



# **Marin Municipal Water District Meeting the Challenge: Water Supply & Demand**

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February, 2009



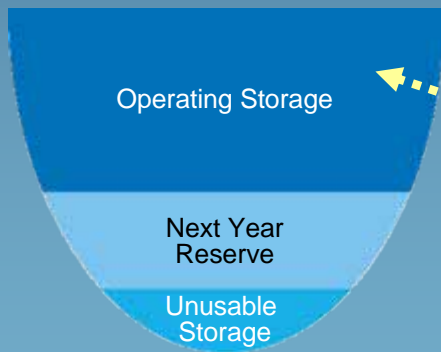
# MMWD's Water Supply



Recycled Water

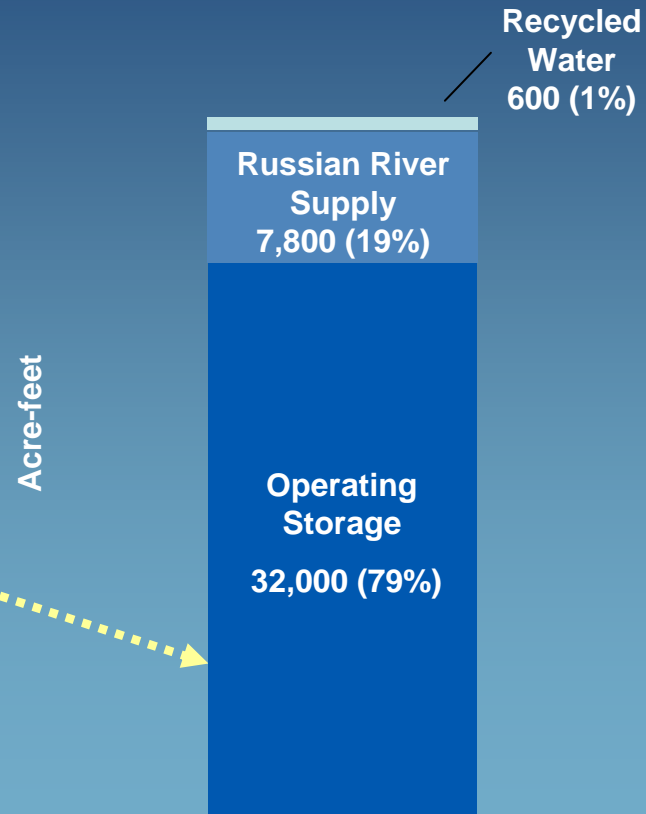


Russian River Pipeline



Reservoir Storage

## Average Year Water Supply Sources



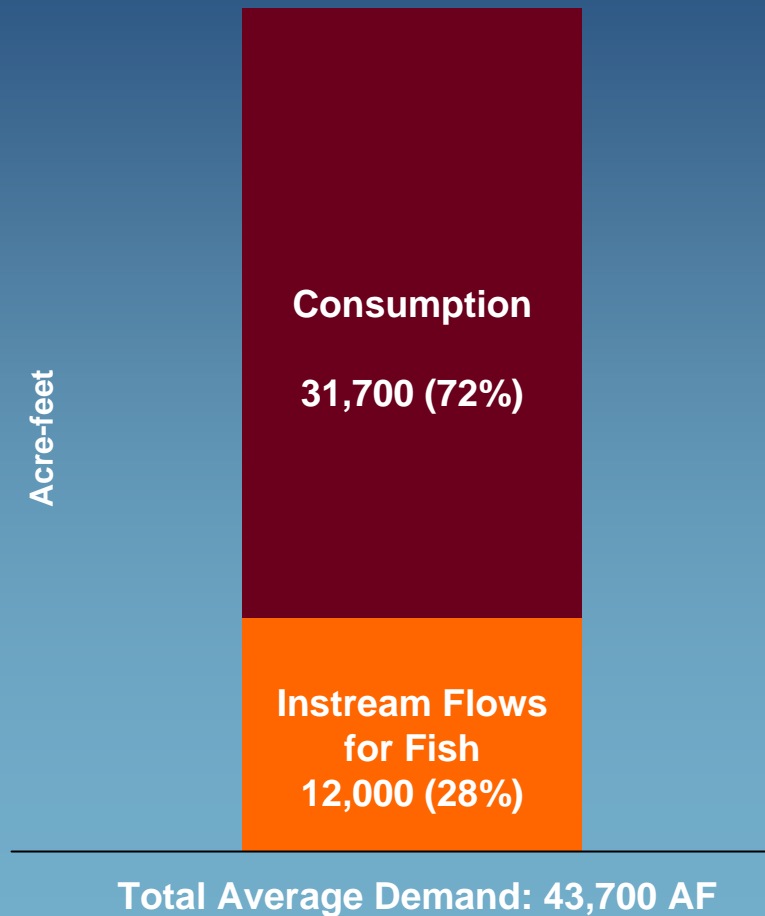
Total Average Supply: 40,400 AF



# MMWD's Water Demand

## Average Water Demand

- Two types of water demand in the district
  - Consumption
  - Fish Releases



# The Challenge

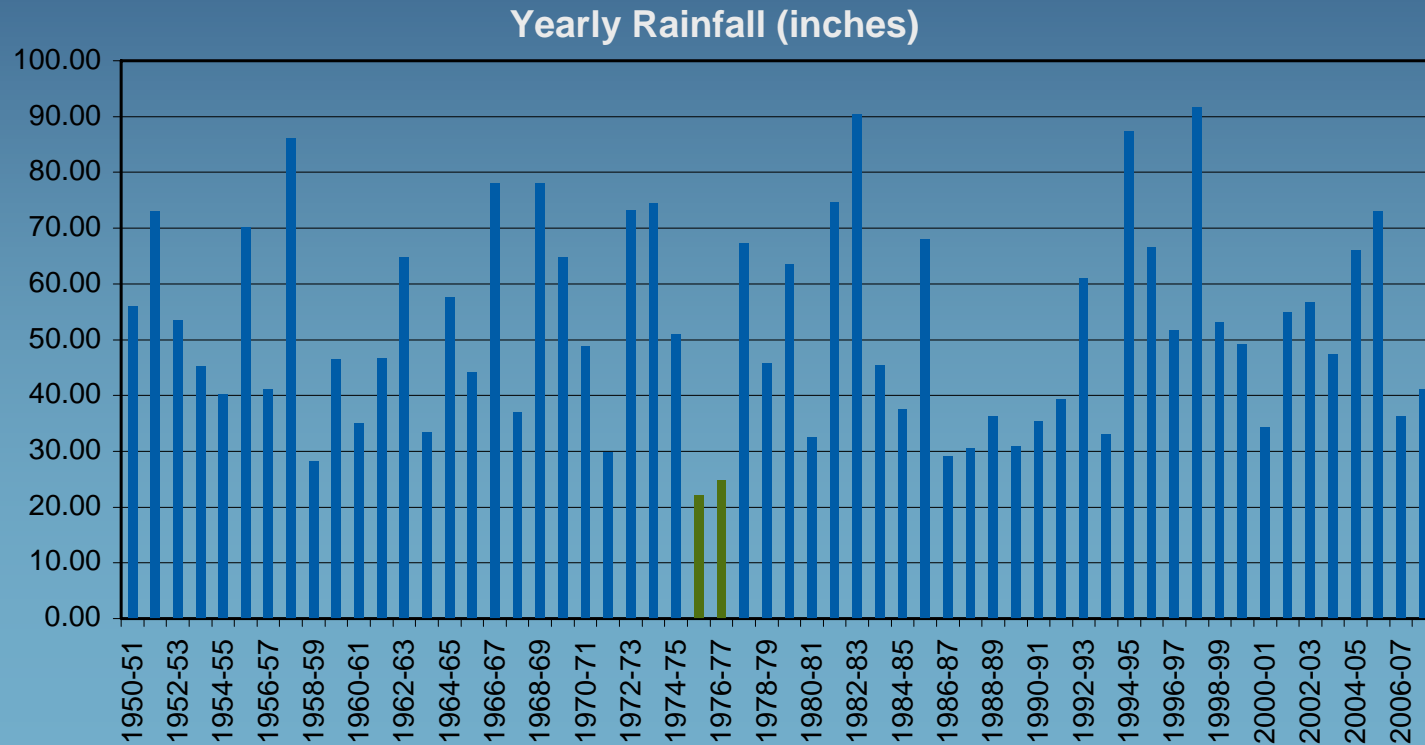
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Given the current water supplies and level of water demand, **MMWD** would not have adequate water supply to meet the needs of people and the environment during a sustained drought similar to the one experienced in the late 1970s.



# The Drought of Historic Record

- During the 1976-77 drought, Marin's rainfall was at historically low levels



# Water Supply and Demand Improvements Since 1977

- **Soulajule Reservoir (1979)**
- **Las Gallinas Recycling Facility (1981 & 1989)**
- **Russian River supply contracts (1988 and 1996)**
- **Expanded Kent Reservoir (1982)**
- **Reduced per capita water consumption**
- **Established a rationing policy for droughts**

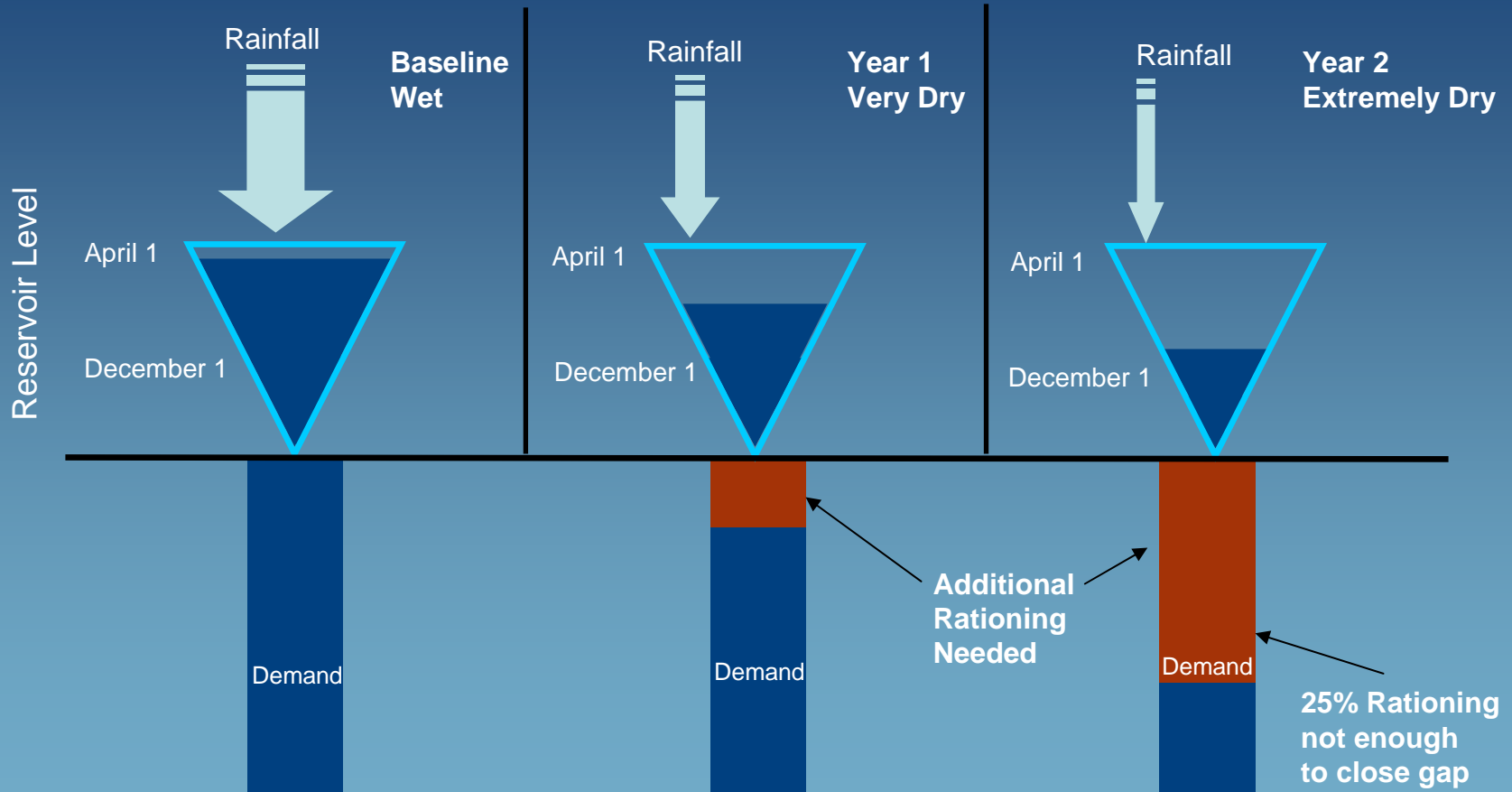


# Rationing Plan

- Rationing plan
  - 10% voluntary use reduction in the first year of a severe drought
  - Mandatory rationing to achieve 25% savings in water use in the second year
- Even with the additional supplies developed and this mandatory rationing:
  - MMWD reservoirs would run out of water in the second year of a severe drought



# Repeat of the 1976-1977 Drought



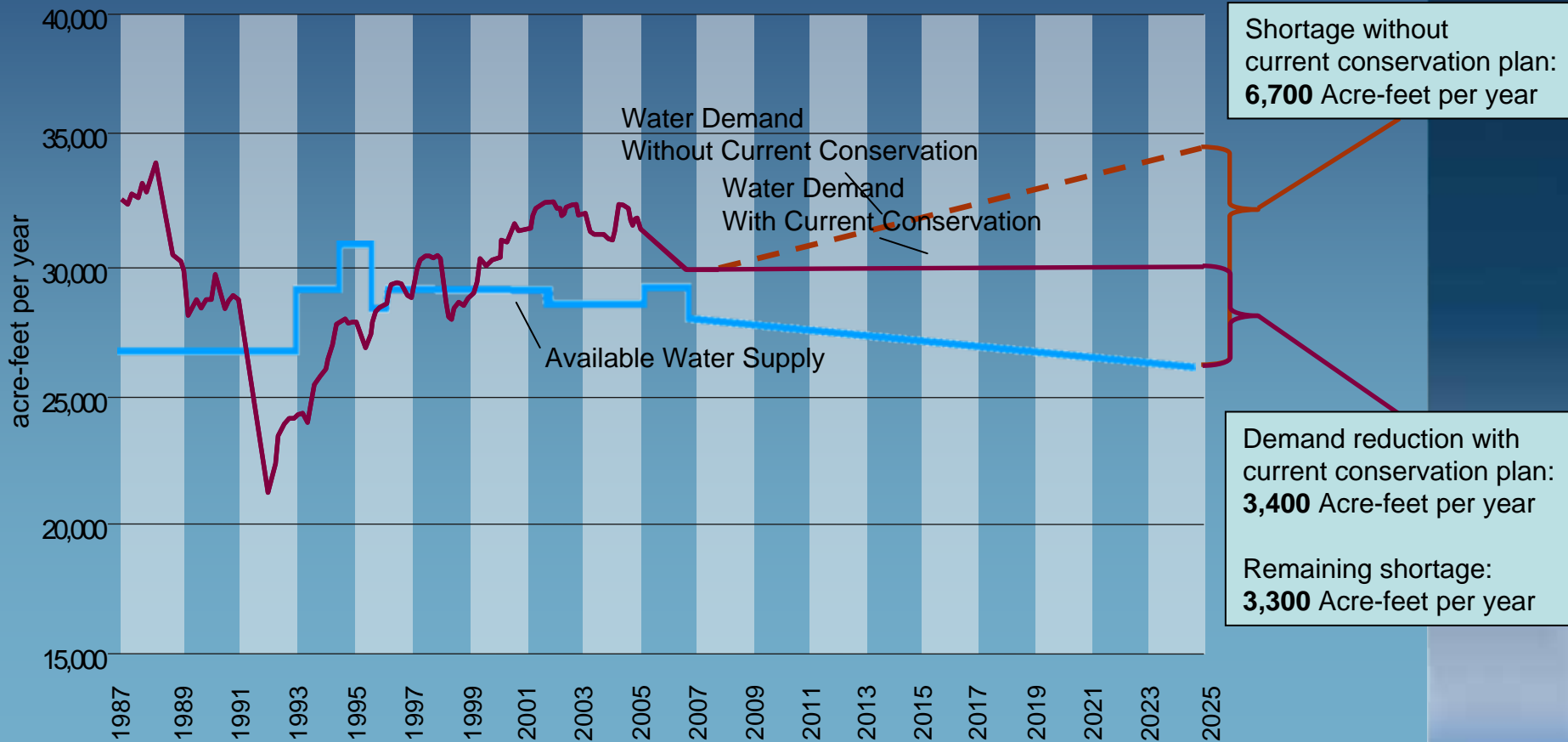
# The Bottom Line

- MMWD does not have adequate water supply to meet regulated fish requirements and customer needs during a sustained drought
- By the year 2025 the supply-demand deficit will more than double to 6,700 acre-feet per year
- To address this deficit, Marin must increase water supply and reduce water demand



# The Long-Term Deficit

## MMWD Water Demand vs. Available Supply



# Closing the Gap

## Opportunities Being Investigated

### Increase Supply

- Desalination
- Increase Russian River Supply
- Modify Reservoir Operations

### Reduce Demand

- Further Increase Water Conservation
- Increase Recycled Water



# The First Step: Water Conservation

- MMWD Board has already committed to an aggressive conservation program
- Investing \$44 million in staffing, rebates, incentives, and education



- Expecting a matching \$96 million in customer investment
- Current conservation program will cut long-term deficit in half



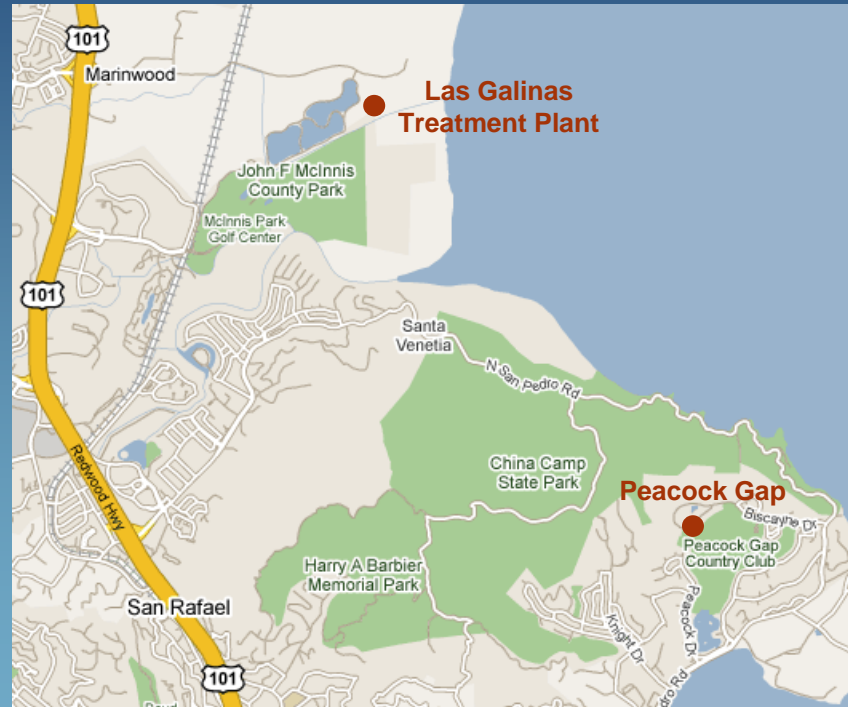
# Recycled Water & Operations

- Expand Recycled Water System
  - Add Peacock Gap golf course and residential customers
- Modify Reservoir Facilities
  - Change intakes, pipes, and pumps
  - Access unused reservoir storage in critically dry years



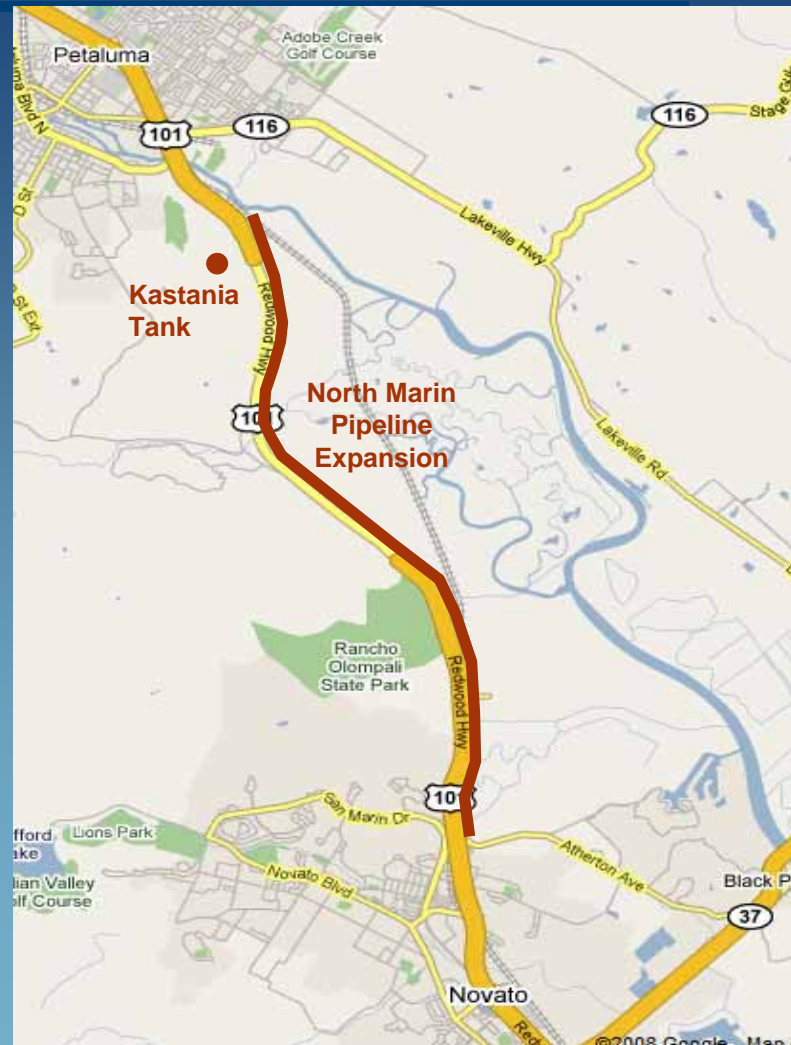
# Recycled Water & Operations

- Benefits
  - Relatively simple to implement
  - Improve system operations
- Considerations
  - Do not fully close the gap
  - Environmental review and permitting to be completed



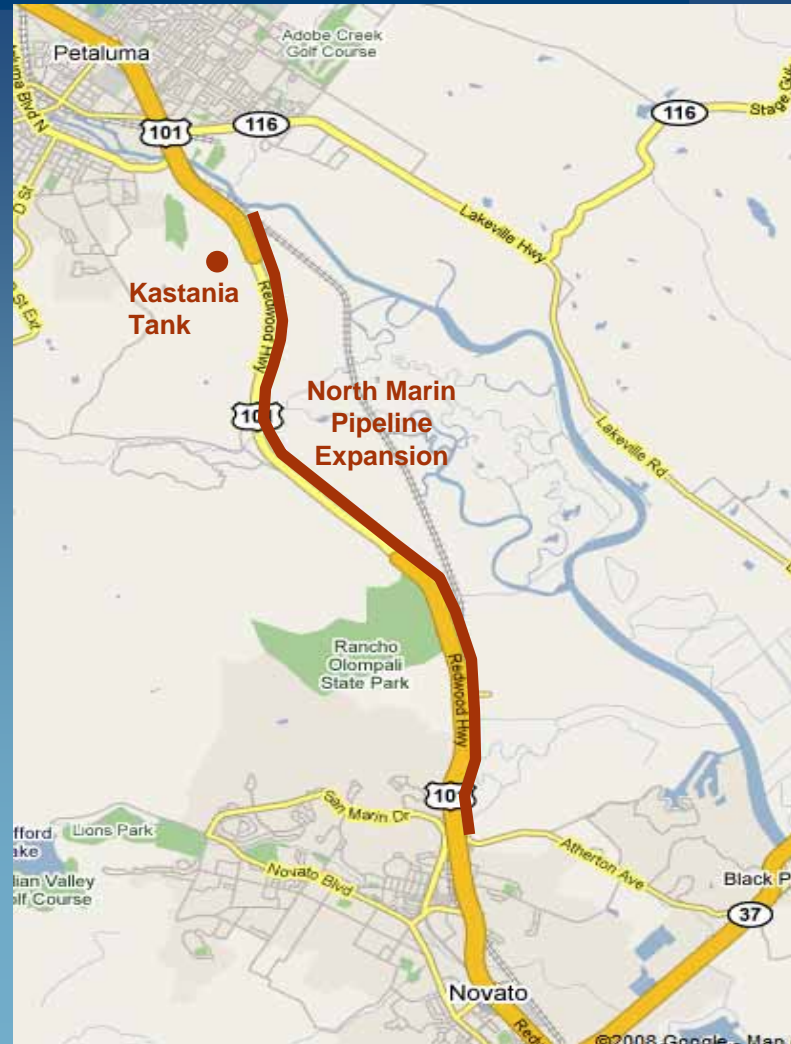
# Russian River Supply Increase

- North Marin Pipeline
  - Enlarge pipeline along Marin-Sonoma Narrows
  - Coordination with North Marin Water District and Caltrans
- Sonoma County Water Agency
  - Pipeline and system improvements within SCWA
  - Coordination with SCWA



# Russian River Supply Increase

- Benefits
  - Least expensive option
  - Water contract already in place
- Considerations
  - Pipeline relies on actions by other water districts
  - Pipeline supply may be unreliable in drought years
  - Supply depends on others completing environmental approvals for diverting water from Russian River



# Desalination

- 5 million gallon-per-day (MGD) facility
  - Site near Richmond Bridge, with an intake on the Marin Rod & Gun Club pier
  - Brine disposal through the existing wastewater treatment plant water discharge pipeline
  - Supplies MMWD distribution system
- 1 MGD facility
  - Supplies San Quentin and adjacent neighborhood





# Increased Water Conservation

- Benefits

- Least environmental impact
- Some program components could be less expensive than other options

- Considerations

- Demand reduction beyond projections of existing program is uncertain – requires more analysis
- Relies on ongoing actions and behavior change by thousands of customers
- Some program elements could be costly



# Opportunities Comparison Criteria

- **Quantity**
  - Amount of Supply or Demand Reduction
- **Cost**
  - Cost per Acre-foot, Rate Impact, Debt Load
- **Timing**
  - When water becomes available or demand is reduced
- **Feasibility**
  - Performance Certainty – Likelihood of providing the expected supply-demand
  - Complexity – Number of partners and permits
  - Flexibility – Response to changes in planning assumptions (climate, population, etc.)
- **Environmental Impacts**
  - Number of significant and unavoidable adverse environmental impacts



# Comparison of Opportunities

Opportunity	Supply/(Demand) Acre feet/year	Effective Date (Year)	Cost (\$/AF)
Conservation Program 3	(3,400)	2025	\$900/2,500
Russian River – North Marin Pipeline	1,000	2011	\$1,600
Russian River – SCWA Improvements	3,300+	2015	\$1,200
Desalination – 5 MGD	3,300+	2014	\$3,500
Desalination – 1 MGD	1,000	2013	\$3,600
Reservoir Operations	1,000	2010	\$400
Regional Desalination	3,300+	2019	\$5,400
Conservation – 1300	(1,300)	2025	\$900/2,500*
Peacock Gap Recycled Water	(300)	2010	\$3,000
Recycled Water – 21 Phases	(1,000)	2020	\$6,200

# Comparison of Opportunities

Opportunity	Performance Certainty	Partnership Complexity	Regulatory Complexity	Flexibility
Conservation Program 3	Medium	High	Low	High->Med
Russian River – North Marin Pipeline	Medium	Medium	Low	Medium
Russian River – SCWA Improvements	Medium	Medium	Medium	High
Desalination – 5 MGD	High	Low	High	Medium
Desalination – 1 MGD	High	Low	High	Low
Reservoir Operations	High	Low	Low	Medium
Regional Desalination	High	Medium	High	Low
Conservation – 1300	Low	High	Low	High->Low
Peacock Gap Recycled Water	High	Low	Low	Low
Recycled Water – 21 Phases	High	Medium	Medium	Medium

# Portfolios Supply/Savings

Supply/Savings in AF/yr	Maximum Diversity	Marin Pipeline	Marin & Sonoma Pipeline	All Conservation	Local Desalination
Conservation Program 3	(3,400)	(3,400)	(3,400)	(3,400)	(3,400)
Reservoir Operations	1,000	1,000	1,000		
Additional Recycling	(300)				
Desalination	1,000				3,300
Russian River	1,000	1,000	2,300		
Additional Conservation		(1,300)		(3,300)	

All Provide 6,700 AF/Yr to Balance Supply and Demand



# Proposed Portfolio

- **Water Conservation**
  - Continue with implementation of Program 3 and evaluate additional opportunities
- **Recycled Water**
  - Design the Peacock Gap project and solicit federal and state funding to support the project
- **Reservoir Operations**
  - Proceed immediately with environmental review, design and construction of the three elements
- **Russian River**
  - Continue to work with North Marin Water District to develop an agreement with TAM and CalTrans to replace and upsize the North Marin Aqueduct
- **Desalination**
  - Prepare for approval the 5MGD project, issue a Notice of Determination and associated documents, and proceed with additional environmental analysis, permitting and partnerships with CMSA and the Marin Rod and Gun Club



# Proposal Timeline

