watershed
2. Deliver benefits to multiple water resource systems and people
3. Advance equity by prioritizing historically vulnerable communities
4. Catalyze long-term, scalable implementation through durable governance, funding, and policy mechanisms



Final AG meeting and public workshop shaped the selection and prioritization of Keystone Actions

Implementation Roadmaps

- **Goal 1: Coordinated Governance & Funding**
  - Develop a Watershed Water Budget Decision-Making Tool (1a)
  - Address Permitting Barriers to Nature-Based Resilience (3a)
  - Evaluate County-Level Measures for Durable Local Revenue (4a)
  - Submit Regional, Bundled Grant Applications (4b)
- **Goal 2: Water Supply Diversification & Reliability**
  - Collaborate on Upland Retention & Runoff Reduction (6b)
  - Establish Coordinated Watershed-Wide MAR Program (6a/6e)
  - Assess Wastewater & Recycled Water Expansion (7a)
- **Goal 3: Climate-Resilient Infrastructure**
  - Implement Urban Green Infrastructure & Green Street Corridors (12a)
  - Advance Climate-Informed Levees & Floodplain Restoration (10a)
  - Coordinate Upgrades to At-Risk Critical Infrastructure (11a)
- **Goal 4: Healthy Ecosystems & Working Lands**
  - Strategically Transition Coastal Land Uses to Avoid Sea-Level Rise Risks (9a/9b)*
- **Goal 5: Connected & Empowered Communities**
  - Restore Tribal Access & Stewardship of Culturally Significant Areas (17a)
  - Facilitate Traditional Ecological Knowledge (TEK) Exchange (17b)

*9a/9b are listed in Goal 2, but also serve Goal 4

PRWRP, Chapter 7

KEYSTONE ACTION

Address Permitting Barriers to Nature-Based Resilience via Public-Private Partnerships (Action 3a)

Leveraging private industry experience and TEK, document barriers and align multi county permitting pathways for common nature based projects through a Pajaro Permitting Partnership, standardized playbooks, and pilot fast track pathways.

Implementation Leadership

- Potential Leads: County planning/public works agencies, PRWFPA.
- Potential Partners: CNRA, CDFW, RCDs, GSAs, city public works/planning; private industry and agricultural associations, private landowners, Central Coast Regional Water Board, State Water Board.

Key Hurdles to Overcome

- Fragmented processes across counties for similar project types
- Need for clarity and consistency for measuring nature-based solutions benefits
- Access the current suite of programmatic and related tools for multi-benefit projects

Tracking Metrics

- Partnership established; permitting matrix published/updated
- Percent of projects using standardized templates; permitting timelines and outcomes tracked

Implementation Phases

1. Set up and host a cross jurisdictional Permitting Partnership with public, private, and agriculture liaisons
2. Compile a case library and constraints matrix across representative nature-based projects and agencies
3. Publish a Permitting Resilience Playbook and public Applicant Guide with eligibility, decision trees, and standardized checklists
4. In partnership with involved entities, participate in lobbying the State and Federal agencies for permitting relief for nature-based projects
5. Pilot fast track pathways on 3–5 representative projects that meet PRWRP vision and goals and refine tools with after action reviews
6. Embed "don't build new risk" screens (fire/water supply) into county intake and tracking

Funding Strategy

County operating budgets and cost recovery fees for development/updates; small allocations from countywide revenue measures; align with Keystone Actions 4a and 4b for stable coordination funds.

Regulatory and Policy Needs

- Clear completeness standards and parallel review for resilience projects
- Integrate Fire Hazard Severity Zone (FHSZ) mapping and water supply verification into planning

Resources and Efforts to Leverage

Leverage Cutting Green Tape, Bay Restoration Regulatory Integration Team lessons, Integrated Watershed Restoration program, Partners in Restoration Permit Coordination Program, and county Unified Permit Centers to standardize requirements. Use state hazard mapping and water supply guidance to operationalize consistent intake screens and reduce review time without lowering protections. Leverage the Recharge Net Metering Program (RCDSCC, PV Water, UCSC). Specific efforts to leverage include, but are not limited to the following. Additional resources can be seen in Appendix I.

- California Energy Commission land use screening for siting renewable energy
- Sustainable Conservation Accelerating Restoration Tools
- Successes from USACE levee projects and PSDMD and County of Santa Cruz CAP 1135 project

Keys to Implementation Success

Coordinate and Consolidate Across Efforts

The watershed contains multiple overlapping plans (GSPs, IRWM efforts, flood projects, habitat initiatives, regional working groups, local General Plans). Aligning priorities, bundling projects, and presenting unified regional proposals will strengthen competitiveness for state and federal grant funding and reduce duplicative efforts.

Build Capacity Across Public, Tribal, and NGO Partners

Many agencies, Tribes, and community-based organizations face restrictive staffing and technical resource constraints. Dedicated funding for coordination, grant writing, technical assistance, and project management will be essential to move from planning to implementation.

Shift from Planning to Action to Address Fatigue

Interested parties throughout the Watershed have participated in extensive engagement processes. Demonstrating early implementation wins, transparent progress tracking, and clear pathways to funding will help maintain trust and momentum.

Center Agriculture as a Core Implementation Partner

Agriculture manages a significant portion of the watershed's land and water resources. Implementation success will depend on designing strategies that are economically viable for growers, aligned with on-the-ground realities, and structured to provide clear regulatory, water supply, and soil health co-benefits.

Invest in Workforce Development and Local Job Creation

Scaling climate resilience, green infrastructure, and nature-based solutions will require a skilled workforce capable of designing, constructing, and maintaining these systems. Partnering with community colleges, workforce development programs, Tribal training initiatives, and local employers can help build career pathways.

Modernize Permitting Pathways for Multi-Benefit Projects

Many climate resilience, floodplain restoration, recharge, and habitat projects face lengthy and fragmented permitting processes across state and federal agencies. Programmatic permits, streamlined review pathways, and improved interagency coordination would accelerate implementation.

PRWRP, ES-14

What's Next?

- **Future Leadership and Post Planning Implementation**
  - Routine watershed coordination meetings
  - Annual workshops to track progress
  - Develop tracking tools
- **Strategic Coordination and Funding**
  - Bundle projects in line with Keystone Actions
  - Develop coalitions to secure funding
- **Continue Exploring & Developing Partnerships**
  - Continued engagement and coordination at watershed scale

Reach out to connect!

Pajaro Valley Water Management Agency
40 YEARS SINCE 1984

- Brian Lockwood, Lockwood@pvwater.org
- Casey Meusel, Meusel@pvwater.org
- Marcus Mendiola, Mendiola@pvwater.org

RINCON CONSULTANTS

- Kiernan Brtalik: kbrtalik@rinconconsultants.com
- Reema Shakra: rshakra@rinconconsultants.com

Project Website: https://www.pvwater.org/public-comment-period-open-for-draft-pajaro-river-watershed-resilience-plan

Discussion Ideas

Questions for you!

- How do you as a region plan to prepare for future climate change?
  - How are thinking about resilience or climate adaptation now?
- What are your region's thoughts about the evolution of IRWM to WRP?
  - Pros and cons?
  - Opportunities for Proposition 4 and other funding?
- How are you as a region considering integration of/collaboration with SGMA?
- What obstacles or hurdles are you facing for watershed resilience planning?

Deep Dive

- Governance and Strategic Coordination
- Funding Approach
- Historic Watershed-wide Water Budget
- Climate Change Data
  - Future exposures
- Climate Vulnerability Assessment
  - Qualitative
  - Quantitative
- Adaptation Strategy Development