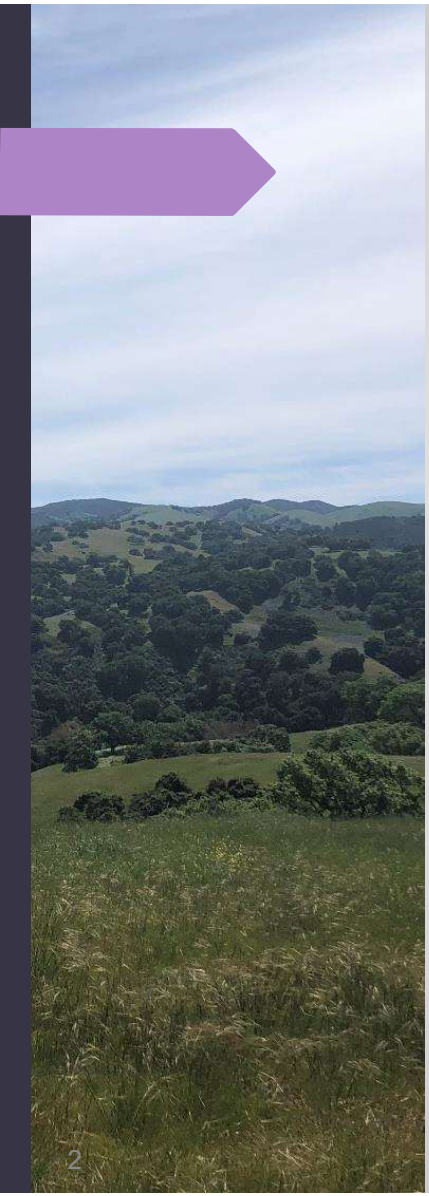
SVBGSA Monterey Subbasin Planning Committee

SMC Update, Projects and Management Actions, and Allocation Approaches

March 5, 2021

MONTGOMERY & ASSOCIATES



Outline

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

Sustainable Management Criteria - Update

Water Quality

Sustainability Indicator	Minimum Threshold	Measurement	Measurable Objective	Undesirable Result
Degraded groundwater quality	**Whole Subbasin:** Minimum threshold is zero additional exceedances of either the regulatory drinking water standards (potable supply wells) or the basin objectives (agricultural supply wells) for groundwater quality constituents of concern known to exist in the Subbasin, as a direct result of projects or management actions taken as part of GSP implementation. Exceedances are only measured in public water system supply wells and domestic and agricultural (ILRP) wells. See Table 8-7 for the list of constituents.	Measured through seawater intrusion representative monitoring well network. Groundwater quality data downloaded annually from state sources.	**Whole Subbasin:** Measurable objective is identical to the minimum threshold. Zero additional exceedances of groundwater quality constituents of concern known to exist in the Subbasin above either drinking water standards (potable supply wells), or basin plan objectives (agricultural supply wells).	During any one year, no groundwater quality minimum threshold shall be exceeded as a direct result of projects or management actions taken as part of GSP implementation.

Subsidence

Sustainability Indicator	Minimum Threshold	Measurement	Measurable Objective	Undesirable Result
Subsidence	**Whole Subbasin:** Minimum threshold is zero net long-term subsidence, with no more than 0.1 foot per year of estimated land movement to account for InSAR errors.	Measured using DWR provided InSAR data.	**Whole Subbasin:** Measurable objective is identical to the minimum threshold, with no more than 0.1 foot per year of estimated land movement to account for InSAR errors, resulting in zero net long-term subsidence.	In any one year, there will be zero exceedances of minimum thresholds for subsidence, with no more than 0.1 foot per year of estimated land movement to account for InSAR errors. It might be helpful to still include the error here

Seawater Intrusion

Seawater intrusion	Minimum threshold	Measurement	Measurable objective	Undesirable Result
	Marina-Ord Area: Seawater intrusion extent (500 mg/L chloride isoconcentration line) set at 2015 location in the lower 180-Foot and 400-Foot Aquifers; Seawater intrusion extent set at approximately Highway 1 in the Dune Sand, upper 180-Foot, and Deep Aquifers. _____ **Corral de Tierra Area**: Not applicable; Seawater intrusion is not occurring and not likely to occur in the Corral de Tierra Area	Measured through seawater intrusion representative monitoring well network.	**Marina-Ord Area:** Measurable objective is identical to the minimum threshold. _____ **Corral de Tierra Area**: Not applicable; Seawater intrusion is not occurring and not likely to occur in the Corral de Tierra Area	On average in any one year there shall be no exceedances of the minimum threshold, i.e. no well inland of the identified extents above 500 mg/L chloride.

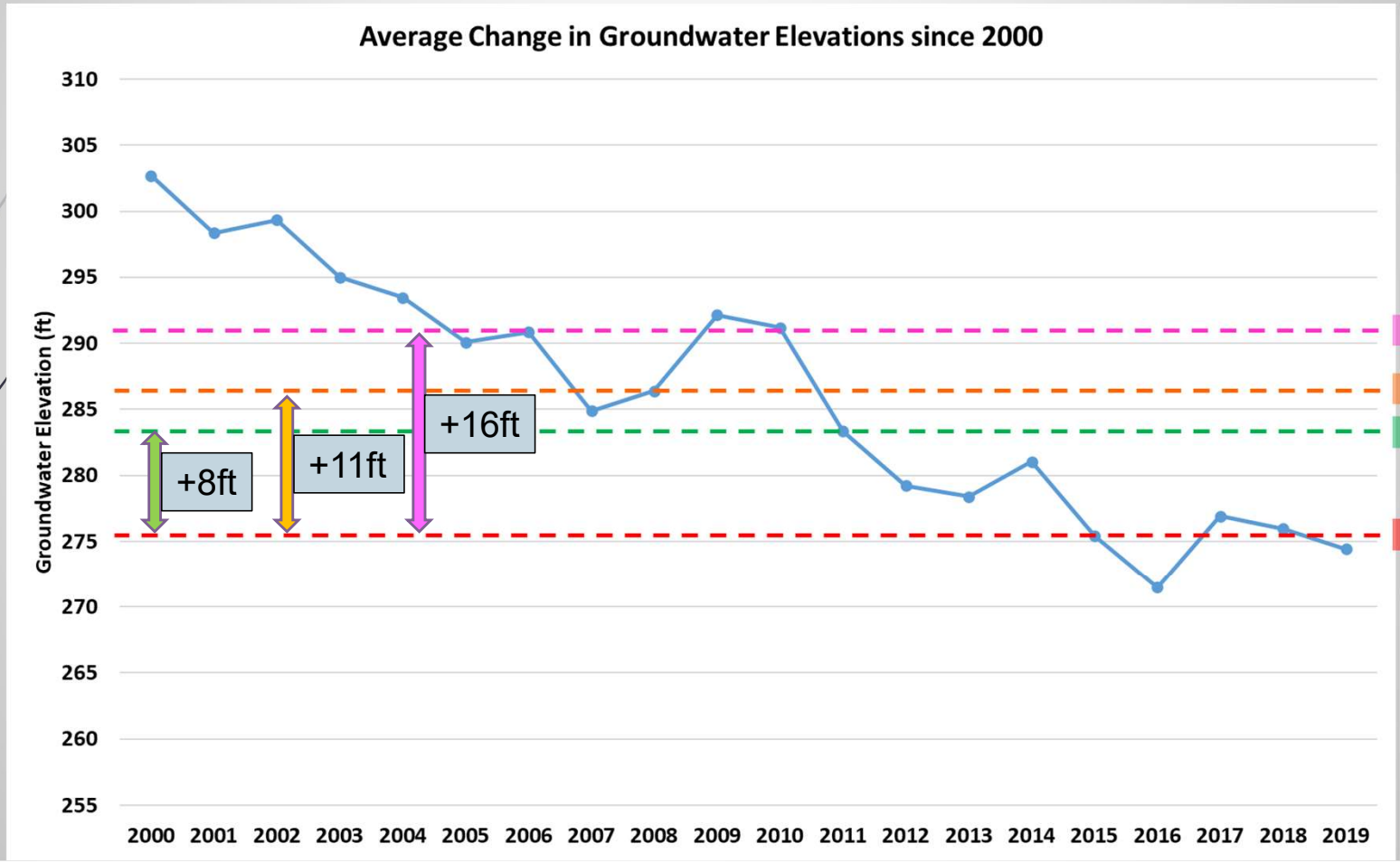
Interconnected Surface Water

Sustainability Indicator	Minimum Threshold	Measurement	Measurable Objective	Undesirable Result
Depletion of interconnected surface water (ISW)	**Marina-Ord Area:** Set to the minimum shallow groundwater elevations historically observed between 1995 and 2015 near locations of ISW. _____ **Corral de Tierra Area:** Set to the shallow groundwater elevations in 2015 or near locations of ISW.	Measured through shallow groundwater elevations as a proxy near locations of ISW in the ISW representative monitoring well network	**Marina-Ord Area:** Measurable objective is identical to the minimum threshold shallow groundwater elevations. _____ **Corral de Tierra Area:** Measurable objective is identical to the minimum threshold shallow groundwater elevations	During average hydrogeologic conditions, more than 40% of minimum thresholds are exceeded near any location of ISW for more than two consecutive years.

Groundwater Levels

Sustainability Indicator	Minimum Threshold	Measurement	Measurable Objective	Undesirable Result
Chronic lowering of groundwater levels	**Marina-Ord Area:** In the Dune Sand, 180-Foot, 400-Foot, and Deep Aquifers, set to the minimum groundwater elevations historically observed between 1995 and 2015. _____ **Corral de Tierra Area:** Set to 2015 groundwater elevations for the El Toro Primary Aquifer System.	Measured through the groundwater elevation representative monitoring well network within each management area	**Marina-Ord Area:** In the Dune Sand, 180-Foot, 400-Foot, and Deep Aquifers, set to the minimum groundwater elevations historically observed between 1995 and 2004. _____ **Corral de Tierra Area:** Set to [YEAR TBD AFTER MARCH STAKEHOLDER MEETING] groundwater elevations for the El Toro Primary Aquifer System.	(1) Within the Marina-Ord Area, over the course of any one year, more than 20% of groundwater elevation minimum thresholds are exceeded in either a) the Dune Sand and upper 180-Foot Aquifers, or b) the lower 180-Foot and 400-Foot Aquifers, or c) the Deep Aquifers; OR (2) Within the Corral de Tierra Area, more than 15% of groundwater elevation minimum thresholds are exceeded over the course of any one year.

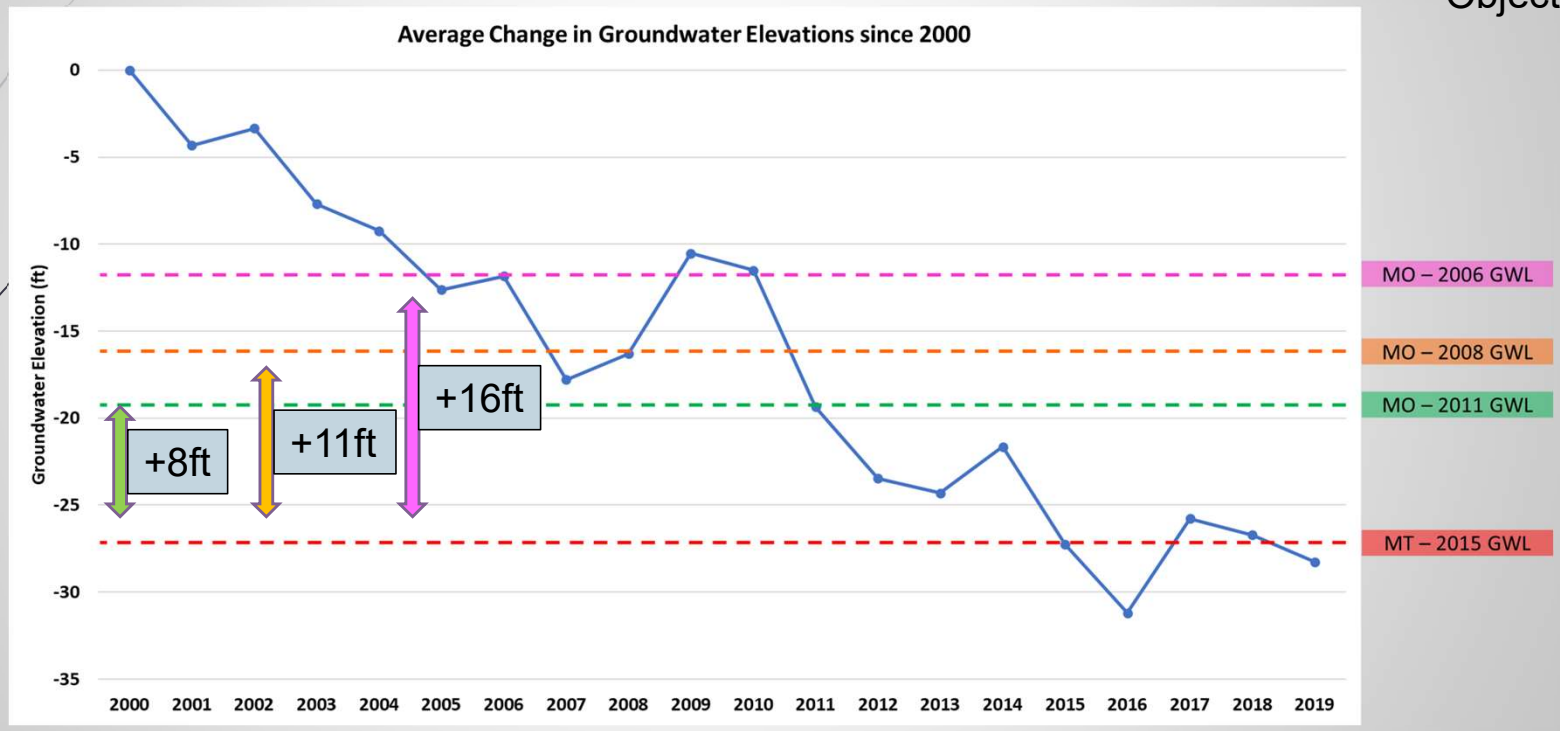
Corral de Tierra Groundwater Levels



MO = Measurable Objective

Corral de Tierra Groundwater Levels

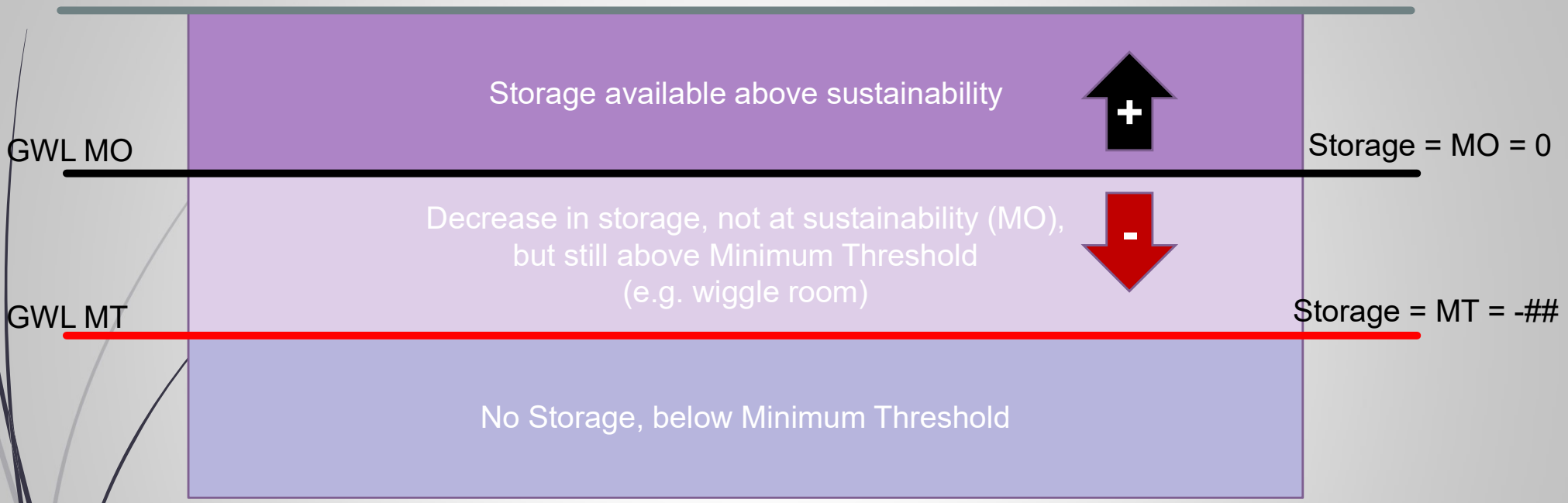
MO = Measurable Objective



Groundwater Storage

- MCWD GSA and SVBGSA working on groundwater storage criteria that are tied to groundwater elevation MTs and MOs

Groundwater Storage Conceptual Diagram



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

Sustainable Yield Estimate

- Sustainable Yield = 1,700 AF/year
  - Based on 2019 pumping estimate and Geosyntec overdraft scenarios for the El Toro Planning Area (Geosyntec, 2007)

2019 pumping – overdraft = sustainable yield

2700 – 1000 = 1700 AF/yr.

Geosyntec. 2007. El Toro Groundwater Study Monterey County, California". Monterey County Water Resources Agency Engineering Reports. 9. https://digitalcommons.csumb.edu/hornbeck_cgb_6_b/9.

Projects and Management Actions

Potential Projects and Management Actions

- **MCWD Projects in the Marina/Ord Area**
  - Indirect Potable Reuse in the 180/400-Foot and/or Deep Aquifers
  - Continued Water Conservation Projects
  - Participation in Regional Projects (Specific Projects To Be Determined)
- **Recharge Projects**
  - Recharge basins with surface water runoff
  - Check dams
  - Decentralized residential in-lieu recharge projects
  - Decentralized stormwater recharge
  - Multi-benefit Stream Channel Improvements (*NEW*)
- **Demand Management**
  - Pumping allocations and controls
- **Implementation Actions**
  - Localized Groundwater Elevation Triggers
  - Expansion of GEMS
  - Well Registration

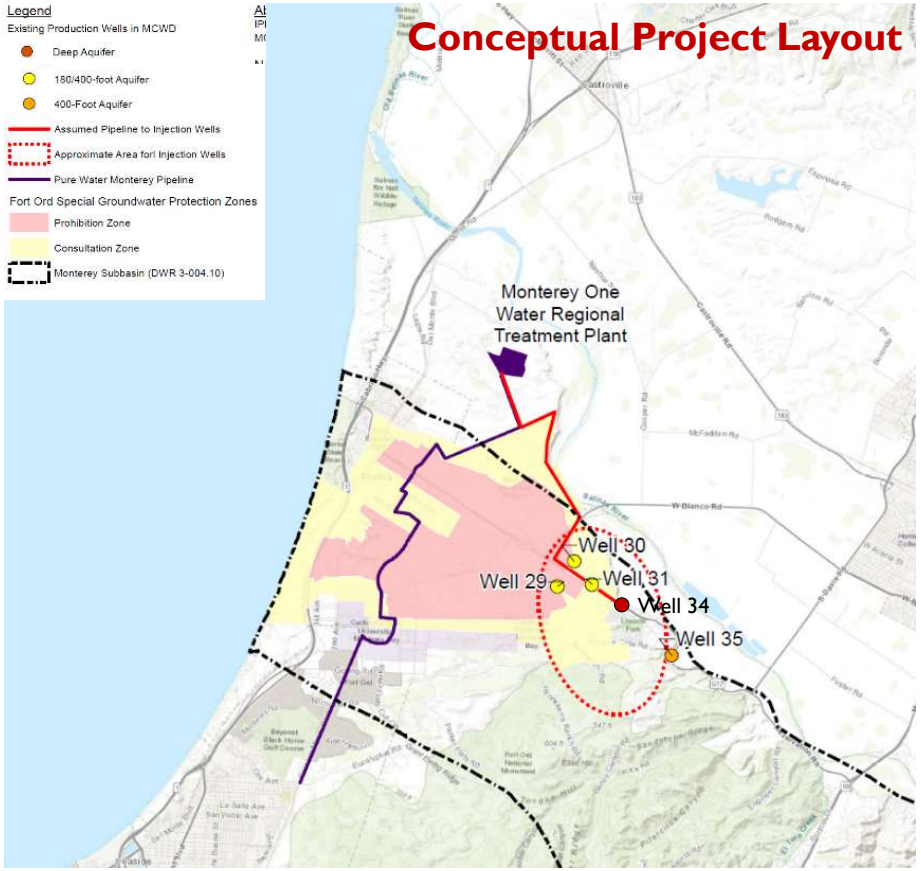
INDIRECT POTABLE REUSE IN 180/400 FOOT AND/OR DEEP AQUIFER ZONES

Description: Project will inject purified recycled water into 180/400 Foot and/or Deep Aquifer Zones. Primarily between October and March. Groundwater will be extracted with existing and/or new MCWD production wells.

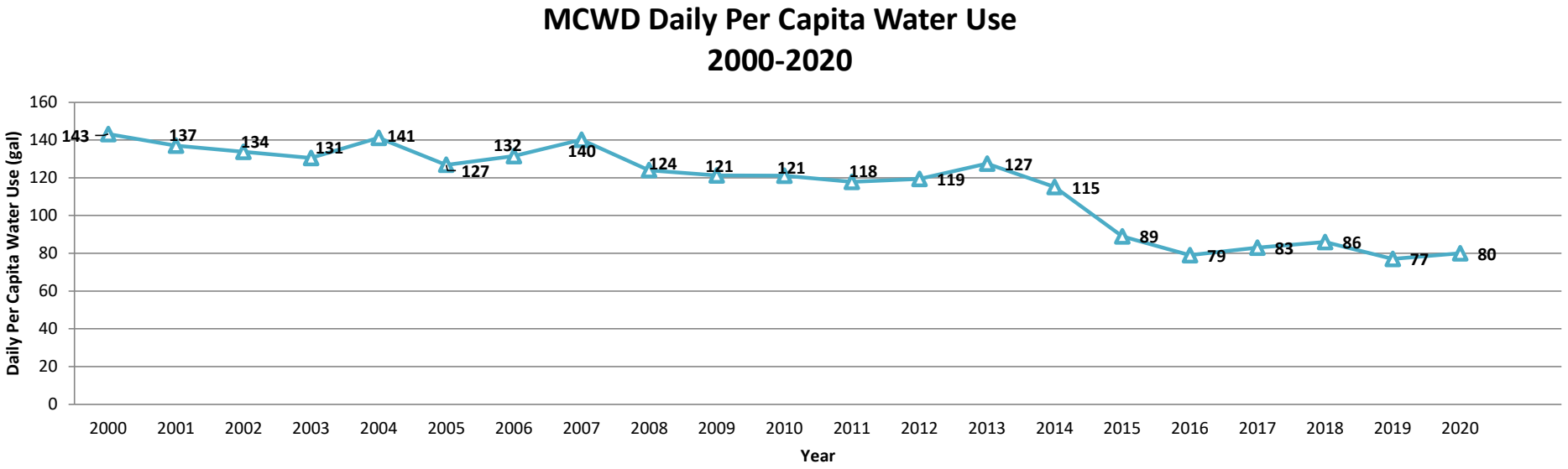
Project Benefit: Project yield estimated at: 1000 AFY to 2500 AFY. Will aid in protecting MCWD Production wells from Seawater Intrusion

Conceptual Cost Estimate:
$2,300 $/AFY to $3,300 $/AF

based on 30-year average (3% interest)
lower costs per AF with increased total yield



CONTINUED WATER CONSERVATION

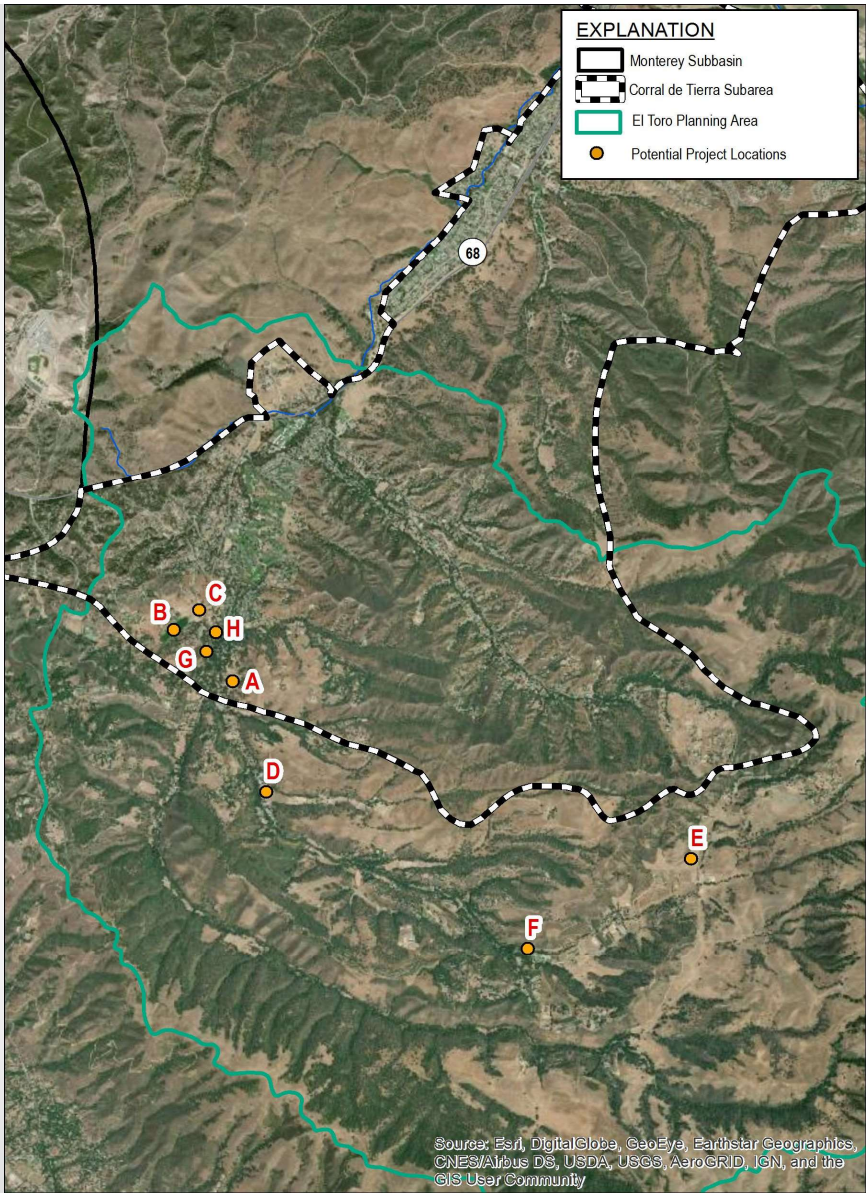


Description: Project will include existing and potentially new conservation programs to decrease MCWD Per Capita Water Use

Project Benefit/Conceptual Cost Estimate: Under Development

Recharge basins with surface runoff

- Divert stream flow into recharge basin to recharge the principal aquifer
- 5 potential locations identified (A-E)
- Scoping of recharge at El Toro Lake found:
  - Average of 160 AF/yr. could be diverted, with median of 43 AF/yr.
  - Capital cost = $5,852,000
  - With Operations & Maintenance, unit cost of water = $3,050/AF



Check dam to encourage in-stream recharge

- Installation of a check dam (like the Salinas River Diversion Facility rubber dam) to slow streamflow and encourage recharge into principal aquifers
- 2 potential locations identified (G and H) downstream of the confluence of Calera Creek and Watson Creek
- Scoping of site H found:
  - Average of 150 AF/yr. could be held back for recharge
  - Capital cost = $5,143,000
  - With Operations & Maintenance, unit cost of water = $2,830/AF

Comparison: Seaside project cost analysis

- The weighted cost per acre-foot of Natural Safe Yield Replenishment Assessment unit cost, or new project water supplies, is $2,947 per acre-foot (Seaside Basin Watermaster, 2020)
- Accounts for engineering focused solutions
- Reflects the scarcity of fresh water

Decentralized In Lieu Recharge Projects

- Program incentivizing homeowners to install in lieu rainwater harvesting and greywater reuse on their properties to store and use rainwater for landscaping in lieu of groundwater use
- **Benefits:** increase groundwater elevations by reducing residential groundwater demand for outdoor irrigation

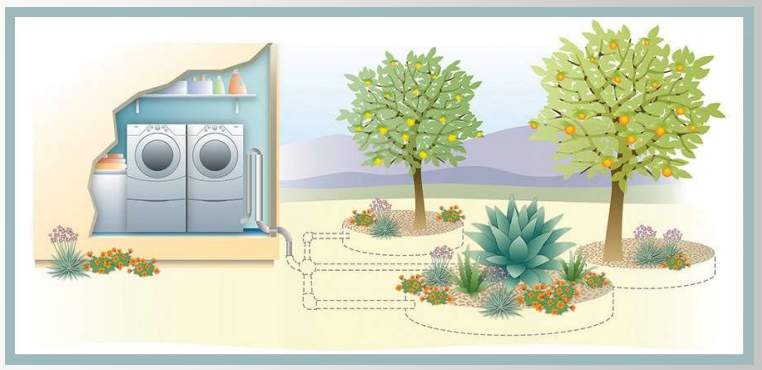
Decentralized In Lieu Recharge Projects

Benefits:

- Rainwater harvesting @ 10% uptake, ~50 AF/yr.
- Graywater systems @ 10% uptake, ~37 AF/yr.

Costs:

- Complete Rainwater Harvesting System $650,000 /AF
- Complete Laundry to Landscape System $52,500/AF



https://naparcd.org/workshop-laundry-to-landscape-grey-water-2016/

Multi-benefit Stream Channel Improvements

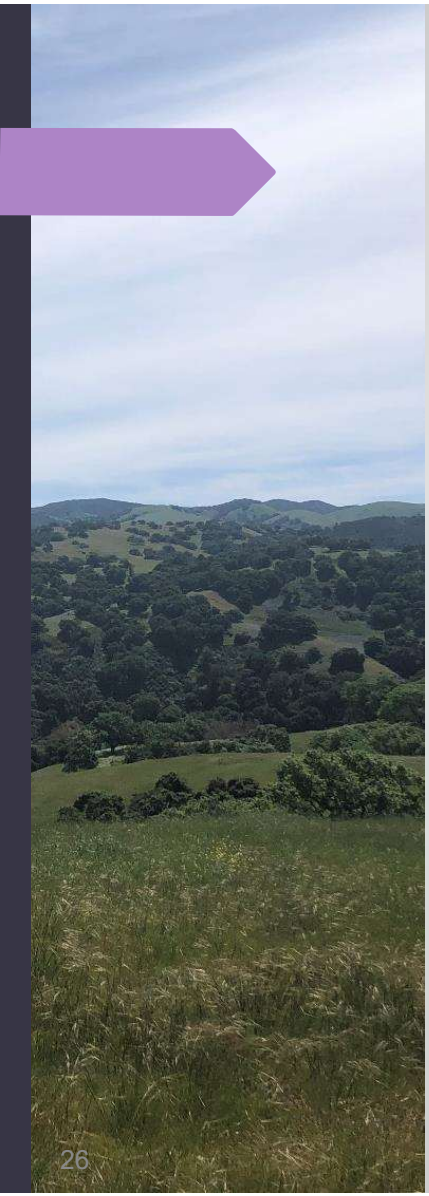
- Salinas River Stream Maintenance Program (SMP) maintains the river corridor to reduce flood risk and minimize bank and levee erosion, while maintaining and improving ecological conditions for fish and wildlife consistent with other priorities for the Salinas River
- Includes vegetation management, 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

Decentralized Stormwater Capture

- Incentivizing installation of stormwater capture features for groundwater recharge
- Stormwater is directed to small recharge basins, flood plains, and bioswales for recharge, or for immediate irrigation application
- **Project benefit:** increased groundwater elevations and storage
- **Cost:** varies widely
- **Example of potential project under this program:** stormwater capture from Prunedale shopping center
  - 9 AF/yr captured for recharge
  - Capital cost = $3.3 million

Projects for the Corral de Tierra

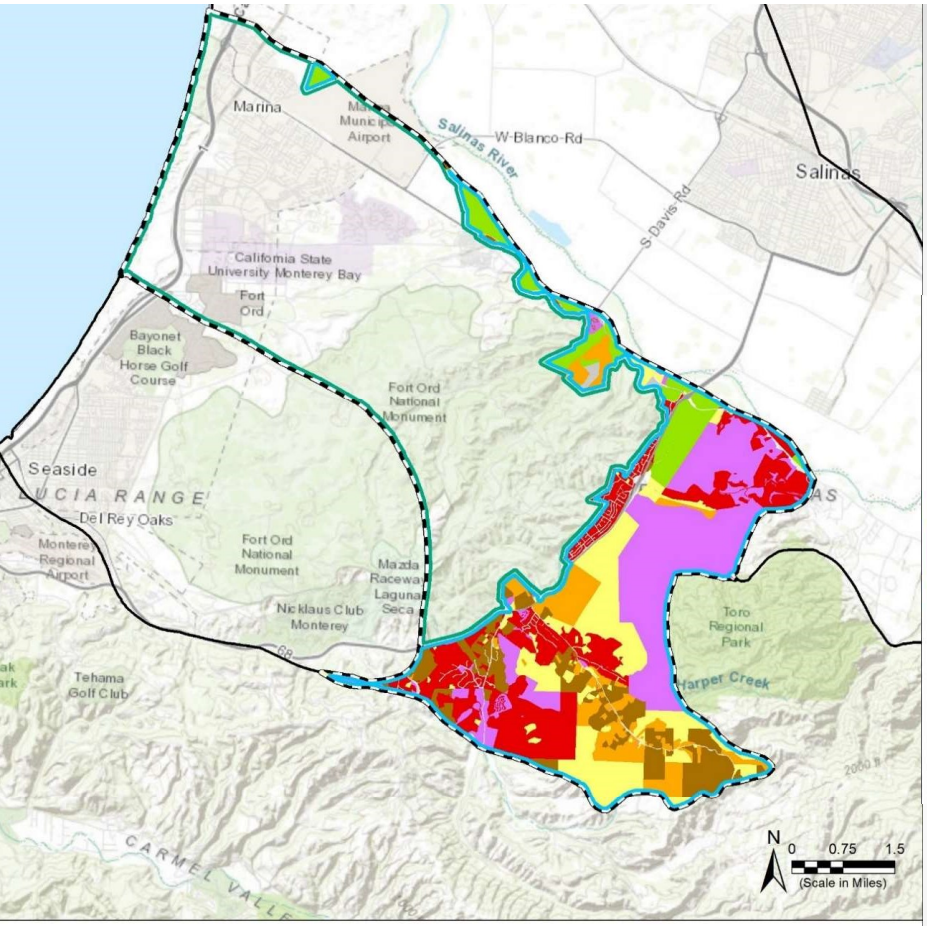
Project or Management Action	Project Benefit	Cost
Recharge Basins with Surface Run-off	160 AF/yr. average	Capital cost = $5,852,000 Unit cost of water = $3,050/AF
Check Dams	150 AF/yr. average	Capital cost = $5,143,000 Unit cost of water = $2,830/AF
Decentralized Residential In-Lieu Recharge Projects	Rainwater harvesting @ 10% uptake, ~50 AF/yr. Graywater systems @ 10% uptake, ~37 AF/yr.	Complete Rainwater Harvesting System $650,000 /AF Complete Laundry to Landscape System $52,500/AF
Decentralized Stormwater Recharge	Not calculated	Example project: $3.3 million for 9 AF/yr.
Multi-benefit Stream Channel Improvements	Not calculated	$150,000/yr administration, plus $95,000 certification renewal
Pumping Allocations and Control	Depends	Program cost low, but cost for individuals to implement varies

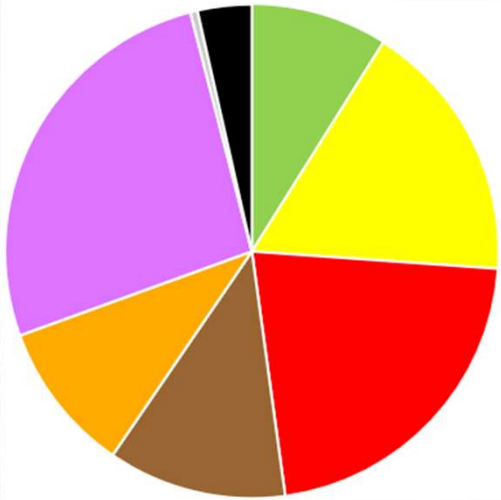


Pumping Controls/Allocations

- 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

Land Use





Land Use	Acres	Percent
Irrigated Agriculture	1,027	8.9%
Non-irrigated Ag/Vacant/Undeveloped	1,975	17.2%
Urban/Municipal	2,496	21.7%
Mutual Water System	1,346	11.7%
Residential (Non-Urban/Municipal)	1,140	9.9%
Institutional/Other	3,047	26.5%
Unclassified	55	0.5%
Not in Parcel Layer	407	3.5%
Total	**11,492**	**100%**

end
- Monterey Subbasin
- Other Groundwater Subbasin within Salinas Valley Basin
- Marina-Ord Area
- Corral de Tierra Area

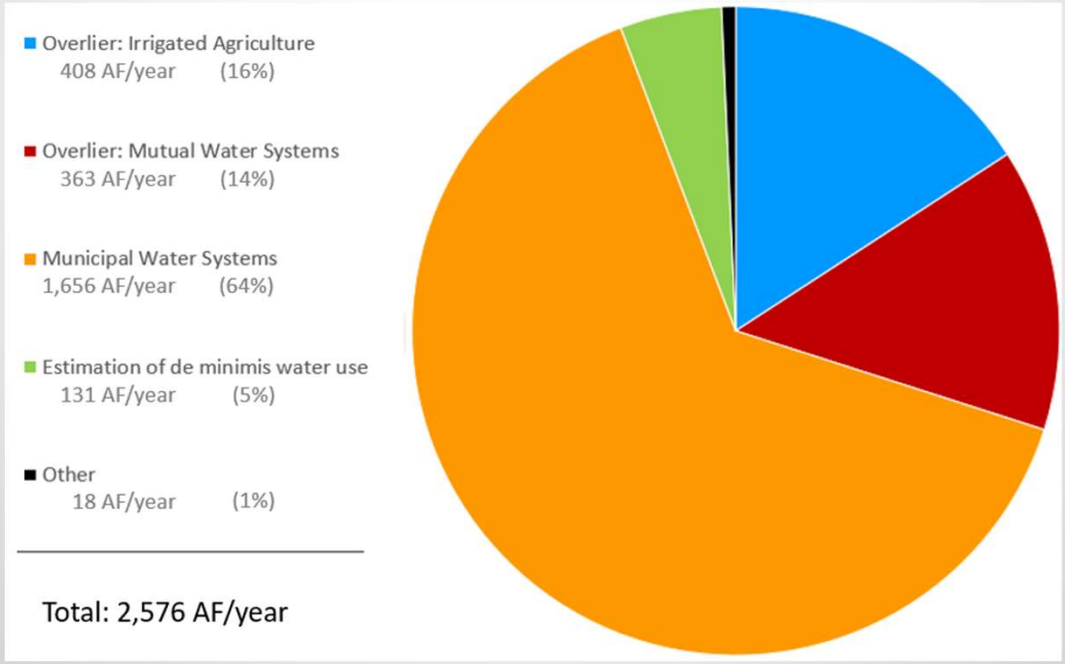
Land Use Category
- Irrigated Agriculture
- Non-Irrigated Agriculture / Vacant / Undeveloped
- Urban/Municipal
- Mutual Water System
- Residential (Non-Urban/Municipal)
- Institutional/Other
- Unclassified

Sources
1. Basemap layers obtained from ESRI.
2. DWR groundwater basins are based on the boundaries defined in California's Groundwater, Bulletin 118 - 2016 Update.
3. Parcels/Land Use obtained from Monterey County

Monterey Subbasin

Estimated Groundwater Extraction

- 2019 Estimated groundwater use in Corral de Tierra portion of the Monterey Subbasin

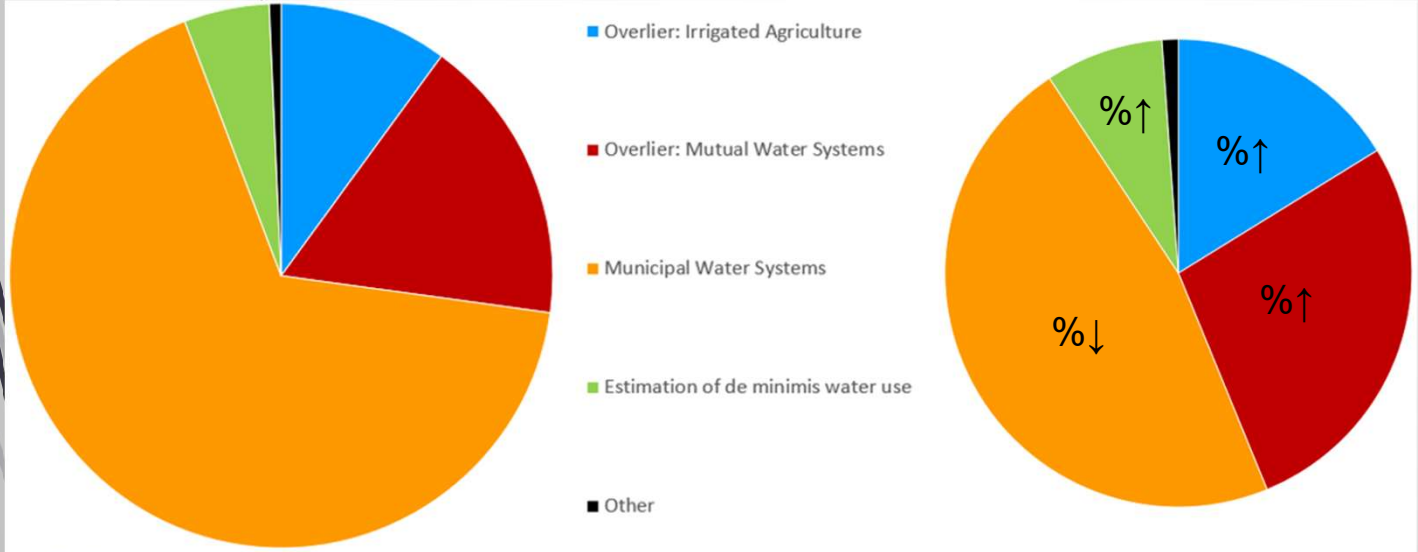


- *See Wallace Group memo for final estimation*

Option 1.

Basis: Equal Weighting of Acreage and Number of Connections for All Categories

Adjustment: Users with Overlying Groundwater Rights have Priority - If sustainable yield is reduced, municipal water systems reduce first



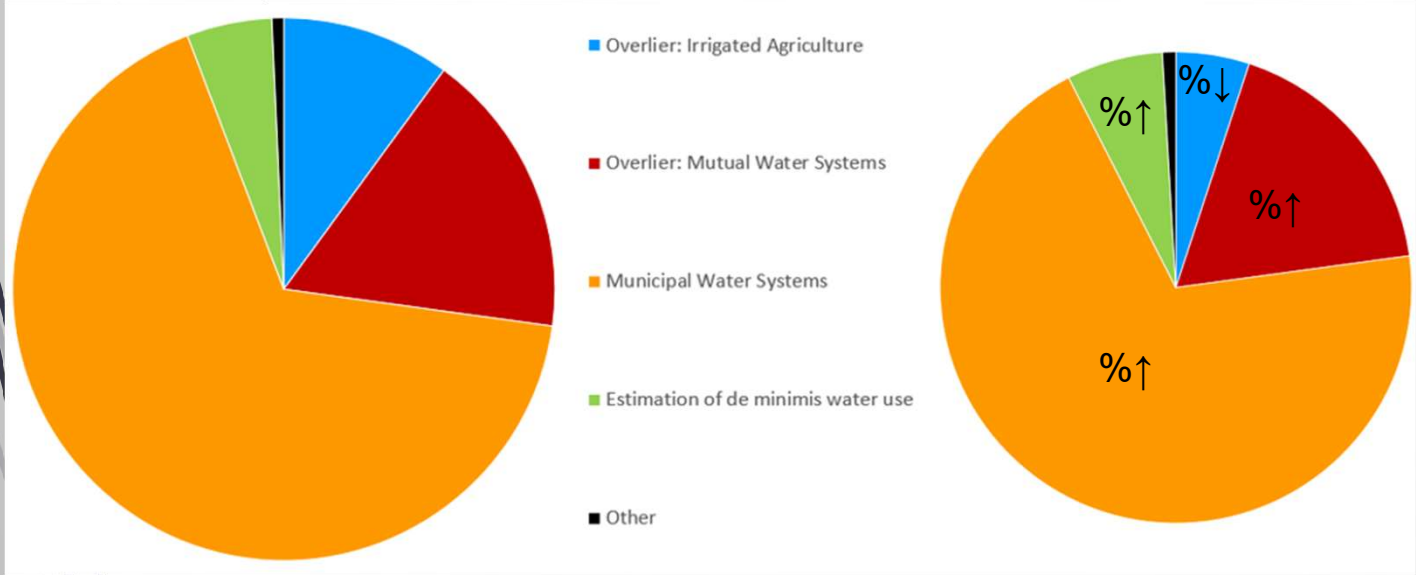
De minimis uses have the same amount of water use in both current and reduced scenarios because it is estimated.

If pumping is reduced, overliers have priority and municipal water systems reduce first

Option 2.

Basis: Equal Weighting of Acreage and Number of Connections for All Categories

Adjustment: Drinking Water Systems have Priority - If sustainable yield is reduced, drinking water systems reduce last



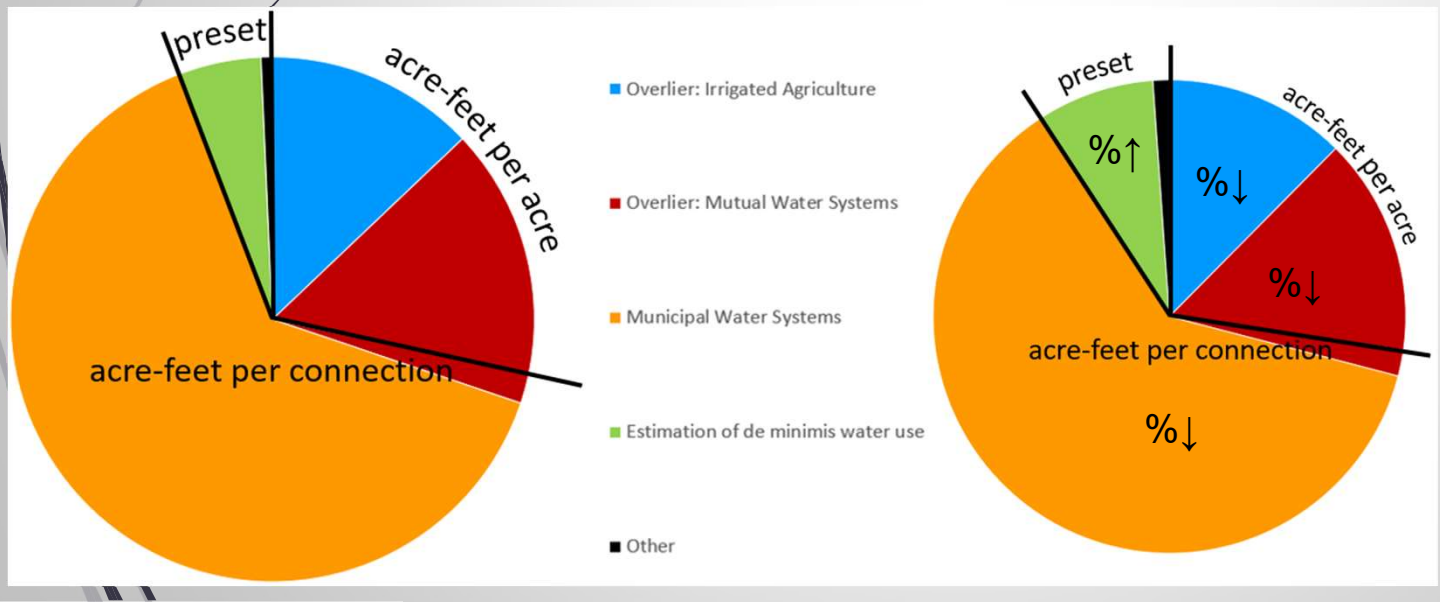
De minimis uses have the same amount of water use in both current and reduced scenarios because it is estimated.

If pumping is reduced, drinking water systems have priority and agriculture reduces extraction first

Option 3.

Basis: Per Connection Allocation for Small Parcels and Per Acreage for Large Parcels

Adjustment: Correlative Reduction in Groundwater Extraction - If sustainable yield is reduced, users reduce proportionally



De minimis uses have the same amount of water use in both current and reduced scenarios because it is estimated.

Municipal water systems receive allocation on a per connection basis, and overliers (mutual water systems and ag) receive allocations on a per connection basis for parcels smaller than 5 acres and a per acreage for parcels over 5 acres.

If pumping is reduced, users reduce proportionally.

Allocation Structure Options

- Option 1. Users with Overlying Groundwater Rights have Priority - Equal Weighting of Acreage and Number of Connections for All Categories
- Option 2. Drinking Water Systems Have Priority - Equal Weighting of Acreage and Number of Connections for All Categories
- Option 3. Correlative Reduction in Groundwater Extraction - Per Connection Allocation for Small Parcels and Per Acreage for Large Parcels
- Other?

Questions?