DRAFT WORKPRODUCT

Borrego Valley Groundwater Basin
Borrego Springs Subbasin
Groundwater Sustainability Plan

Advisory Committee Meeting

October 4, 2018

Geosyntec consultants

DUDEK

GSP Organization

The Groundwater Sustainability Plan is organized as follows:

ES Executive Summary

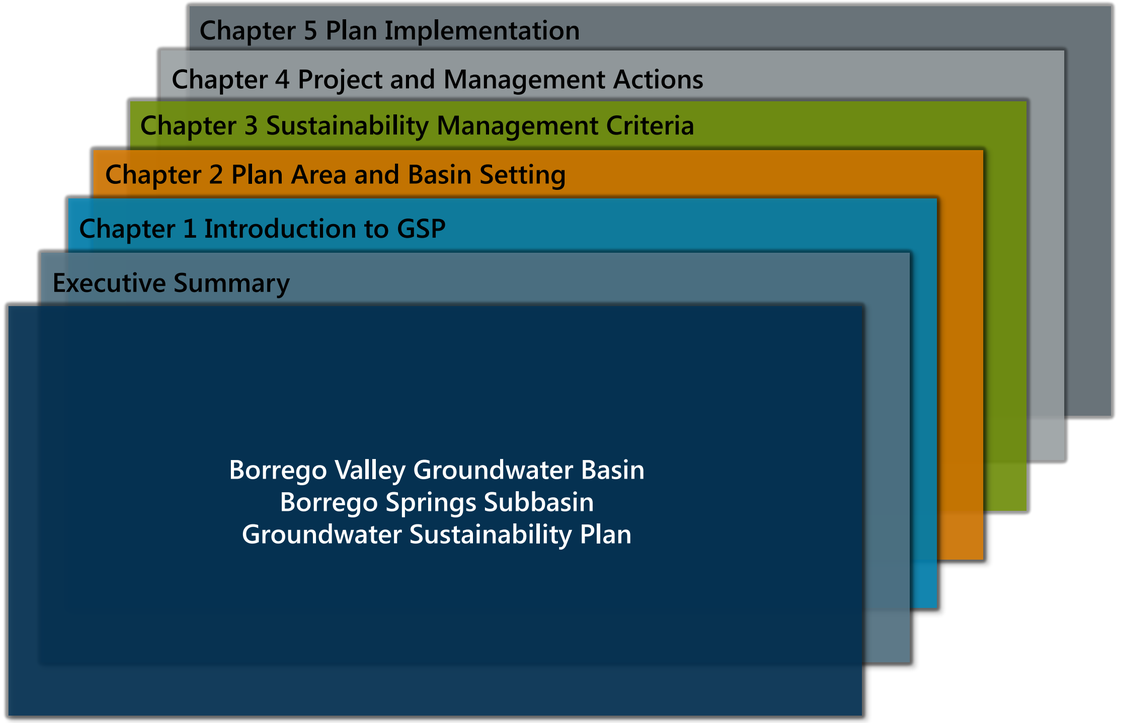
01 Chapter 1
Introduction to GSP

02 Chapter 2
Plan Area and Basin Setting

03 Chapter 3
Sustainable Management Criteria

04 Chapter 4
Projects and Management Actions

05 Chapter 5
Plan Implementation



CHAPTER 1

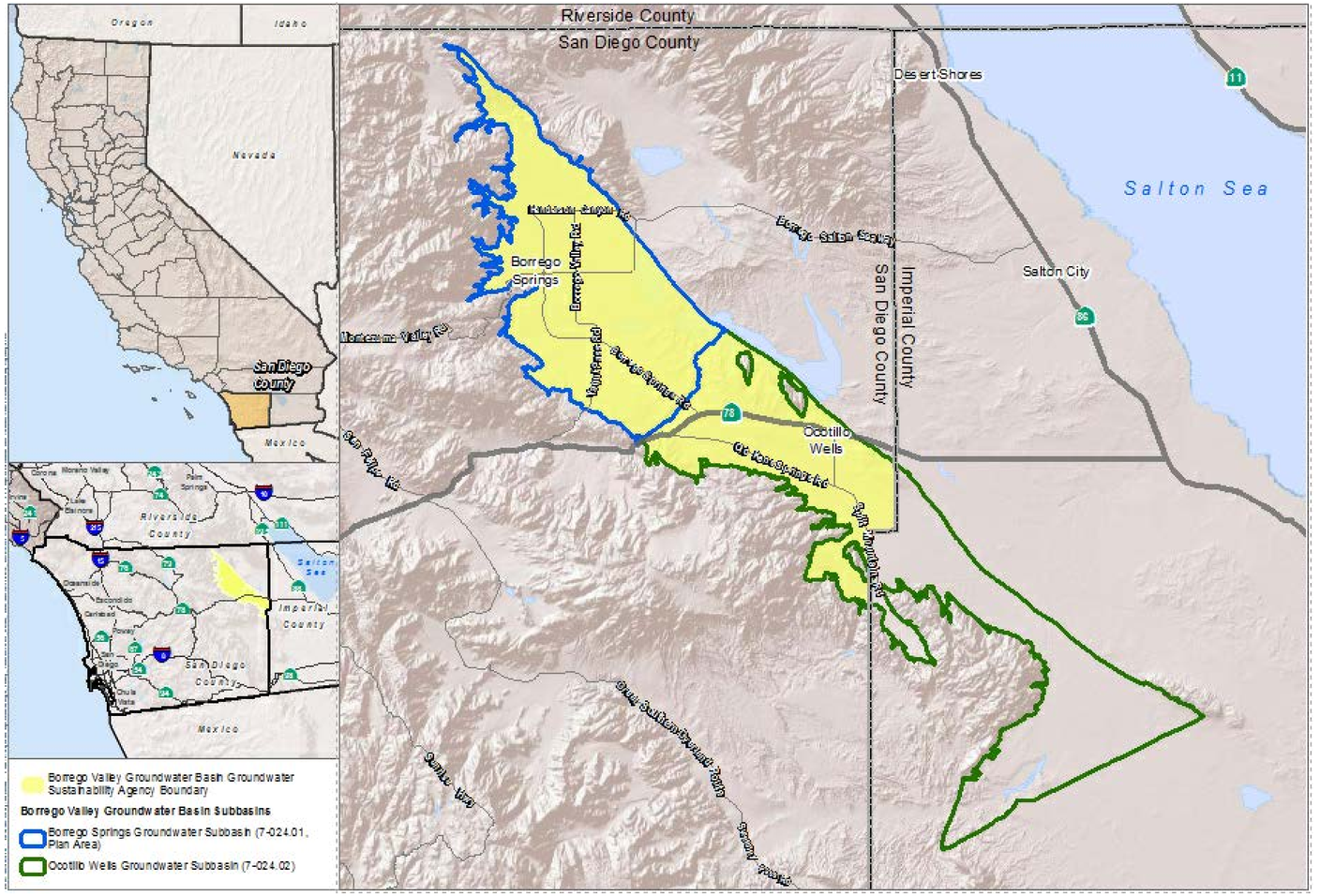
INTRODUCTION TO GSP

CHPATER 1 INTRODUCTION TO GSP

Purpose

Manage and use groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results.

GSP = Operate the Borrego Springs Subbasin within sustainable yield without causing an undesirable result. GSAs must achieve their sustainability goal within a maximum 20 years of GSP implementation.

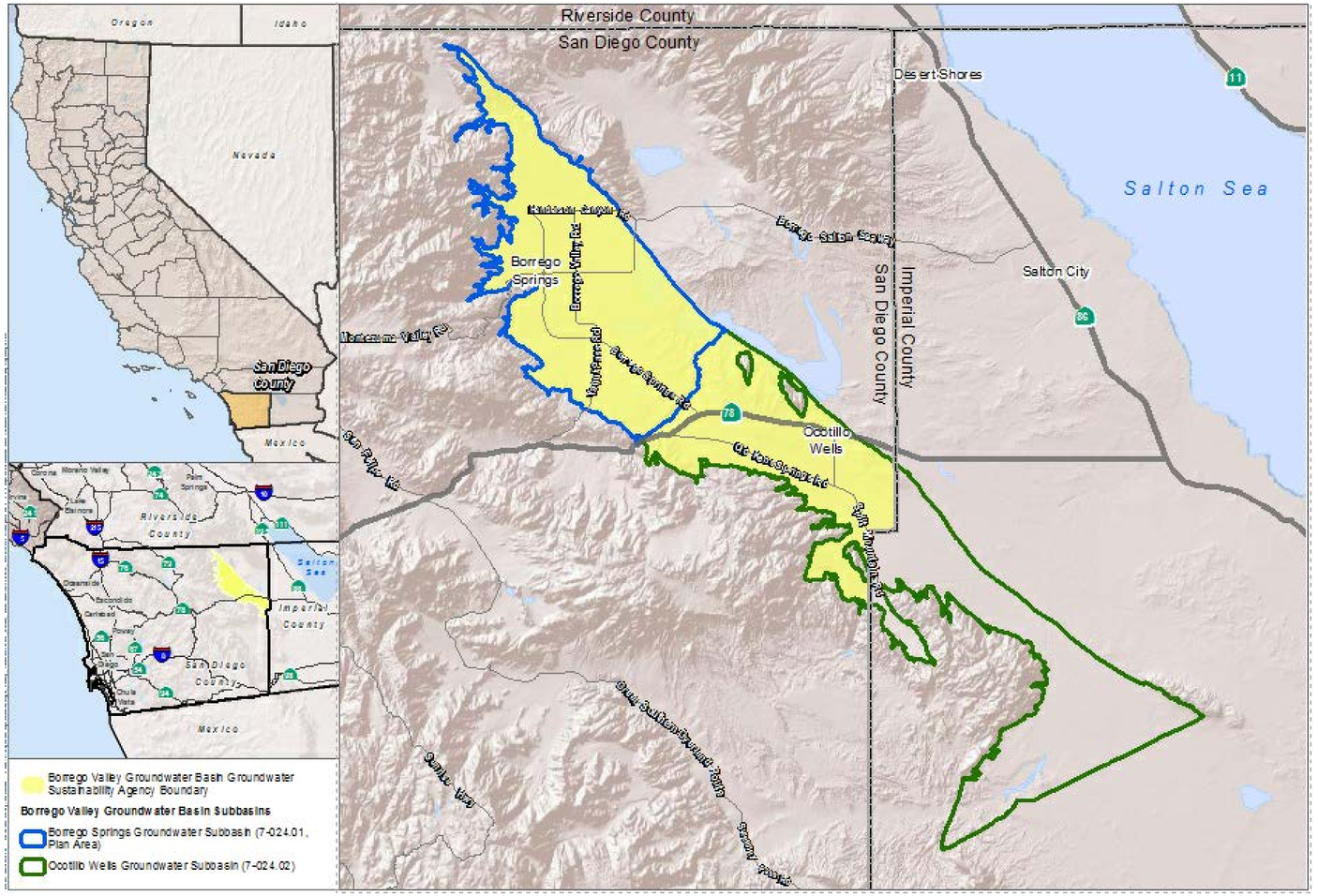


Agency Information

Borrego Valley GSA

Borrego Water District: Water Supply & Management Responsibilities within its Service Area;

County of San Diego: Land Use Responsibility within the Borrego Valley Groundwater Basin within the Boundary of the County of San Diego.

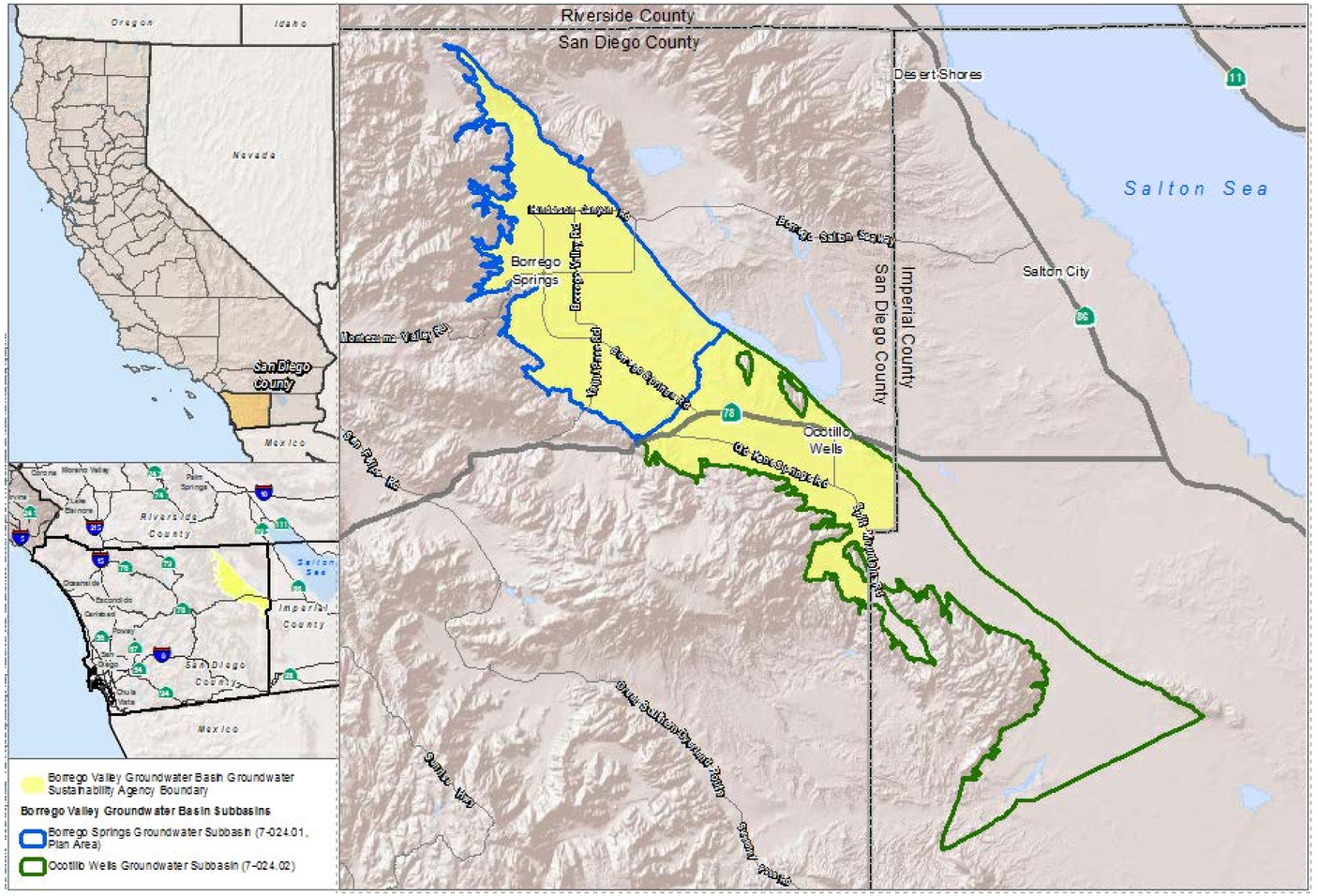


Organization and Management Structure

The GSA has designated:

Borrego Basin Plan Core Team (Core Team): BWD and County representatives

Advisory Committee (AC): Borrego Water Coalition (4 members), State Parks, Borrego Springs Sponsor Group, Borrego Valley Stewardship Council, BWD, Farm Bureau



Legal Authority

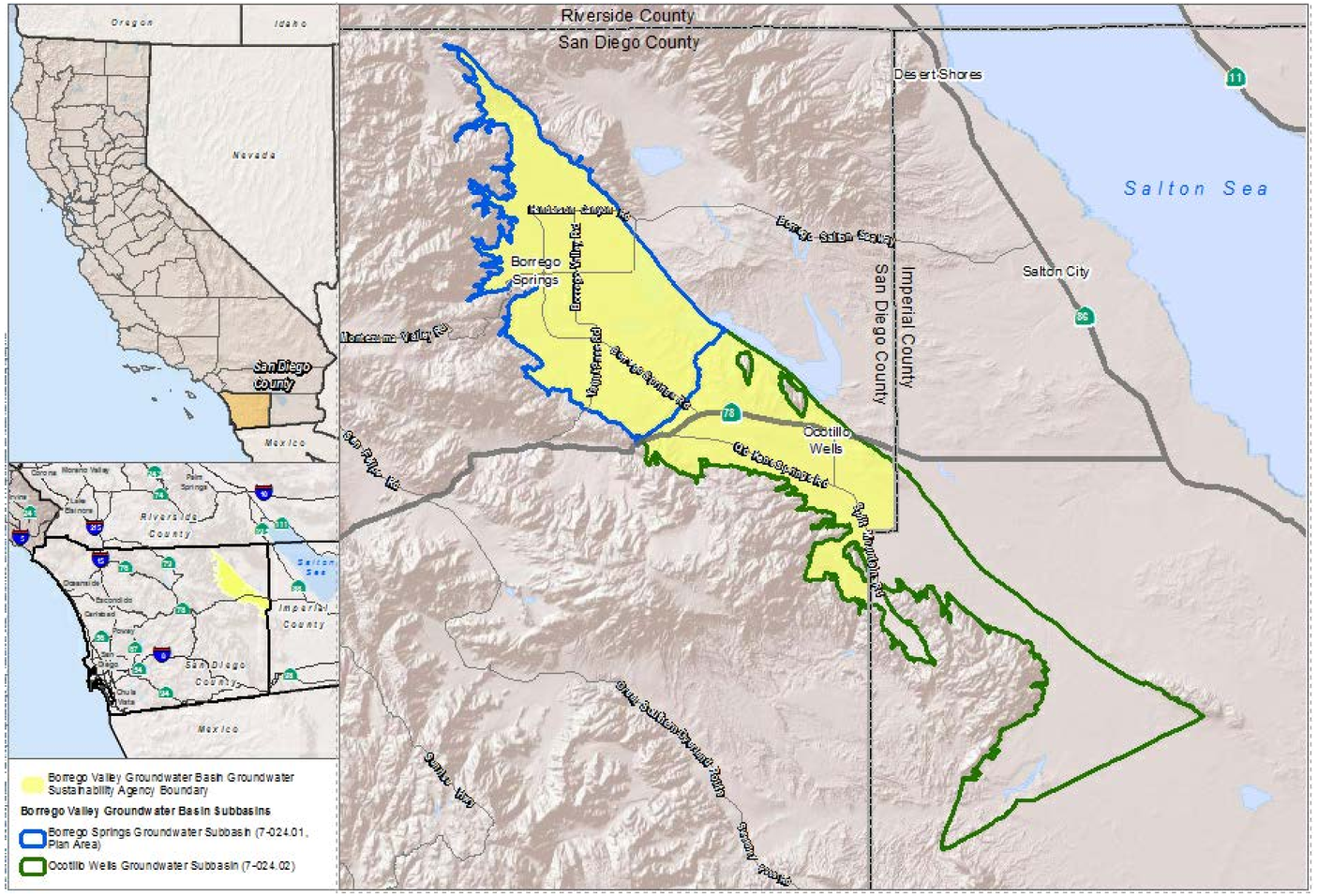
Sustainable Ground Water Management Act

September 16, 2014: Governor Brown Signed SB 1168 & 1319 & AB 1739 to collectively create SGMA legislation

Provides local groundwater agencies with the regulatory, technical & financial authority necessary to manage groundwater.

SGMA chaptered in California Water Code Division 6, Part 2.74.

GSP Regulations Title 23 California Code of Regulations (CCR), Division 2, Chapter 1.5 and Subchapter 2 (23 CCR § 350 et seq.).



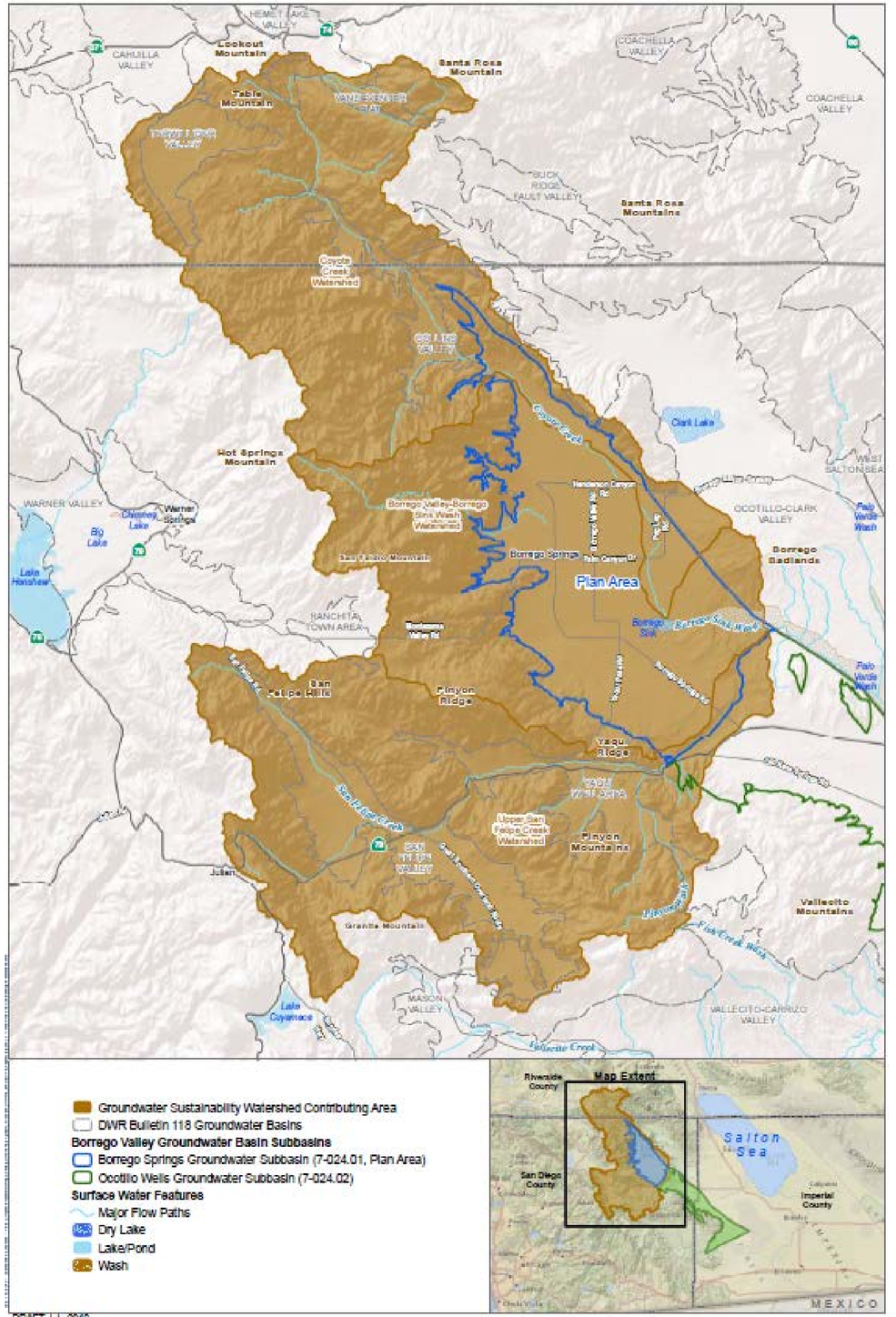
CHAPTER 2

PLAN AREA AND BASIN SETTING

DESCRIPTION OF PLAN AREA

Description of Plan Area

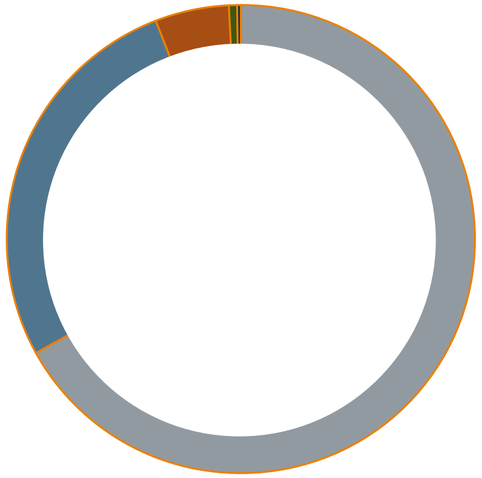
- ❑ Jurisdictional Areas and other Features
- ❑ Water Resource Monitoring and Management Programs
- ❑ Land Use
- ❑ Additional Components
- ❑ Notice and Communication



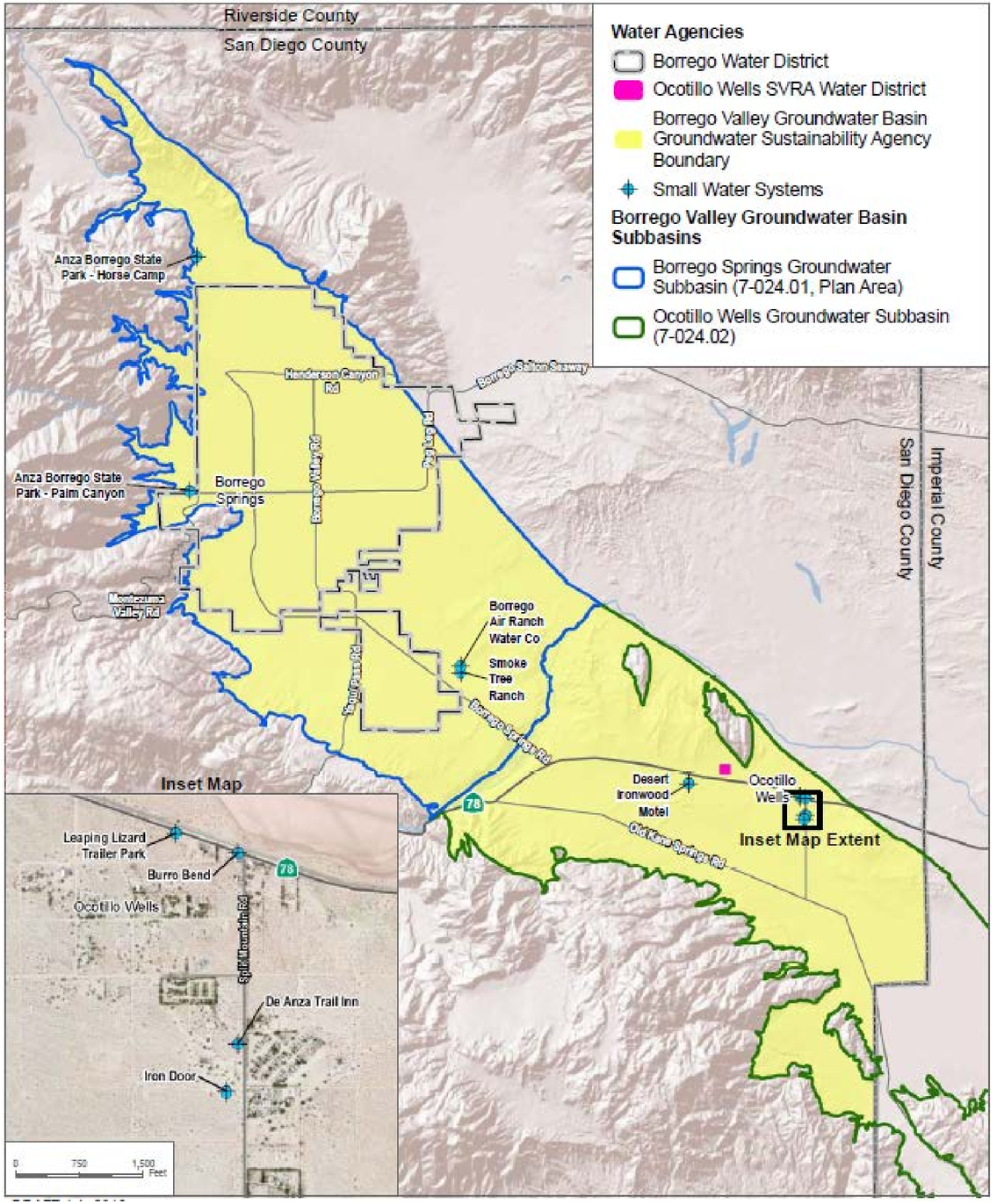
Description of Plan Area

❑ Jurisdictional Areas and other Features

Land Ownership

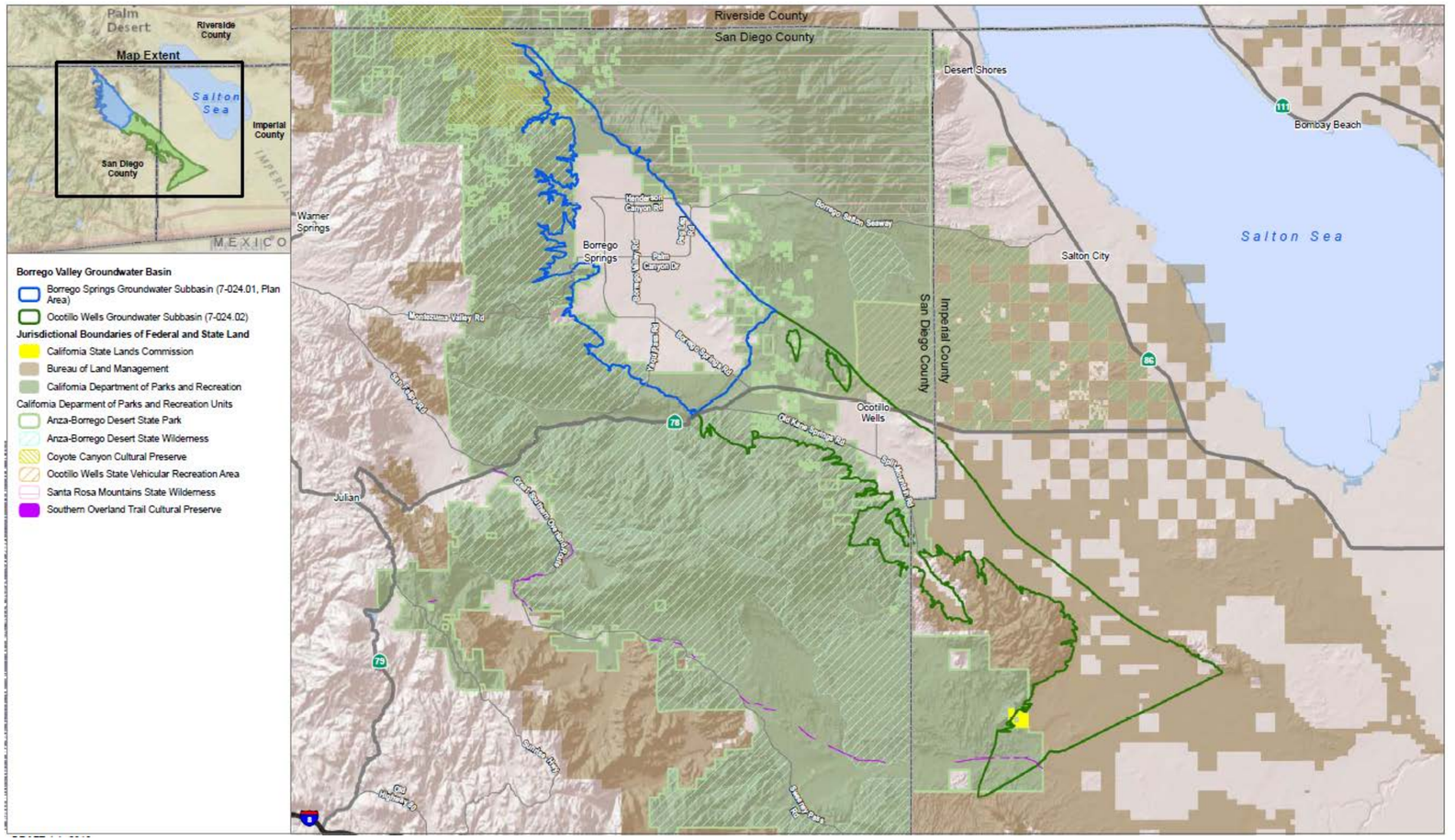


- Private (67%)
- State (27%)
- Non-Profit (5%)
- County (<1%)
- Special District (<1%)



Description of Plan Area

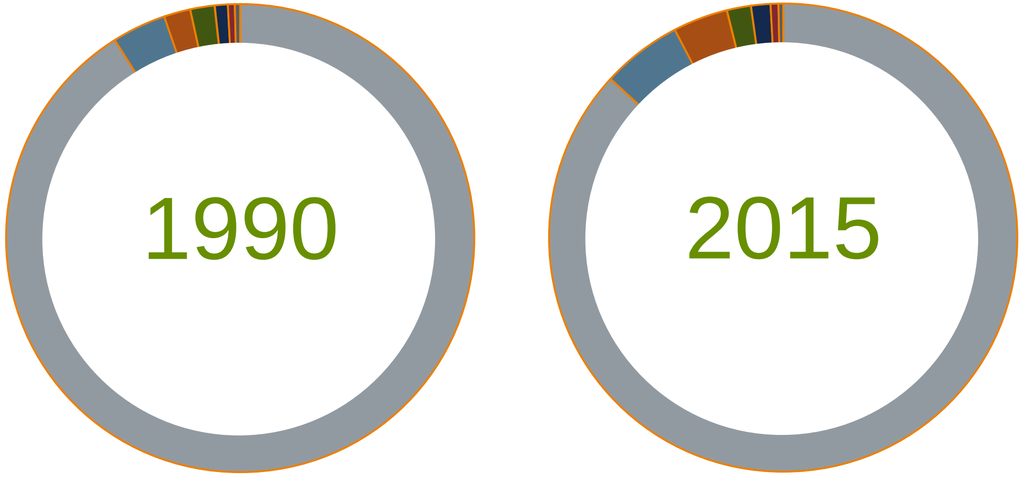
❑ Jurisdictional Areas and other Features



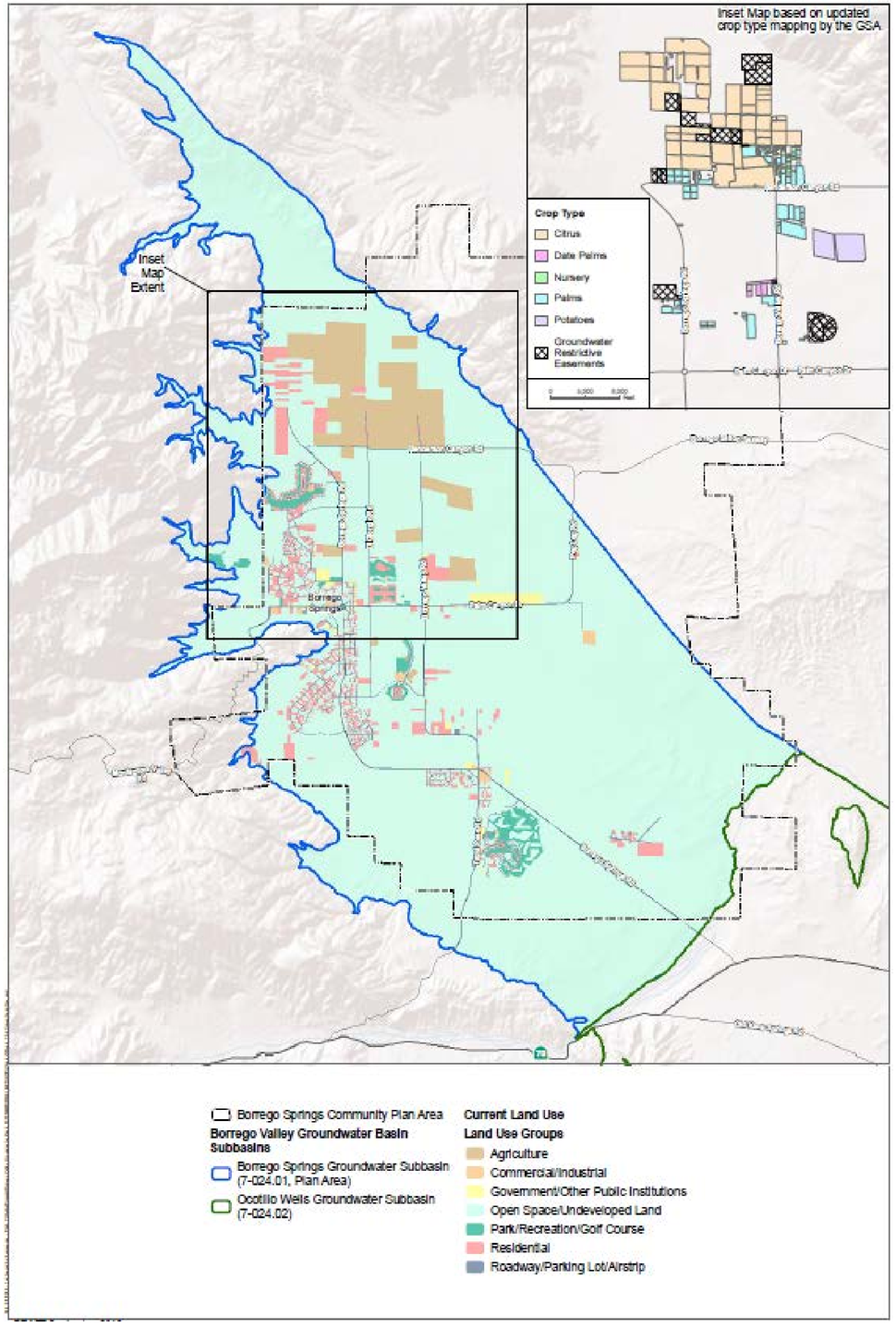
Description of Plan Area

❑ Jurisdictional Areas and other Features

Land Use



- Open Space/Undeveloped Land (91.0% / 86.8%)
- Agriculture (3.7% / 5.5%)
- Roadway/Parking Lot/Airstrip (1.7% / 1.7%)
- Park/Recreation/Golf Course (0.9% / 1.3%)
- Government/Other Public Institutions (0.5% / 0.5%)
- Commercial/Industrial (0.4% / 0.3%)

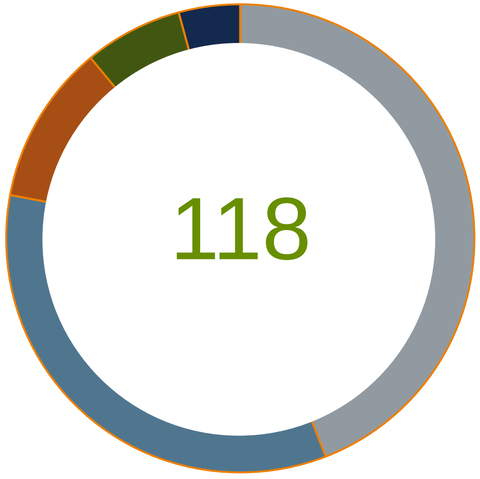


CHAPTER 2 PLAN AREA AND BASIN SETTING

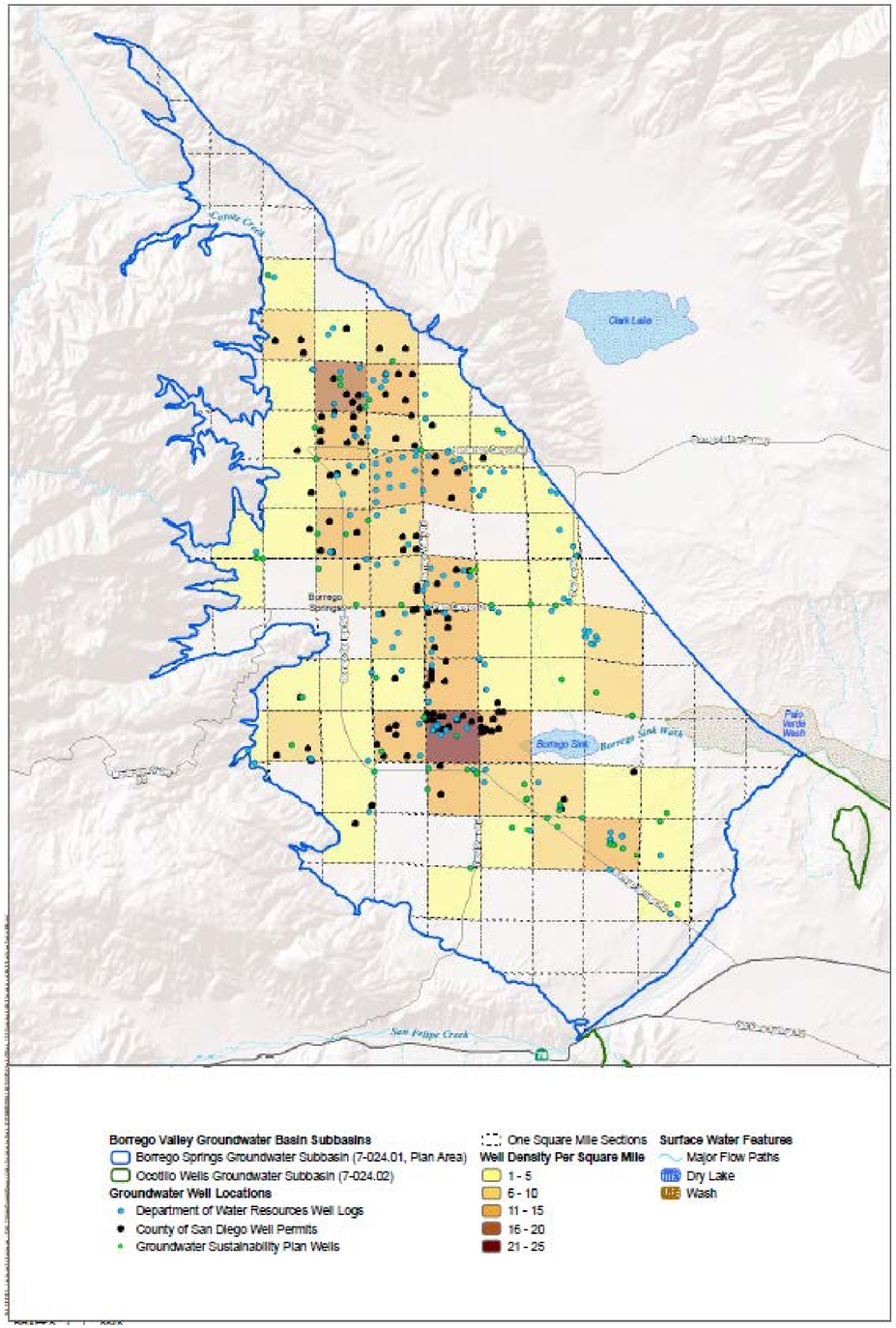
Description of Plan Area

❑ Jurisdictional Areas and other Features

Water Wells



- De-minimis wells (52)
- Agriculture irrigation wells (40)
- Golf irrigation wells (13)
- Municipal wells (8 [active])
- Small Water Systems/State/County (5)



Description of Plan Area

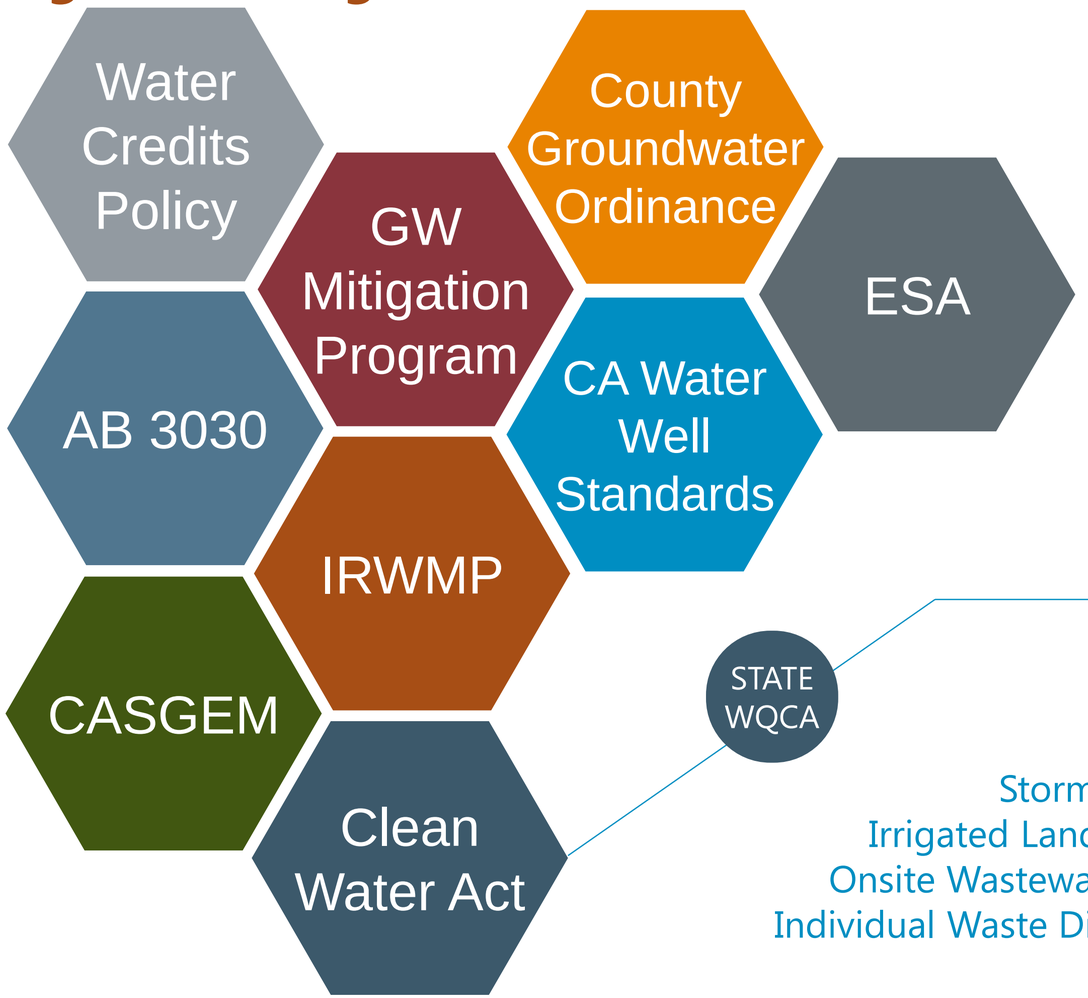
❑ Water Resource Monitoring and Management Programs

Consolidate

SGMA

Complement

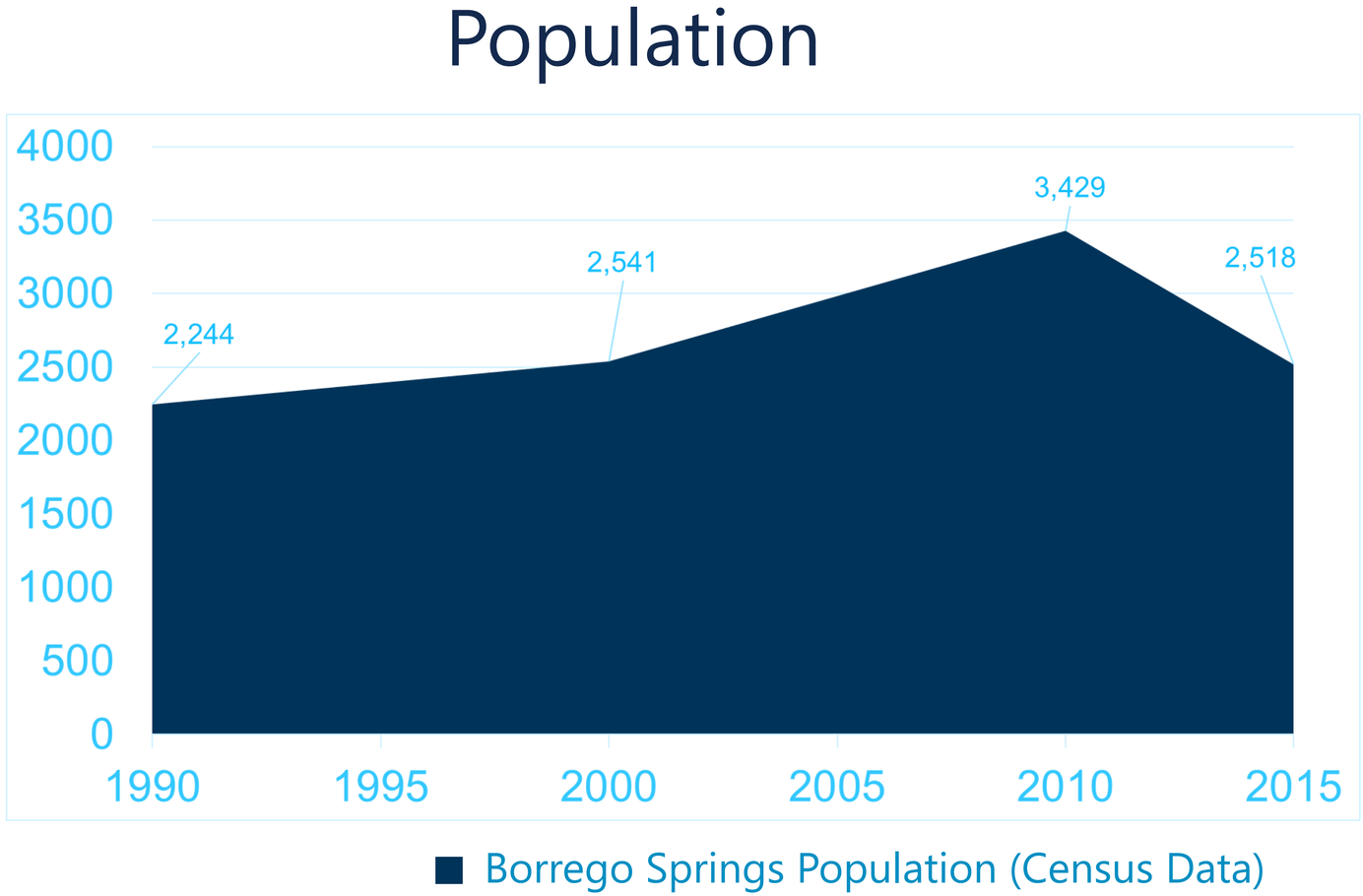
SGMA



Basin Plan
TMDLs
WQOs
Stormwater General Permits
Irrigated Lands Regulatory Program
Onsite Wastewater Treatment Systems
Individual Waste Discharge Requirements

Description of Plan Area

❑ Jurisdictional Areas and other Features



CHAPTER 2 PLAN AREA AND BASIN SETTING

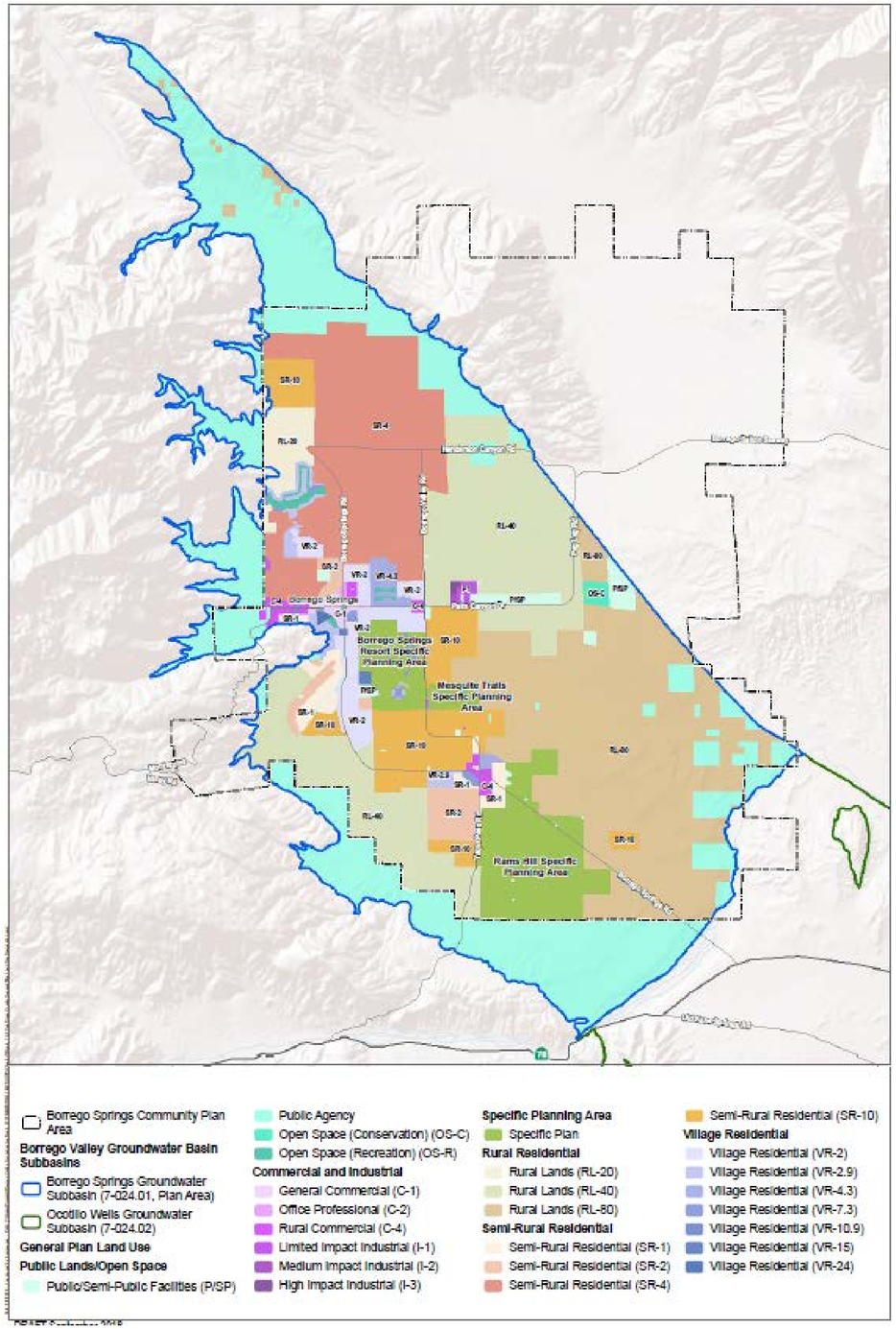
Description of Plan Area

❑ Land Use

County General Plan

Land Use

Community Plan



CHAPTER 2 PLAN AREA AND BASIN SETTING

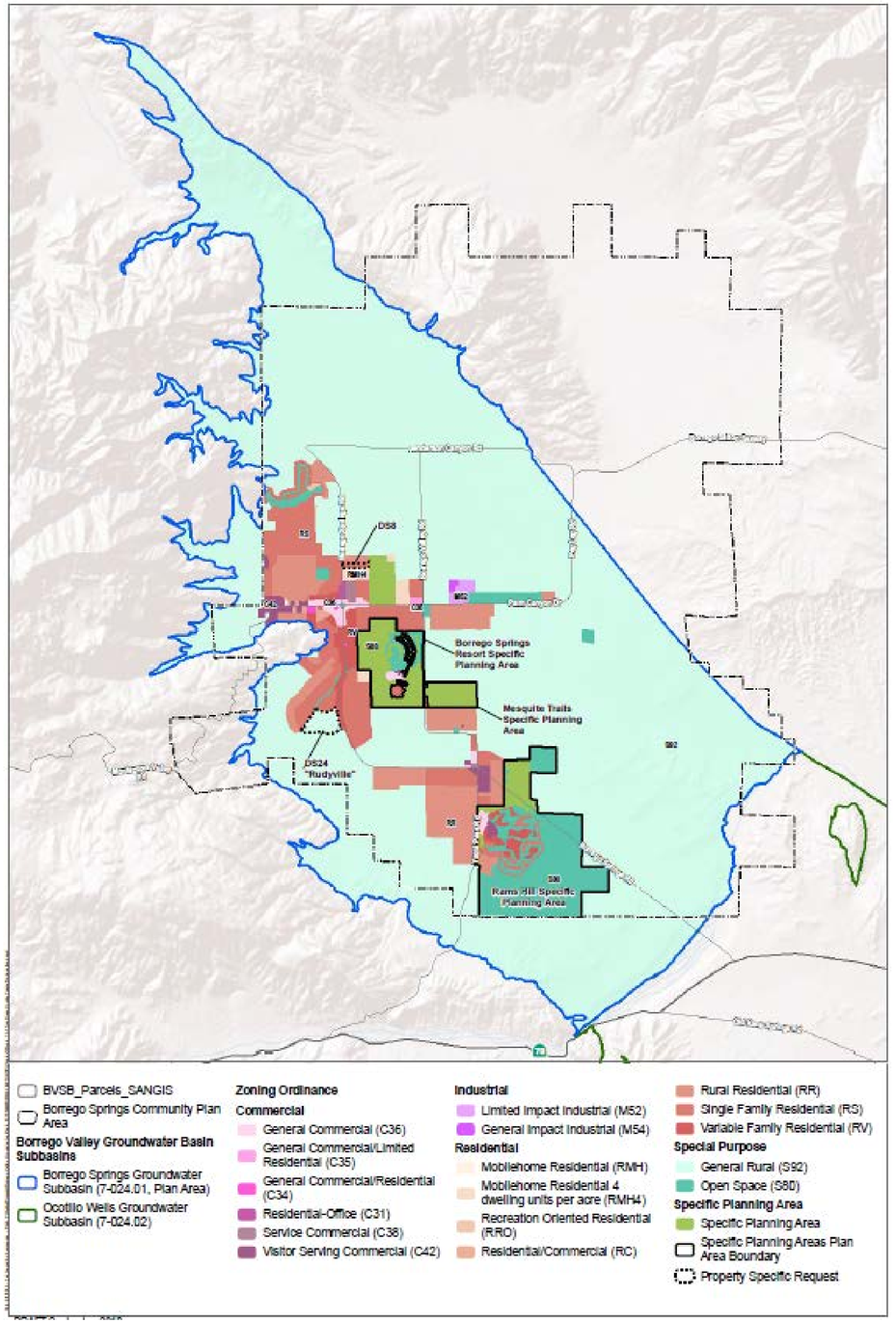
Description of Plan Area

❑ Land Use

County General Plan

Zoning

Community Plan



Description of Plan Area

❑ Additional Components

- Wellhead Protection
- Migration of contaminated groundwater
- Well abandonment and well destruction program
- Replenishment of groundwater extractions
- Conjunctive use and underground storage
- Well construction policies
- Groundwater contamination cleanup, recharge, diversions to storage, conservation, water recycling, conveyance, and extraction projects
- Efficient water management practices
- Relationships with state and federal regulatory agencies
- Land use plans and efforts to coordinate with land use planning agencies to assess activities that potentially create risks to groundwater quality or quantity
- Impacts on groundwater dependent ecosystems
- Well Metering (Borrego Valley GSP component)
- Water Quality Monitoring (Borrego Valley GSP component)

Description of Plan Area

❑ Notice and Communication

Advisory Committee

Ryan Hall
AGRICULTURAL PUMPERS

Bill Berkley
RECREATIONAL PUMPERS

Jack McGrory
INDEPENDENT PUMMPERS

Jim Wilson
AT-LARGE MEMBER

Borrego Water Coalition (4 members)

Rebecca Falk
BORREGOSPRINGS COMMUNITY SPONSOR GROUP

Diane Johnson
BORREGO VALEY STEWARDSHIP COUNCIL

Gary Haldeman
BORREGO WATER DISTRICT RATEPAYERS

Jim Seley
SAN DIEGO COUNTY FARM BUREAU

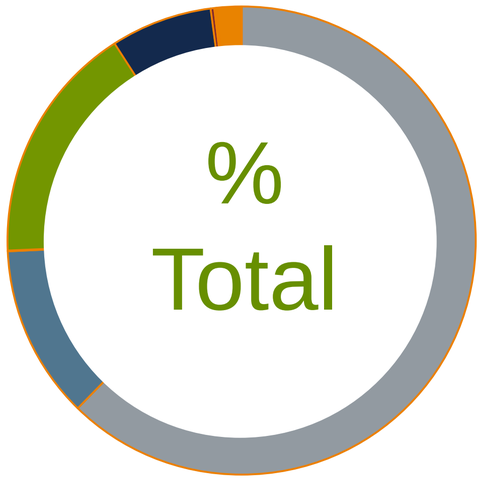
Gina Moran
ANZA-BORREGO DESERTSTATE PARK

Description of Plan Area

❑ Notice and Communication

Beneficial Uses and Users

Beneficial Use
Beneficial Users



- Agriculture (62%)
- Municipal (12%)
- Industrial (0.04%)
- Recreation [Golf Courses] (17%)
- Water Credits [original face value as AG-1 credit] (7%)
- Domestic Users [Non de-minimis] (0.3%)
- De-minimis users (0.1%)
- Groundwater Dependent Ecosystems (2%)

CHAPTER 2

PLAN AREA AND BASIN SETTING

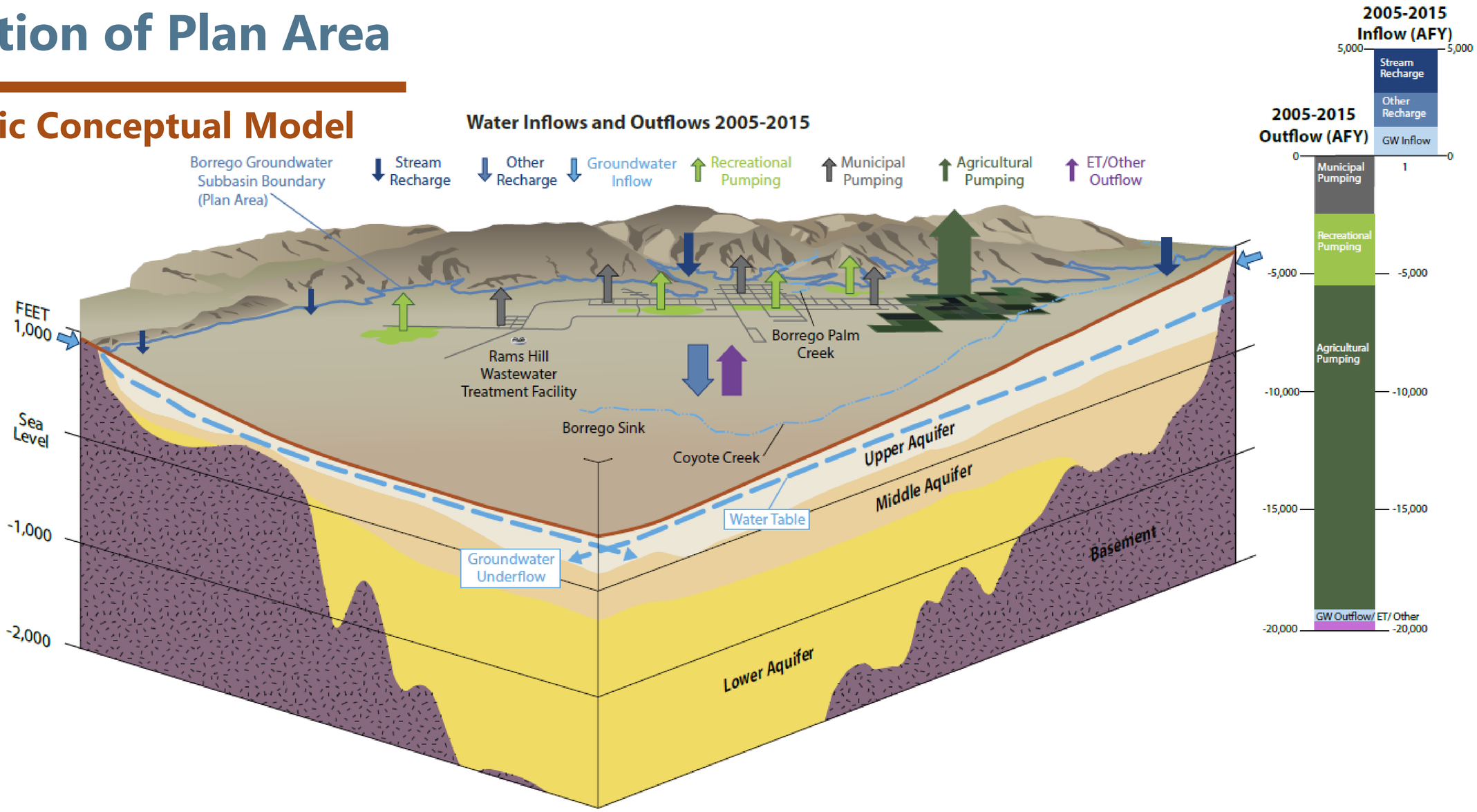
BASIN SETTING

Basin Setting

- ❑ Hydrogeologic Conceptual Model
- ❑ Current and Historical Groundwater Conditions
- ❑ Water Budget
- ❑ Management Areas

Description of Plan Area

❑ Hydrogeologic Conceptual Model

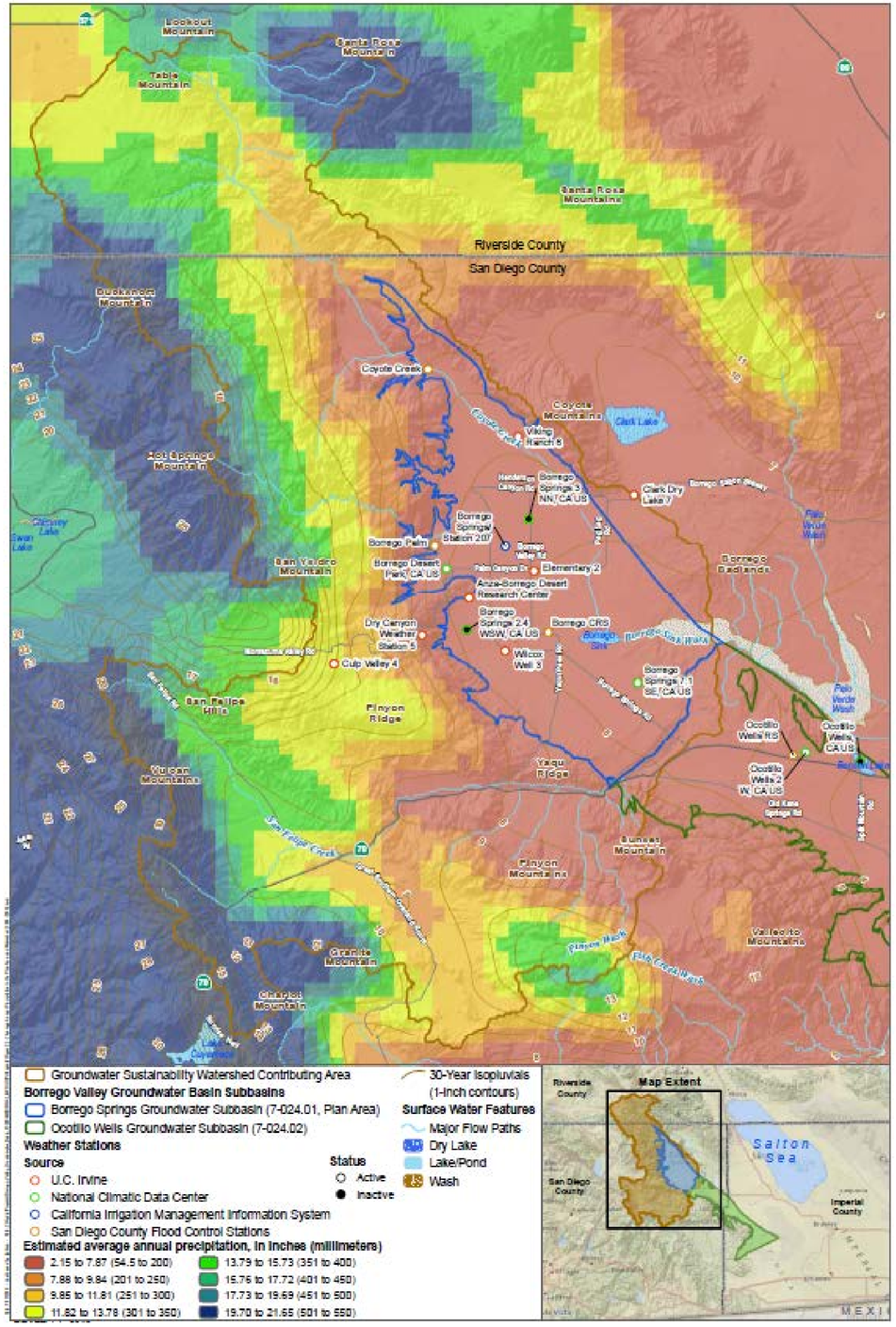


CHAPTER 2 PLAN AREA AND BASIN SETTING

Description of Plan Area

❑ Hydrogeologic Conceptual Model

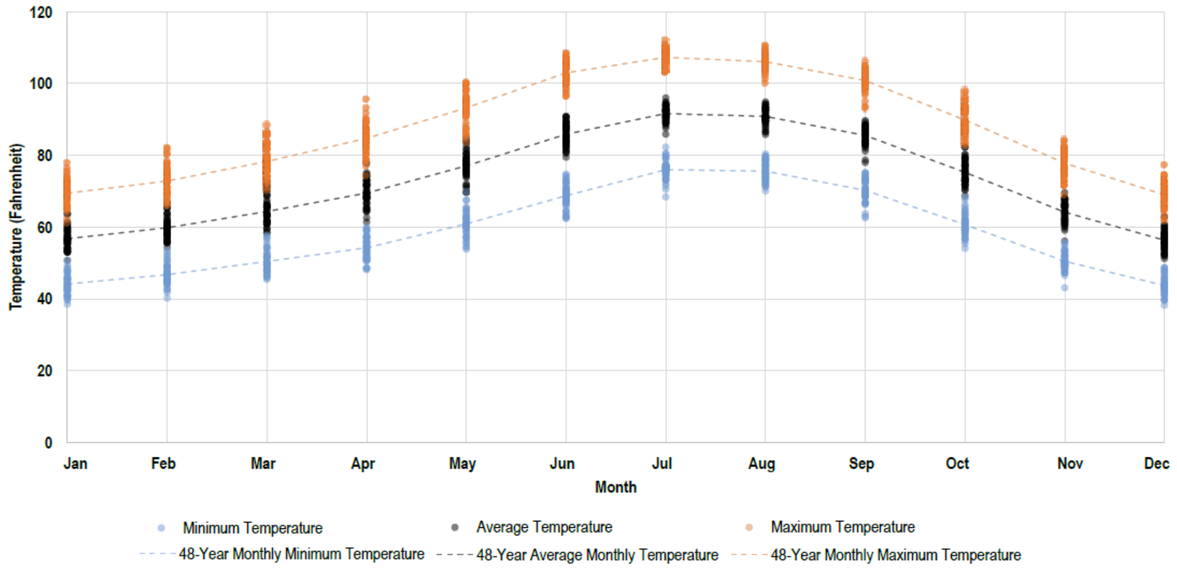
Climate



Description of Plan Area

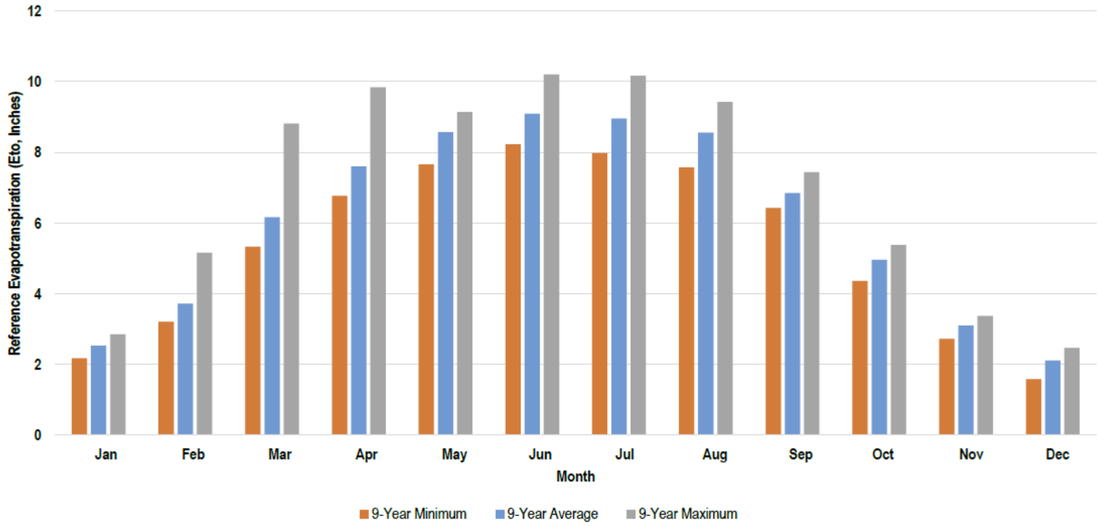
❑ Hydrogeologic Conceptual Model

Temperature



Borrego Desert Park Station Average Monthly Temperatures
Source: NOAA 2017

Evapotranspiration



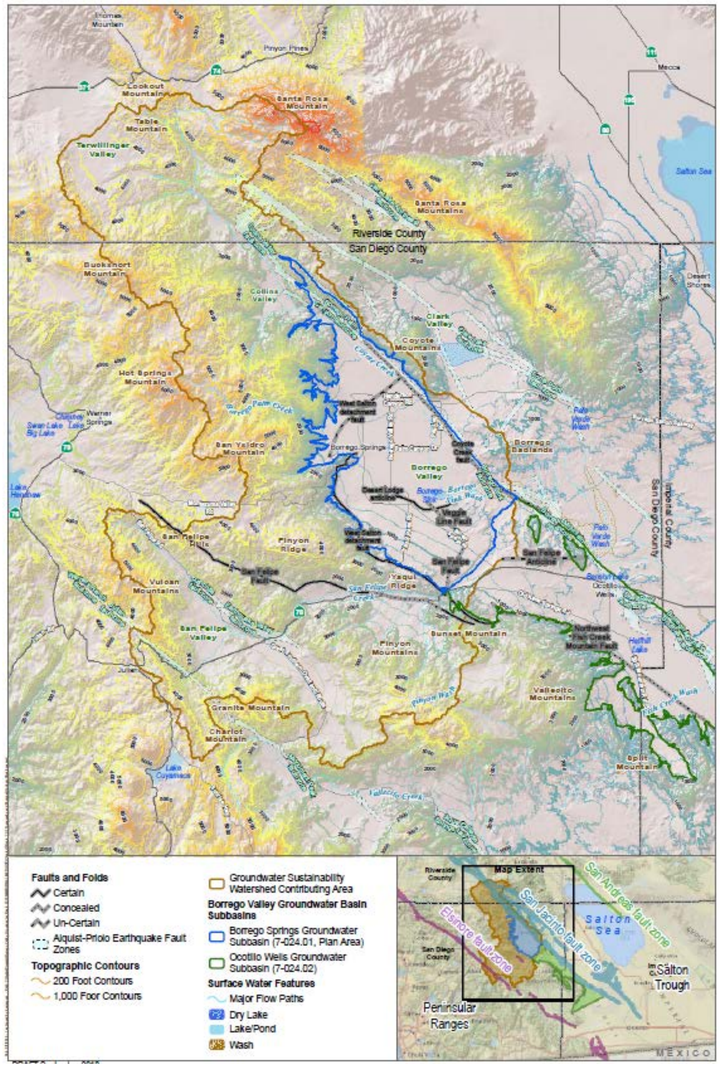
CIMIS Station 207 Average Monthly Evapotranspiration
Source: CIMIS 2018

Annual 9-Year Minimum = 68.33 inches (5.69 feet) [2011]
Annual 9-Year Average = 72.21 inches (6.02 feet)
Annual 9-Year Maximum = 77.35 inches (6.45 feet) [2010]
Annual 9-Year Standard Deviation = 3.15 inches (0.26 feet)

CHAPTER 2 PLAN AREA AND BASIN SETTING

Description of Plan Area

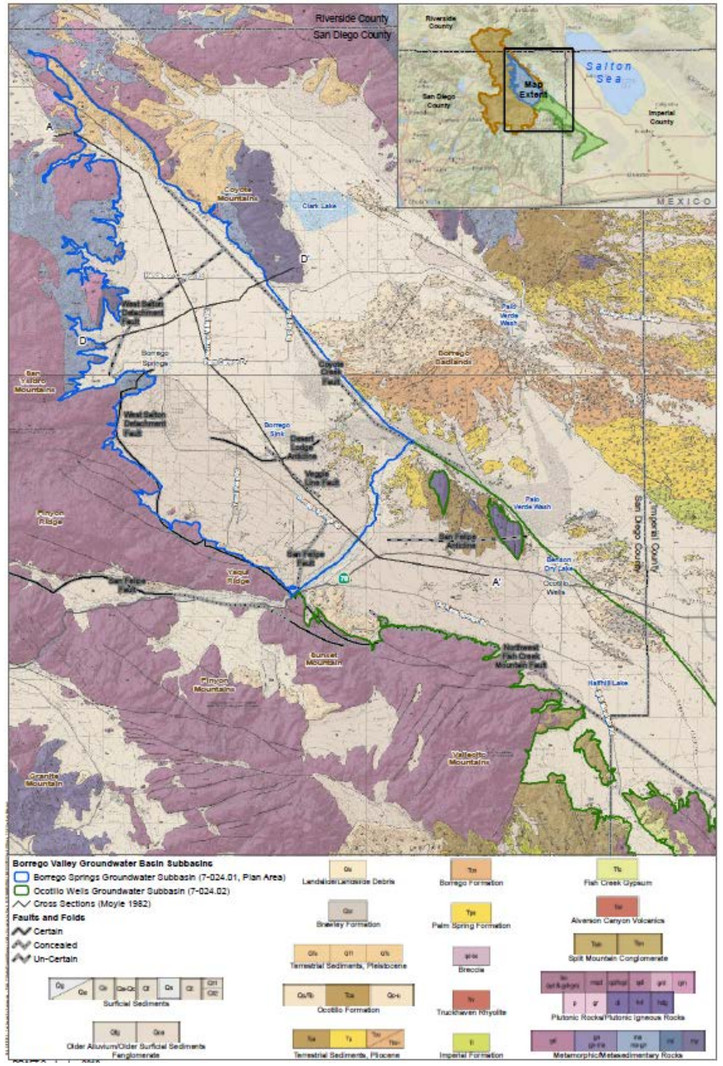
Topography And Regional Geologic Structures



Topography and Geology

❑ **Hydrogeologic Conceptual Model**

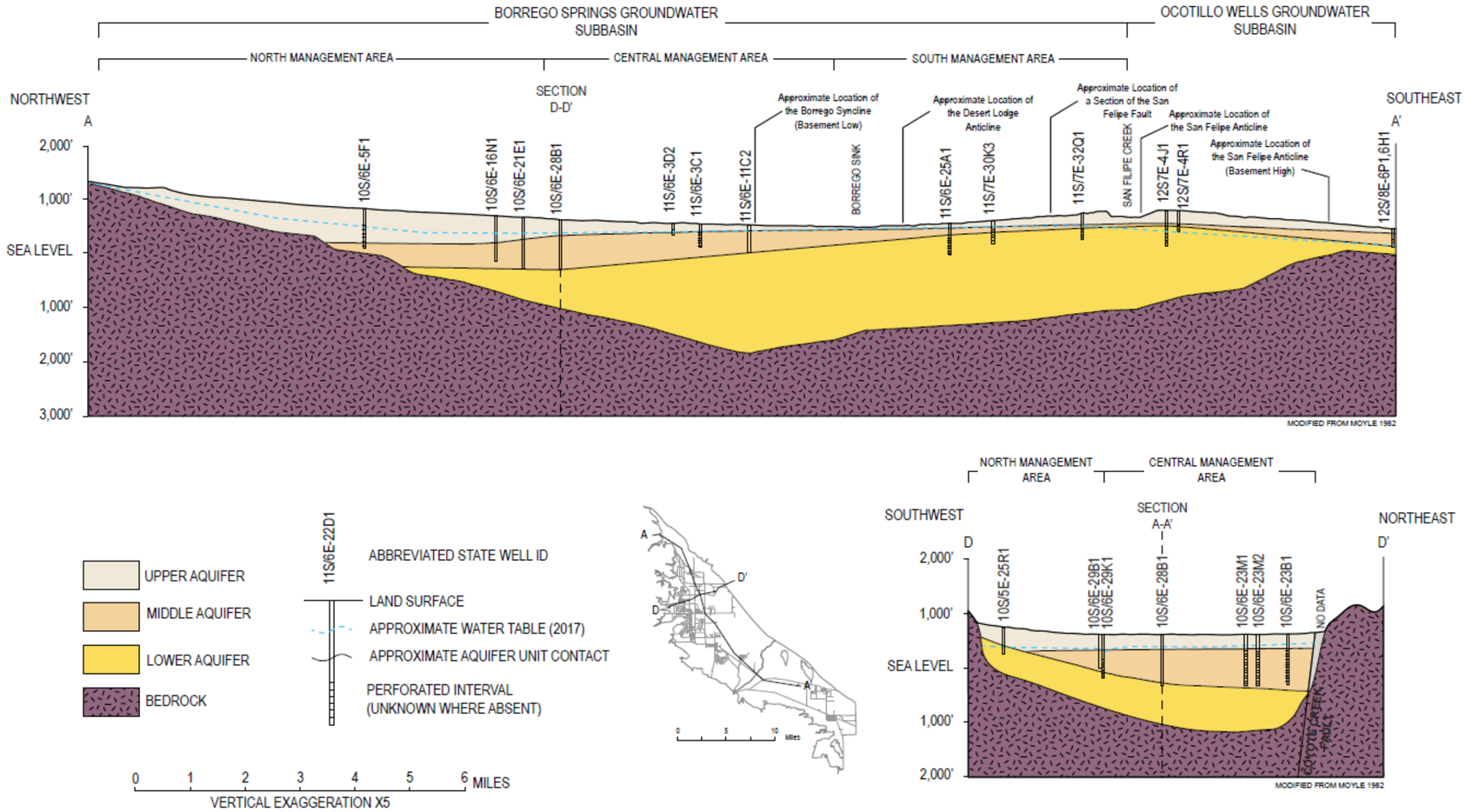
Geologic Map



Geologic Cross Section

Description of Plan Area

❑ Hydrogeologic Conceptual Model

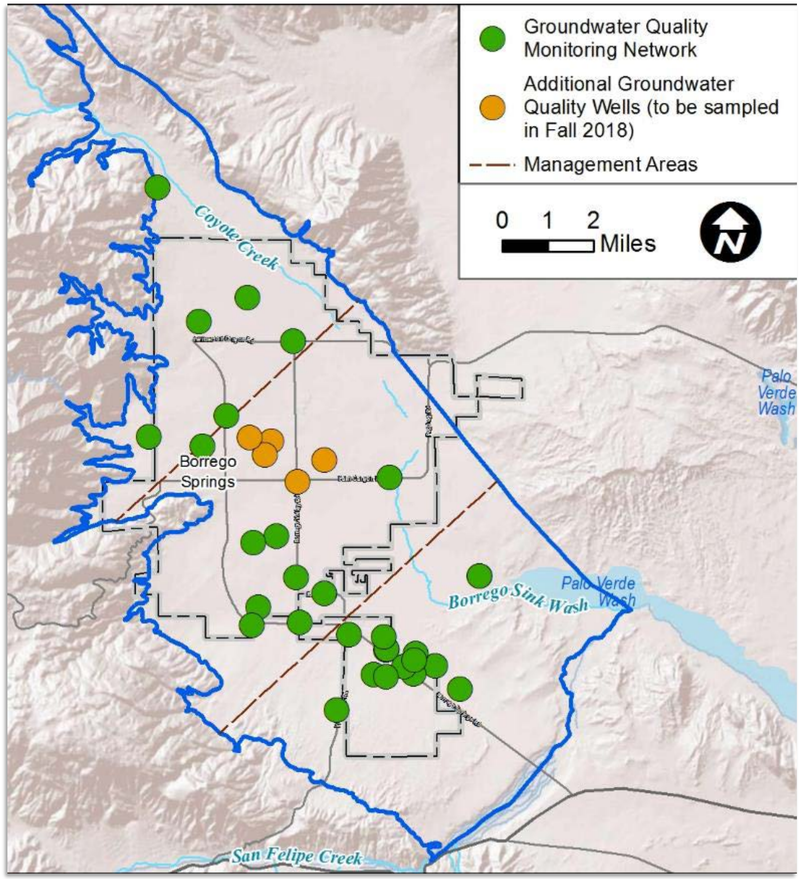


Groundwater Elevations

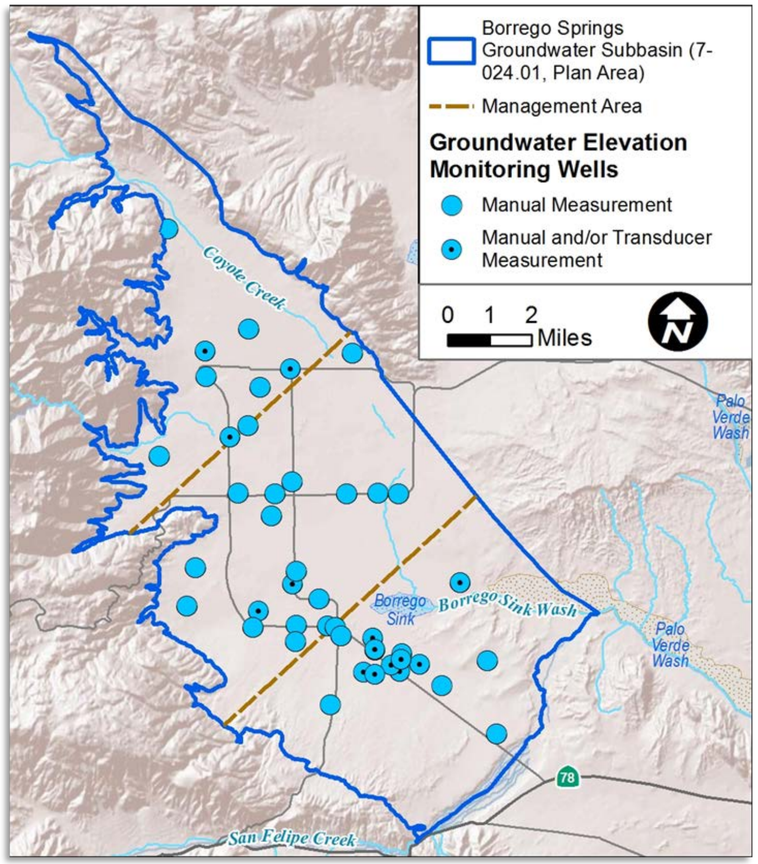
Description of Plan Area

❑ Current and Historical Groundwater Conditions

Groundwater Quality Monitoring Network



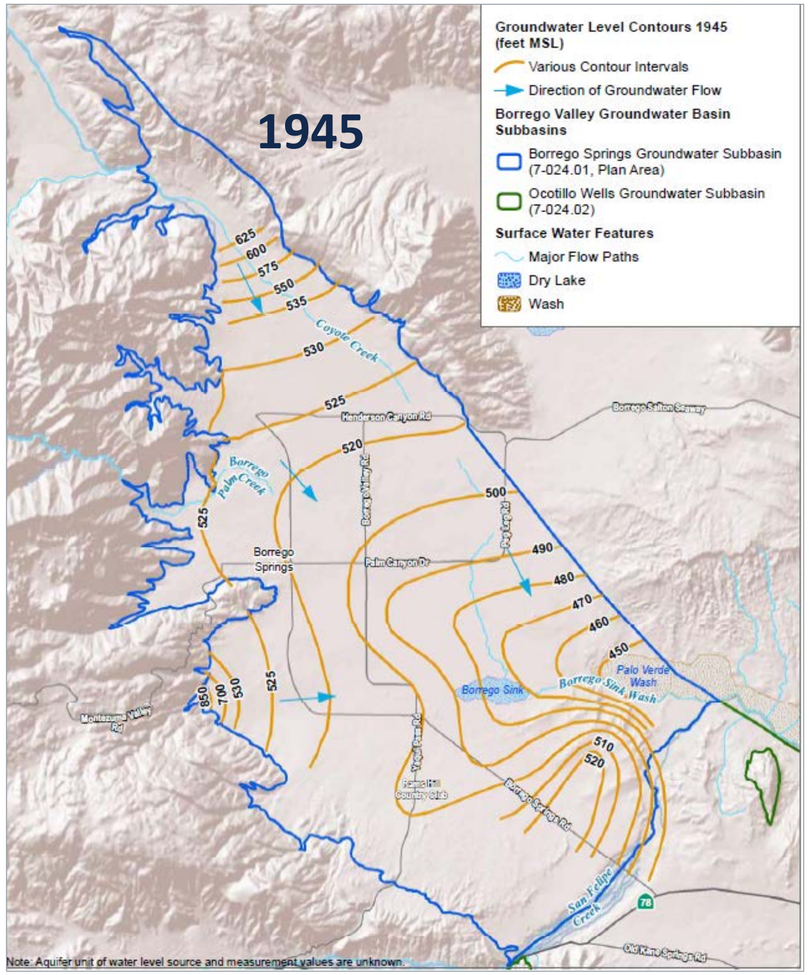
Groundwater Elevation Monitoring Wells



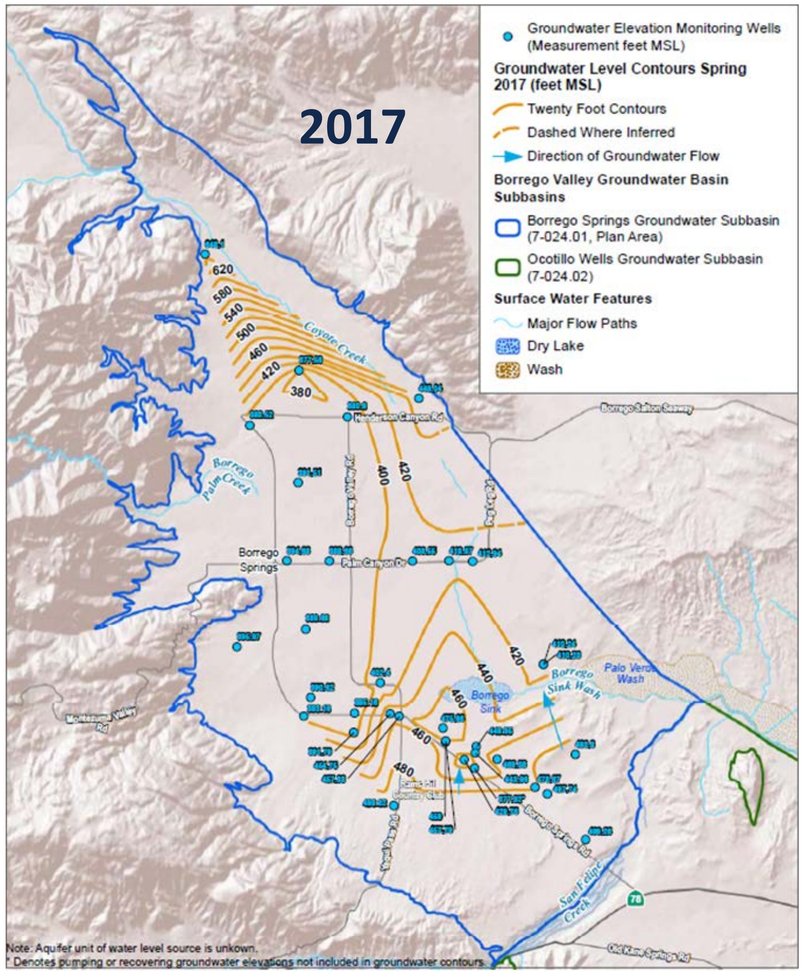
Description of Plan Area

❑ Current and Historical Groundwater Conditions

1945 Groundwater Elevations



2017 Groundwater Elevations



Groundwater Elevations

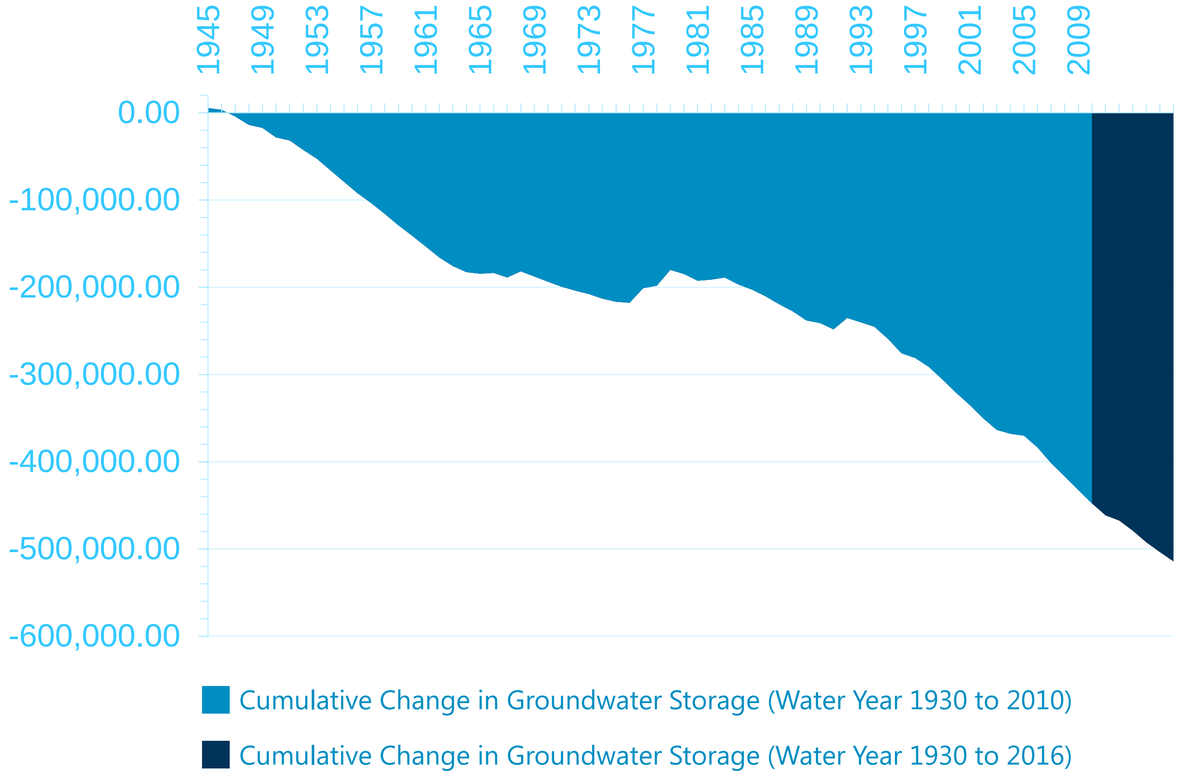
CHAPTER 2 PLAN AREA AND BASIN SETTING

Description of Plan Area

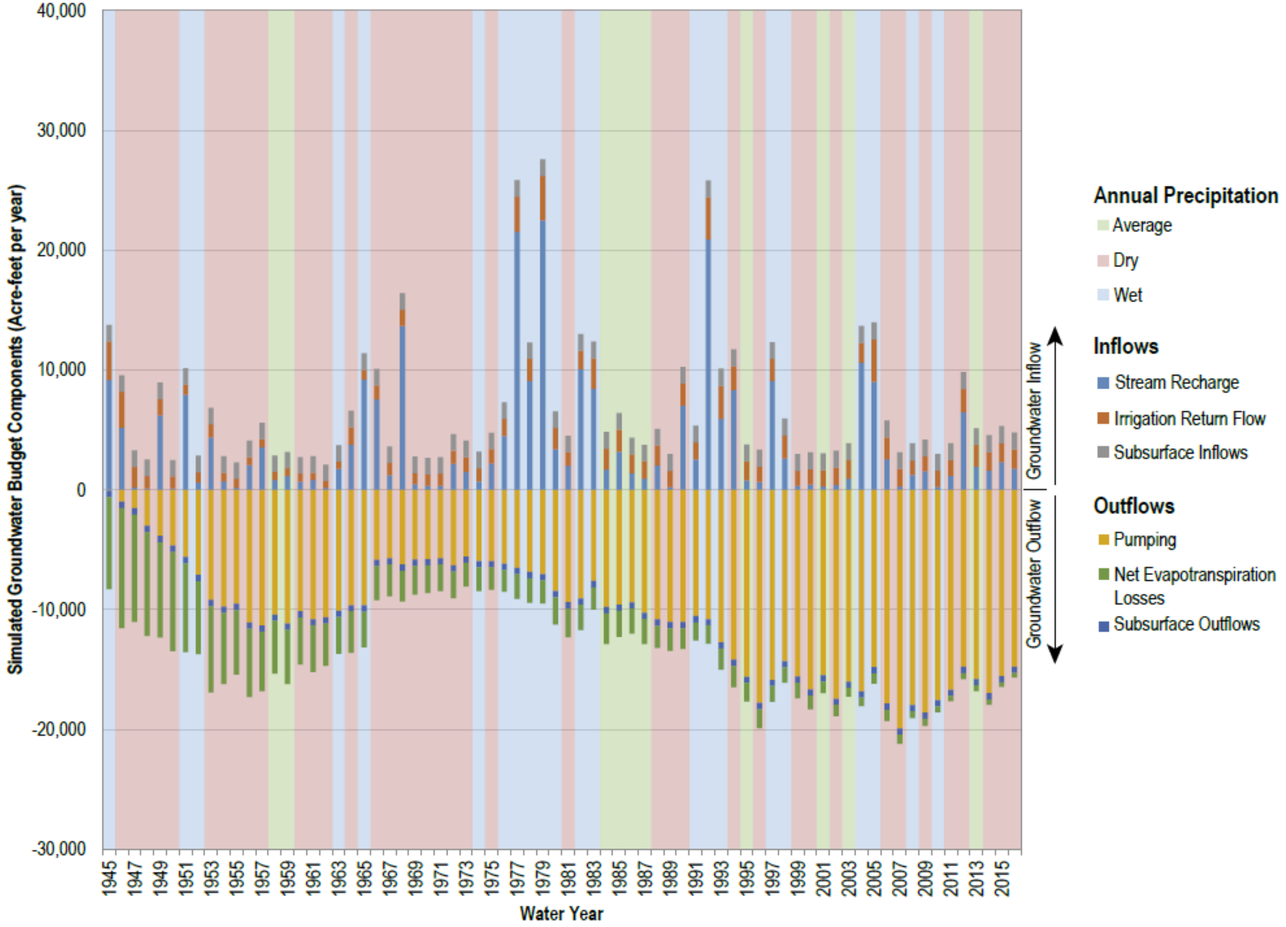
Groundwater Storage

❑ **Water Budget**

Cumulative Change in Groundwater Storage (1945 to 2016)

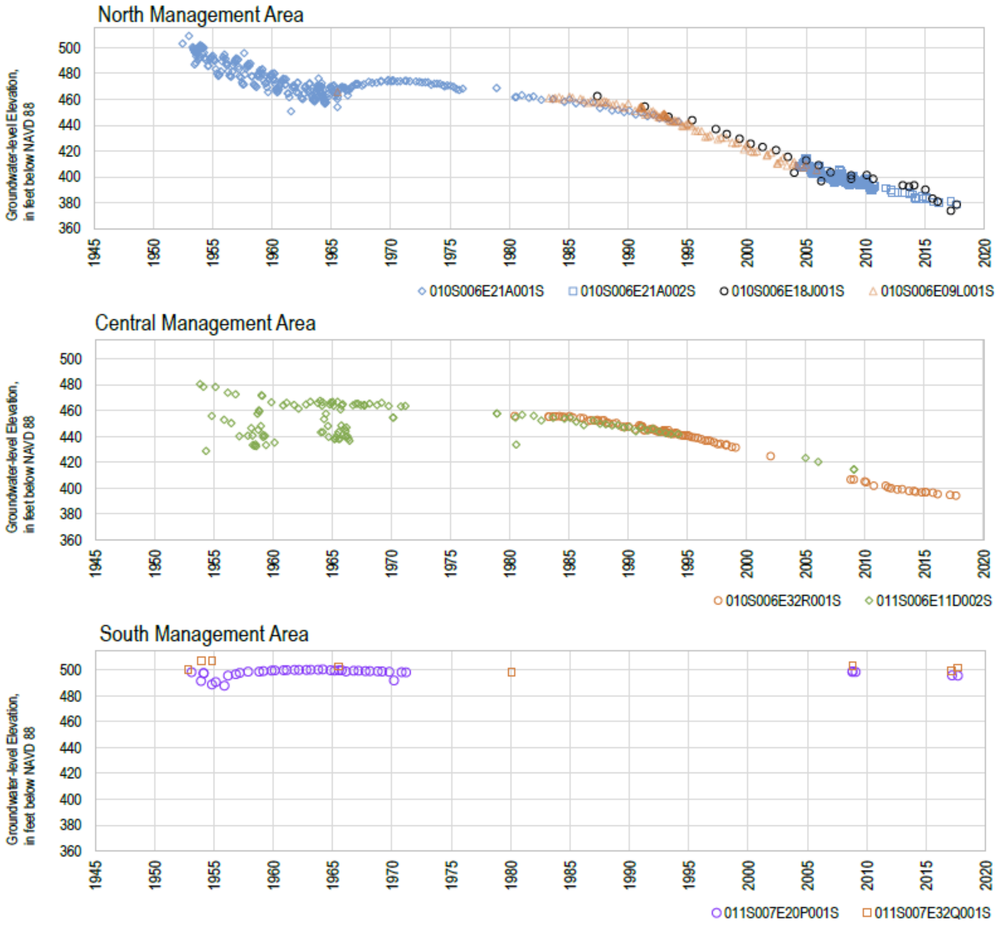


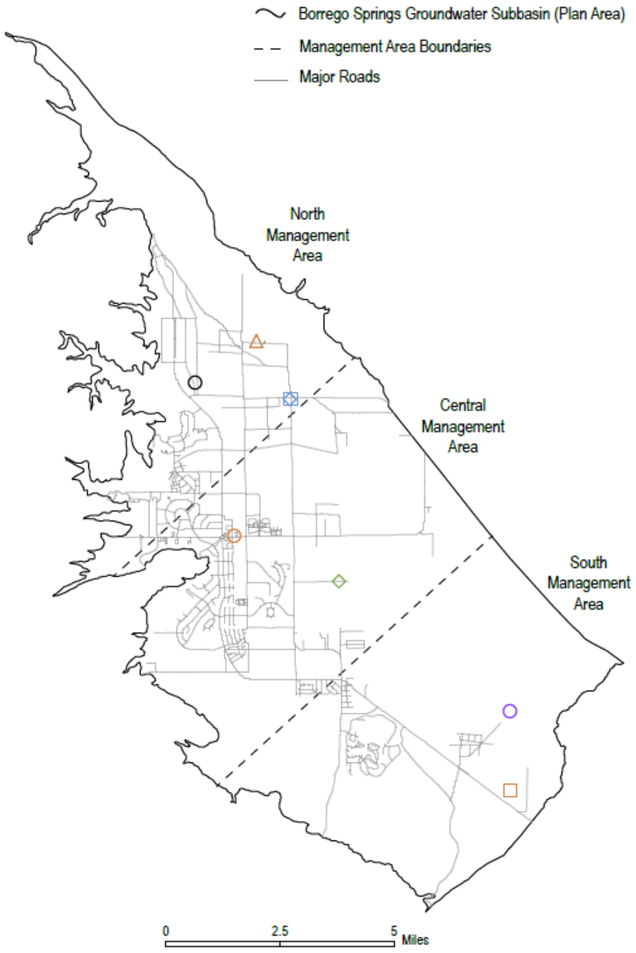
Groundwater Inflows and Outflows by Year (1945 to 2016)



Description of Plan Area

❑ Management Areas





CHAPTER 3

SUSTAINABILITY MANAGEMENT CRITIERIA

SUSTAINABILITY GOAL

SUSTAINABILITY GOAL

SGMA Requirements

- The GSA must adopt a non-quantitative sustainability goal, or goals, that set the framework for determining what is significant and unreasonable for each sustainability indicator.
- These goals are primarily policy statements that communicate the GSA's vision for sustainable management of the Subbasin.

Chronic Lowering of Groundwater Levels

Reduction of Groundwater Storage

Degraded Water Quality

Land Subsidence

Depletion of Interconnected Surface Water Affecting Beneficial Use (i.e. Groundwater Dependent Ecosystems)

SUSTAINABILITY GOAL

OVERARCHING GOAL

- The overarching sustainability goal is to maintain a viable water supply for current and future beneficial uses and users of groundwater within the Plan Area by identifying measures to bring groundwater use to within the Subbasin's estimated sustainable yield within 20 years, and by maintaining groundwater of suitable quality for current and future beneficial uses.

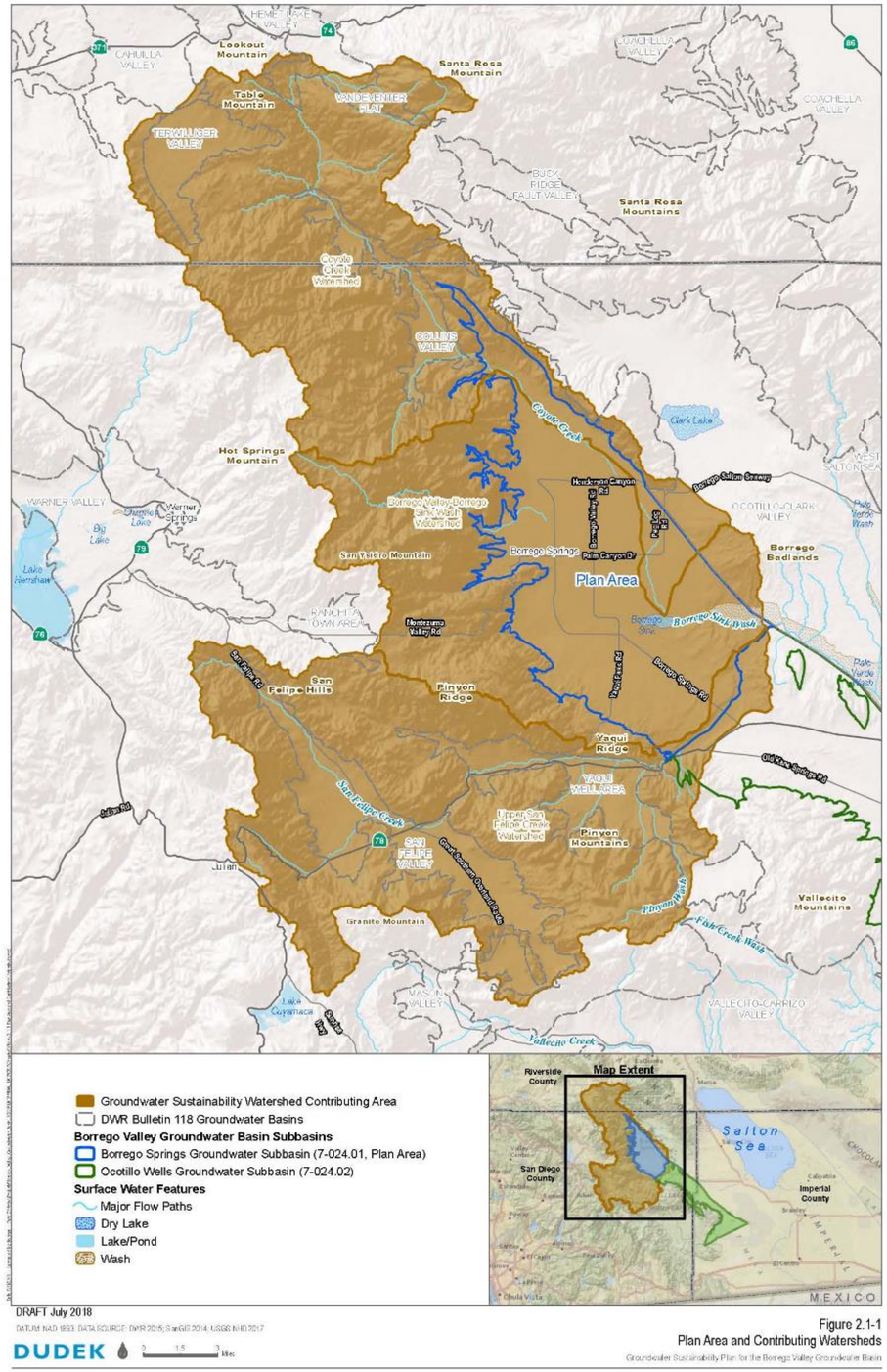


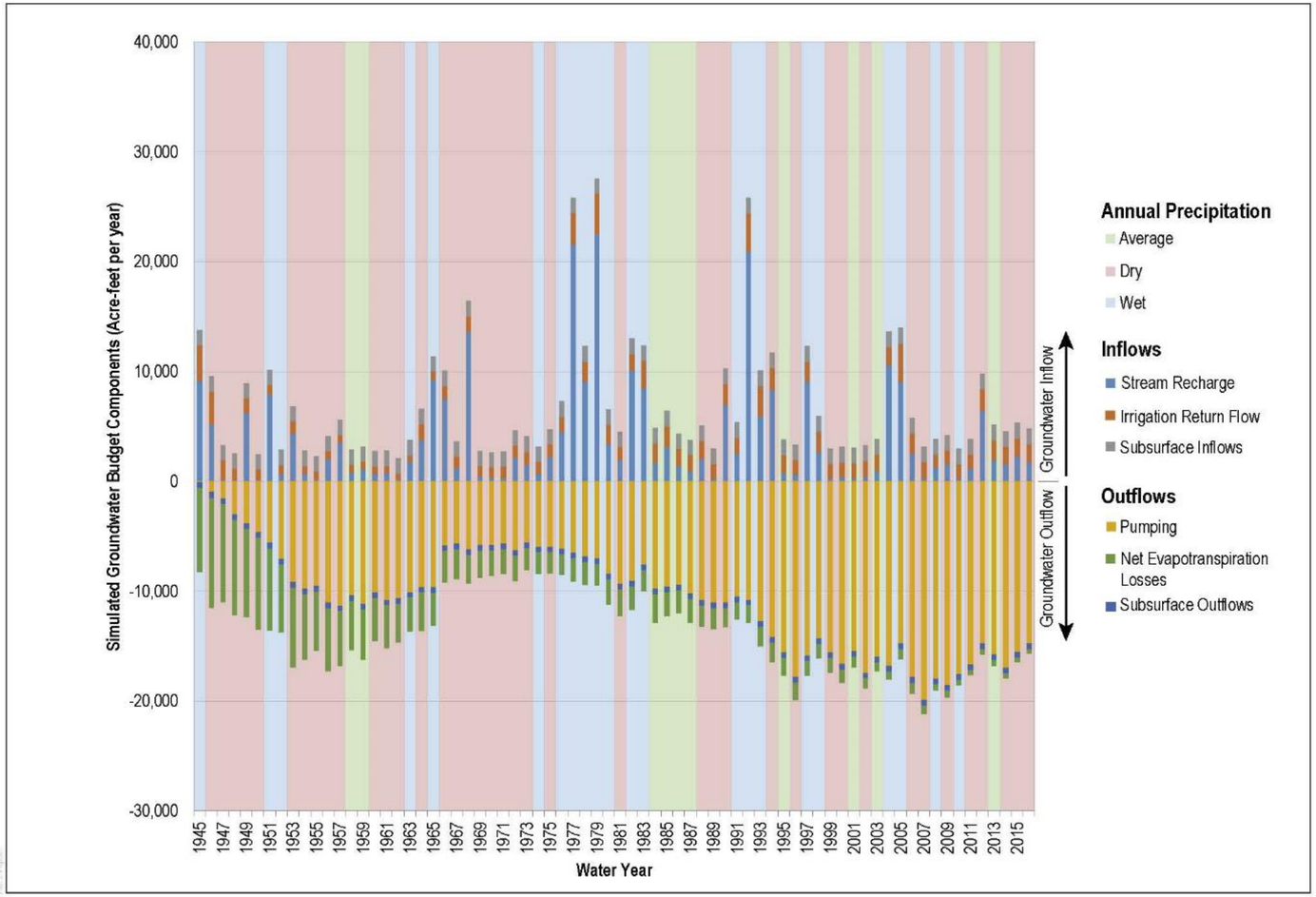
Figure 2.1-1
Plan Area and Contributing Watersheds
Groundwater Sustainability Plan for the Borrego Valley Groundwater Basin

SUSTAINABILITY GOAL

SUSTAINABLE CONDITIONS

Conditions within the Subbasin can be considered sustainable when the following sustainability goals are met:

- ❑ Long-term, aggregate groundwater use is less than or equal to the Subbasin' s estimated sustainable yield, as defined by SGMA.



SOURCE: USGS 2015, Dudek 2017

DUDEK

FIGURE 2.2-22A

Groundwater Inflows and Outflows by Year (1945 - 2016)

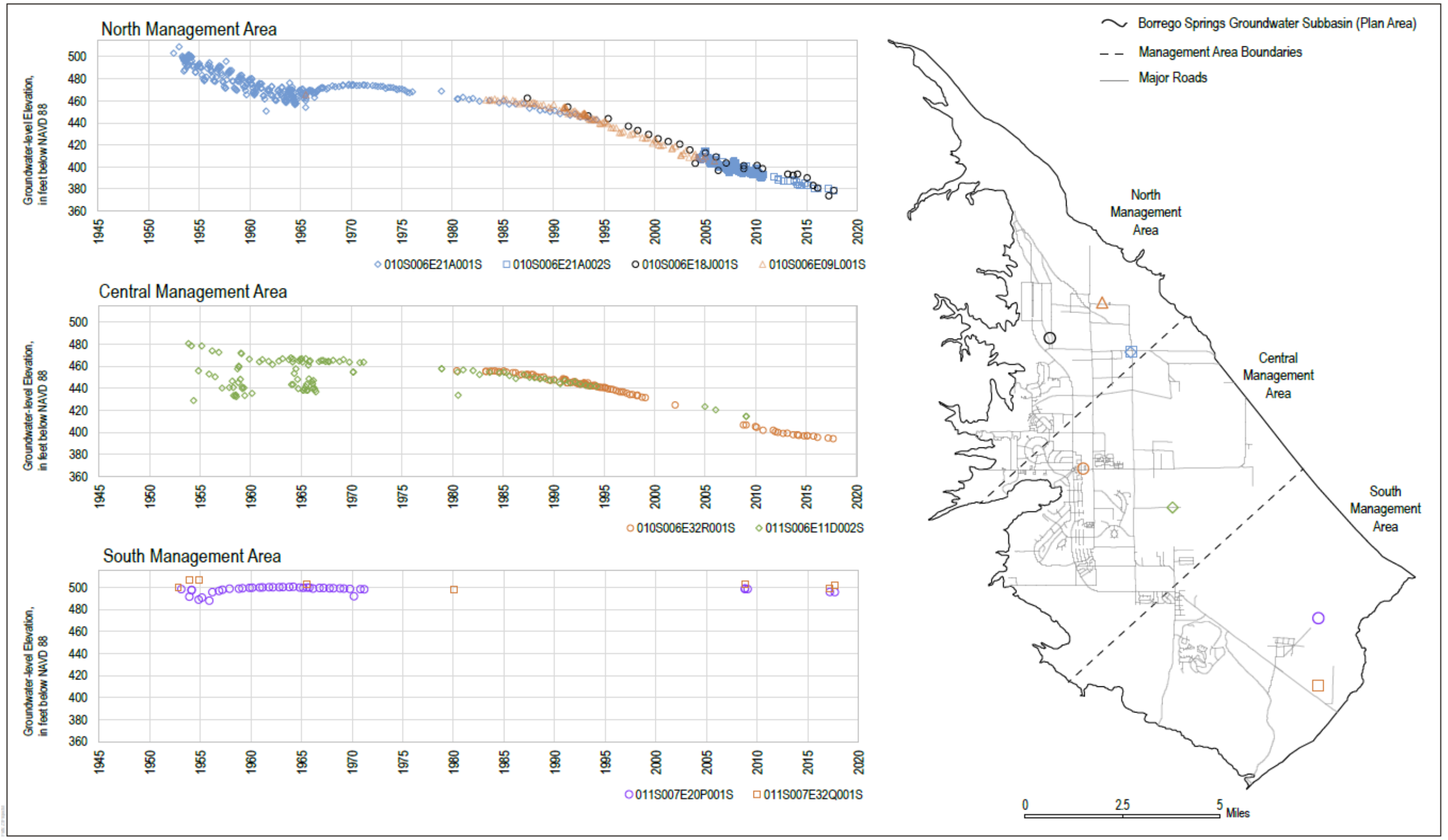
Groundwater Sustainability Plan for the Borrego Valley Groundwater Basin

SUSTAINABILITY GOAL

SUSTAINABLE CONDITIONS

Conditions within the Subbasin can be considered sustainable when the following sustainability goals are met:

- ❑ The rate of groundwater level change within the Subbasin, averaged across indicator wells will generally be stable or increasing when compared to the contemporary groundwater level trend.



SOURCE: USGS 2015

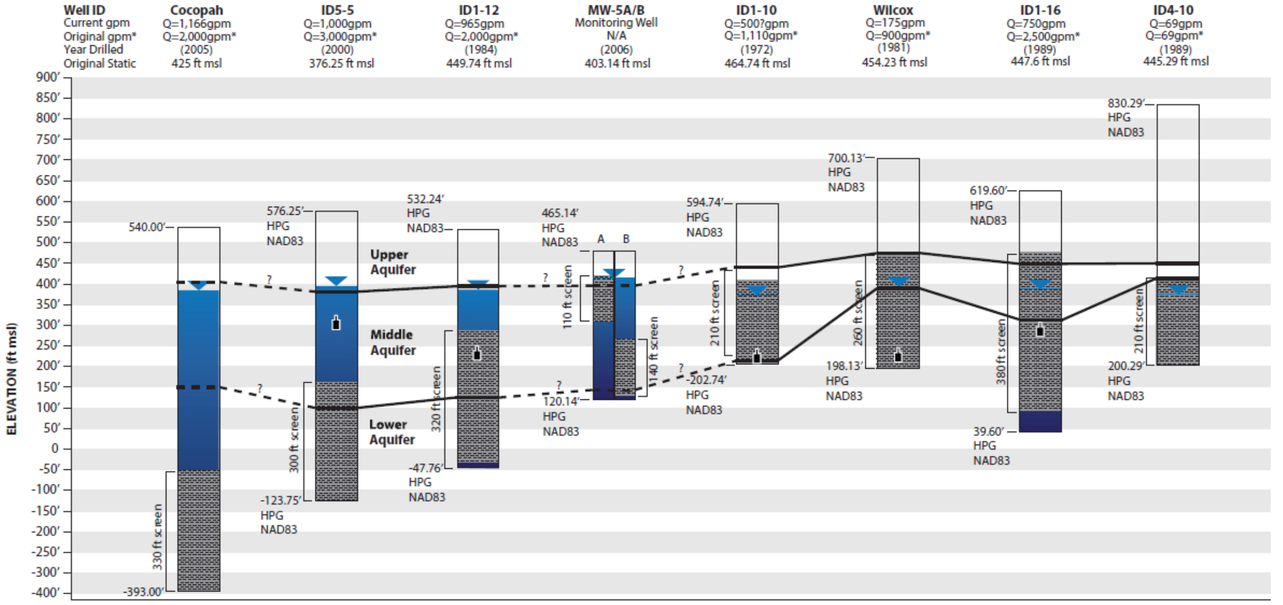
FIGURE 2.2-13E
Water-level Elevations in Selected Wells in Parts of the Plan Area, 1952-2017
Groundwater Sustainability Plan for the Borrego Valley Groundwater Basin

SUSTAINABILITY GOAL

SUSTAINABLE CONDITIONS

Conditions within the Subbasin can be considered sustainable when the following sustainability goals are met:

- ❑ Groundwater levels will be maintained at elevations necessary to avoid undesirable results. Lowering of groundwater levels potentially leading to significant and unreasonable depletions of available water supply for beneficial use could occur if groundwater levels fall below the screened interval for key municipal water wells.



Casing Inside Diameter (in):	14" ID	16" ID	14.75" ID	4" ID	12.75" ID	12.75" ID	16" ID	8" ID
Well Depth (ft bls):	570' bls	700' bls	580' bls	900' bls	392' bls	502' bls	550' bls	630' bls
Borehole Depth (ft bls):	699' bls	708' bls	726' bls (2004)	1,238' bls (2004)	816' bls	502' bls	705' bls	630' bls
Pump Size (HP):	160 HP	200 HP	200 HP	N/A	150 HP	80 HP	200 HP	N/A
Pump Depth (ft msl):	N/A	316 ft msl	242 ft msl	N/A	204 ft msl	225 ft msl	219 ft msl	N/A
Specific Capacity (gpm/ft):	N/A	N/A	75.4 gpm/ft	N/A	20.3 gpm/ft	26.4 gpm/ft	31.0 gpm/ft	20 gpm/ft
Current Production Rate (gpm):	1,166 gpm	1,000 gpm	965 gpm	Monitoring Well	500? gpm	350? gpm	723 gpm	N/A
Casing Type:	Mild Steel	Mild Steel	Mild Steel	Mild Steel	Mild Steel	Mild Steel	Mild Steel	Mild Steel
Drop Pipe:	N/A	10"	8"	N/A	8"	6"	8"	N/A

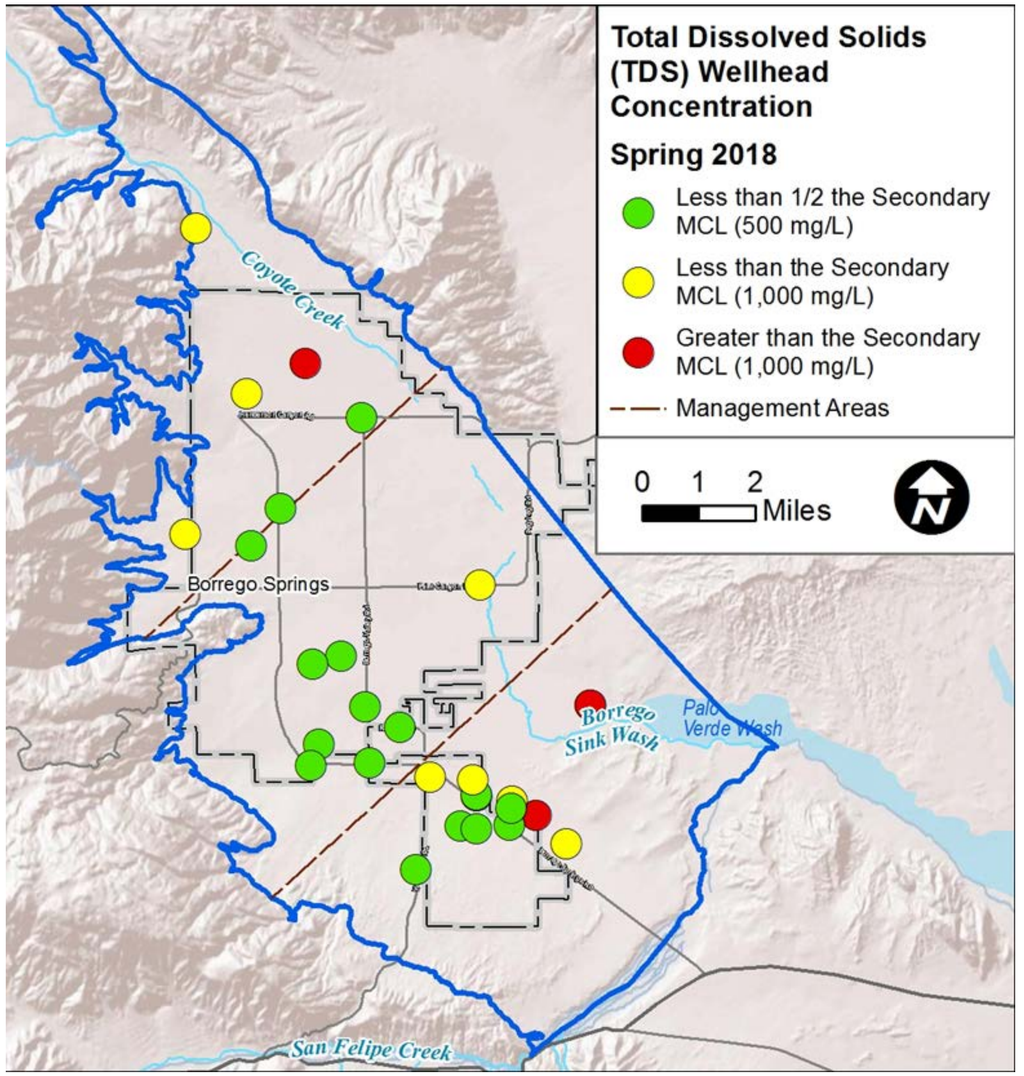
*Indicates original tested production rate when drilled.

SUSTAINABILITY GOAL

SUSTAINABLE CONDITIONS

Conditions within the Subbasin can be considered sustainable when the following sustainability goals are met:

- ❑ Groundwater quality, as measured in municipal and domestic water wells, generally exhibits a stable and/or improving trend for identified contaminants of concern: arsenic, nitrate, sulfate and total dissolved solids or meets Title 22 drinking water standards.



CHAPTER 3

SUSTAINABILITY MANAGEMENT CRITIERIA

UNDESIRABLE RESULTS

UNDESIRABLE RESULTS

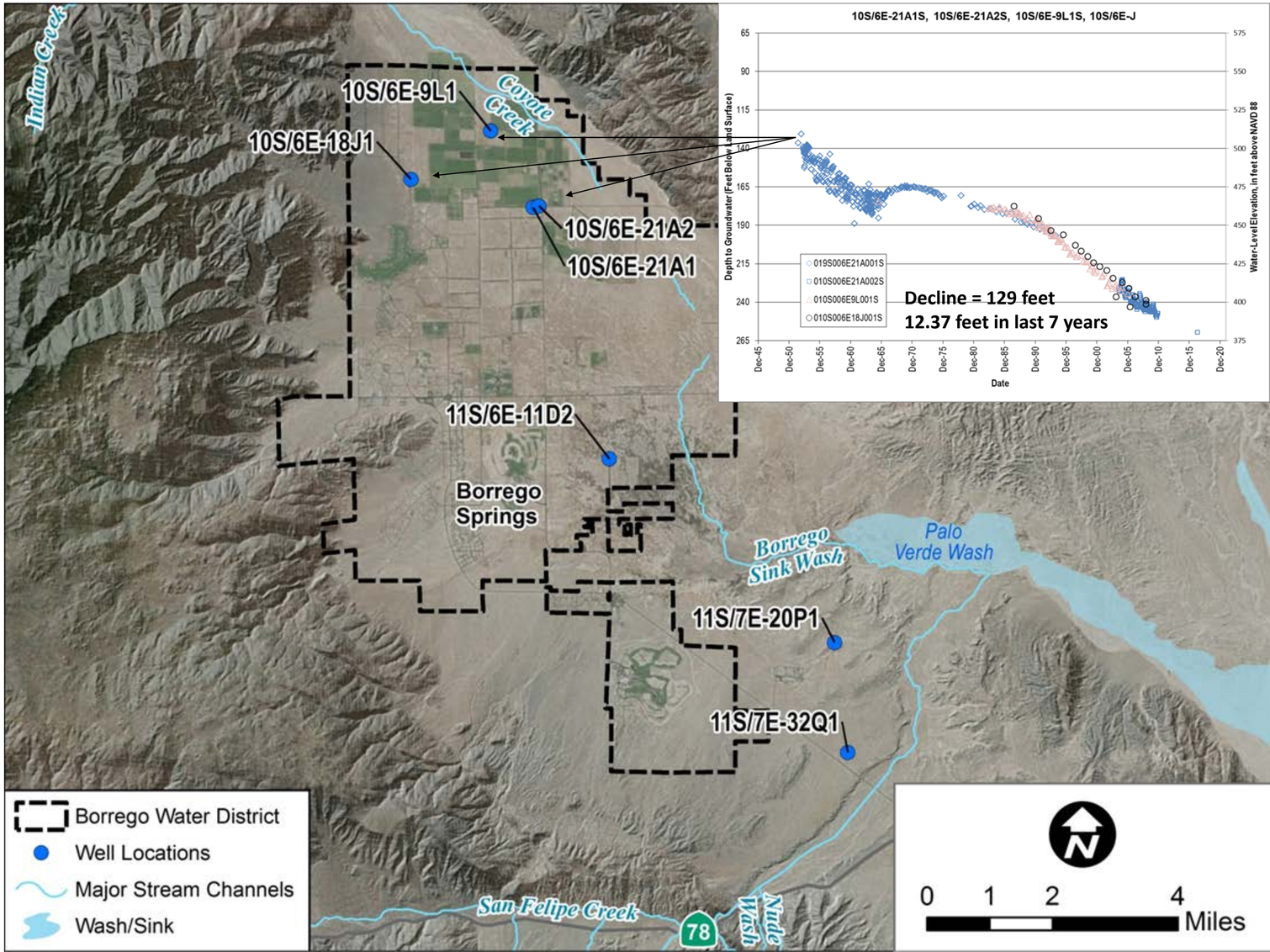
SGMA REQUIREMENTS

The GSP must define undesirable results in the Subbasin by determining what condition(s) in the Subbasin would be significant and unreasonable for each sustainability indicator. This determination will be based on both a technical assessment of the sustainability indicators and an analysis of how the minimum thresholds may affect the interests of beneficial uses and users of groundwater, or land use and property interests.

UNDESIRABLE RESULTS

CHRONIC LOWERING OF GROUNDWATER LEVELS

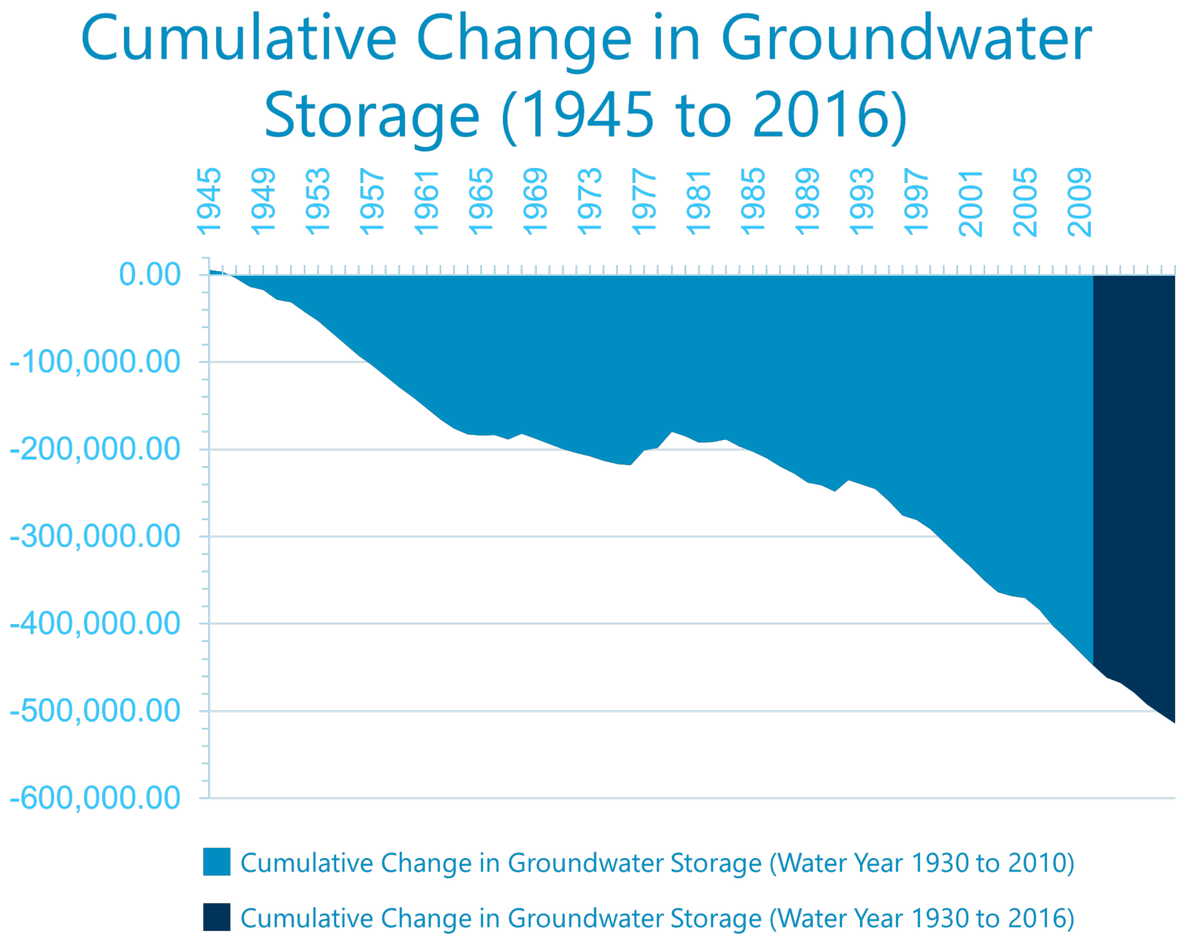
Groundwater level declines are significant and unreasonable if they are sufficient in magnitude to lower the rate of production of pre-existing groundwater extraction wells below that which no longer meets the minimum required to support the overlying beneficial use(s).



UNDESIRABLE RESULTS

REDUCTION OF GROUNDWATER IN STORAGE

Reduction in groundwater storage is significant and unreasonable if it is sufficient in magnitude to lower the rate of production of pre-existing groundwater wells below that which no longer meets the minimum required to support the overlying beneficial use(s).



UNDESIRABLE RESULTS

DEGRADED WATER QUALITY

Degraded water quality is significant and unreasonable if the magnitude of degradation of water quality from pre-existing groundwater wells precludes the use of groundwater for existing overlying beneficial use(s).

CHAPTER 3

SUSTAINABILITY MANAGEMENT CRITIERIA

MINIMUM THRESHOLDS

MINIMUM THRESHOLDS

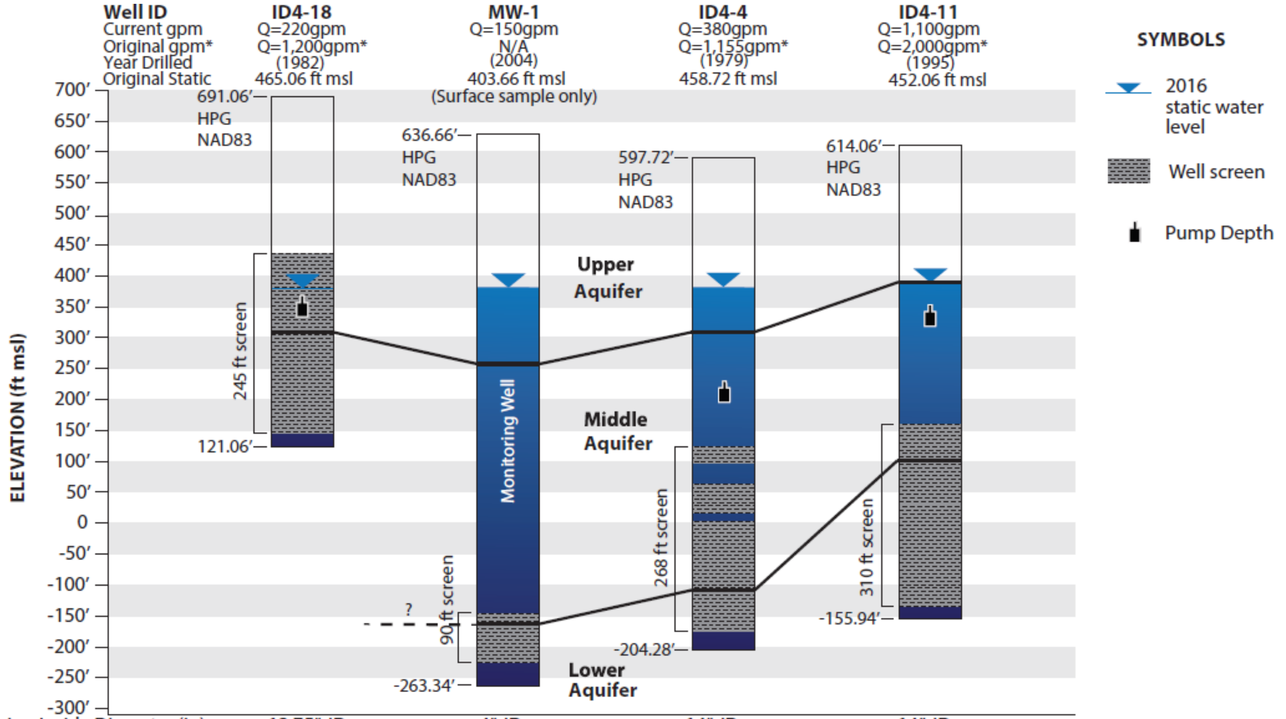
SGMA REQUIREMENTS

The minimum thresholds are the quantitative measure of undesirable results and are set at individual monitoring sites or combination of monitoring sites. These thresholds will be established in the GSP, based on an analysis of how they would impact beneficial uses and users of groundwater in the Subbasin and the determination of undesirable results for each sustainability indicator.

MINIMUM THRESHOLDS

CHRONIC LOWERING OF GROUNDWATER LEVELS

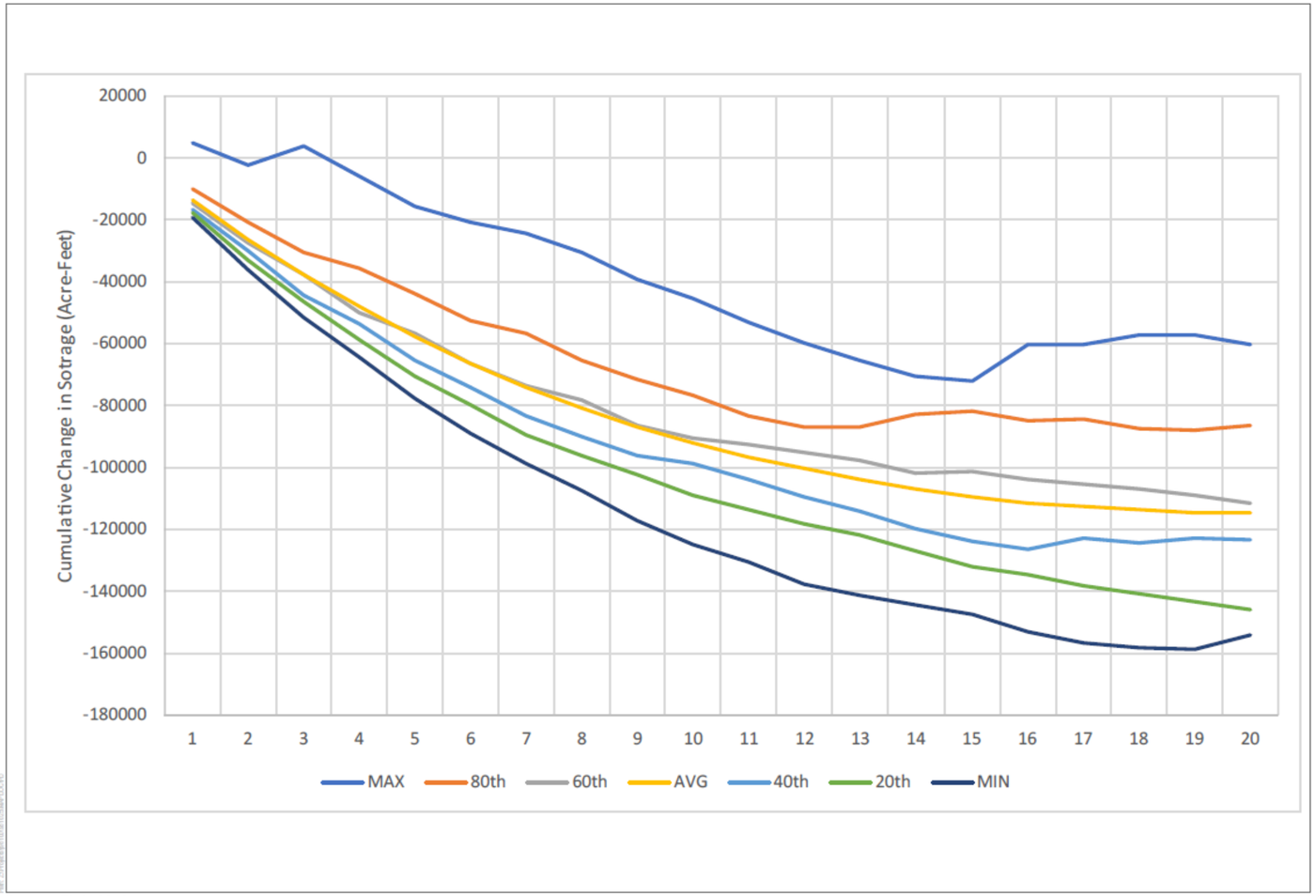
Maintaining groundwater levels above saturated screen intervals for pre-existing and proposed municipal wells is being proposed for inclusion in the GSP as the minimum desired threshold for groundwater elevations that would be protective of beneficial use(s) and users in the Subbasin.



MINIMUM THRESHOLDS

REDUCTION OF GROUNDWATER IN STORAGE

The change in groundwater in storage associated with the 20th percentile is being proposed for inclusion in the GSP as the minimum threshold for the Subbasin meaning that based on fifty-three 20-year periods evaluated, values below the minimum threshold occur 20% of the time and values above the threshold occur 80% of the time. The minimum threshold limits useable groundwater in storage to an estimated 152,000 acre-feet (ENSI 2018).



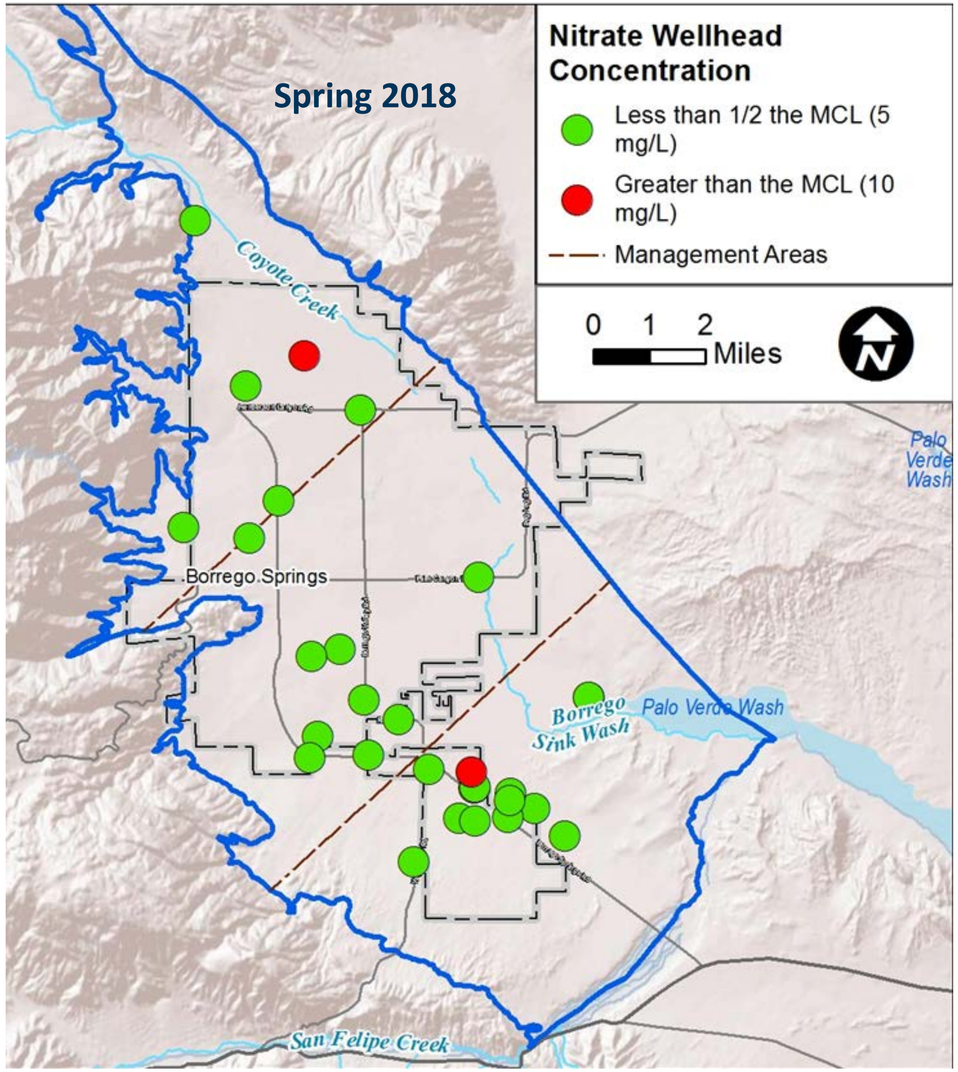
Source: ENSI 2018

FIGURE 3.3-2
Monte Carlo Simulation Time Varying Recharge 1945 to 2010 and Forecast Cumulative Overdraft
Groundwater Sustainability Plan for the Borrego Valley Groundwater Basin

MINIMUM THRESHOLDS

DEGRADED WATER QUALITY

For municipal and domestic wells, this means water quality that meets potable drinking water standards specified in Title 22 of the California Code of Regulations. For irrigation wells, water quality should generally be suitable for agriculture use.



CHAPTER 3

SUSTAINABILITY MANAGEMENT CRITIERIA

MEASURABLE OBJECTIVES

MEASURABLE OBJECTIVES

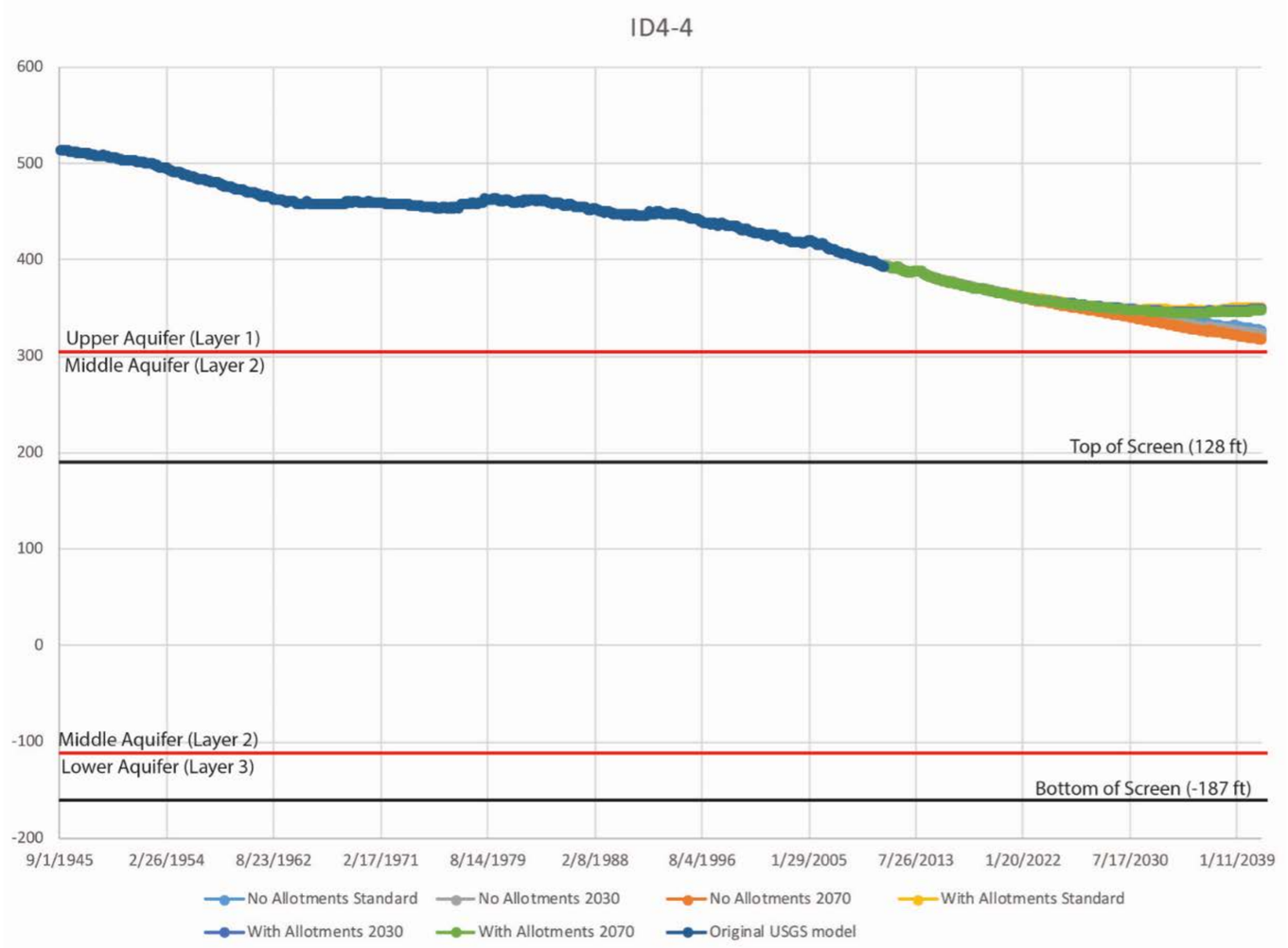
SGMA REQUIREMENTS

Just as the minimum thresholds are the quantitative measure of undesirable results, measurable objectives are the quantitative measure of the sustainability goal. They are set at individual representative monitoring sites that are, preferably, the same as those selected for the minimum thresholds. If conditions at the monitoring sites meet or exceed the measurable objectives, the Subbasin is at the desired groundwater condition.

MEASURABLE OBJECTIVES

CHRONIC LOWERING OF GROUNDWATER LEVELS

The interim milestones and measurable objective are based on the results of the BVHM estimates of change in groundwater head at each model node applying a linear fixed reduction to the estimated sustainable yield target of 5,700 acre-feet per year and the applied 2030 DWR climate change factors. In cases where there was a groundwater level increase between 2035 and 2040, the measureable objective was held at 2035 levels.



MEASURABLE OBJECTIVES

REDUCTION OF GROUNDWATER IN STORAGE

The reduction of groundwater in storage measurable objective was developed using the same methodology as chronic lowering of groundwater levels. The estimated reduction of groundwater in storage simulated using the BVHM was used to establish the interim milestones and measurable objective.

Year	Percent Pumping Reduced	Pumping Allowance (Percent)	Estimated Reduction of Groundwater in Storage (Acre-feet)
0	0.0%	100%	0
5	18.5%	81.5%	43,500
10	37.1%	62.9%	73,000
15	55.6%	44.4%	76,600
20	74.1%	25.9%	72,000

MEASURABLE OBJECTIVES

DEGRADED WATER QUALITY

For municipal and domestic wells, this means water quality that meets potable drinking water standards specified in Title 22 of the California Code of Regulations. For irrigation wells, water quality should generally be suitable for agriculture use.

CHAPTER 3

SUSTAINABILITY MANAGEMENT CRITIERIA

MONITORING NETWORK

MONITORING NETWORK

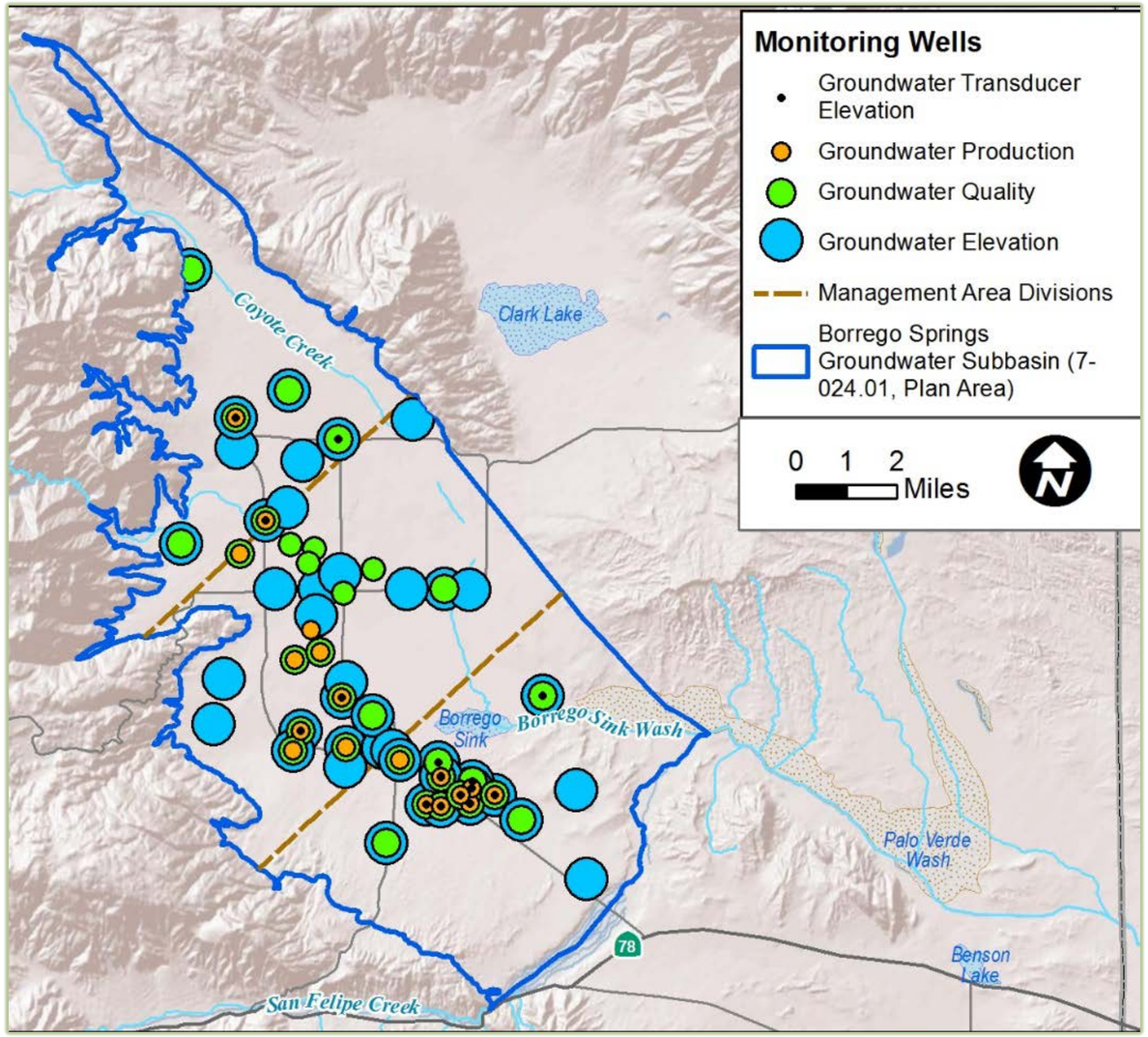
SGMA REQUIREMENTS

Monitoring and Management of Groundwater Levels

Monitoring and Management of Groundwater Quality and Quality Degradation

Type of Monitoring Sites, Type of Measurements and Frequency of Monitoring

Monitoring Protocols



Borrego Valley Groundwater Basin
Borrego Springs Subbasin

Groundwater Sustainability Plan

QUESTIONS?

Geosyntec consultants

DUDEK