

Regional Water Reuse Program

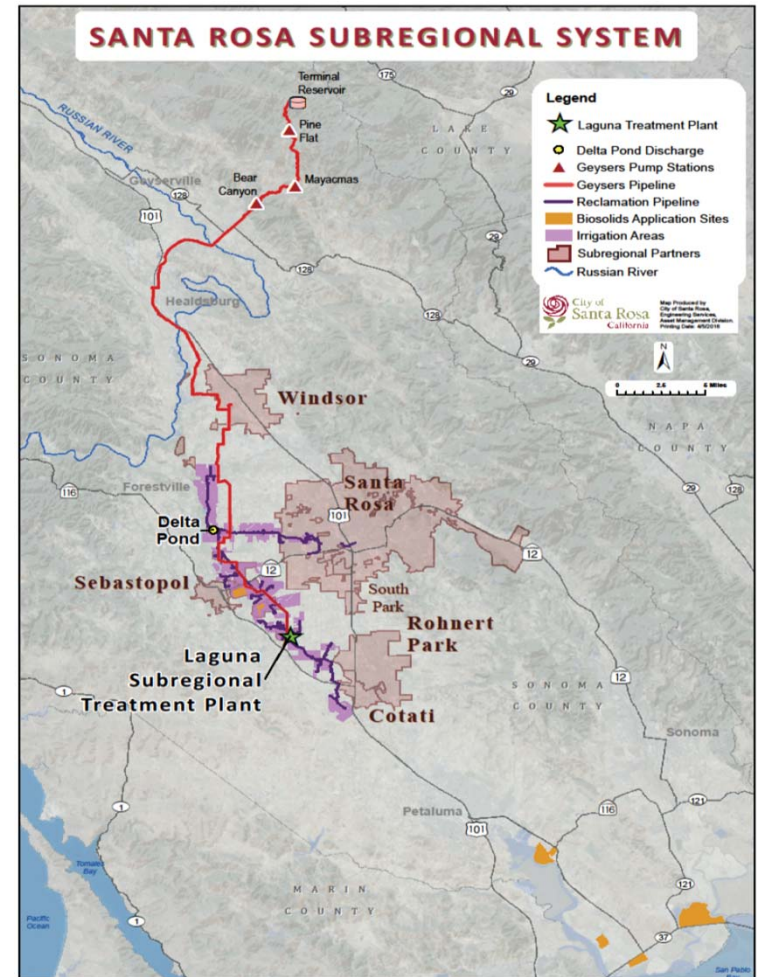
Board of Public Utilities
August 6, 2020

Joe Schwall | Deputy Director
Regional Water Reuse Operations
and
Dave Smith
Merritt Smith Consulting



Agenda

- Reuse Program Overview
- History/Background
 - Reuse and Discharge
 - Regulatory Pressures
- Geysers Project
- Current Program
- Operational Considerations
- Future Opportunities



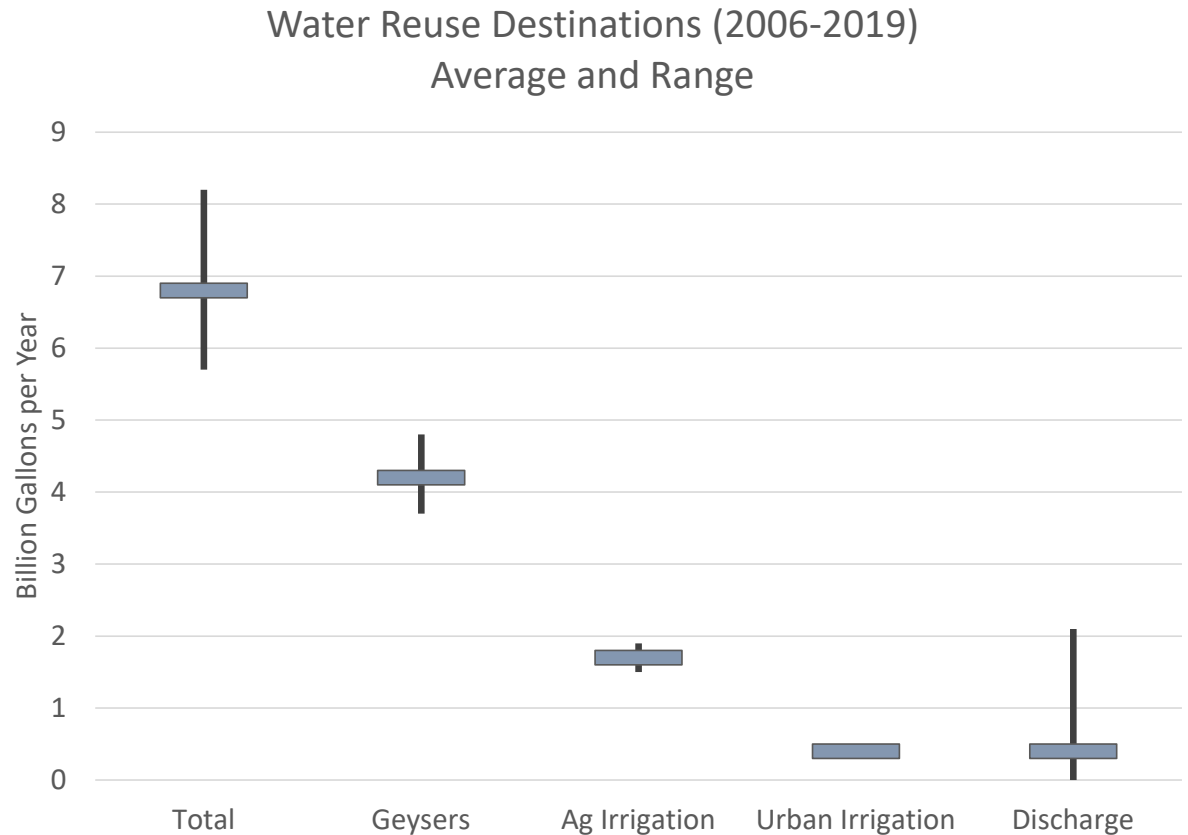
Today's Reuse Program



- **Geysers Steam Field Recharge Project**
 - Year-round Re-use Option
 - Renewable Electricity Generation
- **Agricultural Irrigation**
 - 6,400 acres Irrigated
 - Pasture, Hay, Grapes, Vegetables
 - Supports Local Agriculture
- **Urban Irrigation**
 - 700 acres
 - Preserves Potable Water
- **Discharge to Creeks/River**
 - Winter-only Option
 - Used As-needed

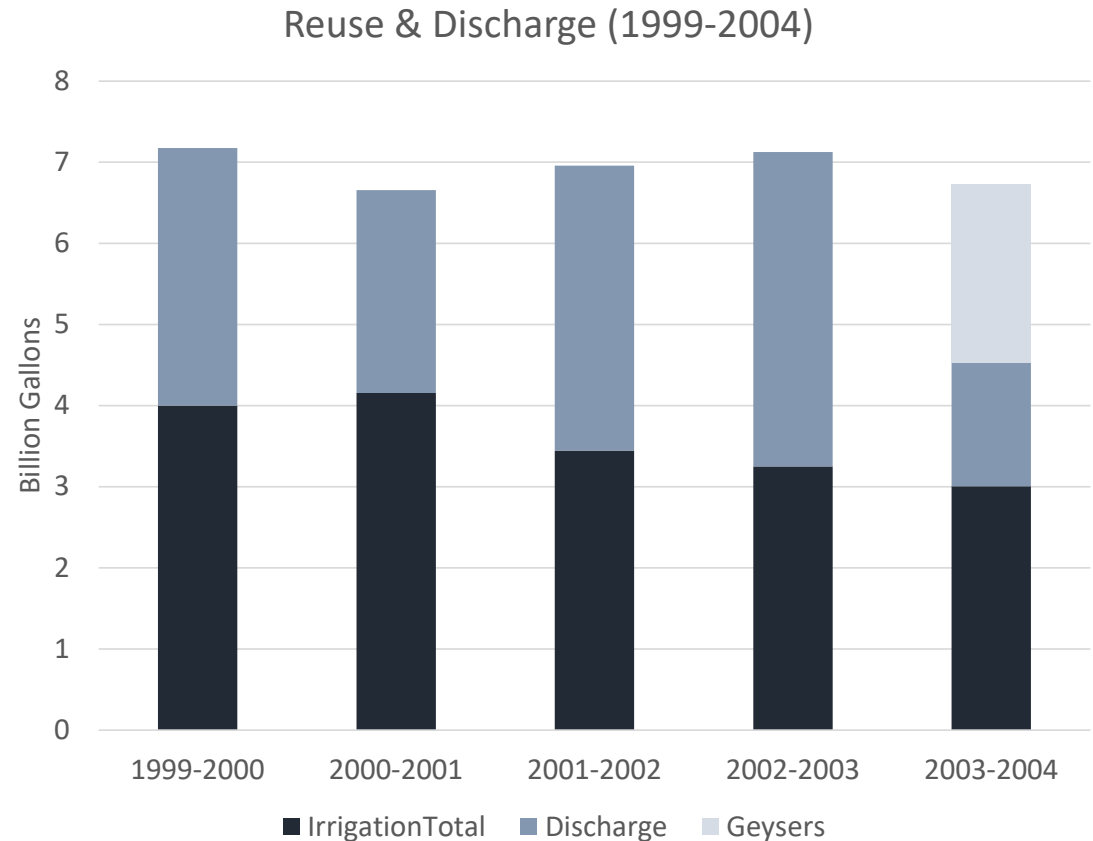
Today's Reuse Program

- **5.7-8.2 Billion Gallons**
Received and Treated
- **3.7-4.8 Billion Gallons**
to Calpine Geysers Steam Fields
- **1.5-1.8 Billion Gallons**
to Agricultural Irrigation Customers
- **0.4 Billion Gallons**
to Urban Irrigation Customers
(Rohnert Park, SSU, Santa Rosa)
- **0-2.1 Billion Gallons**
Discharged, if Necessary



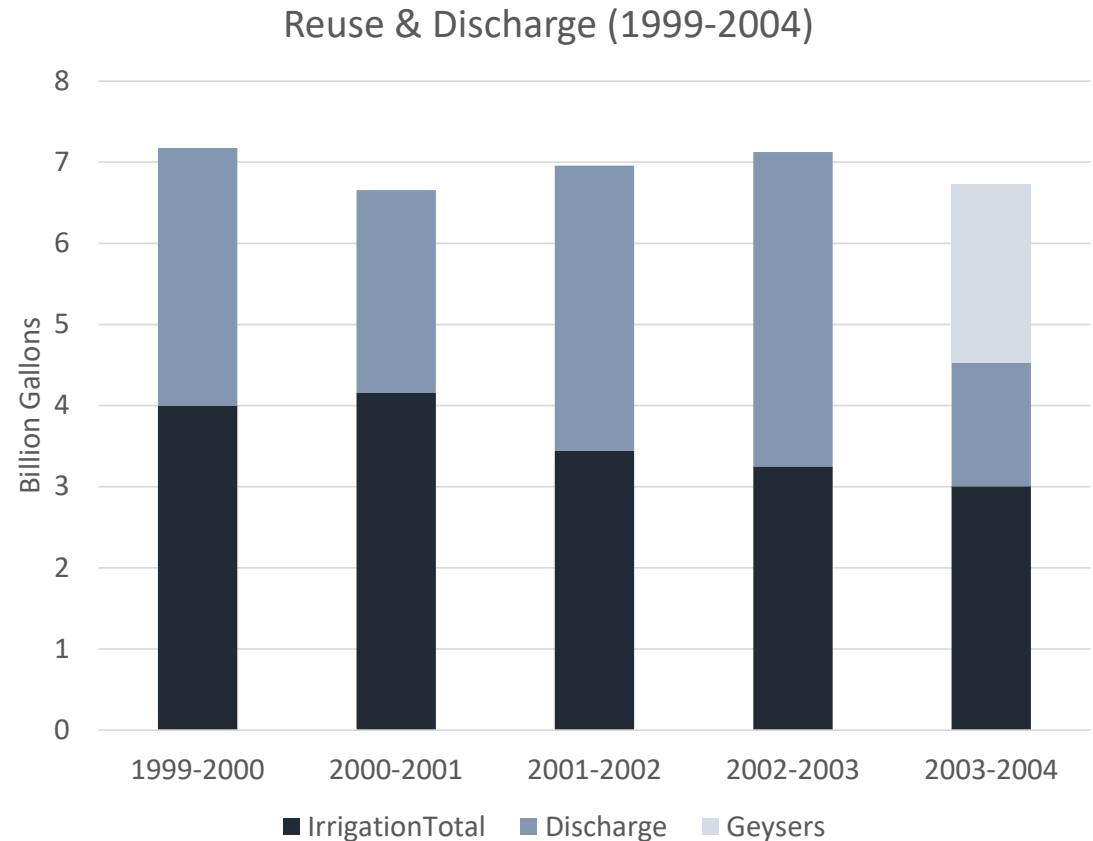
History (Overview)

- 1968 | LTP On-line
- 70's | Summer Discharge Prohibited
- 70's - 90's | Irrigation Program Develops
 - Pipelines
 - Ponds
 - Pump Stations
- 1985/86 | Unauthorized Discharge
- 80's-90's | Search for Long-term Solution to Minimize Discharge



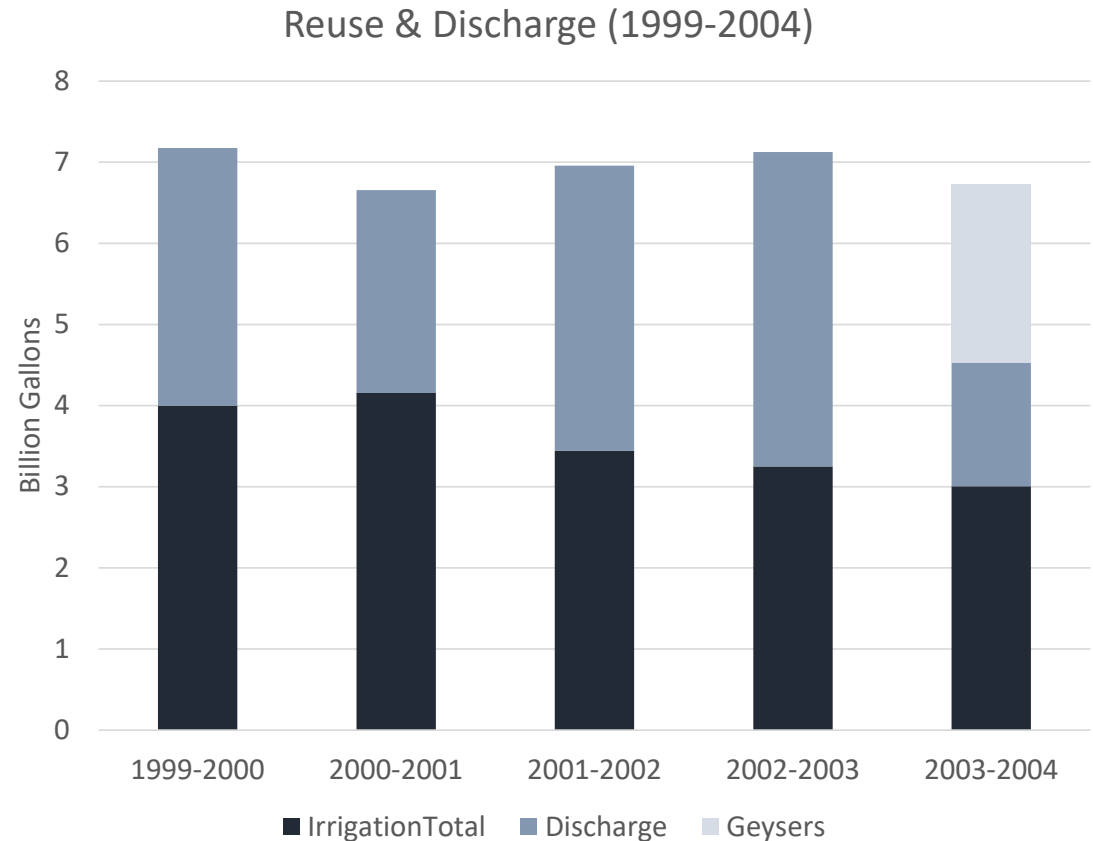
History (Pre-2004)

- Winter Mode
Discharge to Receiving Waters
 - Increasing Water Quality Limits Restricted Discharge Flow and Compliance Reliability
 - Storage could not Contain Winter Flows
- Summer Mode
Emphasis on Ag Irrigation with Incentives for Accepting Water



History (Cost of Discharge)

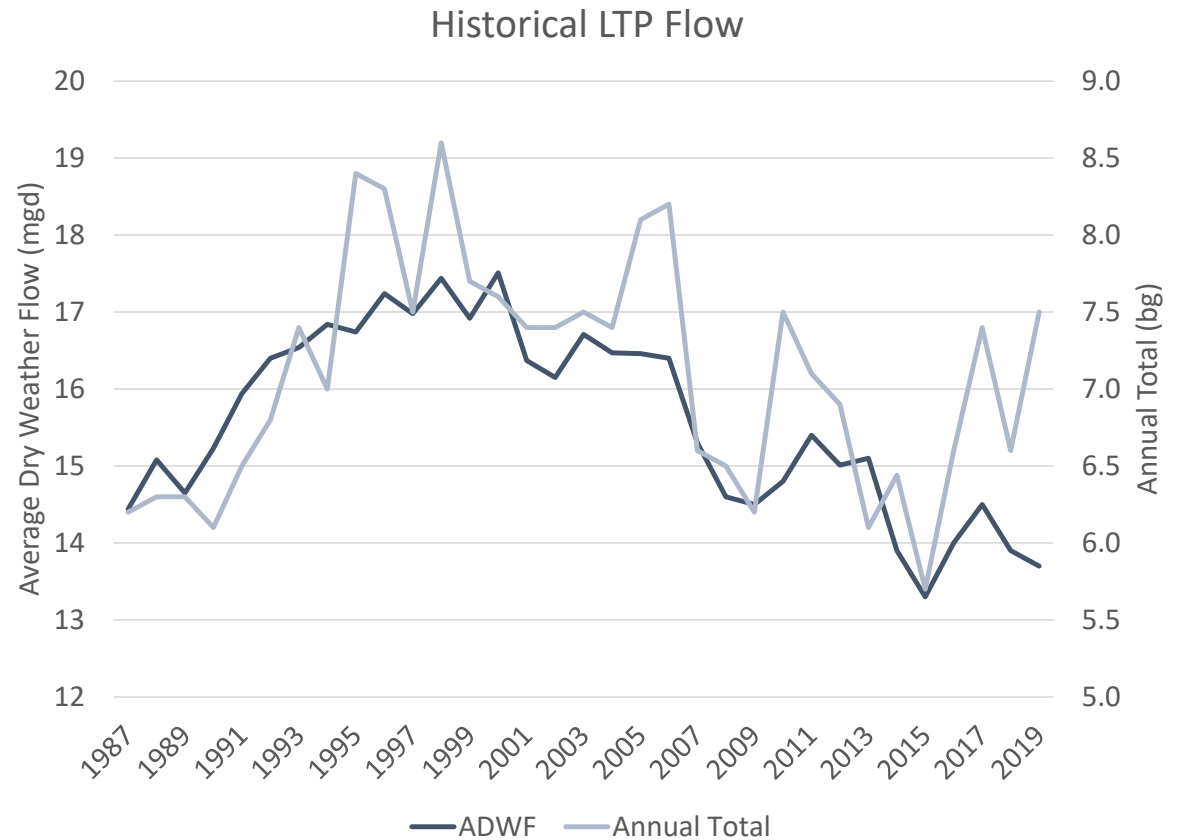
- Unit Costs
\$50/Phosphorus Credit
~\$60,000 Lab Labor
- Without Geysers
\$3.75M/yr
- With Geysers
\$326k/yr
 - \$0 – \$2.1M



History (LTP Flows)

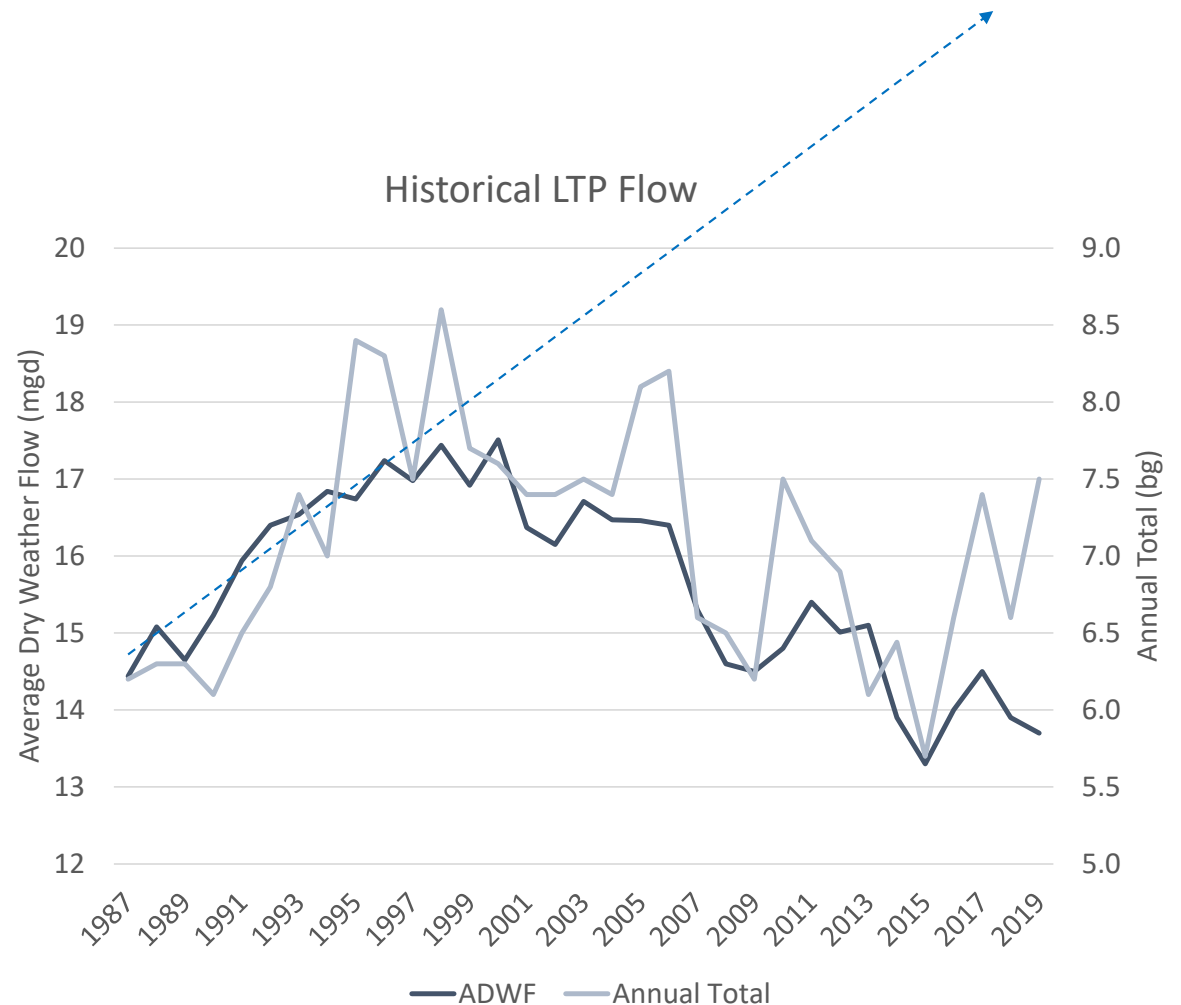
City Recognized Need to Reduce/Eliminate Discharge

- City Building Moratorium
- 1980's & 1990's LTP Flows were Increasing
- Major Planning Effort for Long-term Solution



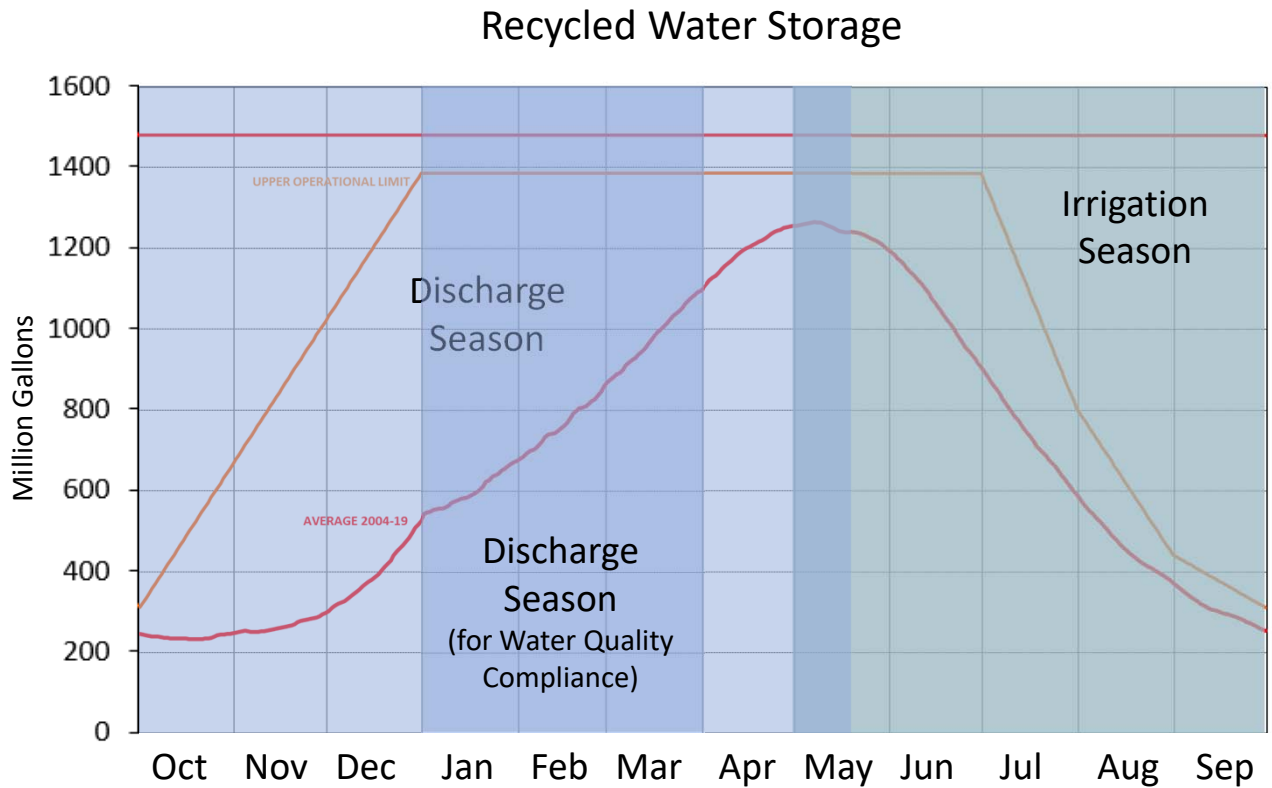
History (LTP Flows)

- “Average Dry Weather Flow” measures flow contributed by people
- “Annual Total” is influenced by weather
- In the 90’s, 25 mgd Average Dry Weather Flow was Expected by 2019



History (Regulatory Pressure)

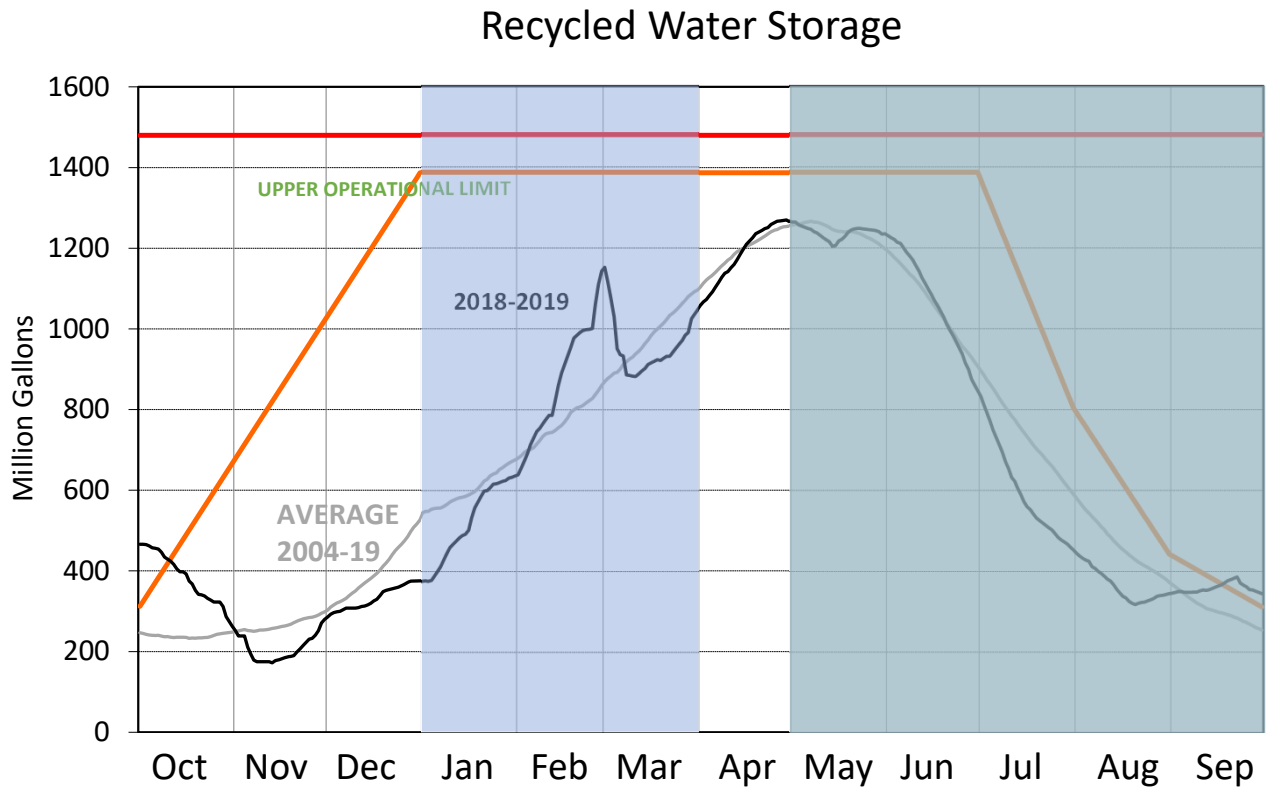
- Large Discharge Volumes became Less Manageable with Increasing Regulatory Pressure
 - Phosphorus
 - Nitrogen
 - Dissolved Oxygen, Turbidity, Temp, Flow
- Effective Discharge Window is Jan – Mar



History (Regulatory Pressure)

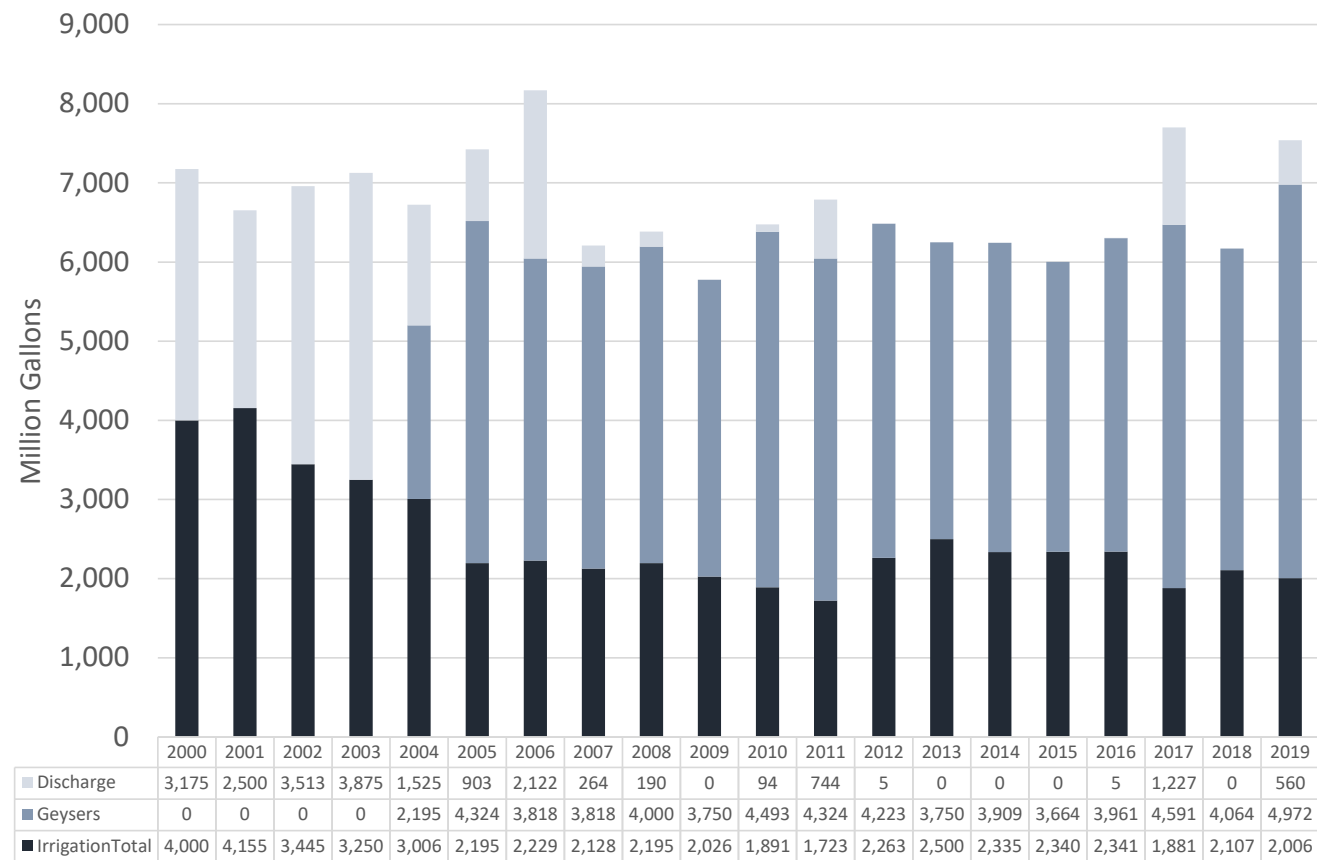
Example | Feb 2019 Storm

- Discharge
Late Feb – Early March
- Volume/Timing of Discharge is Dictated by Unknown Future Weather



History (Reuse of Water)

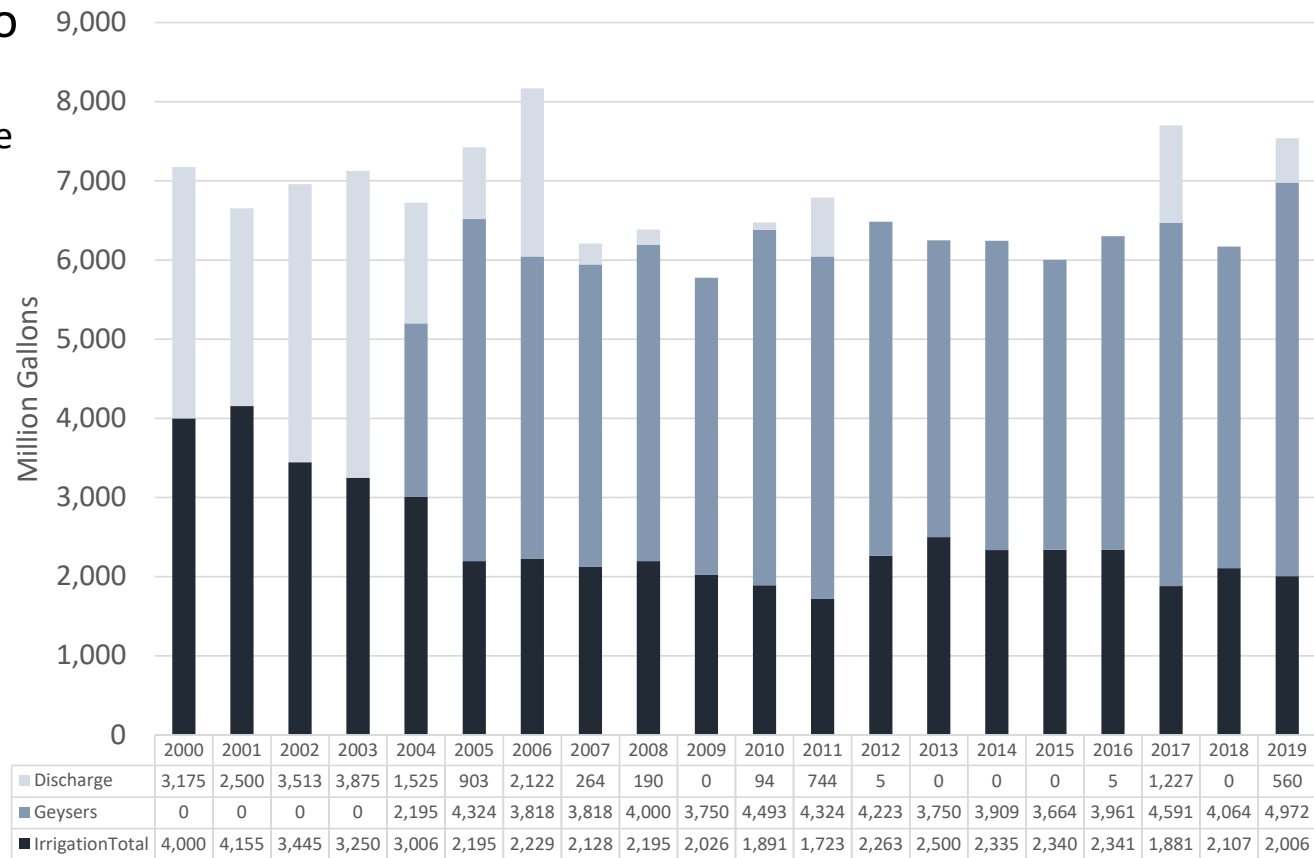
- Discharges Decreased when Geysers came online, along with Ag Irrigation
- All Recycled Water was Reused in Drier-than-normal years



Water Year Ending September of Year Shown

Summary of Key System Features

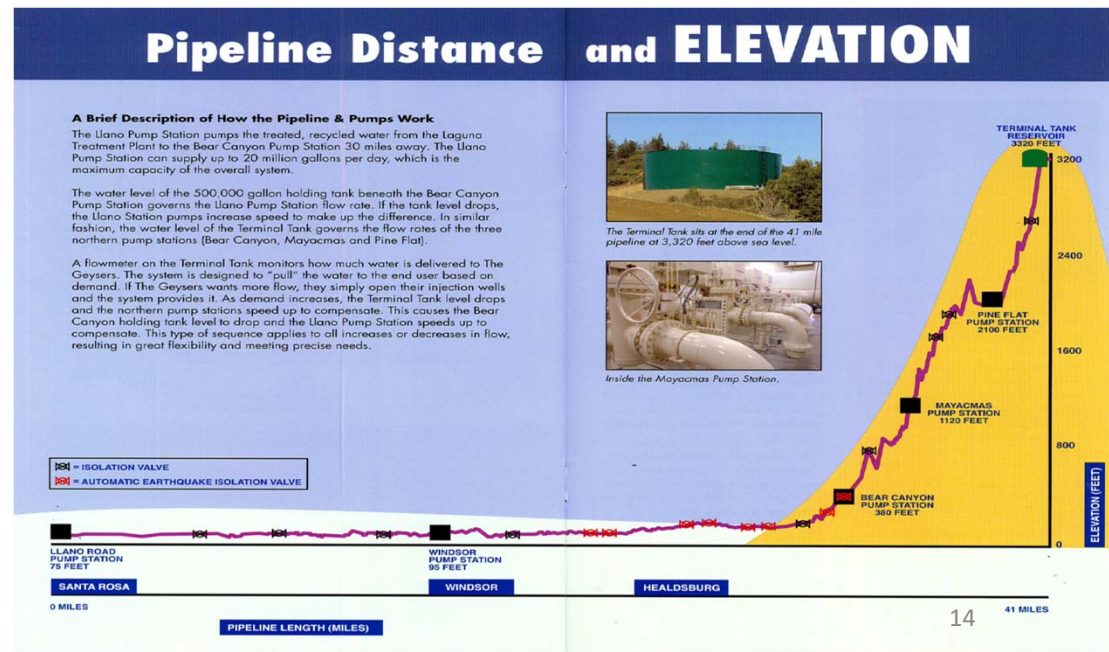
- Geysers Project Designed to
 - Reduce Discharge
 - Optimize use of Existing Storage
 - Retain Local Reuse
 - Be Cost-effective for City and Steam Field Operator
- Discharge needed in Wet years to avoid Very Large Additional Storage Cost
- Additional Storage would not be Used in Half the Years



Water Year Ending September of Year Shown

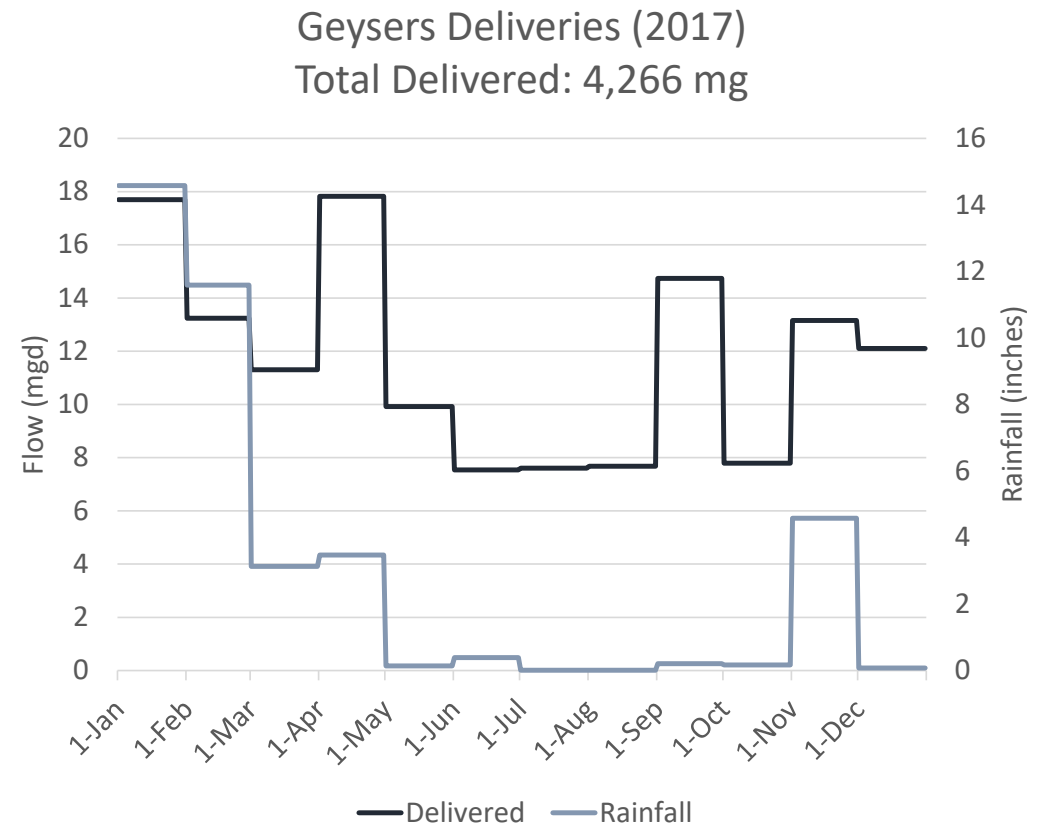
Geysers Recharge Project

- Public-Private Partnership with Calpine (and Predecessor Unocal)
- \$220M Investment by Subregional Partners
 - 4 Major Pump Stations, 41 Miles of Pipeline, 2 Reservoirs
- \$17M Annual Debt Service by SR
- Nearly \$85M Initial Investment by Calpine (+ ongoing invest.)
- Provides Water to Previously Declining Steam Fields
- > 100 MW Renewable Electricity Generation (for programs like Evergreen)
 - 1 MW = 1,000 households



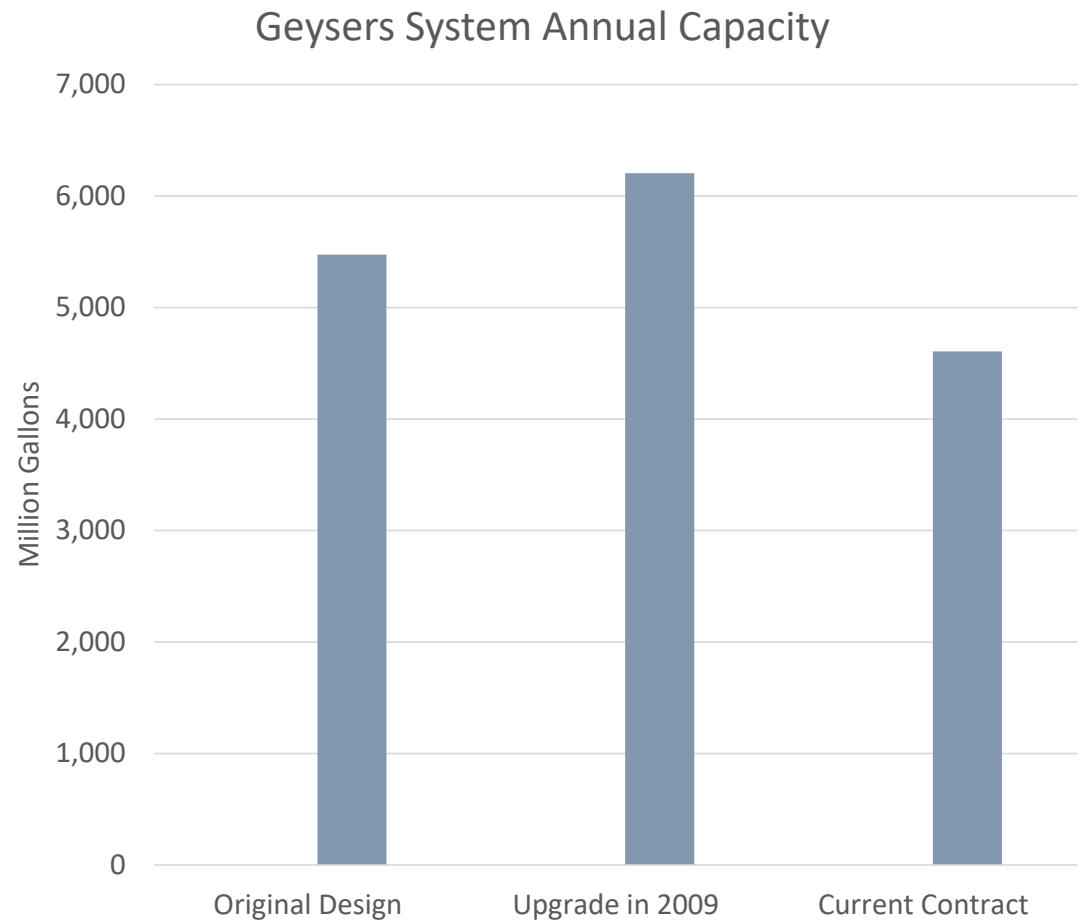
Geysers Recharge Project (Agreement)

- Term | 1998-2037
 - Amended in 2004 & 2007
- Joint Operations Committee
- Annual Delivery | 4,607 MG (2007)
 - Can be Reduced by Mutual Agreement for Maintenance Shutdowns or *Force Majeure*
 - eg: Valley, Tubbs, Kincade Fires
- Penalties for Under-Performance
 - < 90% of contract = \$360k, up to \$1.2M



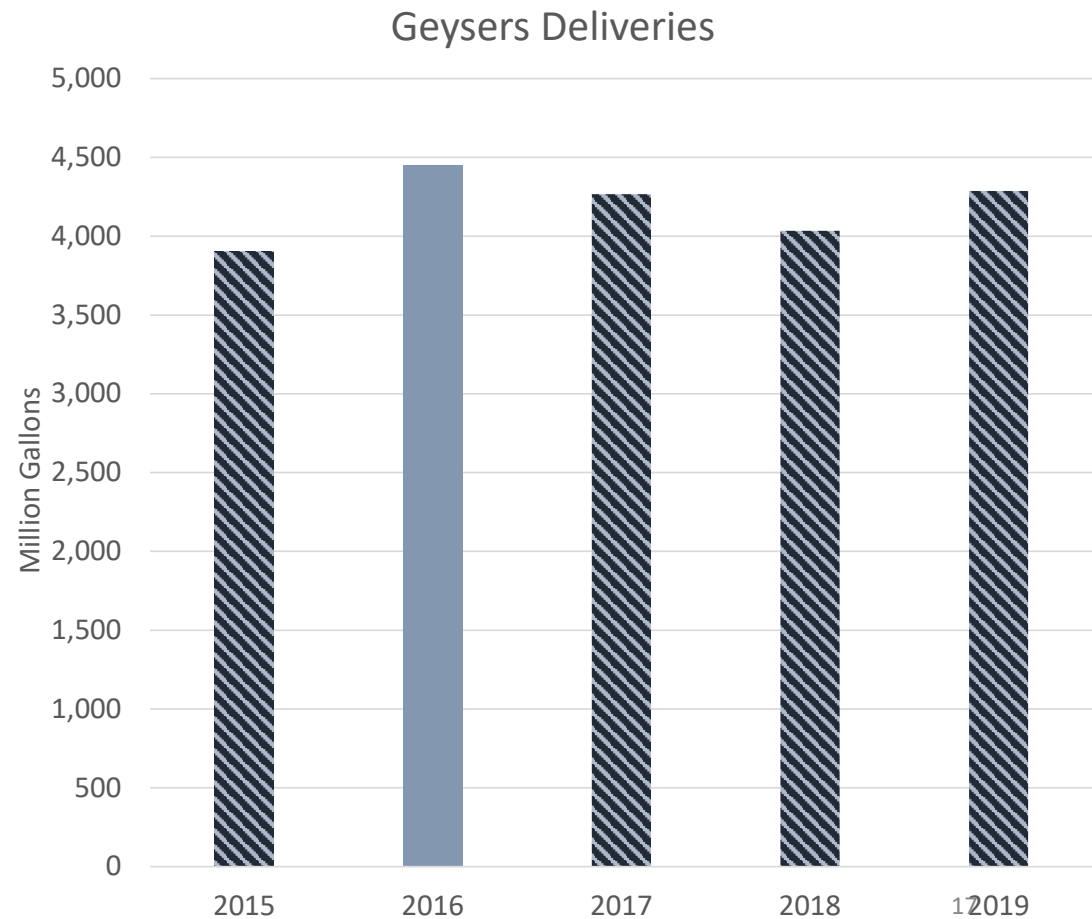
Geysers Recharge Project (Agreement)

- **System Capacity**
 - Original design flow = 5,475 mg
 - Pump upgrade in 2009 = 6,205 mg
 - Current contract = 4,607 mg
- **City Pays for Power at 1st Pump Station (on Llano Road)**
 - \$650k/year
- **Calpine Provides Power for Remaining 3 Pump Stations**
 - Estimated >\$5M/year Value
- **Calpine Reimburses City \$300k/year 2008-2022 in lieu of Letter of Credit (2007 Amendment)**



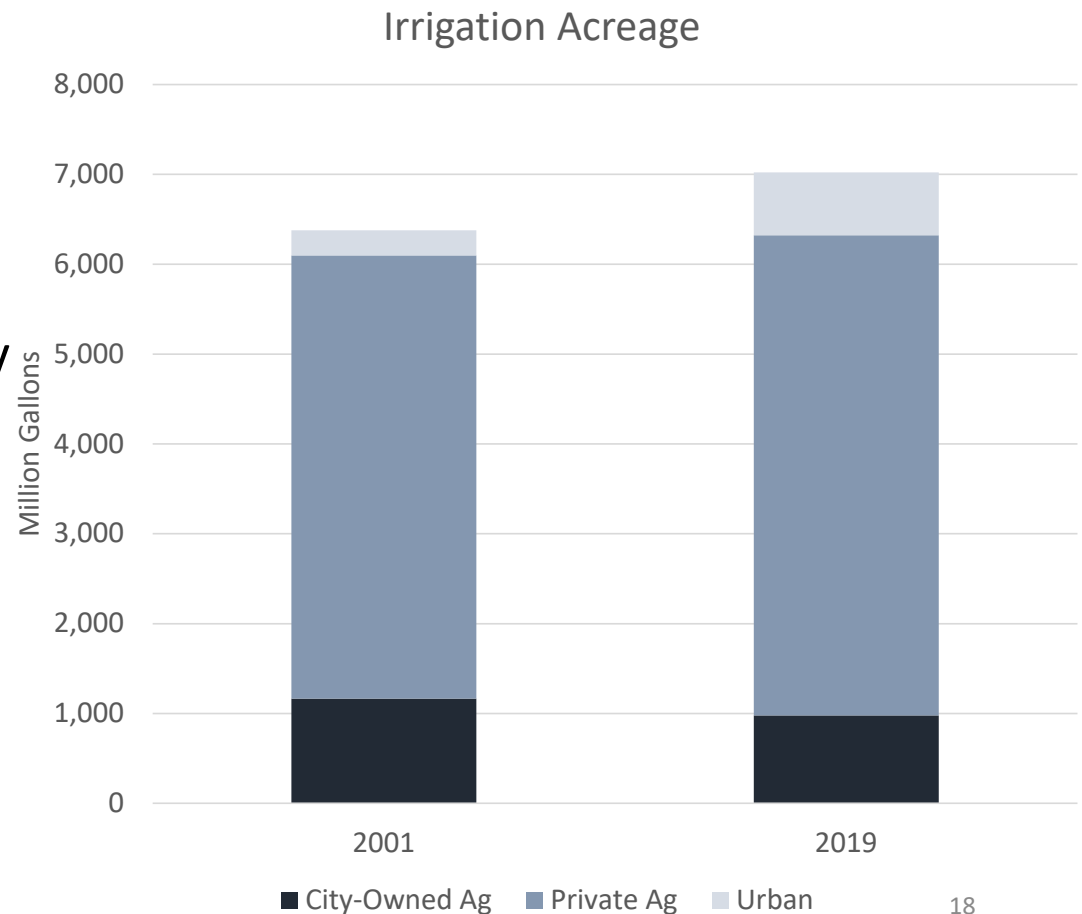
Geysers Recharge Project (Operations)

- Annual Flow Pattern
 - Winter | High delivery to manage storage to obviate discharge
 - Spring | Begin reducing flows as threat of discharge wanes
 - Summer | Low flow
 - Fall | Increase flow as plant flow picks up to keep storage volumes low
- Target ~93% of Contract
- Assume Dry Nov/Dec to Meet Delivery Requirement
- 2-week Maintenance Shut-down in Summer



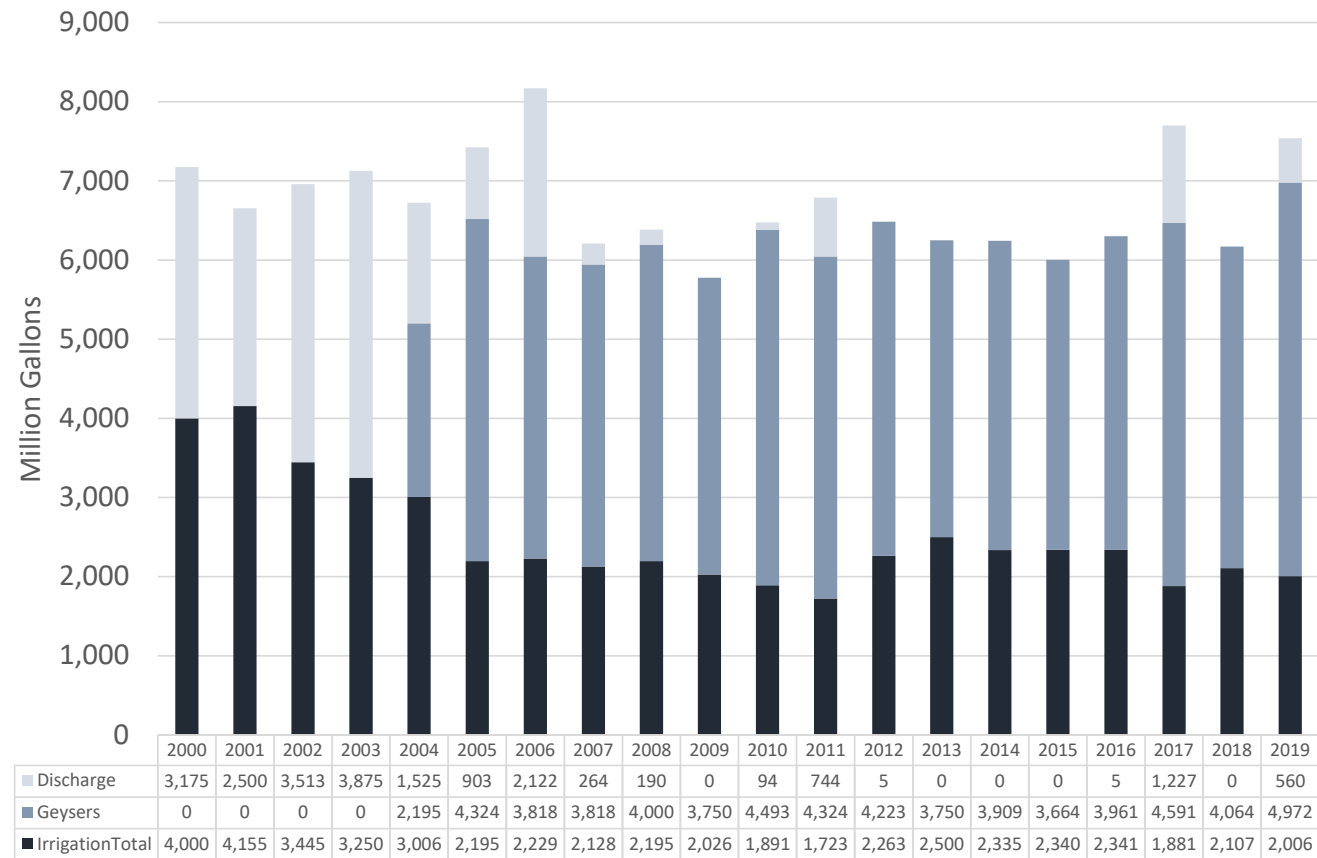
Irrigation Program (Agricultural and Urban)

- Water used for Pasture, Hay/Silage, Vineyards, Vegetables, Landscaping (Homes, Schools, Parks, Golf Courses)
- Heaviest Use | May – Sept
- Agricultural | Interruptible Supply
- Urban | Un-interruptible Supply
- Agricultural Acreage has been Steady, but some Farmers have Shifted to Vineyards
 - Vineyards use < 1/3 the Water of Pasture



Irrigation Program (Agricultural and Urban)

- Pre-Geysers Irrigation
3,250 to 4,155 mg/yr
- Post-Geysers Irrigation
1,725 – 2,500 mg/yr
- Various Water needs of Ag Users are Difficult to Manage in Dry years
- Guaranteed Supply Reduces Operational Flexibility and Increases Costs



Water Year Ending September of Year Shown

Irrigation Program (Agricultural)

2019 Development of New Ag Irrigation Agreement

- Extensive Discussion with Ag Representatives
- Mutually Beneficial
- Long-term | 12 years
- Fee structure
 - Interruptible Supply
 - Ramp to \$50/acre-ft by 2024
 - Other Local Rates | \$150-\$862/ac-ft
 - City Provides Electricity
 - > \$900k/year
 - City Provides Vector Monitoring
 - City Provides some Irrigation Equipment
 - \$30-\$40k/yr
- Fee Structure Incorporates Value of Flexibility to City Operations



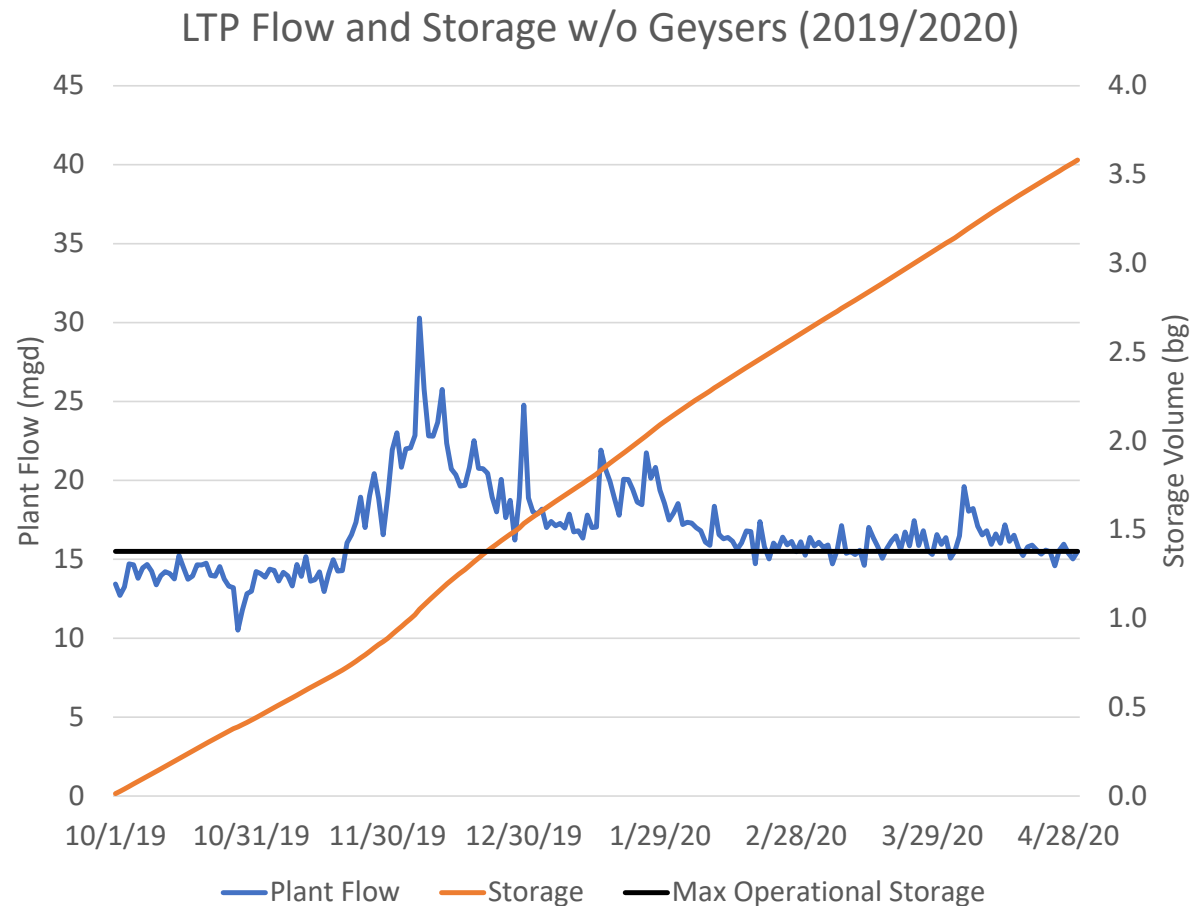
Irrigation Program (Urban)

- Wholesale to Rohnert Park
 - RP Retail to SSU, Golf Courses, Business Parks
 - 340 mg (up to 450 mg)
 - \$297/ac-ft
 - Un-interruptible
- Santa Rosa Retail
 - City Parks, Business Parks, Residential Common Areas
 - 47 mg/yr
 - \$1,825/ac-ft
 - ~ 8% Discount Compared to Potable Water
 - Un-interruptible
- Annual Site Supervisor Training



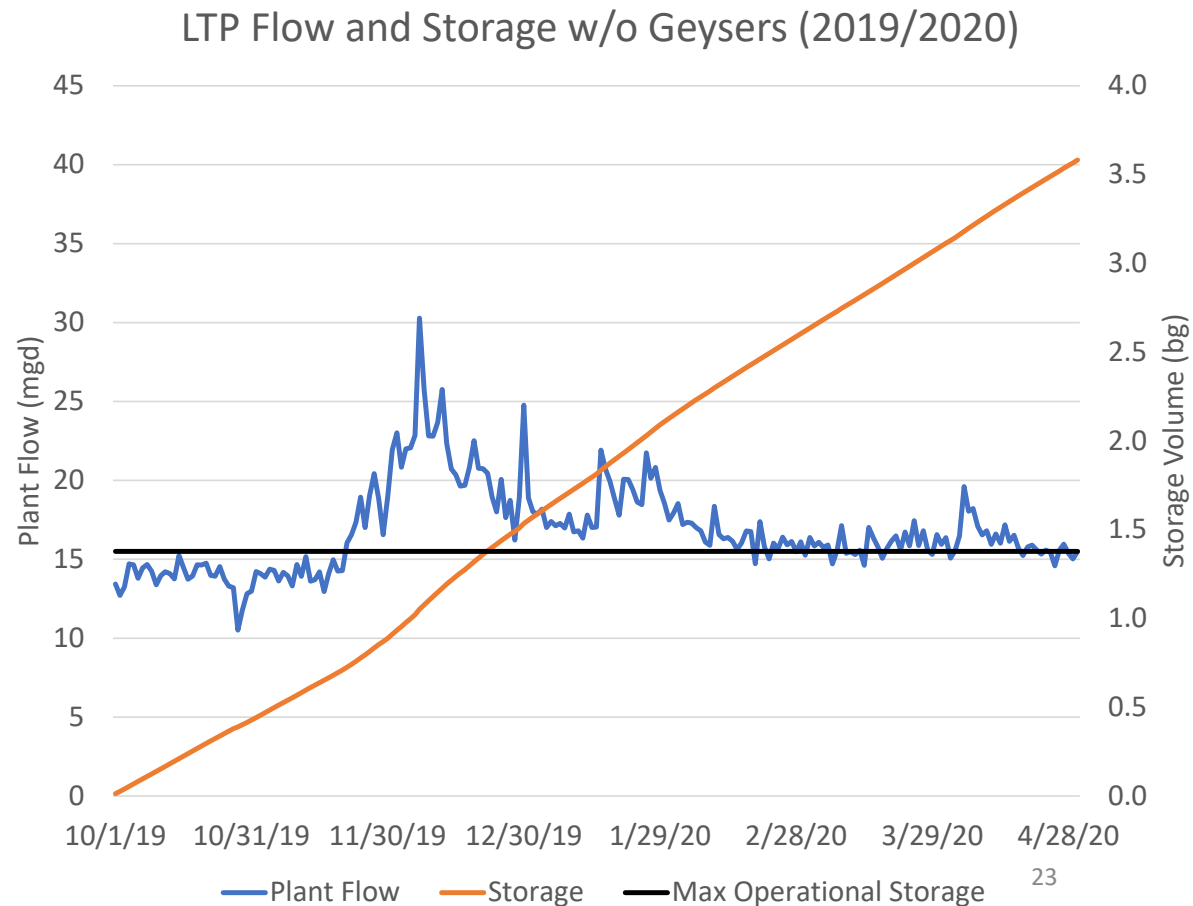
Operational Considerations

- Storage Capacity
1.4 Billion Gallons
(20% of Annual Flow)
- Most Flow Dec – Mar
- Storage is not Sufficient to Prevent Winter Discharge
- After Study, BPU Decided not to Pursue Additional Storage
 - Storage would not be used in many years
 - BPU decision to not pursue additional storage in 2008
- More Storage would not help in Dry years



Operational Considerations

- Last Winter, we would have Filled Storage (and Discharged) in Late December w/o Geysers
 - Unpredictable weather and short discharge window of opportunity lead to increased discharge
 - Likely would have over-discharged in 2020, expecting continuing rain
- Each Wet Season has Similar Planning Challenges

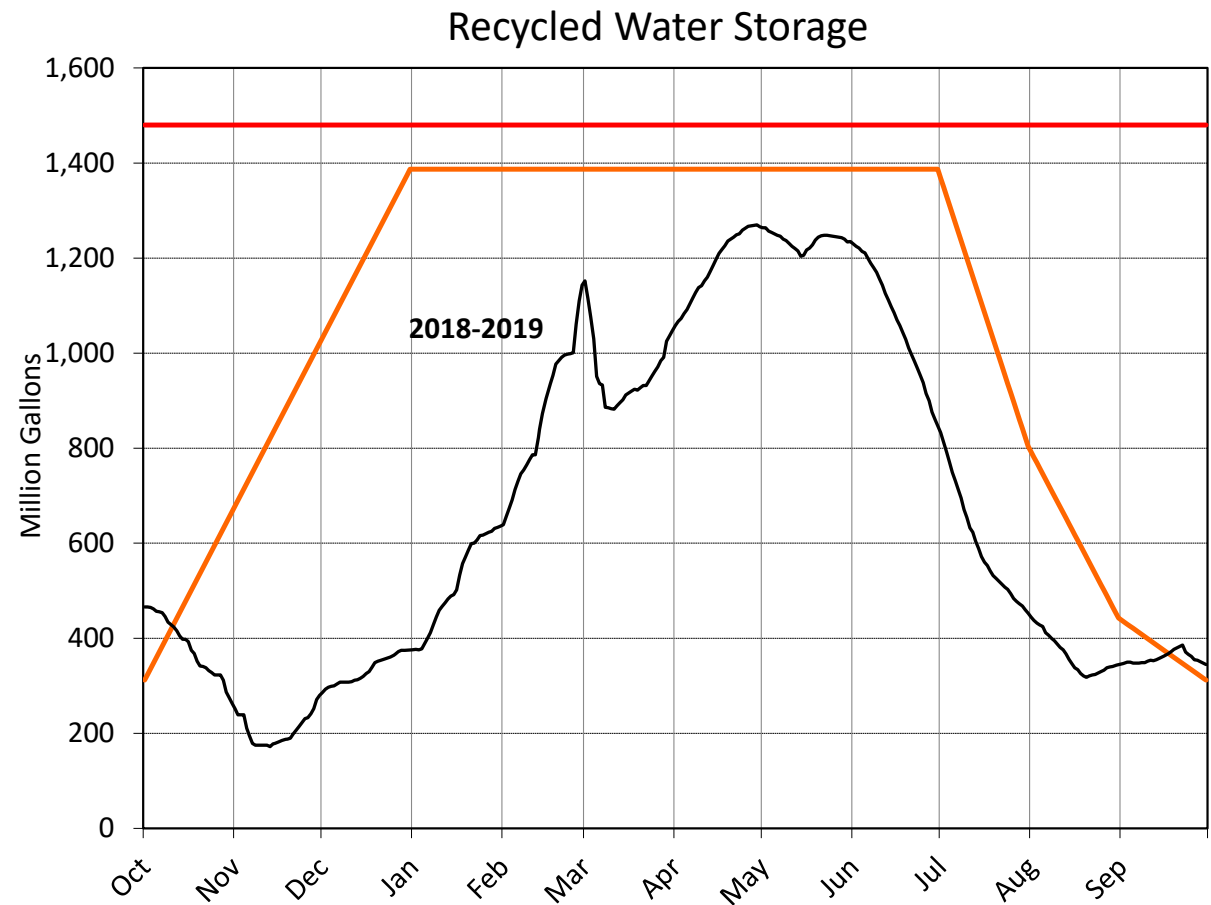


Operational Considerations

2018-2019

Storage Volume Increase
Overcame Ability to
Manage with Geysers
Delivery Alone and
Discharge was Required

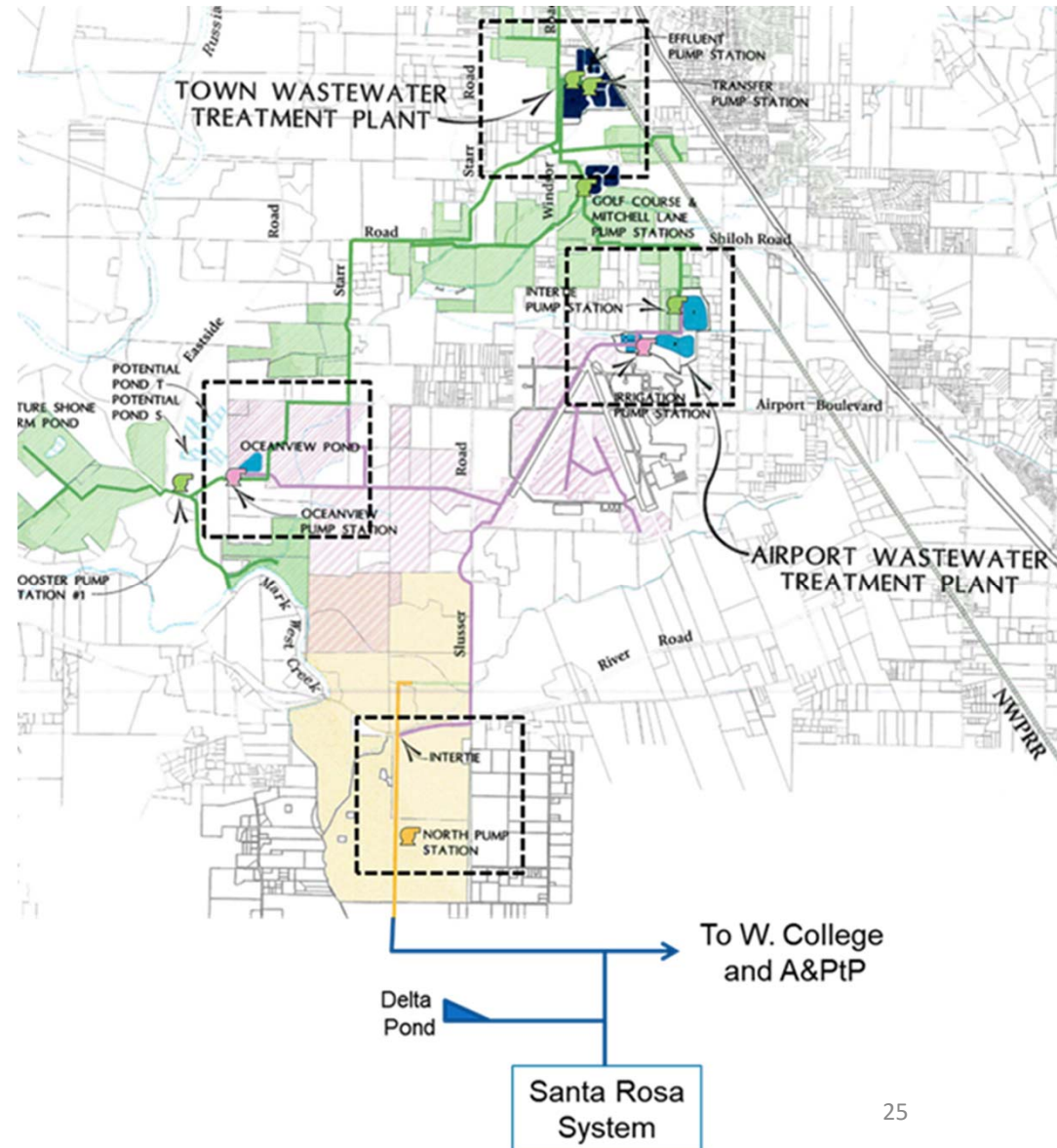
- How much to discharge?
- How much will it rain in March?
- How wet/dry will the spring be after discharge season is effectively over?



Future Regional Opportunities

Sonoma Water

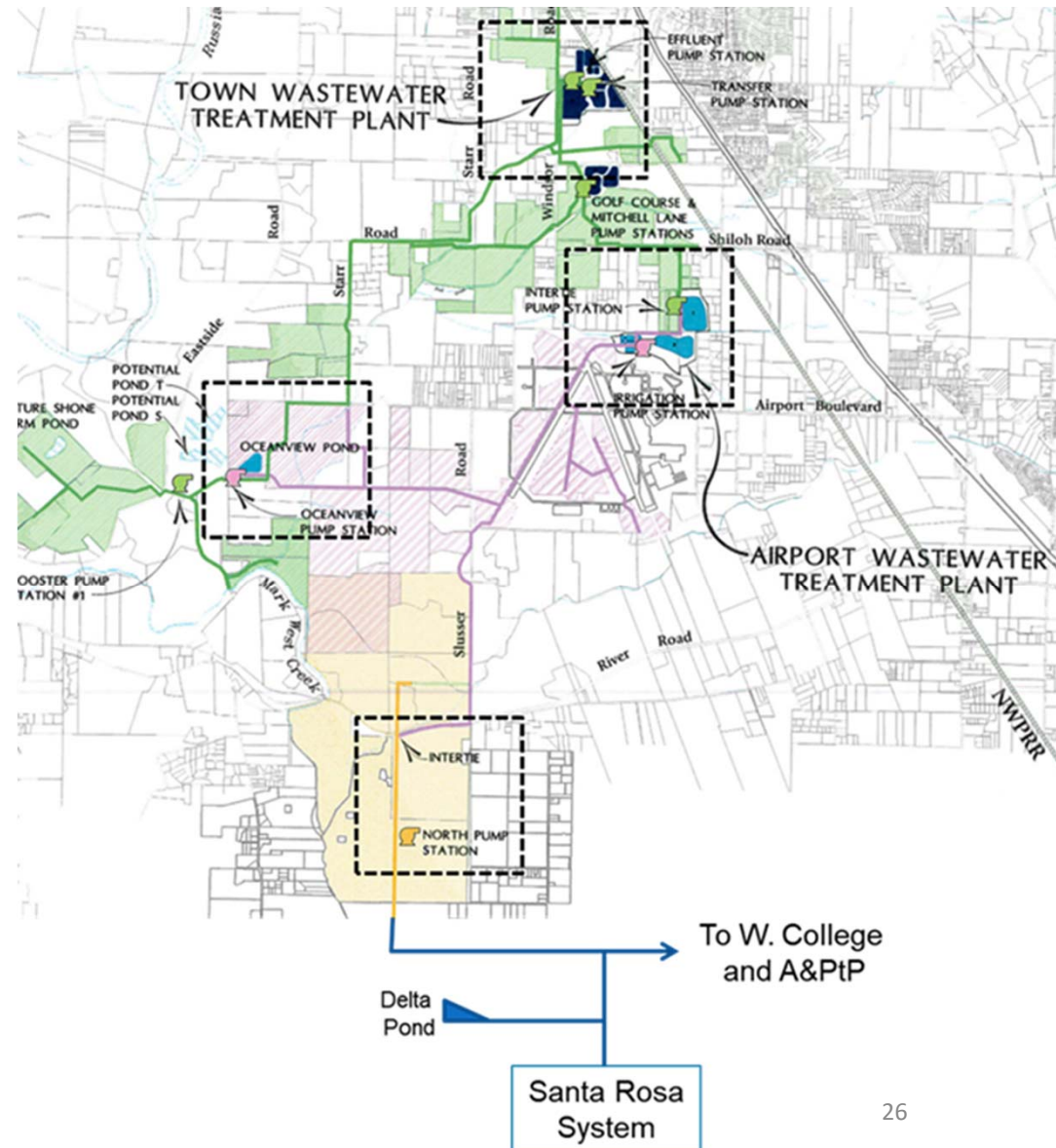
- Airport Plant is Non-discharge
 - Looking for Reuse Customers Some years
 - Existing Reclaimed Water Inter-tie with SRWater
- Optimize Sonoma Water's Storage?
- Partner w/ Windsor?
- Regulatory Constraints?



Future Regional Opportunities

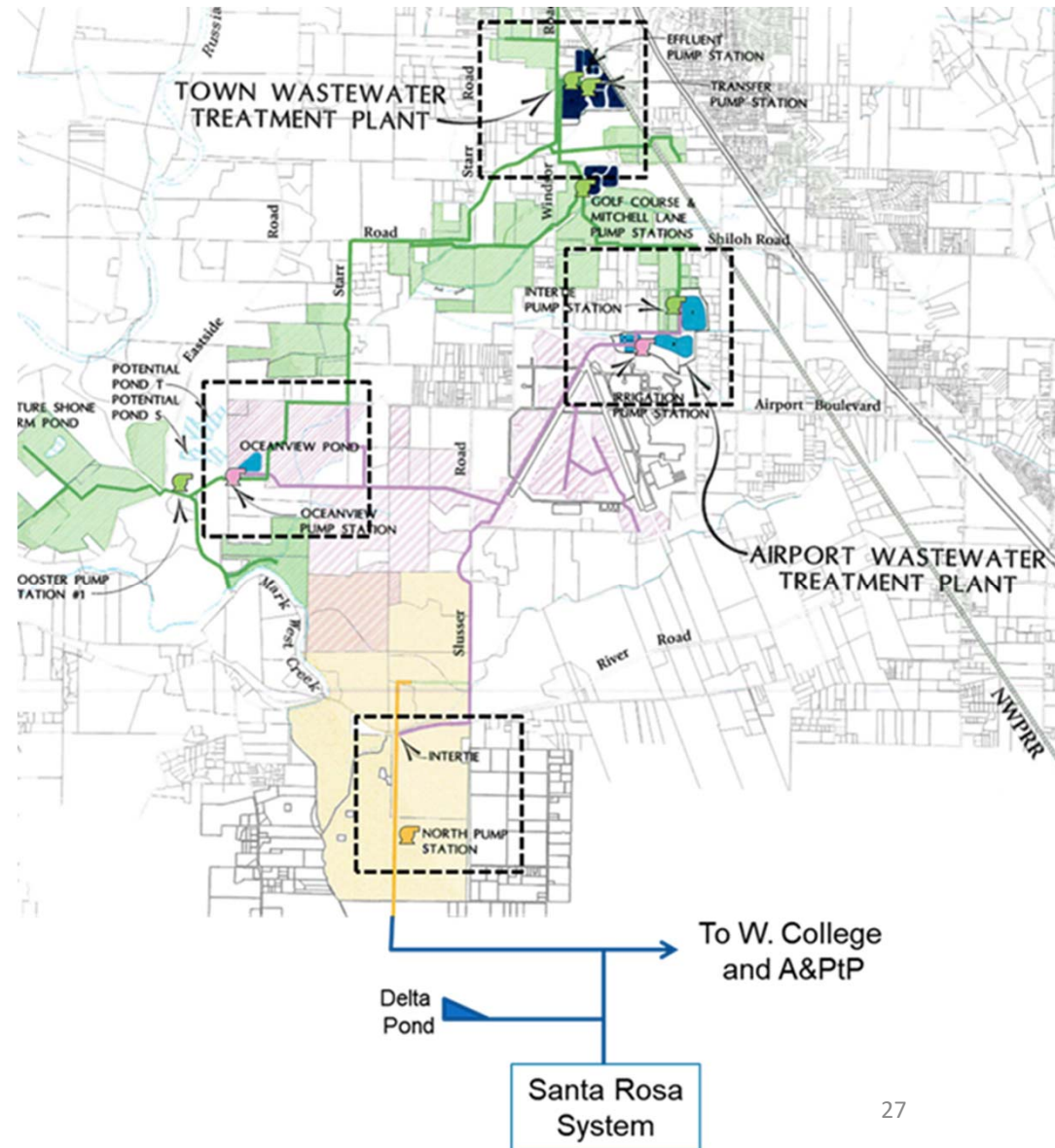
Town of Windsor

- Uses Geysers Pipeline
 - 193 mg/year (456 mg/yr future max)
 - \$913k in 2020 (flat fee, increases annually)
 - \$1,540/ac-ft
- Storage-Constrained Partner w/ Sonoma Water?
- Wheel water through Sonoma Water to Santa Rosa?
- Increase flow to Geysers?



Future Regional Opportunities

- Previous Studies of Potential for Regional Coordination in 2005 & 2017
- Talks have Renewed to help Understand Needs/Constraints



Summary

Four Key Components to Regional Reuse Program

- Geysers
 - Year-round, produces green power, reduces need for discharge, provides operational flexibility
- Agricultural Irrigation
 - Seasonal, supports local agriculture, offsets groundwater use, provides operational flexibility
- Urban Irrigation
 - Seasonal, offsets potable water use
- Discharge
 - Seasonal, greatly reduced but not eliminated

Continued Evaluation of Regional Opportunities



Questions/ Discussion

Four Key Components to Regional Reuse Program

- Geysers
 - Year-round, produces green power, reduces need for discharge, provides operational flexibility
- Agricultural Irrigation
 - Seasonal, supports local agriculture, offsets groundwater use, provides operational flexibility
- Urban Irrigation
 - Seasonal, offsets potable water use
- Discharge
 - Seasonal, greatly reduced but not eliminated

Continued Evaluation of Regional Opportunities

