DRAFT WORK PRODUCT

Borrego Valley Groundwater Basin
Borrego Springs Subbasin
Groundwater Extraction Metering

Borrego Valley Groundwater Basin Sustainability Plan

Advisory Committee Meeting

June 29, 2017

Geosyntec consultants

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Presentation Topics

1. Subbasin Groundwater Extraction Metering
2. Sustainable Groundwater Management Act (SGMA) Legislation
3. Voluntary Groundwater Extraction Metering Program
4. Types of Flow Meters
5. Implementation of Flow Meter Monitoring
6. Recommendations and Funding

Subbasin Metering

Current Reporting Requirements

- **State Water Systems (Borrego Water District, State Parks)**
- **Small Water Systems**
- **County Major Use Permits for Golf Courses**

SGMA Reporting Requirements

- **Non–De Minimis Users (greater than 2 acre-feet per year)**
  - **Independent Pumpers**
  - **Municipal Pumpers**

SGMA Legislation

SGMA legislation provides for implementation of flow meter monitoring of all non–de minimis wells in the subbasin.

The pertinent SGMA requirement, per the California Water Code:

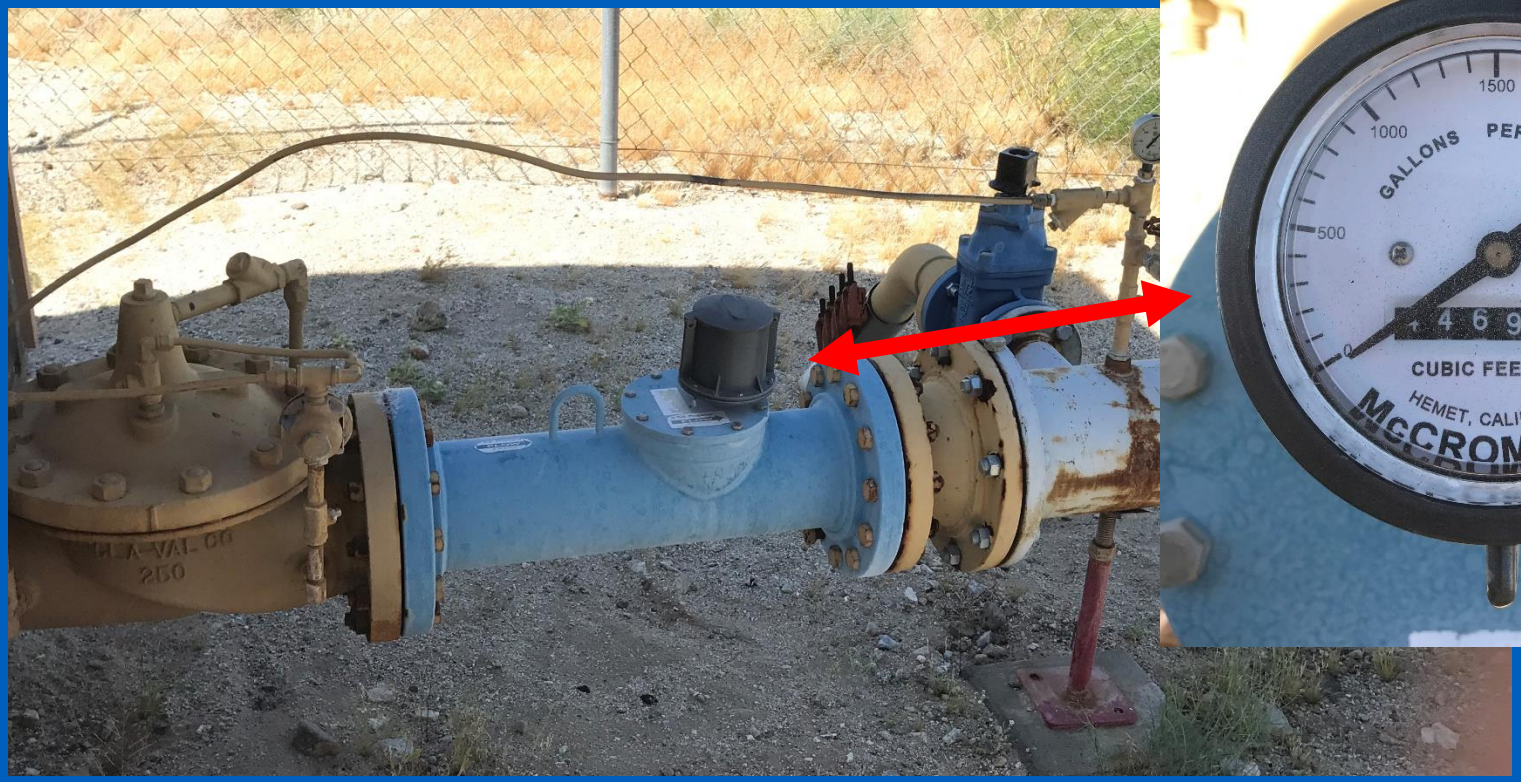
- **Section 10725.8, Measurement Devices and Reporting**

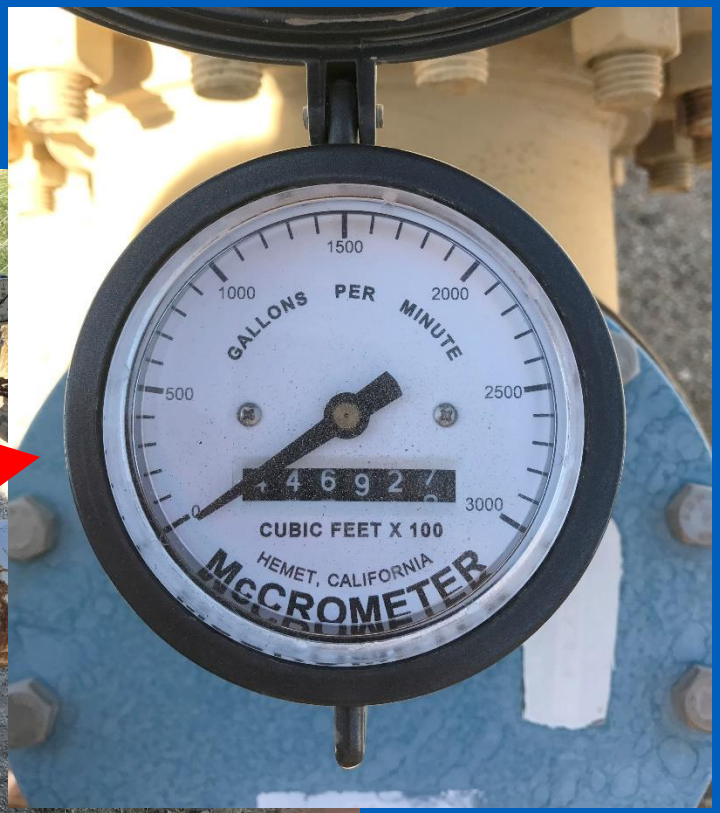
Voluntary Metering Program

- Groundwater Sustainability Agency (GSA) to apply for state grant to cover a portion of the cost for the voluntary installation of flow meters.
- Flow meters to be installed on existing production wells that extract more than 2 acre-feet of groundwater per year (non–de minimis users).
- For the grant proposal, applicants are required to sign a written agreement allowing access to install, monitor, and maintain flow meter equipment.
- Grant requires participation from independent pumpers for the grant proposal.

Flow Meters

Typical flow meter installed in Borrego Springs Subbasin





Flow Meters

Typical flow meter mechanical dial face installed in Borrego Valley Groundwater Basin

Instantaneous flow rate

Analog water production read-out typically recorded in gallons or cubic feet

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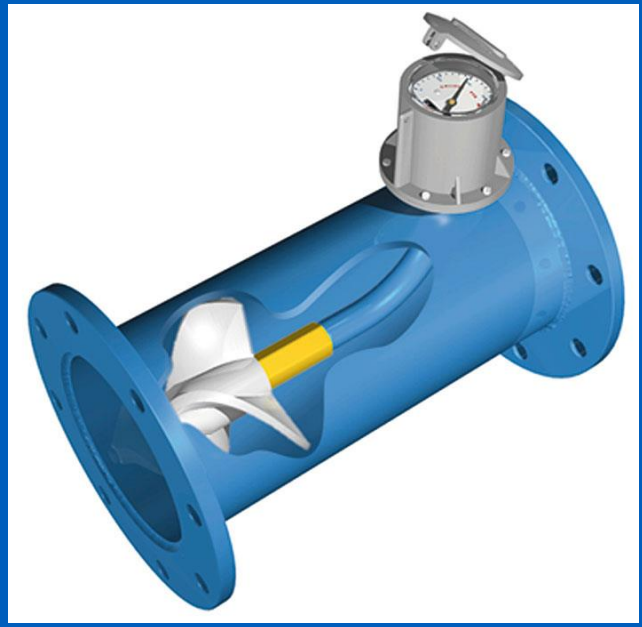
Flow Meters

Typical private residential flow meter installed in Borrego Springs Subbasin

Flow Meter Options

Propeller Type

- Propeller flow meters use mechanical parts to record production and/or measure flow rate.
- Commonly used in agriculture and municipal settings (majority of meters in Borrego Springs are propeller meters).
- Propeller meters must be sized based on expected flow rate and pipe diameter size.
- Historically reliable for long-term use.
- May require maintenance, as bearing wear can occur from the internal propeller. Calibration is also periodically required.
- Future data collected would be of comparable accuracy to historically collected flow meter data.
- Flow meter accuracy plus or minus 2%.

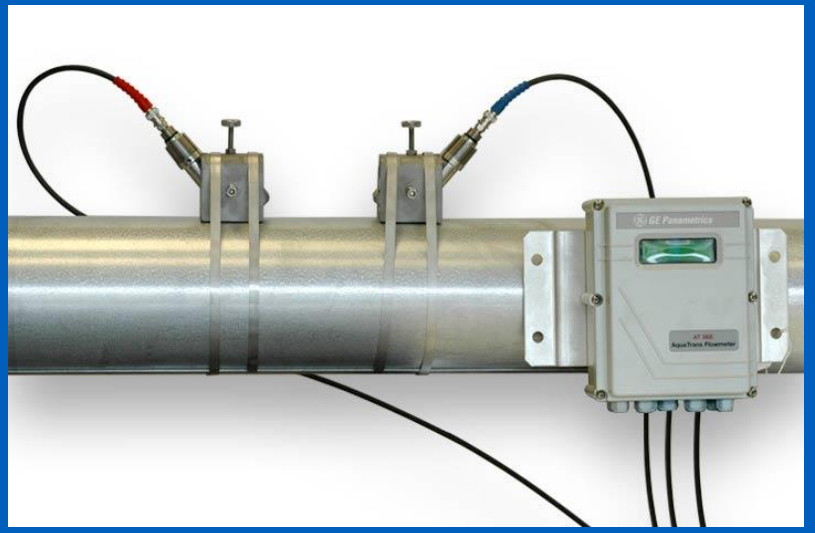


Source: Alco Engineering 2017, McCrometer 2017

Flow Meter Options

Ultrasonic Type

- Ultrasonic flow meters measure flow velocity using an emitted beam of ultrasound (soundwave) to calculate flow volume.
- Commonly used in wastewater treatment and low-flow applications.
- Can be affected by temperature, density, viscosity, and suspended particles.
- Not recommended in Borrego Springs due to temperature variability and unknown long-term reliability.
- Requires a power source to register flow – potential for batteries to fail.
- Alligator clamps prone to electrical failure.
- Manual on/off switches prone to operator error.



Source: rshydro 2017

Flow Meter Options

Automated Meter Infrastructure (AMI)

- Reporting intervals from daily to every 15 minutes
- Easy access to data via web or mobile device

Communications Options:

- Satellite
- Cellular

Power Options:

- Grid
- Battery-Only
- Rechargeable Solar Power

Source: McCrometer 2017

Flow Meter Installation

Installation Process

- Although some wells may have flow meters installed, many wells will require new flow meter installation, retrofits, or meter calibration.
- Flow meter installation typically takes 4–8 hours.
- Installation to be performed by a licensed pump contractor.

Options for Install

- GSA install through subsidized program.
- Independent pumper install at own cost.

Source: Fain Drilling 2017

Reporting

Flow Meter Reporting

It is recommended that flow meter reads occur, at minimum, on a monthly basis to document seasonal fluctuation in water demand. Meter reads will either be performed manually by GSA staff, be self-reported by private pumpers, and/or be read remotely using advanced metering infrastructure.

Options for Recording

- Monthly Manual Reads
  - GSA staff performs flow meter reads throughout the Subbasin
  - Private pumpers self report
  - Automated reads (likely will require periodic manual meter reads for confirmation of automated data)

Funding

Meter Installation Funding

- Funding available through the California Department of Water Resources (DWR) Proposition 1 Grant – Proposal Solicitation Package for Groundwater Sustainability Plans and Projects.
- Borrego Springs qualifies under two funding categories: Severely Disadvantaged Community (SDAC) and Critically Overdraft Subbasin.
- Grant proposal requires agreements with independent pumpers to install flow meters and allow access to read meters.
- Grant will allow for subsidized installation of flow meters during a limited timeframe.
- The GSA requests an itemized cost estimate for the installation of flow meters. The cost estimate will include the cost of the meter and appurtenant fittings/pipe, and labor for installation.

Recommendations and Next Steps

- Prepare list of independent pumpers interested in participating in the Voluntary Metering Program.
- Draft agreement for property access and documentation of groundwater extraction facilities (private wells) within the Basin.
- Investigate to determine flow meter status for existing wells.
- Apply for Prop 1 Grant.
  - GSA to receive flow meter cost estimate.

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Borrego Valley Groundwater Basin
Borrego Springs Subbasin
Proposed Management Areas

Borrego Valley Groundwater Basin
Sustainability Plan

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Proposed Management Areas

Management Area: An area within a basin for which the Groundwater Sustainability Agency (GSA) may identify different minimum thresholds, measurable objectives, monitoring, or projects and management actions based on differences in water use sector, water source type, geology, aquifer characteristics, or other factors.

Three Management Areas are proposed for the Subbasin:

- North Management Area (NMA)
- Central Management Area (CMA)
- South Management Area (SMA)

SGMA Regulations

- GSA may define management areas where **minimum thresholds** for each applicable sustainability indicator differ.
  - **Minimum Threshold**

    "Minimum threshold" refers to a numeric value for each sustainability indicator used to define undesirable results.
  - **Minimum Threshold Example**

    Groundwater levels do not drop to the extent that they dewater the upper aquifer at specific indicator wells. In this example, the undesirable result is dewatering the upper aquifer. This undesirable result may apply to the North Management Area where the upper aquifer is thick (hundreds of feet thick) and still saturated, but not to the South Management Area where the upper aquifer is thin (tens of feet thick) and already dewatered.

SGMA Regulations

- GSA may define management areas for which measurable objectives for each applicable sustainability indicator differ.
  - Measurable Objective

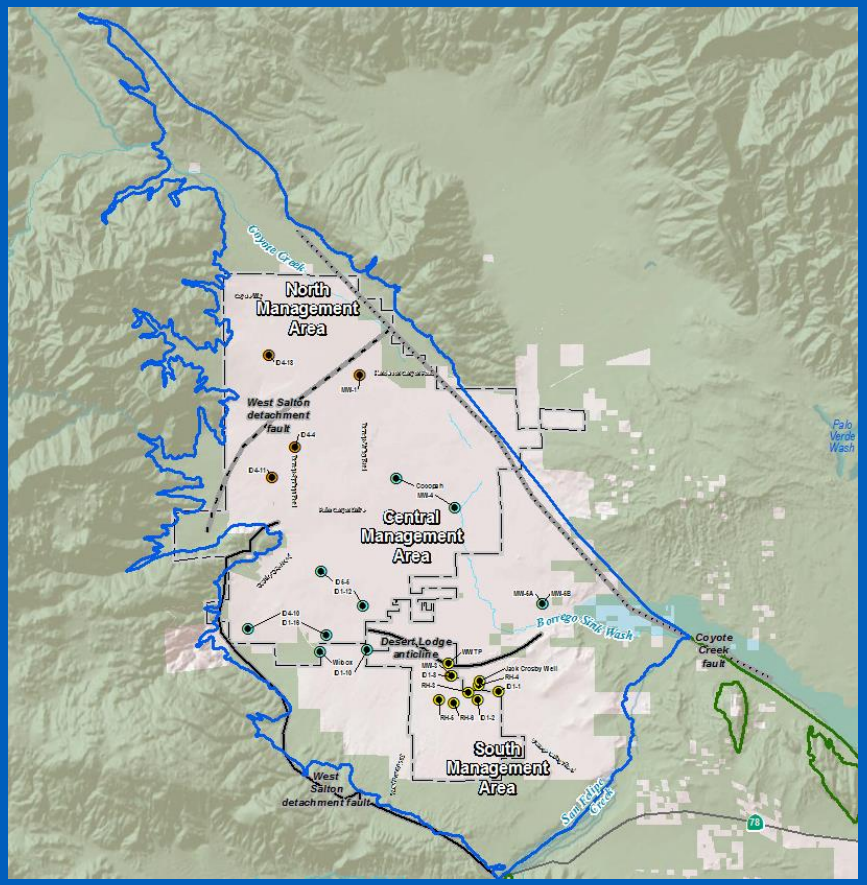
    "Measurable objectives" refer to specific, quantifiable goals for the maintenance or improvement of specified groundwater conditions that have been included in an adopted plan to achieve the sustainability goal for the basin.
  - Measurable Objective Example

    Reduce trend of declining groundwater level at indicator wells by 20% by Year 5 of plan implementation. If the current rate of drawdown is 3 feet per year at a specific indicator well, the trend should be reduced to 2.4 feet per year at Year 5 of plan implementation.

Delineation of Management Areas

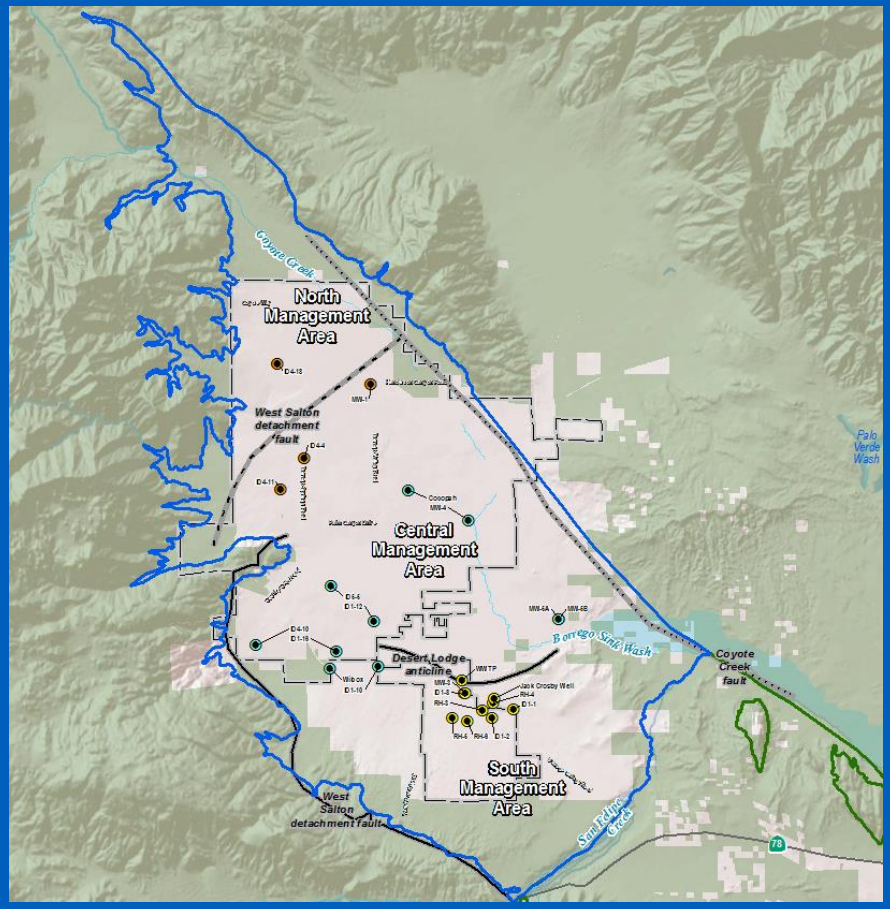
Criteria for Delineation

- Distribution of the three aquifers underlying the subbasin (upper, middle, and lower)
- Geologic controls on groundwater movement
- Differences in overlying land uses and associated groundwater pumping depressions
- Groundwater quality



North Management Area

- Mostly agricultural land use
- Majority of pumping for agricultural uses
- Thicker upper aquifer
- Potential for nitrate above drinking water standards in the upper aquifer based on historical data from select wells



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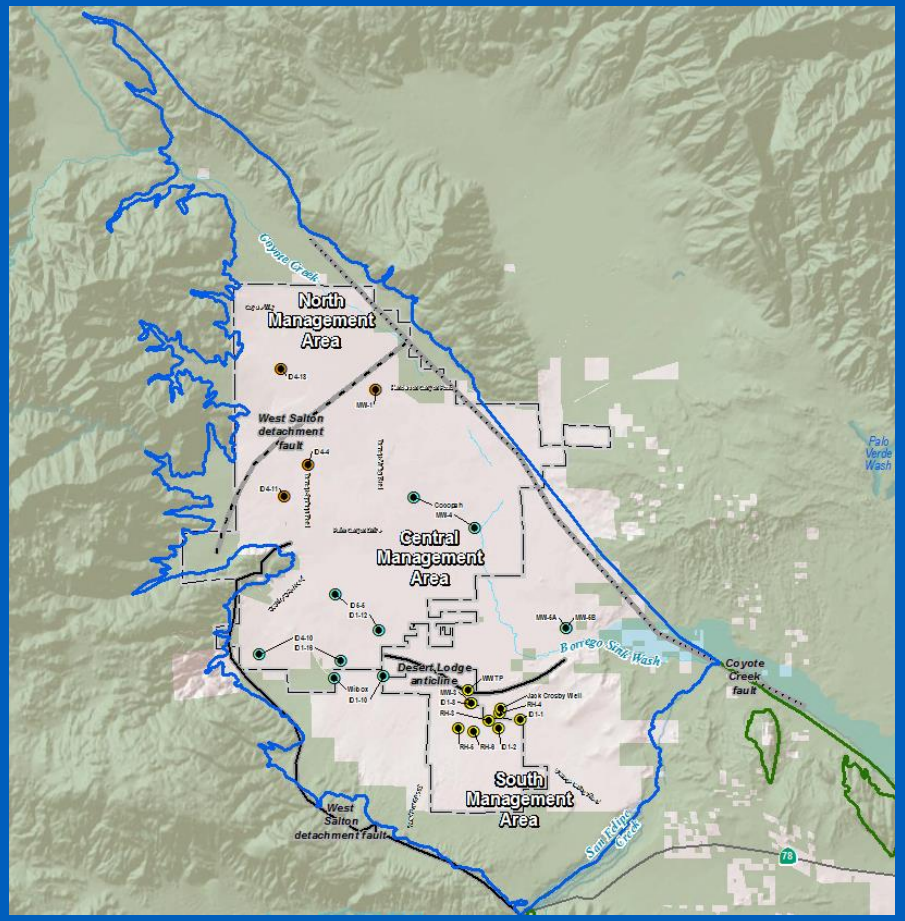
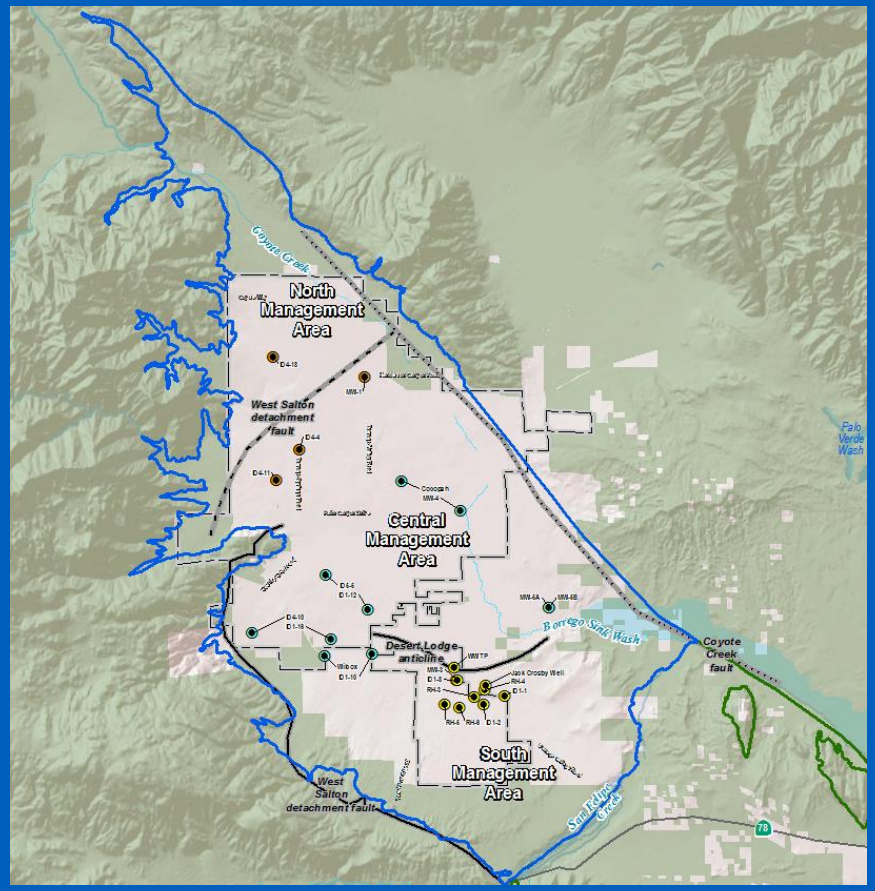
Central Management Area

- Recreational and residential land use
- Majority of pumping for municipal and recreational uses
- Upper aquifer thins and is less saturated
- Water quality typically suitable for drinking water



South Management Area

- Dominated by recreational land use
- Majority of pumping for recreational use
- Upper aquifer becomes unsaturated
- Arsenic detected above drinking water standards in many wells



Questions and Discussion

Roger Mann Study Proposed Projects

Cost Rank	Action Description	Net AFY Overdraft Reduction	Million $ cost	$/AF (20 years)	$/AFY
1	Manage tamarisk	350	$0.56	$116.26	$1,600.00
2	Retire old citrus, 50% of citrus acres, $10k per acre	5,183	$13.13	$184.07	$2,533.28
3	Replace 85 acres golf irrigated turf with native landscaping	478	$1.53	$232.58	$3,200.84
4	Retire mid-aged citrus, 25 % of citrus acres, $14k per acre	2,591	$8.91	$249.87	$3,438.83
5	Retire 70% of all citrus acres (GSP)	7,670	$27.61	$261.58	$3,600.00
6	Replace 90 acres golf irrigated non-turf area with native landscaping	386	$1.62	$304.95	$4,196.89
7	Retire 75% of palm acreage, $15k per acre	2,147	$10.36	$350.61	$4,825.34
8	Reduce municipal irrigated landscape area	317	$2.70	$618.88	$8,517.35
9	Reduce HOA landscaping	66	$0.56	$616.51	$8,484.85
10	Maximize citrus irrigation efficiency	264	$2.52	$693.58	$9,545.45
11	Stop golf winter over-seeding on 300 acres	154	$1.54	$726.61	$10,000.00

Roger Mann Study Proposed Projects

Cost Rank	Action Description	Net AFY Overdraft Reduction	Million $ cost	$/AF (20 years)	$/AFY
12	Percolation ponds and wastewater recovery wells below sewer evaporation ponds	50	$0.60	$871.93	$12,000.00
13	Golf irrigation system management (physical and operational)	41	$0.51	$903.83	$12,439.02
14	Irrigation efficiency on remaining palm, potato and nursery	101	$1.40	$1,007.18	$13,861.39
15	De Anza Country Club storm water project, 24 acres	154	$2.21	$1,042.73	$14,350.65
16	Rehabilitate golf irrigation systems on remaining acres	304	$5.76	$1,376.73	$18,947.37
17	Retire 75% of potato acreage, $15k per acre	512	$10.54	$1,495.79	$20,585.94
18	Improve HOA irrigation efficiency	26	$0.78	$2,179.82	$30,000.00
19	Municipal landscape audits	127	$3.80	$2,174.10	$29,921.26
20	Viking Ranch storm water project, 150 acres	300	$10.32	$2,499.53	$34,400.00

Sources: Mann 2014; Dudek 2016