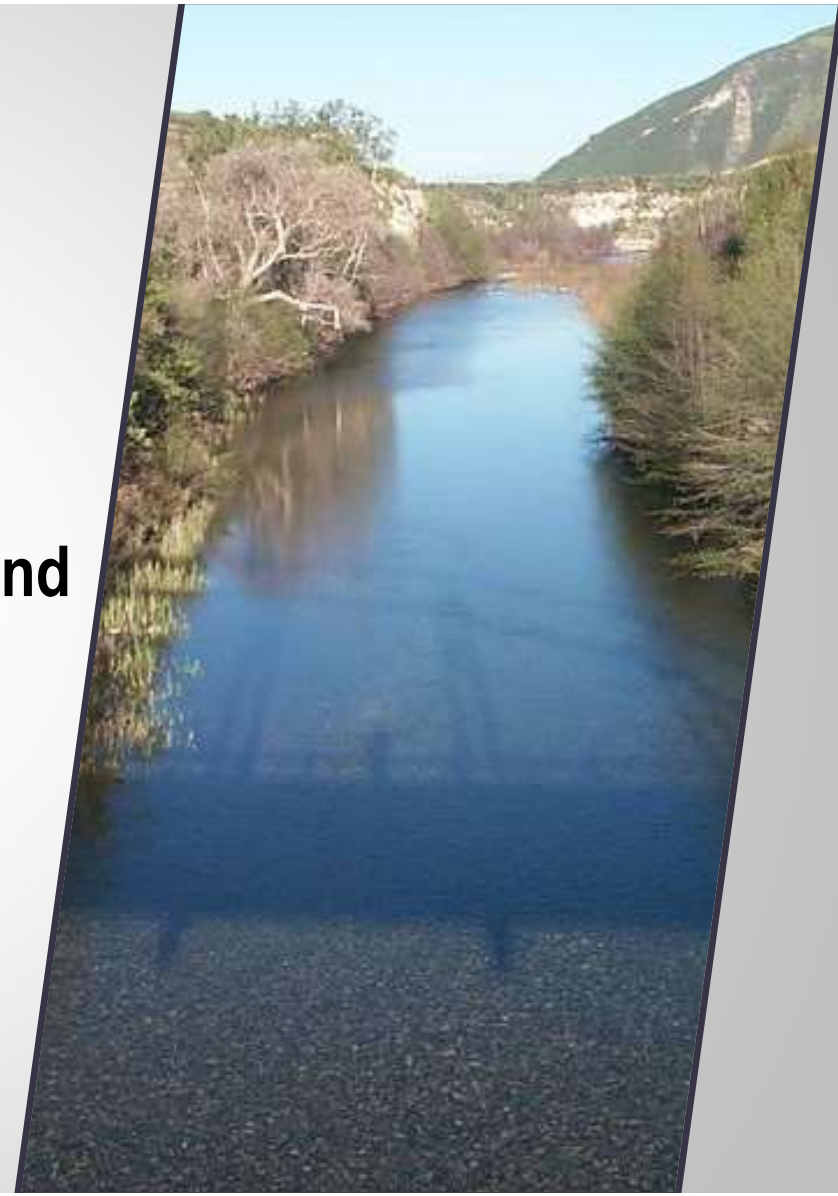
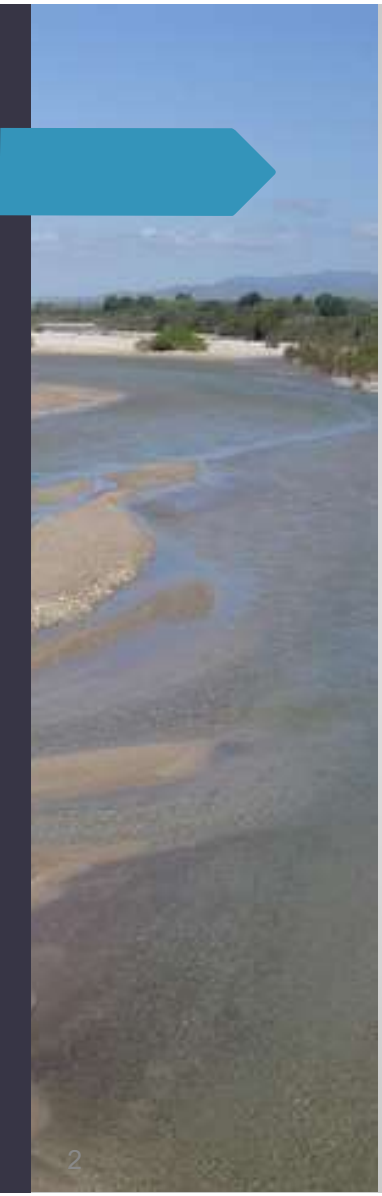
Salinas Valley Basin GSA

Projects & Management Actions and Allocation Options

Presented to Forebay Area
Subbasin Committee
March 3, 2021

MONTGOMERY & ASSOCIATES





Outline

- SMC Update
- Projects and Management Actions
  - Potential Projects and Management Actions
  - Allocation Options
  - Discussion

SMC – Update

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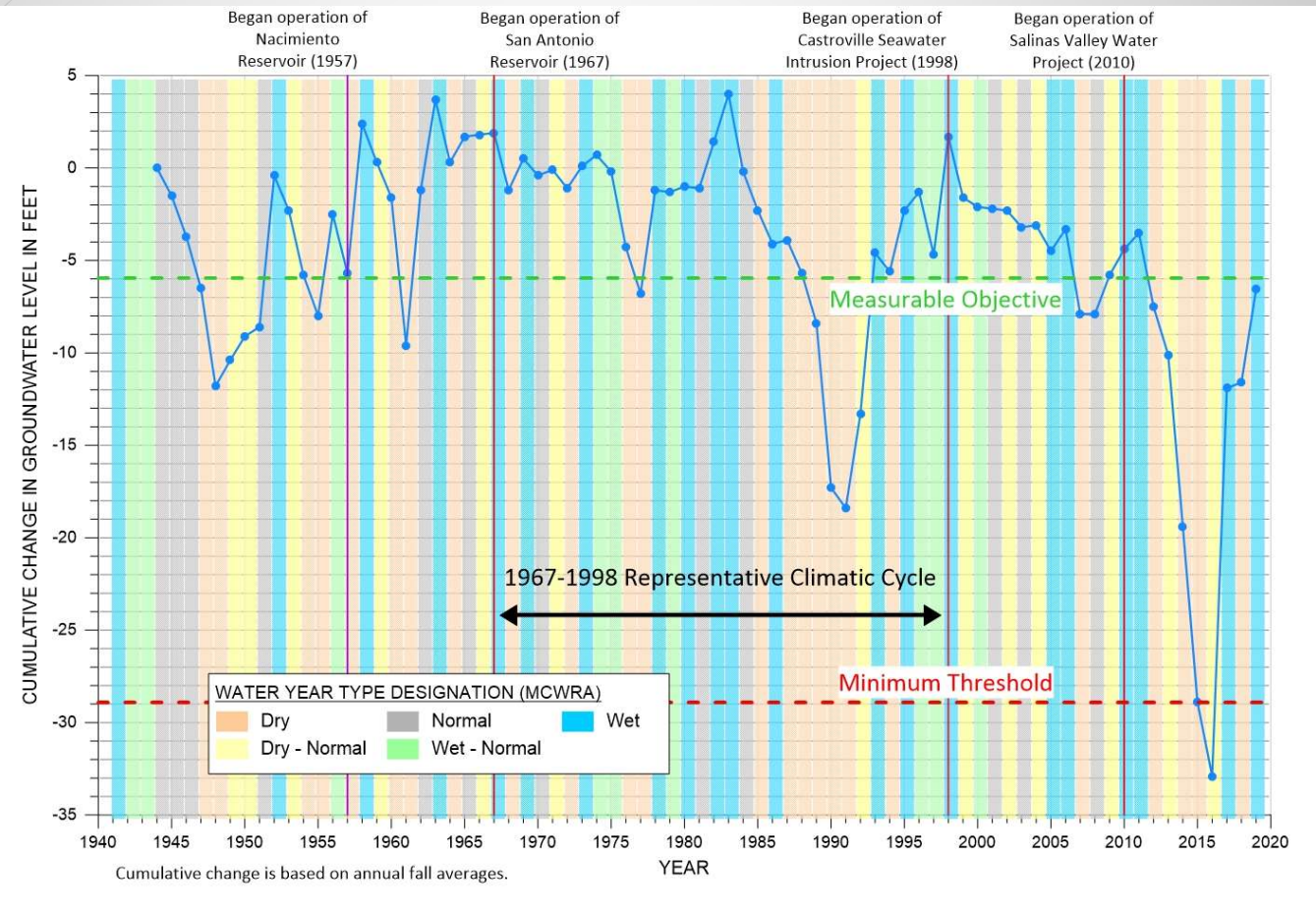
Chronic Lowering of Groundwater Levels

(MT/MO presented at Nov meeting)



MO = 75% of difference between 2015 and 1998 groundwater elevations

MT = 2015 groundwater elevations

New Slide

Reduction in Groundwater Storage

- *In November, presented agreement with ASGSA that change in storage would be calculated based on groundwater level Minimum Thresholds/Measurable Objectives*
- ***Measurable Objective*** - The measurable objective for reduction in groundwater storage measurable objective is 0 when the groundwater elevations are held at the groundwater level measurable objectives. Since the goal is to manage to the measurable objective, additional water in storage is needed until groundwater elevations are at their measurable objectives.
- ***Minimum Threshold*** - The minimum threshold for reduction in groundwater storage is 267,000 acre-feet below the measurable objective. This reduction is based on the groundwater level minimum thresholds. This number will be refined as additional data are collected and other projects are implemented.

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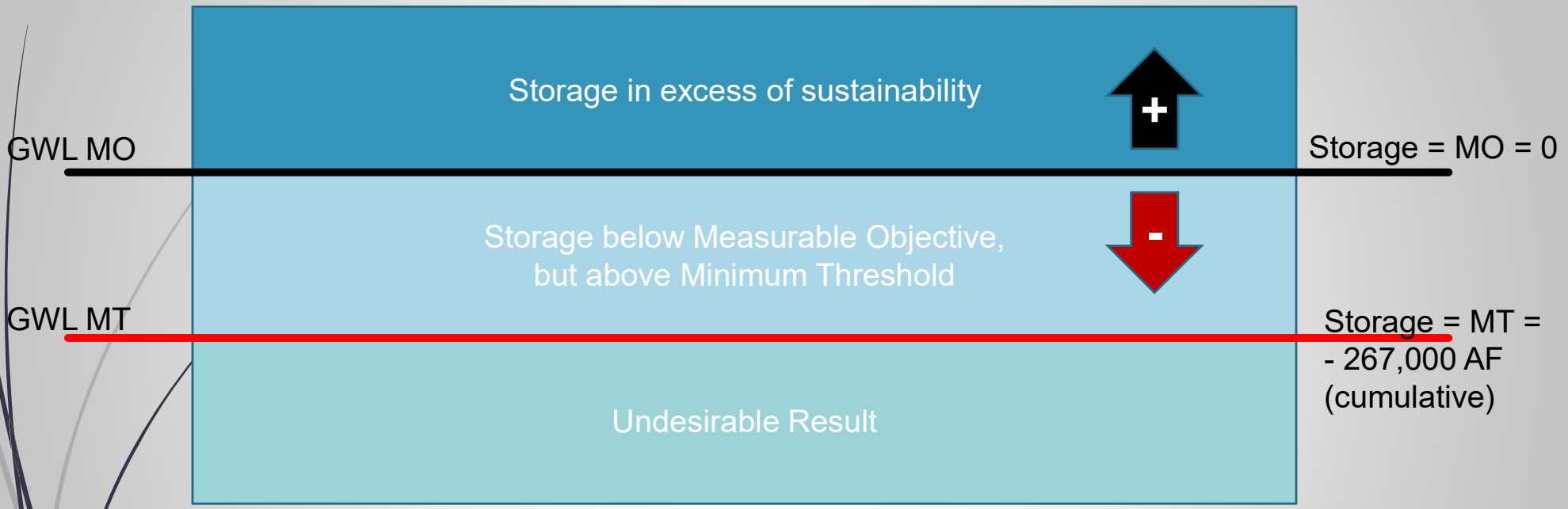
Reduction in Groundwater Storage – Conceptual Diagram



GWL MO = Groundwater Level Measurable Objective
GWL MT = Groundwater level Minimum Threshold

Interconnected Surface Water

- Excludes the period from June to September assuming that is when conservation releases occur
- Blue cells indicate areas that are interconnected for more than 50% of model period
- Clear cell show areas that are interconnected for less than 50% of the model period
  - require further evaluation
- This map does not show the extent of interconnection

This data (model and/or model results) are preliminary or provisional and are subject to revision. This model and model results are being provided to meet the need for timely best science. The model has not received final approval by the U.S. Geological Survey (USGS). No warranty, expressed or implied, is made by the USGS or the U.S. Government as to the functionality of the model and related material nor shall the fact of release constitute any such warranty. The model is provided on the condition that neither the USGS nor the U.S. Government shall be held liable for any damages resulting from the authorized or unauthorized use of the model.

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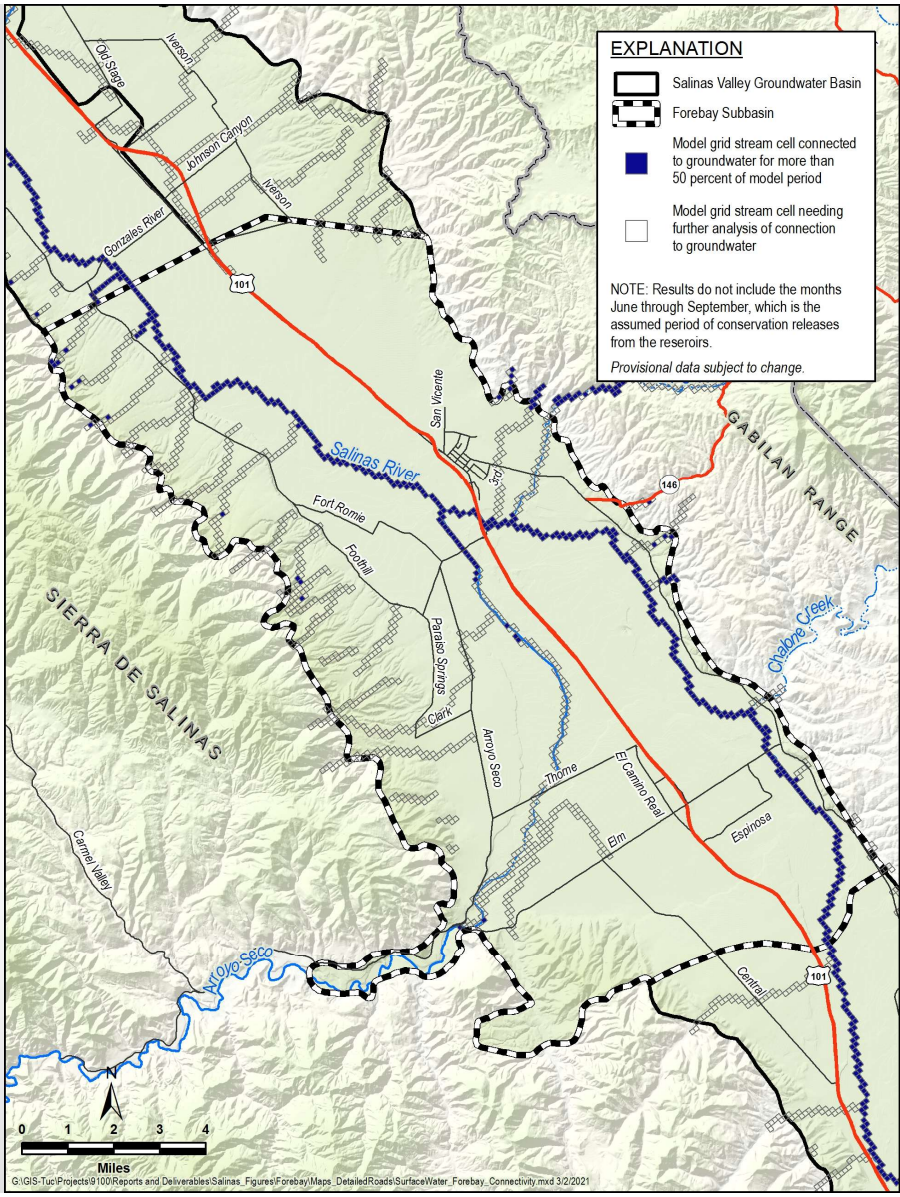

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Water Quality

- ***Minimum Threshold*** **-** The minimum threshold is zero additional exceedances up to those existing up to December 31, 2019 of either the regulatory drinking water standards (potable supply wells) or the basin objectives (agricultural supply wells) for groundwater quality constituents of concern.
- ***Measurable Objective*** **-** Measurable objective is identical to the minimum threshold.

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Subsidence

- ***Minimum Threshold*** **-** The minimum threshold for subsidence is 0.133 feet per year. This is the rate that results in less than one foot of cumulative subsidence over a 30-year implementation horizon, plus 0.1 feet per year of estimated land movement to account for InSAR measurement errors.
- ***Measurable Objective*** **-** The proposed measurable objective is a long-term subsidence rate of 0. To account for InSAR measurement error, the annual measurable objective is 0.1 feet per year of estimated land movement.

Projects and Management Actions

Projects and Management Actions

- **Stream Channel Projects**
  - Invasive species eradication
  - Multi-benefit stream channel improvements
- **Projects that result in Reservoir Reoperation**
  - Winter releases from reservoirs, with ASR in the 180/400-Foot Aquifer Subbasin
  - Inter-lake Tunnel
  - Drought reoperation
- **Management Actions**
  - Conservation and agricultural BMPs
  - Fallowing, fallow bank, and agricultural land retirement
  - On-farm recharge
  - Pumping management

Invasive Species Eradication *(Arundo donax)*

- **Description:** Project will remove invasive *Arundo donax* from the Salinas River channel to reduce evapotranspiration of surface water and groundwater
- **Project Benefit**: Indirect project yield originally estimated at 20,000 AF/yr., but recent estimates indicate could be substantially less
- **Capital cost**: $35,230,000, with $325,000 annual O&M
- **Amortized cost of water**: $160/AF
- *Will be updated when updated yield estimates are available*

Multi-benefit Stream Channel Improvements

- Salinas River Stream Maintenance Program (SMP) maintains the river corridor to reduce flood risk and minimize bank and levee erosion, while maintaining and improving ecological conditions for fish and wildlife consistent with other priorities for the Salinas River
- Includes vegetation management, non-native vegetation removal, and sediment management
- **Project benefits** include increased groundwater elevations near river channel, increased water availability, flood risk reduction, reduced velocities during high flows to lessen bank and levee erosion, and enhanced infiltration by managing vegetation and sediment throughout the river and its tributaries
- **Cost:** $150,000 annual administration, $95,000 certification renewal; maintenance, monitoring, and reporting costs paid by program participants

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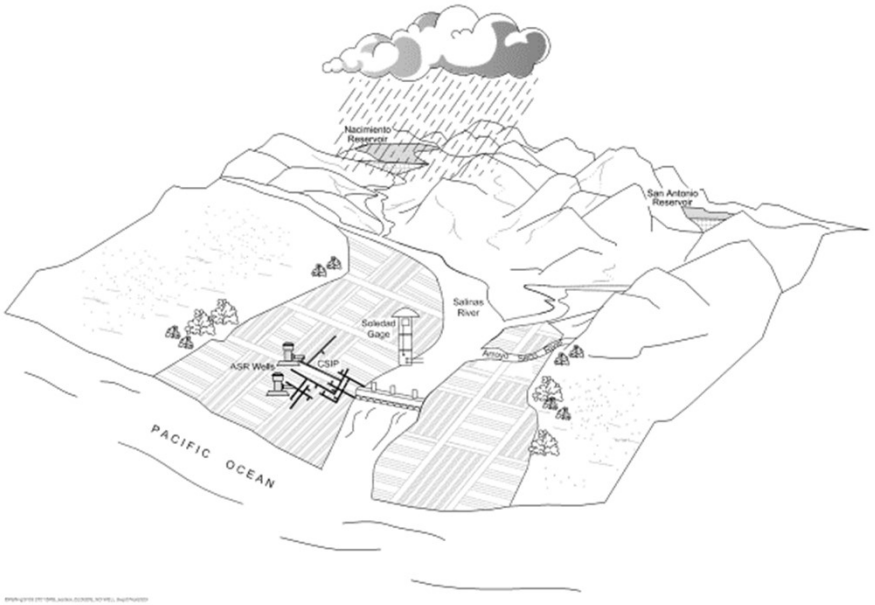
Projects that Result in Reservoir Reoperation

- Three projects under consideration would alter reservoir releases for groundwater benefits and other purposes:
  - winter releases with aquifer storage and recovery,
  - inter-lake tunnel and spillway modification, and
  - drought reoperation.
- These projects rely on infrastructure owned by MCWRA, and implementing any one of these would be a cooperative effort.
- These projects will affect the entire Salinas Valley, and analyses must consider the impact on all subbasins.
- This GSP is primarily concerned with project benefits that achieve groundwater sustainability. However, ancillary benefits and relative costs must also be addressed and carefully evaluated.

- **Proposed approach in GSP: include the three projects that would result in reservoir reoperation and note further evaluation is needed during GSP implementation.**

Winter Releases from Reservoirs, with Aquifer Storage and Recover in the 180/400-Foot Aquifer Subbasin

- Shift summertime conservation releases to winter reservoir releases
- Diverts 13,000 AF at SRDF in winter months
- 16 ASR injection wells in the 180/400 Subbasin
- Release reservoir releases every winter
- CSIP customers extract injected water in summertime
- **Project Benefit:** greater recharge to aquifers, ability to maximize SRDF diversion, more water for CSIP and beneficial users, reduction in seawater intrusion, more consistent winter releases, reduced evapotranspiration
- **Cost:** Capital costs are assumed to be $51,191,000 for construction of an injection well field consisting of 16 wells and pipeline.



Interlake Tunnel and Spillway Modification

- Construct of a tunnel for diversion of water from the Nacimiento Reservoir to the San Antonio Reservoir to divert this flood control water from Nacimiento Reservoir to San Antonio Reservoir.
  - Would increase total volume of water in storage and water available for conservation releases between April and October.
- **Benefit**: Additional conservation releases would result in approximately 30,500 AF/yr. of additional groundwater recharge from the Salinas River in the basin
- **Cost:** total capital cost would be $173,319,000

Drought Reoperation

- MCWRA formed a Drought Operations Technical Advisory Committee (D-TAC) to provide, when drought triggers occur, technical input and advice regarding the operations of Nacimiento and San Antonio Reservoirs.
- D-TAC developed Standards and Guiding Principles to be used in the development of a proposed reservoir release schedule triggered under specific, seasonally defined conditions.
- This management action would result in decisions on reservoir operation and flow releases during a drought.

Conservation and Agricultural BMPs

- Leveraging evapotranspiration (ET) data
  - Incorporate ET data with soil moisture sensors, soil nutrient data, and flow meter data to help inform more efficient irrigation practices
  - Secure funding and/or coordinate with existing local agricultural extension specialists who conduct research and provide technical assistance to growers
- Education and outreach
  - Support existing local agricultural extension specialists with their education and outreach on BMPs to increase water conservation and decrease pumping
  - Use technical workshops and partnerships to accomplish outreach effectively and efficiently with growers
- Any others?

Fallowing, Fallow Bank, and Agricultural Land Retirement

Focused on retiring land to reduce groundwater extraction, including through:

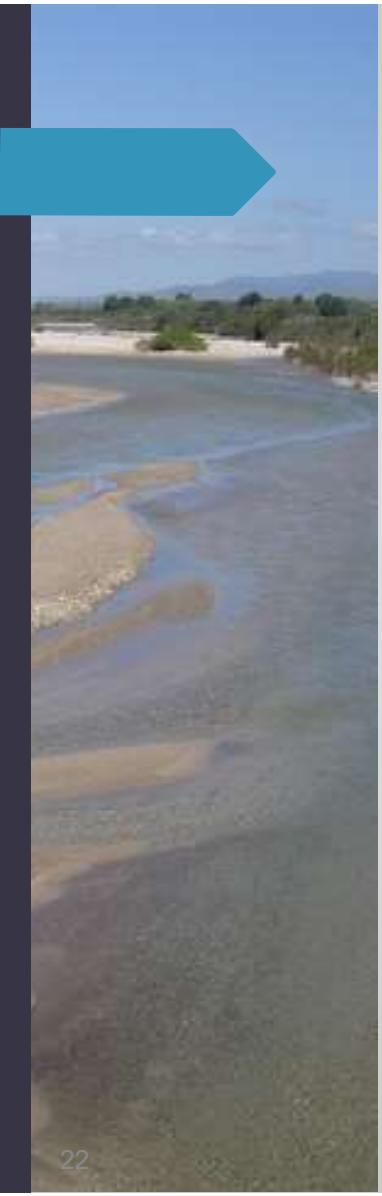
- **Rotational Fallowing**: Every grower is required to fallow some percentage of land or a rotating basis.
- **Fallow Bank**: All growers could contribute to a bank. Anybody fallowing land could draw against the bank to offset the lost income from fallowing.
- **Ag Land Retirement**: SVBGSA would pay to retire agricultural land, effectively reducing the amount of groundwater used in the Subbasin.

On-farm Recharge

- Incentivize growers to build recharge ponds on their land and reward them based on the volume of water that flows into the ponds for infiltration
- Might be difficult to measure quantity of water recharged, and most effective in areas with the most permeable geology

Pumping Allocations

- Management action to enable Subbasin to pump within sustainable yield
- Not water rights, but rather an approach to divide up sustainable yield among beneficial users
- They can be used to:
  - Underpin management actions that manage pumping
  - Generate funding for projects and management actions
  - Incentivize water conservation and/or recharge projects

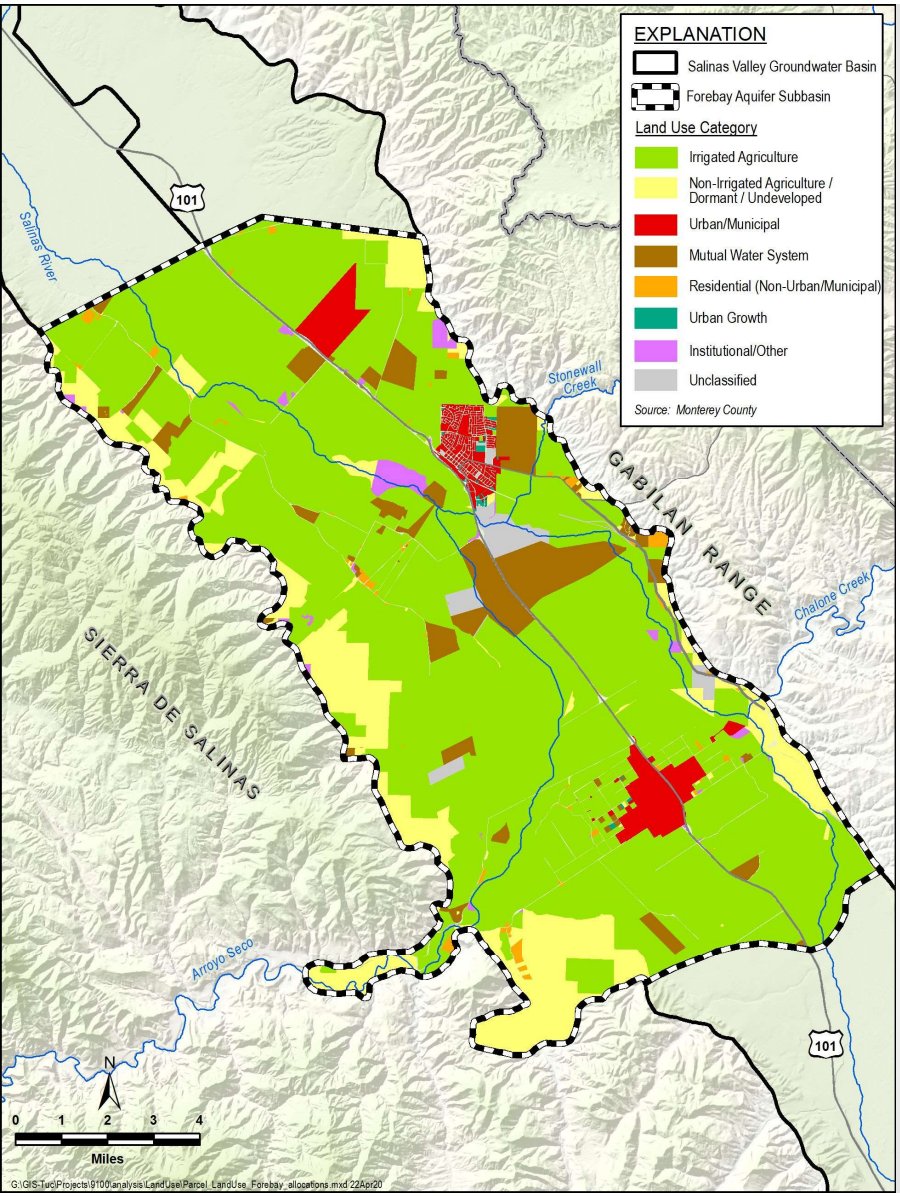


Options for Inclusion within Forebay GSP:

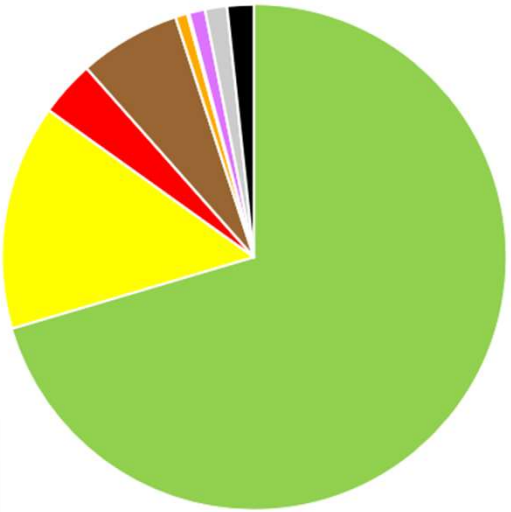
- Include pumping management as an alternative management action
- Include pumping allocations primarily for funding purposes
- Include in GSP for drought conditions only

Three Allocation Approach Options *(not the only ones)*

- Allocation by Irrigated Acreage
- Irrigated Acreage With Dormant Set Aside
- Historical Cropping With Dormant Set Aside

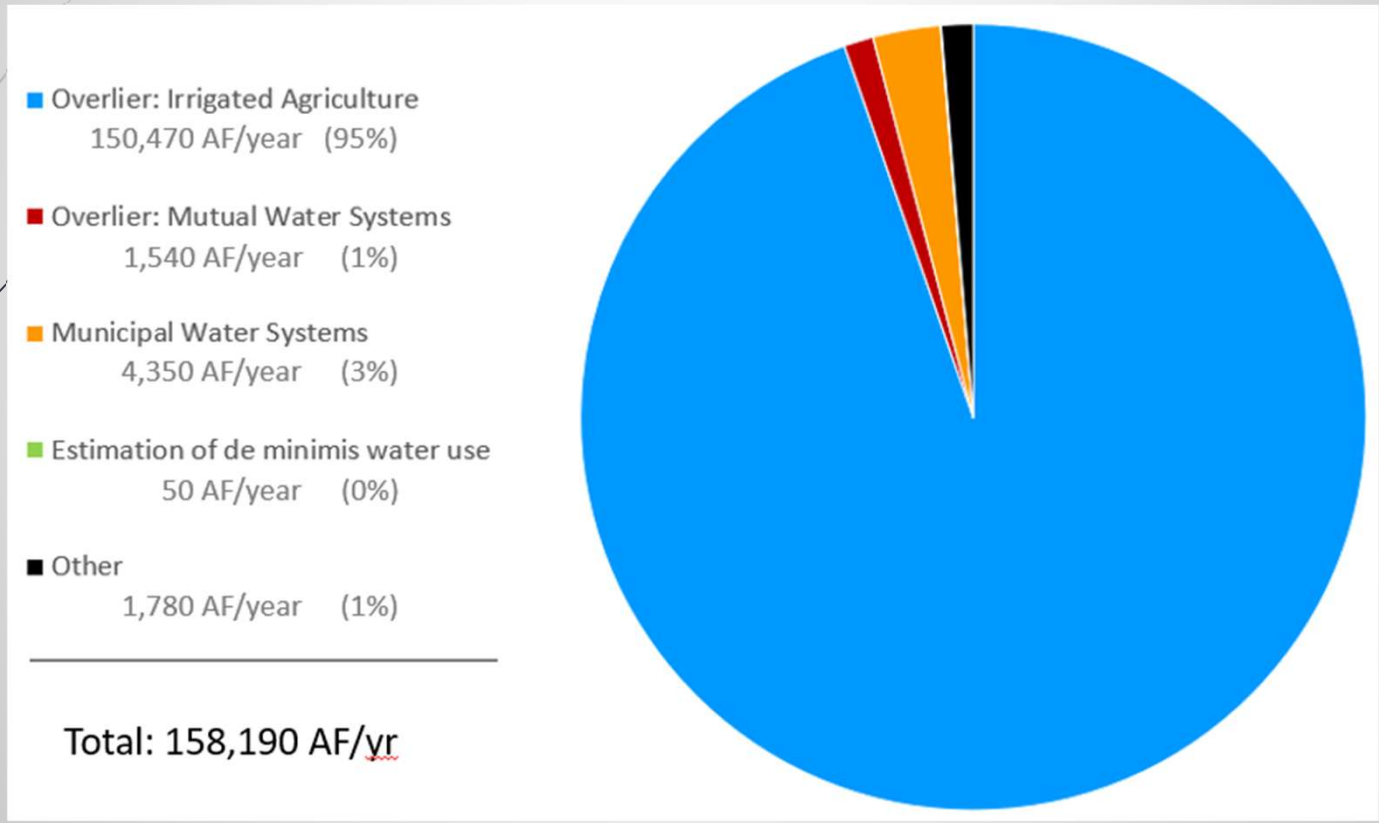


Land Use

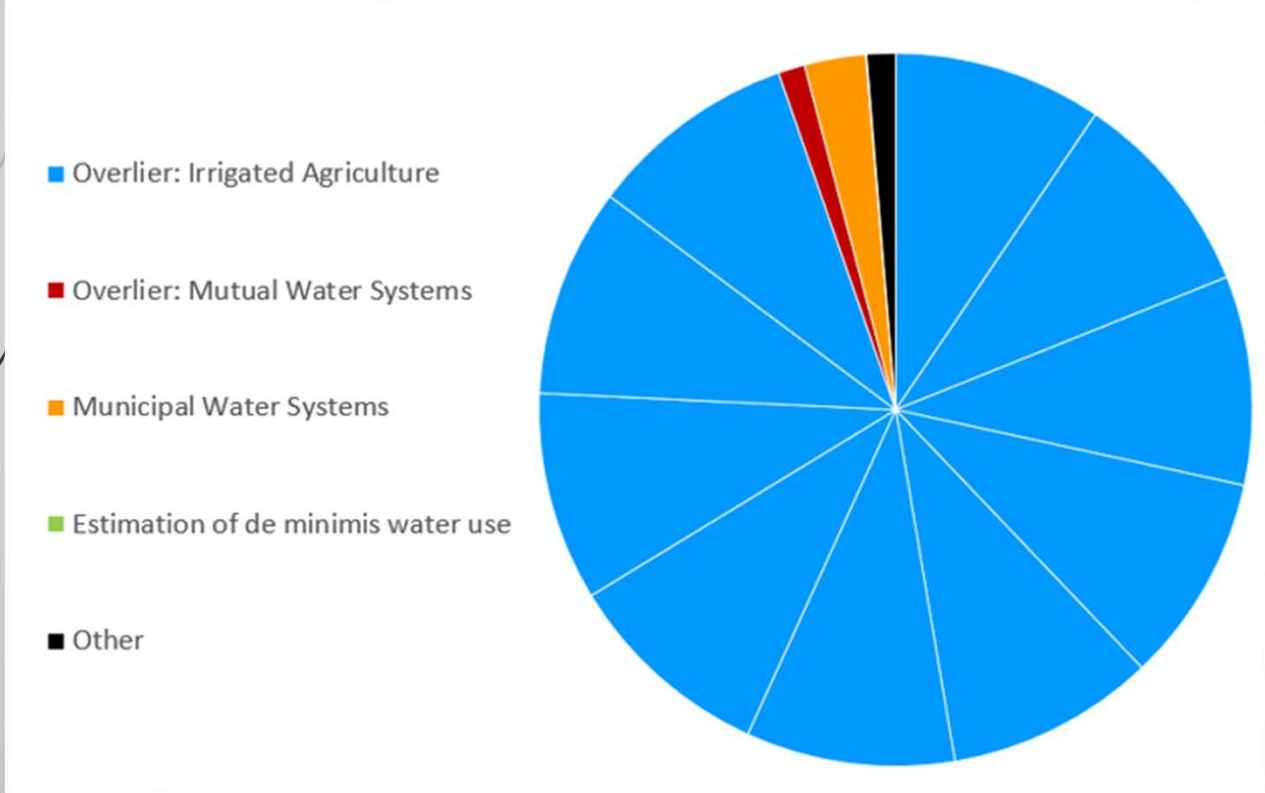


Land Use	Acres	Percent
Irrigated Agriculture	66,234	70.4%
Non-irrigated Ag/Dormant/Undeveloped	13,590	14.5%
Urban/Municipal	3,357	3.5%
Mutual Water System	6,126	6.5%
Residential (Non-Urban/Municipal)	730	0.8%
Urban Growth	110	0.1%
Institutional/Other	969	1.0%
Unclassified	1,322	1.4%
Not in Parcel Layer	1,605	1.7%
Total	**94,043**	**100%**

Estimated Groundwater Use (2013 GEMS data)



Option 1: Irrigated Acreage



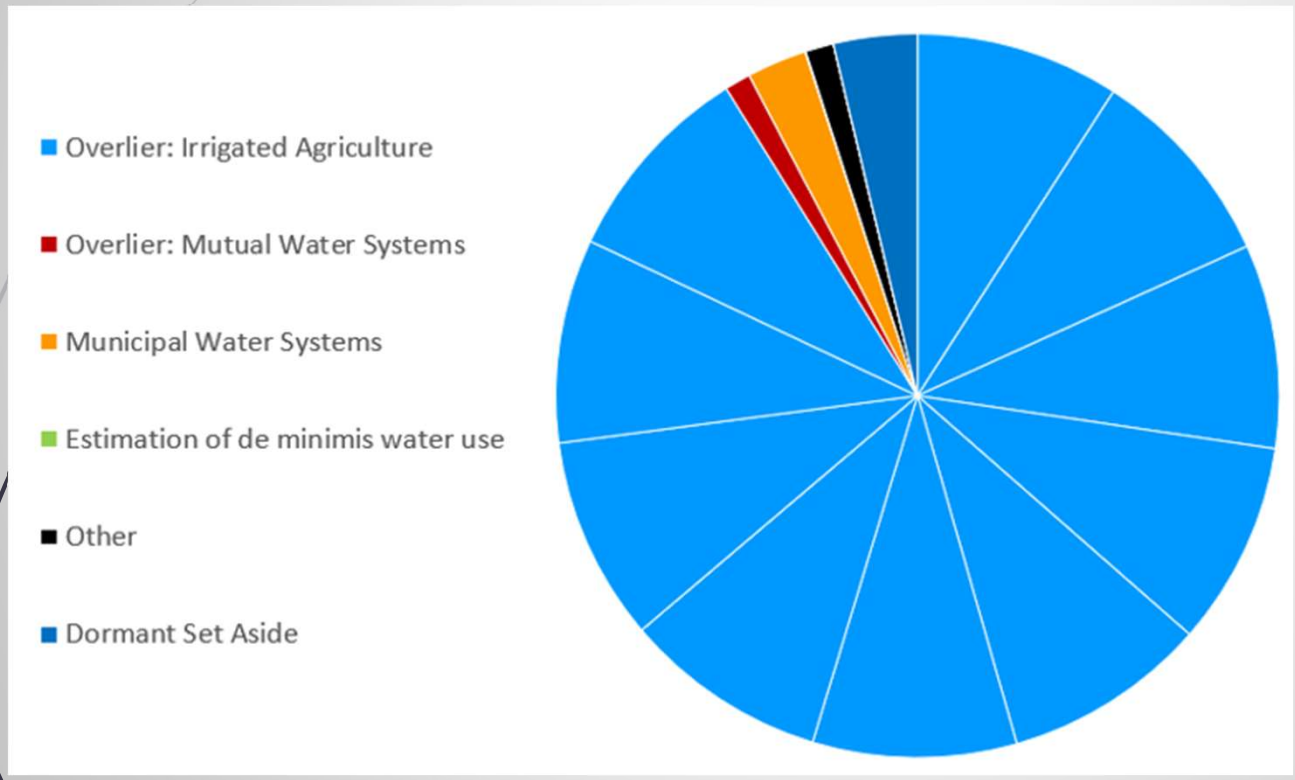
Each acre of irrigated agriculture would receive the same amount of water.

Water reallocated as dormant land comes into production.

Municipal use pre-set at historic conditions.

Planned urban growth would be offset by conservation requirements.

Option 2: Irrigated Acreage With Dormant Set Aside

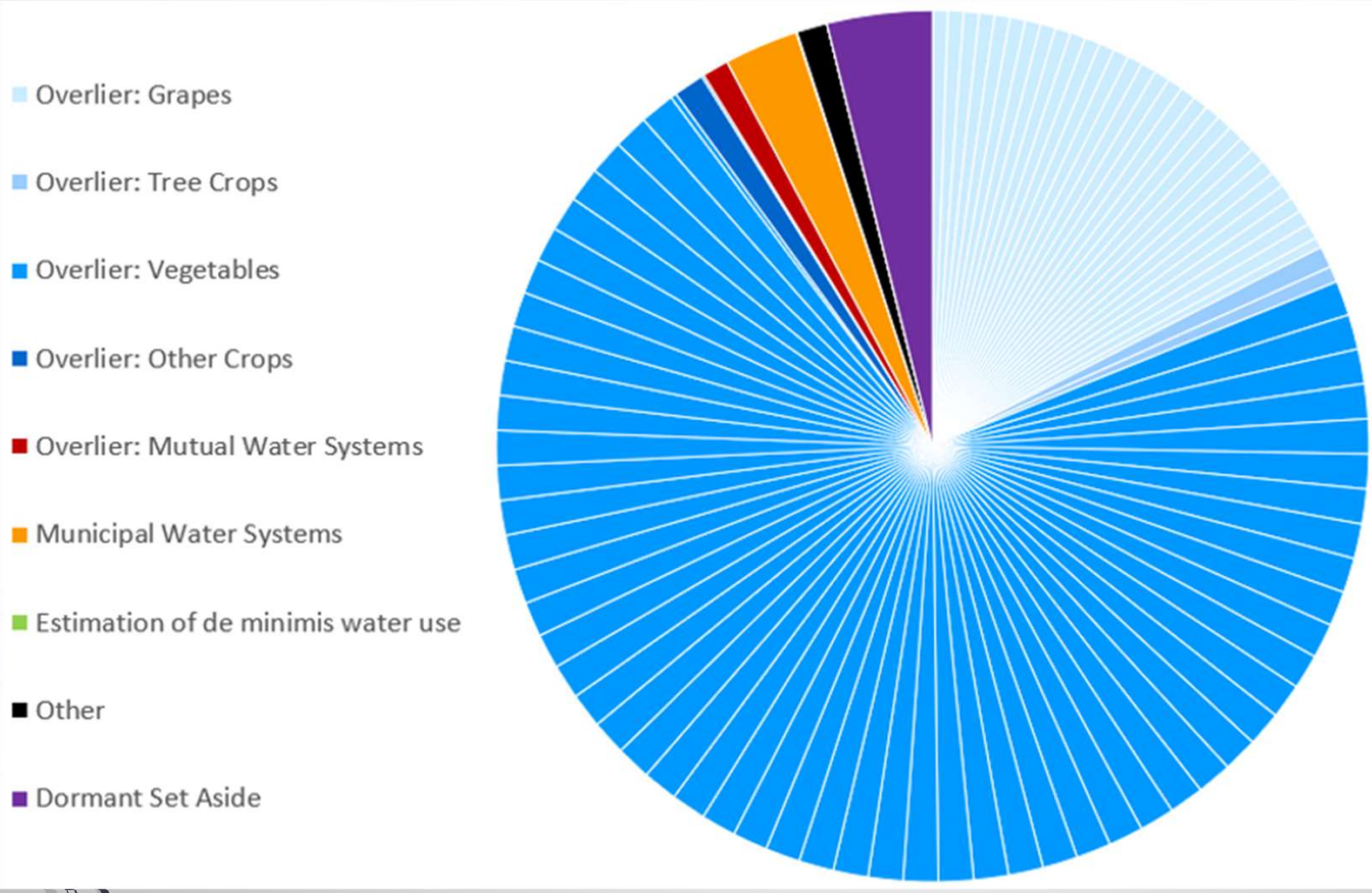


Each acre of irrigated agriculture would receive the same amount of water.

Some water would be set aside for dormant land to be converted into irrigated agriculture.

Same treatment as Option 1 for other users.

Option 3: Historical Cropping With Dormant Set Aside



Agricultural allocations would be based on historical crop type with land that grew more water intensive crops receiving more water.

Some water would be set aside for dormant land to be converted into irrigated agriculture.

Same treatment as Option 1 for other users.

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Discussion on Projects and Management Actions

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- Discussion on this list of projects and management actions
- Is the Committee in agreement with the projects and management actions added and our suggested approach?
- How should pumping management be included?
- Is anything missing?

- Next up:
  - Implementation, specifically funding
  - Chapters 2, 6, and 8 (complete) will be released soon
  - Comments on Chapters 1-8 due April 15th

Questions