Regional Water Supply Resiliency Study

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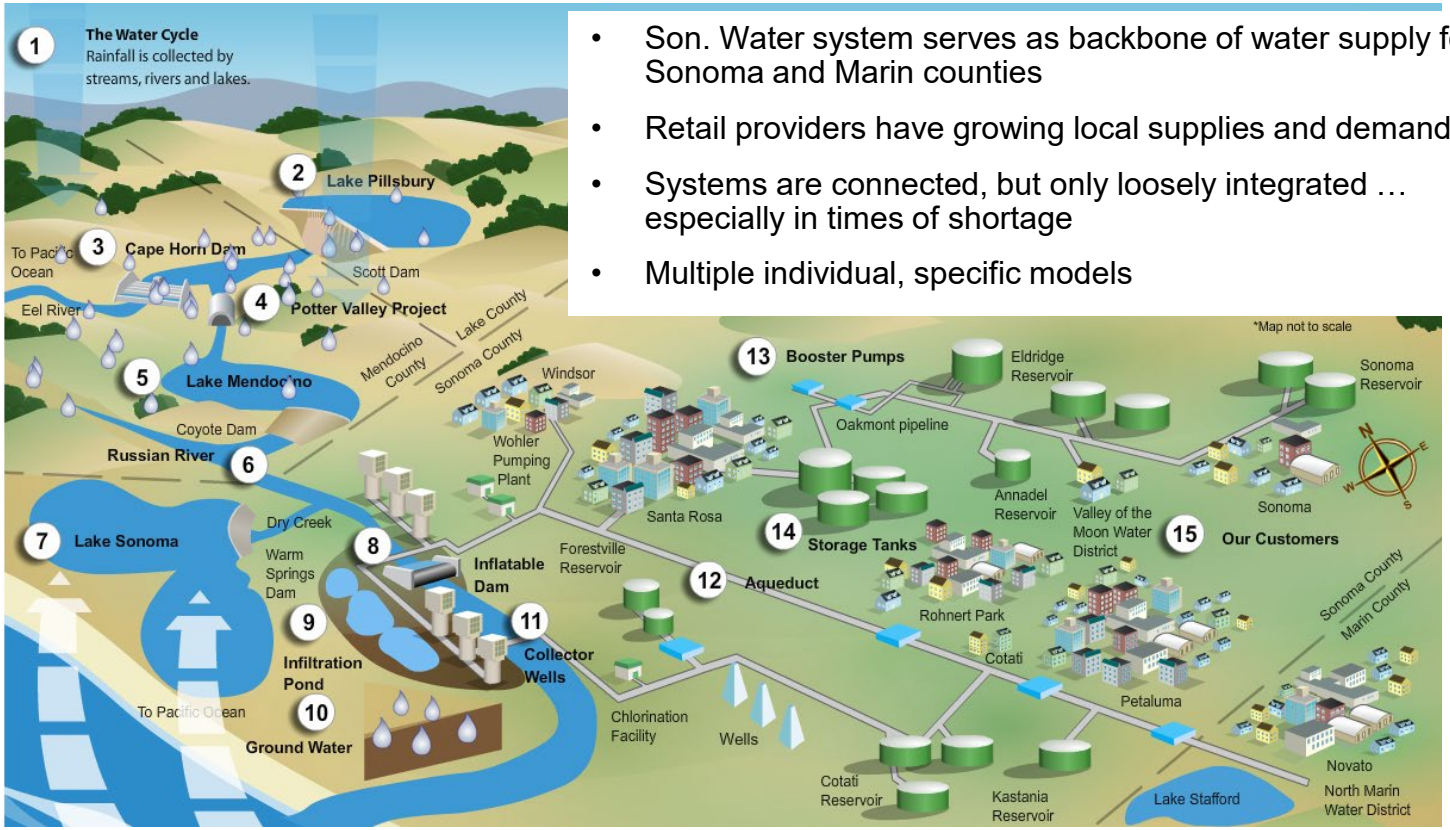
Complex Interconnected System



- Son. Water system serves as backbone of water supply for Sonoma and Marin counties
- Retail providers have growing local supplies and demands
- Systems are connected, but only loosely integrated … especially in times of shortage
- Multiple individual, specific models

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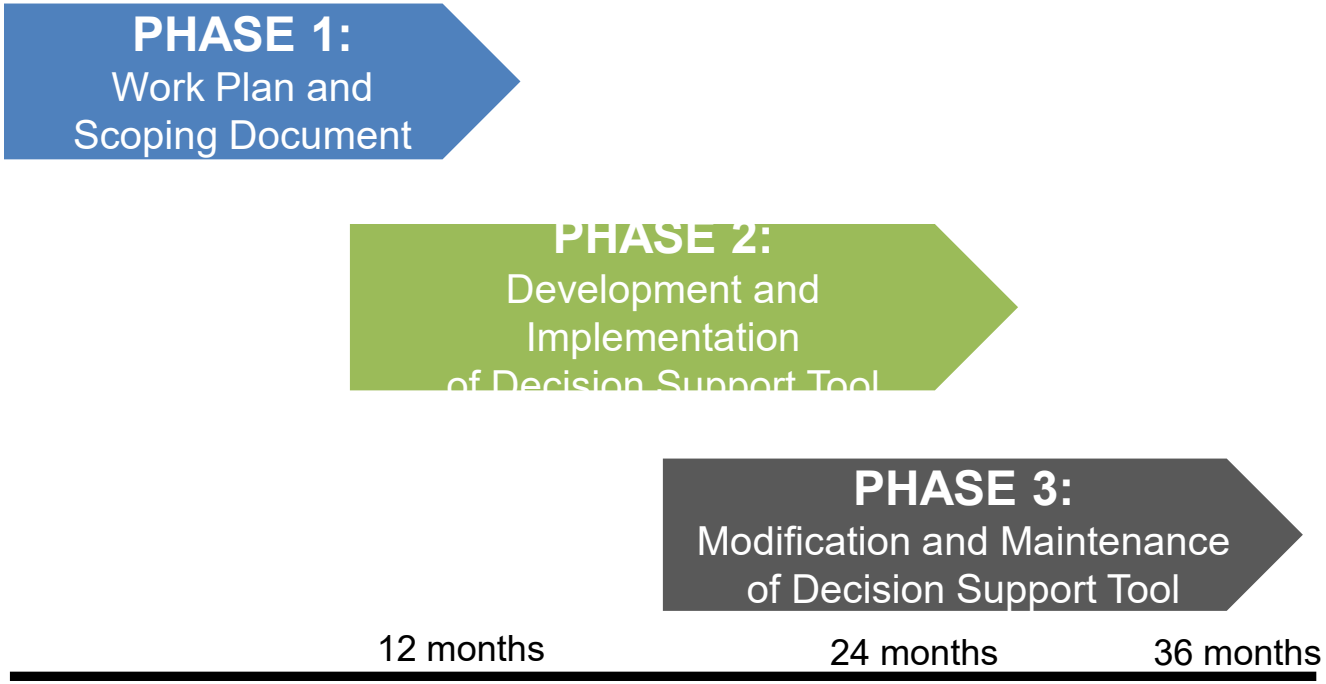
Resiliency Study Project Overview



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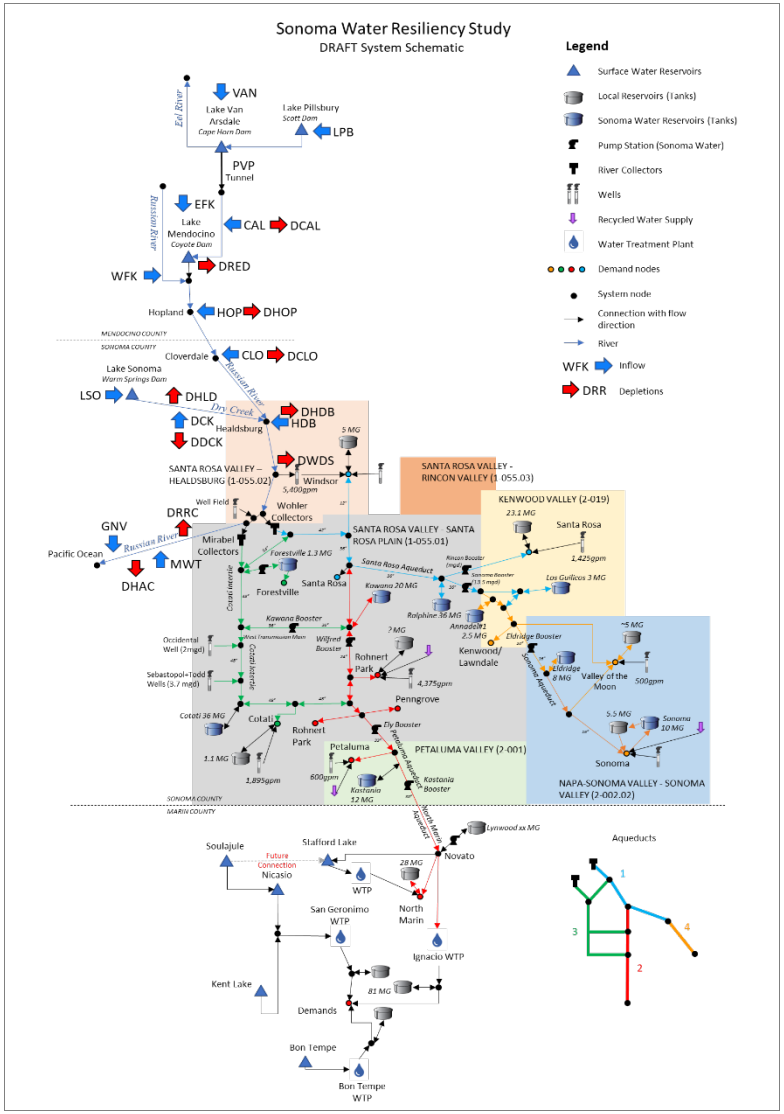
Sonoma Water Resiliency Study

Resiliency Study seeks to:

- identify the key factors impacting regional water supply resiliency,
- evaluate the current levels of resiliency,
- develop a decision support framework model and process, and
- identify promising opportunities for Sonoma Water and its retail customers to improve regional resilience in the future

First of a kind look at the Integrated Regional System

- Russian River & Potter Valley Project (Eel River)
- Sonoma Water “backbone” system
- 9 retail customer systems
- 6 groundwater basins
- local supplies and recycled water
- multiple risk drivers
- decision support model



Ranking Risk Drivers: Drought and Seismic Highest Priority

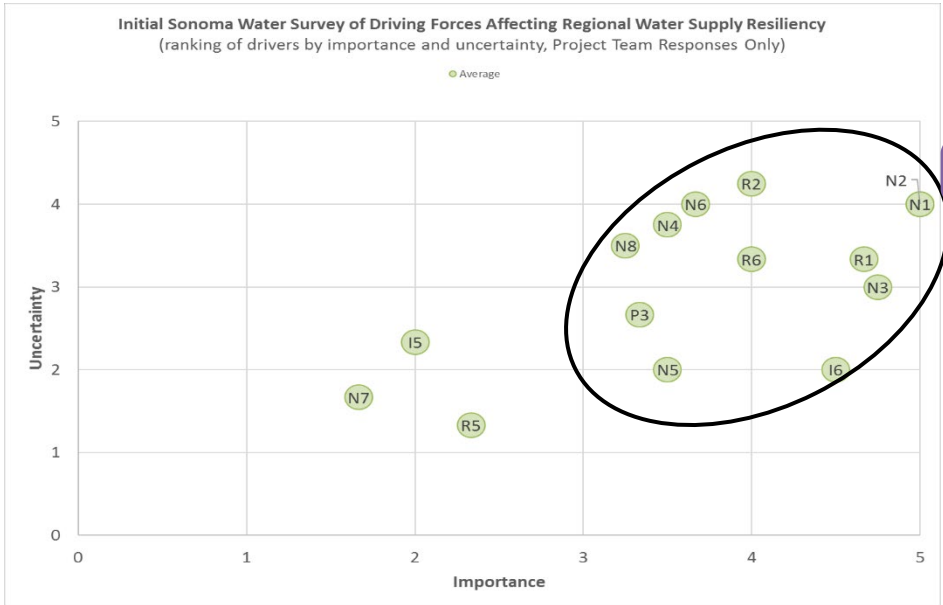


Figure 4. Average Results for the Risk Driver Survey Conducted by Project Team Members
(*Note: I11 and I12 risk drivers were not included in the initial survey and are thus not shown in the graphic).*

No.	Risk Driver	Risk Type	Phase of Study
N1	Wildfire	Sudden	Phase 2
N2	Earthquake	Sudden	Phase 2
N3	Drought	Sudden/Gradual	Phase 2
N4	Russian River Water Quality Contamination	Sudden	Phase 2
N5	Power Loss	Sudden	Phase 2
N6	Flooding	Sudden	Phase 2
N7	Sea Level Rise	Gradual	TBD
N8	Local Source Water Quality Contamination	Sudden	Phase 2
P3	Rapid Demand Growth	Sudden/Gradual	Phase 2 (TBD)
R1	Potter Valley Project Uncertainty (seismic/regulatory)	Sudden/Gradual	Phase 2
R2	New Russian River Treatment Regulations	Gradual	TBD
R5	SGMA Impacts on Groundwater Supply (City of Sonoma/VOMWD)	Gradual	Phase 2 (TBD)
R6	Changing Biological Opinions	Gradual	TBD
I5	Groundwater Well Operational Failures	Sudden	Phase 2
I6	Aging Infrastructure	Sudden/Gradual	Phase 2
I11	COVID-19 Workforce Response	Sudden/Gradual	TBD
I12	Operational Control Systems Disruption	Sudden	Phase 2

Assessment of Drought Resiliency Completed Spring 2022

- Stochastic analysis of 108 traces (1910-2017)
- Probabilities of storage and supply deficits derived from traces
- Compare base-line (no mitigation measures) to scenarios with packages of mitigation measures
- Evaluate near-term stress test for WY 2022-26) by using worst-case 5-year interval (WY 1976-78) Represents severe 2-year drought preceded by current drought
- Evaluate long-term drought resiliency (climate future forecasts)

JACOBS

Sonoma Water Regional Water Supply Resiliency Study

Accelerated 2021-2022 Drought Resiliency Analysis

FINAL DRAFT

April 27, 2022

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SYNTHESIS OF DROUGHT WATER MANAGEMENT OPTIONS

Increase Supply

- Increase groundwater production (new or rehabilitated wells)
- Winter water diversion
- Regional groundwater bank (Santa Rosa Plain, Sonoma Valley, Petaluma)
- Alexander Valley FloodMAR
- Sonoma Developmental Center water supply and forebay for groundwater recharge
- Expand recycled water supply
- Ocean desalination and/or brackish water desalination
- Interconnection with Bay Area supplies (water transfers)

Reduce Demand

- Water conservation and water use efficiency in agricultural, municipal, and CII sectors

Improve Operations

- Kastania Pump Station improvements
- Expand surface storage (Lake Stafford weir, sediment removal)
- Lake Sonoma Forecast Informed Reservoir Operations (FIRO)
- Increase recycled water storage
- Storage operational management levels
- Lake Mendocino variable gates and outlet channel improvements

Modify Policy and Regulations

- Regulatory flexibility through TUCPs

PLANNING FOR LONGER-TERM DROUGHTS

Early Actions Offer Immediate Opportunities for Resiliency Benefits

- Water conservation
- Flexibility through TUCPs
- Increasing groundwater production (Sonoma Water and Retail Customers)
- Kastania Pump Station improvements

Longer-Term Actions Offer Potential for Resiliency during Prolonged, Extreme Droughts

- Lake Sonoma FIRO
- Regional groundwater bank
- Expand winter water diversion
- SDC water supply
- Ocean and brackish Desalination
- Expand surface storage
- Expand recycled water supply
- Alexander Valley Managed Aquifer Recharge

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Seismic Resiliency (In-Process)

- Since 2004, Sonoma Water has evaluated seismic risks and implemented several projects to reduce those risks
- Design Event (Magnitude 7.0 Rogers Creek Fault earthquake)
- Sonoma Water recently completed update to Natural Hazard Reliability Plan (NHRP)
  - Detailed finite element modeling of seismic hazards to collector wells
  - Modeling of transmission system (Monte Carlo simulation)
  - Modeling to estimate magnitude and duration of service interruption to repair transimission system
  - NHRP has several recommended actions (studies & projects) to improve risk analysis & reduce risk

- Sonoma Water and Retail Agencies are incorporating results of seismic analyses into regional model to inform assessment of regional risk mitigation projects and measures

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