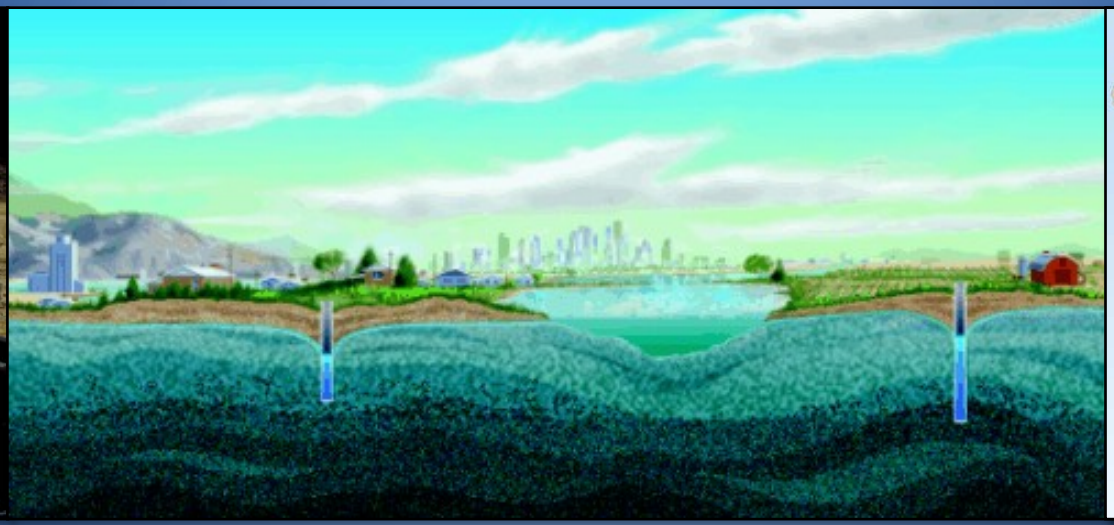
DWR's Sustainable Groundwater Management Implementation

Groundwater Sustainability Plan (GSP) & Alternative (Alt) Emergency Regulations



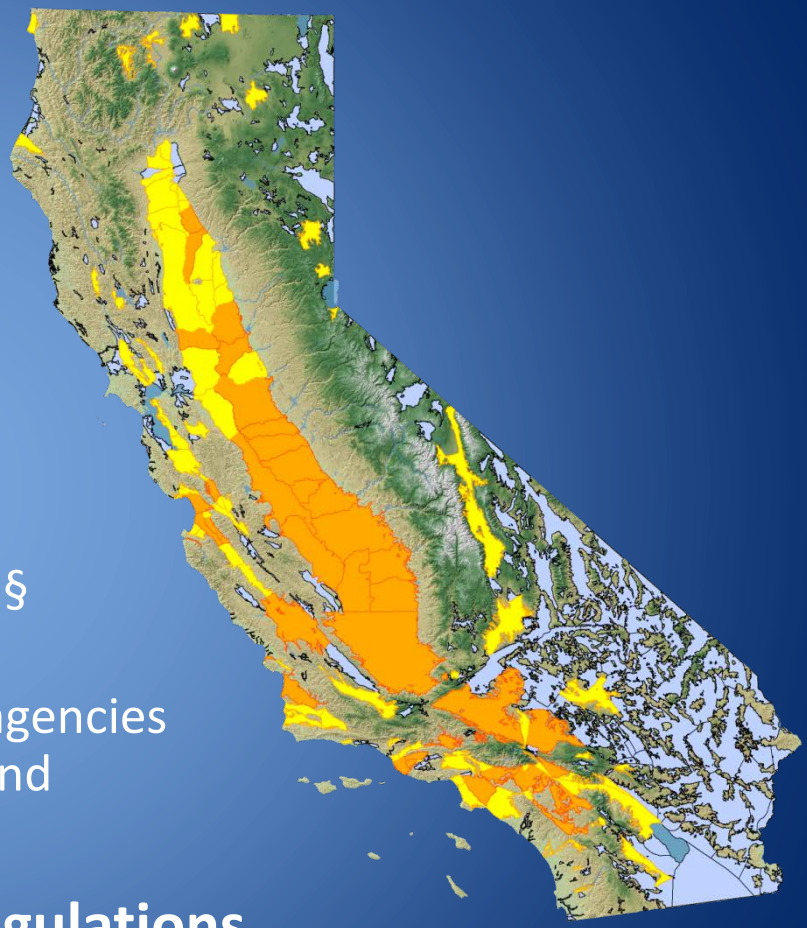
Advisory Group Meetings
December 17, 2015

Presentation Overview

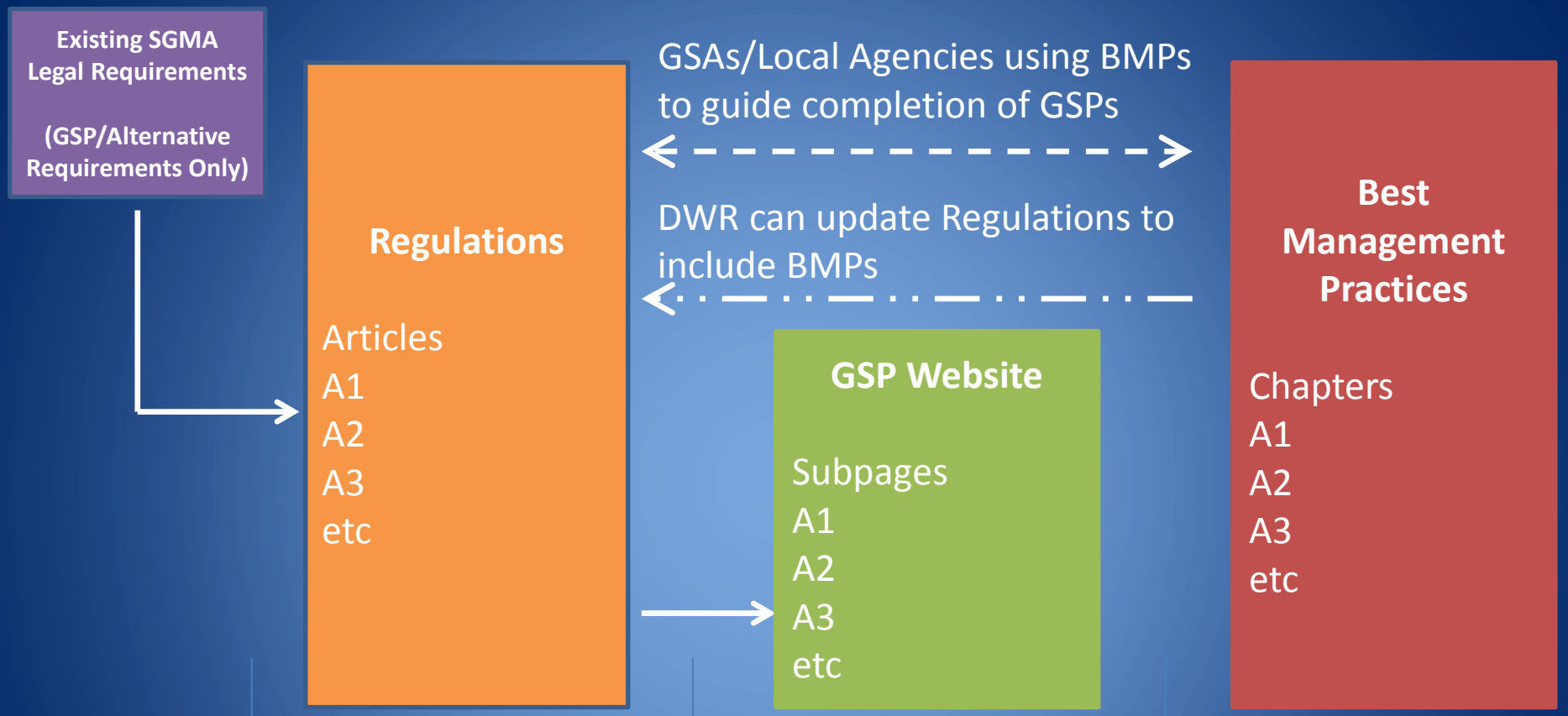
- Background
- Regulation Considerations
- Next Steps

SGMA GSP Requirements

- **By June 1, 2016, DWR shall adopt regulations for:**
  - Evaluating GSP
  - Implementation of GSP
  - Coordination agreements
- **The regulations shall identify:**
  - Required Plan Components (§ 10727.2)
  - Additional Plan Elements (§ 10727.4)
  - Coordination of Multiple GSPs in Basin (§ 10727.6)
  - Other information that will assist local agencies in developing and implementing GSPs and coordination agreements.
- **The department may update the regulations,** including to incorporate the best management practices (§ 10729 & 10733.2 (b)(1))



Best Management Practices



General Purpose

Minimum requirements to Evaluate Initial GSPs/Alt and Implementation of GSPs/Alt

Common **information** to complete/comply with the Regulations (Forms, Data, and Instructions)

Guidance Document for use by GSAs or Local Agencies to promote SGMA

GSP/ALT Regulations

Sustainable Groundwater Management

Required for All High and Medium Priority Basins (127)

GSP

- Covers Entire Basin
- Multiple GSPs Require Coordination Agreement
- Submitted by GSA(s)
- Annual Reporting
- 5 Year Evaluation
- Submitted to DWR by
  - 1/31/2020 (Critical Overdrafted)
  - 1/31/2022 (all other High/Medium Priority)

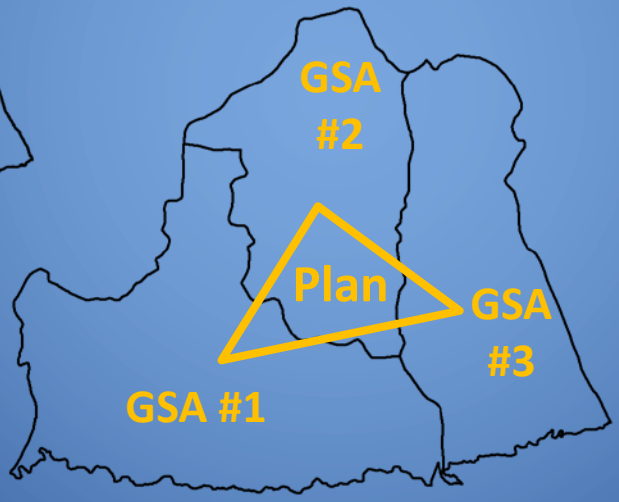
Alternative Plan

- Covers Entire Basin
- Submitted by Local Agency or GSA
- Eligibility:
  1. Existing GMP
  2. Adjudication
  3. Basin Operated within Sustainable Yield for 10 years
- CASGEM Compliant
- Annual & 5 Year Reporting
- Submitted to DWR by 1/1/2017

Paths To Sustainability

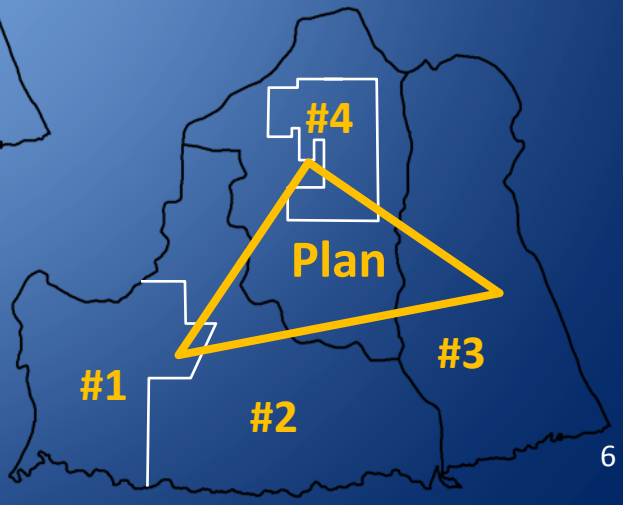
- **Three Options (§ 10727)**

One GSA
One GSP



Many GSAs
One GSP with a Coordination Agreement

Many GSAs
Many GSPs with a Coordination Agreement



GSP Regulations – 10 Issue Topics

Phase 1 – Scoping (Collection of Issues)

All 10 + Topics (May-Jun)

Phase 2 – Draft Discussion Papers and Public Informational Sessions

- 1st Batch (Jun-Jul)
- 2nd Batch (Jul–Aug)
- 3rd Batch (Aug-Sep)

http://www.water.ca.gov/groundwater/sgm/gsp.cfm

GSP Communication and Outreach

Advisory Group	GSP Topics	GSP Batch 1	GSP Batch 2	GSP Batch 3
1. Practitioners Advisory Panel	6/22/2015		7/24/2015	8/24/2015
2. ACWA (Statewide)	6/12/2015	7/16/2015	8/21/2015	9/23/2015
3. RCRC & CSAC	6/10/2015	7/16/2015	8/12/2015	9/30/2015
4. Ag Group	6/29/2015	7/31/2015	9/1/2015	9/28/2015
5. Non-Governmental Organizations (NGOs)	6/19/2015	7/13/2015	8/7/2015	10/3/2015
6. Tulare Lake Hydrologic Region	5/27/2015	7/6/2015	8/28/2015	9/22/2015
7. San Joaquin Tributaries Authority (Delta)	5/29/2015	7/17/2015	9/24/2015	
8. San Luis &Delta-Mendota Water Authority	5/29/2015	–	–	–
9. Central Coast Area	6/11/2015	7/15/2015	8/17/2015	9/29/2015
10. Northern California Water Association (NCWA)	6/19/2015	7/10/2015	8/17/2015	10/7/2015
11. Tribal Government	8/13/2015		10/5/2015	
Public Meetings / Webcasts	–	7/20/2015	8/27/2015	9/21/2015

40 meetings, >100 hours

Potential Regulation Components

Overview	Potential Regulation Content	Stakeholder Input
Governance & Coordination "Who is managing & participating"	Governance Coordination Land Use	All Topics 6 - Coordination Agreements 7 - State Agency Coordination 8 - Water Budgets and Coordination 3 - Land Use & County Involvement
Basin Setting "What are the current conditions"	State of the Basin	2- Pre SGMA Conditions and Undesirable Results
SGM Planning "How will GW be managed & measured"	Sustainability Goal (Sustainable Yield, SGM) Measurable Objectives & Undesirable Results Monitoring Plan	1 - Measurable Objectives 2- Pre SGMA Conditions and UR's 8 - Water Budgets and Coordination 10 - Adaptive Mgt. and Focus Areas 1 - Measurable Objectives 2- Pre SGMA Conditions and UR's 9 - Data Collection, Mgt., & Reporting
Evaluation "Reporting, Evaluation, & Adaptive Management"	Implementation & Reporting	9 - Data Collection, Mgt., & Reporting 10 - Adaptive Mgt. and Focus Areas
Equivalent GSPs	Alternative GSPs & Fringe Areas	4 - Alternative GSP 5 - Boundaries, Overlapping & Unmanaged Areas

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Governance

GSA Formation – Chapter 4 of SGMA (§10723)

- Entire basin must be covered by a GSA(s) by June 30, 2017
  - A local agency can decide to *become* a GSA or a combination of local agencies can *form* a GSA through a JPA or other legal agreement
  - A water corporation or mutual water company may participate in a GSA through a legal agreement
  - Senate Bill (SB) 13 changed DWR's role in reviewing GSA notices and addressed overlapping service area boundaries

GSP Governance – Chapter 6 of SGMA (§10727)

- Adoption or Amendment of Plan Following Public Hearing (§10728.4)
- Public Notification and Participation (Advisory Committee) (§10727.8)

Considerations

- Description of proof of adoption, legal authority, roles & responsibilities
- Description of how beneficial use was considered and users of groundwater were engaged and considered in development of GSP
- Stakeholder comment letters will be considered when evaluating GSP as defined in SGMA

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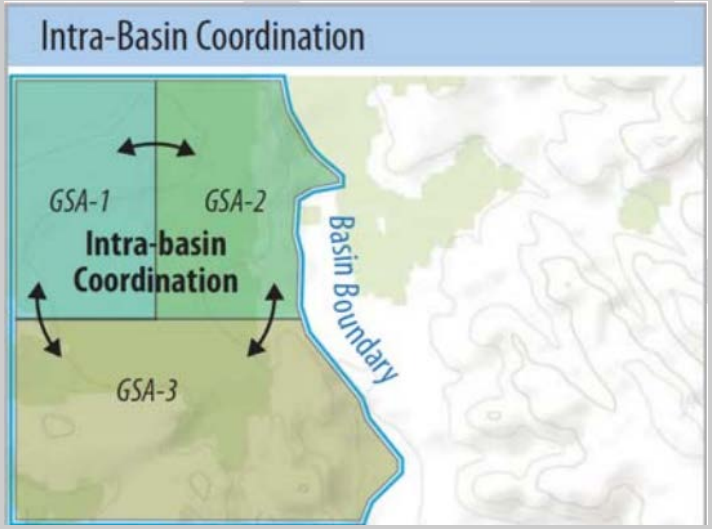
Coordination

Intra-Basin

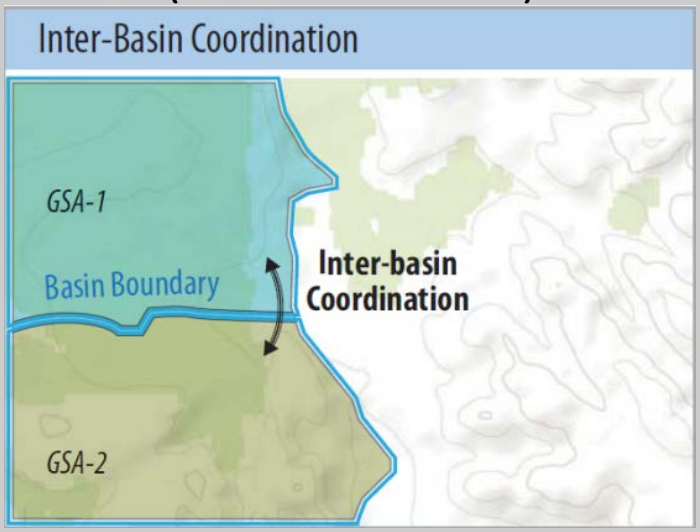
(Within Basin)



- Coordination Agreement is required if there are multiple GSP's in basin (§ 10726.6)

Inter-Basin

(Between Basins)



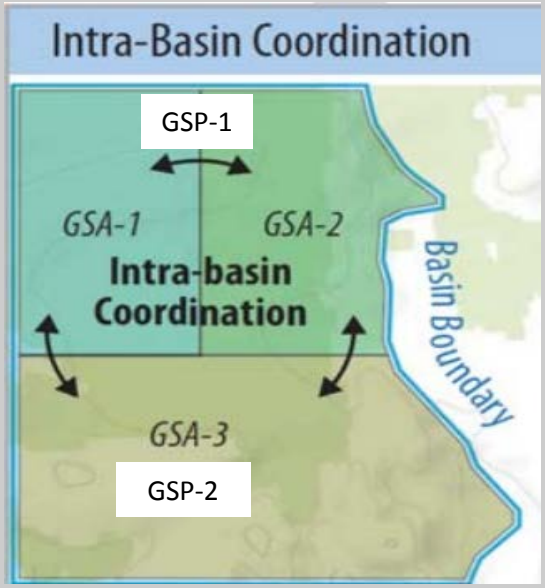
- DWR shall evaluate if one GSP adversely affects an adjacent GSP (§ 10733 (c))

(§ 10721.)(d)"Coordination agreement" means a legal agreement adopted between two or more groundwater sustainability agencies that provides the basis for coordinating multiple agencies or groundwater sustainability plans within a basin pursuant to this part.

Coordination (cont.)

Intra-Basin

(Within Basin)



Coordination Agreement

GSA-1 →
GSA-2 → GSP-1
GSA-3 → GSP-2

GSP "whole basin" Requirements

1. Coordinated GSP- includes summary document submitted with multiple GSPs where multiple GSAs exist within one basin
   a) Sustainability Goal
   b) Sustainable Yield
      I. Undesirable Results
   c) State of the Basin
      I. Hydrogeologic Conceptual Model
      II. Water Budget/Baseline
   d) Monitoring Plan
2. Annual Report

Coordination (cont.)

Same Data and Methodologies (§10727.6)

- For **groundwater elevation**, **groundwater extraction**, and **surface water supply**
  - Monitoring Protocols
    - Spatial resolution by land use type (approx. same)
    - Temporal resolution
    - Type of monitoring
    - Standard operating procedures (SOPs)
  - Data management system
- Basin wide calculation of **total water use**, **change in groundwater storage**, **water budget**, and **sustainable yield**
- Agreement on hydrologic assumptions

  (do not have to use same model)

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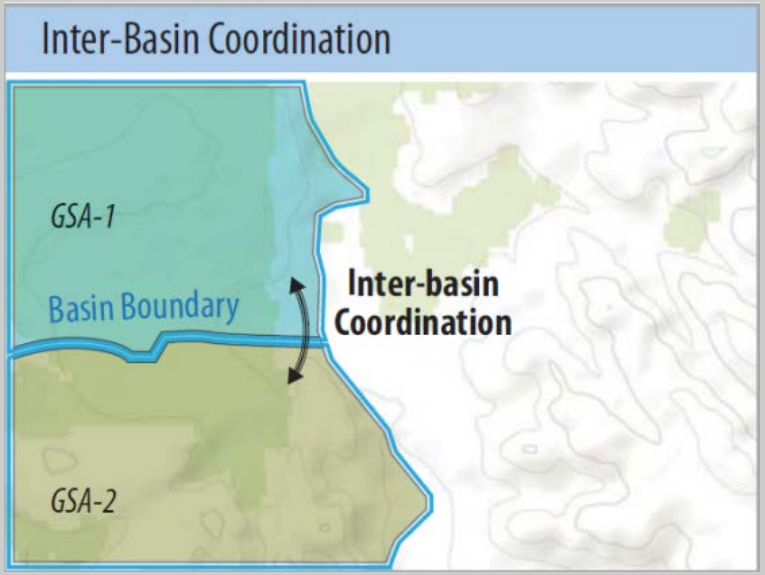
Coordination (cont.)

Inter-Basin (Between Hydraulically Connected Basins)

- Technical Requirements
  - Water budget information necessary to estimate groundwater flux across basin boundaries
  - Estimate of stream-aquifer interactions at boundaries



- Narrative Requirements
  - Description of how GSAs interact between adjacent hydraulically connected basins and how the GSAs will not adversely affect adjacent hydraulically connected basins
  - Description of how conflicts will be identified and resolved
- Not a duplication of Intra Basin Coordination requirements

Land Use

Governance

Coordination

Land Use

State of the Basin

Sustainability Goal

Measurable Objectives & Undesirable Results

Monitoring Plan

Implementation & Reporting

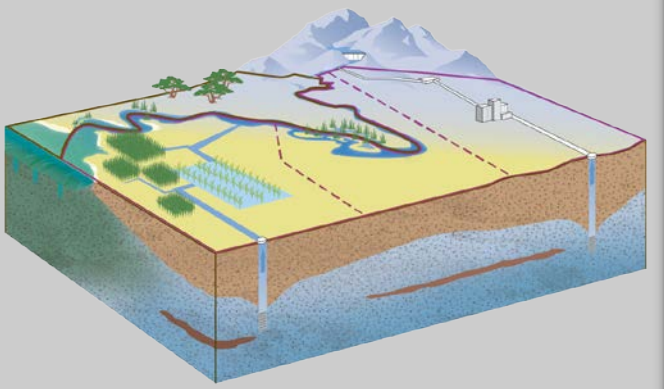
Alternative Plans & Frings Areas

Planning and Land Use

- **Review and Consideration of GW Requirements (Govt. Code 65350.5)**
  - Before adoption or amendment of a city's or county's general plan, the planning agency shall review and consider the GSP
- **Consideration of All Beneficial Uses and Users of Groundwater (§10723.2)**
  - GSAs shall consider the interests of all beneficial uses and users of groundwater including local land use planning agencies
- **Required GSP Elements (§10727.2 (g))**
  - GSP description of consideration of county and city general plans and how GSP may affect general plans

Land Use Considerations

- Identification of strategies and policies reliant on outside of GSP area
- Description of coordination with Cities and Counties
- GSAs provide GSP content in accessible (layperson) format for land use agencies
- Identification of recharge areas



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Basin Setting

(Maps, Hydrogeologic Conceptual Model, Water Budgets/Baseline)

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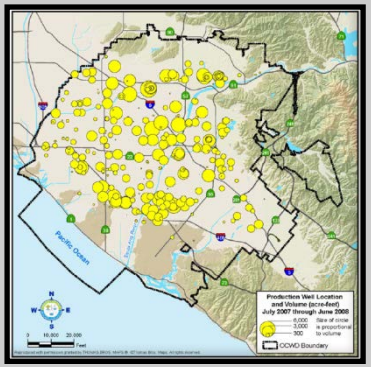
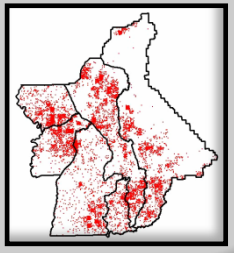
State of the Basin

Required Plan Components (§10727.2)

- Physical characteristics and aquifer system
- Historical data
- Groundwater levels, groundwater quality, subsidence, and groundwater-surface water interaction data
- Map of boundaries
- Map of recharge areas
- Map of appropriate planning agencies
- A general discussion of historical and projected water demands and supplies (*including well inventory*)



Water Budget/Baseline (§10733.2)



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State of the Basin (cont.)

Governance

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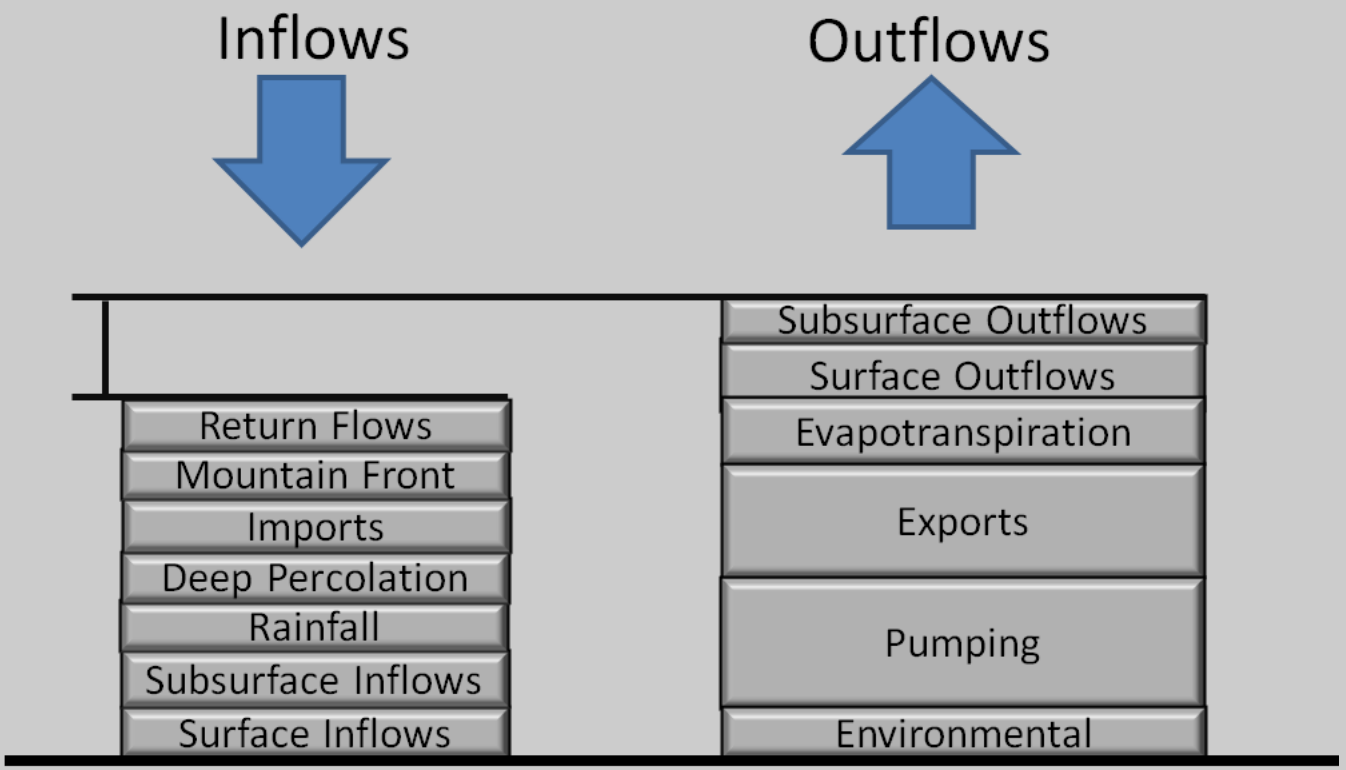
Water Budget: §10721(y)

Water Budget means an accounting of the total groundwater and surface water entering and leaving a basin including the changes in the amount of water stored.

$$\text{Inflows} - \text{Outflows} = \Delta\text{Storage}$$



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State of the Basin (cont.)

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Water Budget: §10721(y)

Water Budget means an accounting of the total groundwater and surface water entering and leaving a basin including the changes in the amount of water stored.

Baseline: §10733.2(b)(2)

The regulations adopted pursuant to paragraph (1) of subdivision (a) shall identify appropriate methodologies and assumptions for baseline conditions concerning:

1. hydrology,
2. water demand,
3. regulatory restrictions that affect the availability of surface water, and unreliability of, or reductions in, surface water deliveries to the agency or water users in the basin, and the impact of those conditions on achieving sustainability.

The baseline for measuring unreliability and reductions shall include the historic average reliability and deliveries of surface water to the agency or water users in the basin

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State of the Basin (cont.)

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Historical Baseline Considerations:

- Used to evaluate future conditions concerning hydrology, climate, water demand, water supply, change in storage and water reliability.
- Start with current conditions and extend back a minimum period of no less than 25 years.
- Provide a historical accounting of groundwater and surface water entering and leaving the basin, water demands and supplies, including the changes in the amount of water stored.
- Used to document and describe how past water budgets and management actions have contributed to the January 2015 undesirable results in the basin and the ability to achieve groundwater sustainability.

State of the Basin (cont.)

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Historical Baseline Considerations (cont.):

- Hydrology: Historical river and stream flow data and surface water storage.
- Climate: Annual precipitation & average annual temperature
- Water Supply & Demand: By water source type & water use sector. Includes evaluation of changing land use.
- Change in Storage: Annual change in gw & sw storage. Includes evaluation of historic gw levels.
- Water Supply Reliability: planned vs actual supply (by water source type). Includes a description of whether the reduction or unavailability is due to water year conditions or regulatory restrictions, and a includes a discussion of how historic surface water supply reliability has impacted the ability to achieve basin sustainability

State of the Basin (cont.)

Projected **Water Budget Considerations:**

- Projected water budget scenario takes into consideration…
  - The January 2015 undesirable results in the basin
  - The historical average supply reliability or regulatory reduction.
- Start with current conditions and project forward to the 50 year planning horizon (repeating 25 year baseline).
- Includes assessment of changing climate uncertainty on the projected water budget:
  - Qualitative: Vulnerability Assessment
  - Quantitative: Apply DWR-developed changes in precipitation, temperature, and sea level rise.

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State of the Basin (cont.)

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Projected Water Budget Considerations (cont.):

- Hydrology: Projected hydrology using 25-yr historic baseline data
- Climate: Evaluate projected annual precipitation and temperature based on historic trends *and based on uncertainties associated with changing climate conditions*.
- Water Demand: Projected water demands based on 25-yr historic trends (evaluate by water source type & water use sector).
- Water Supply: Projected water supplies based on historic trends *and uncertainty associated with changing climate conditions*.
- Change in Storage: Estimated annual change in gw & sw storage based on projected water supply, demands, management practices, gw levels, and changing climate conditions
- Water Supply Reliability: Estimated planned vs actual supply (by water source type) based on the average historic reliability.

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State of the Basin (cont.)

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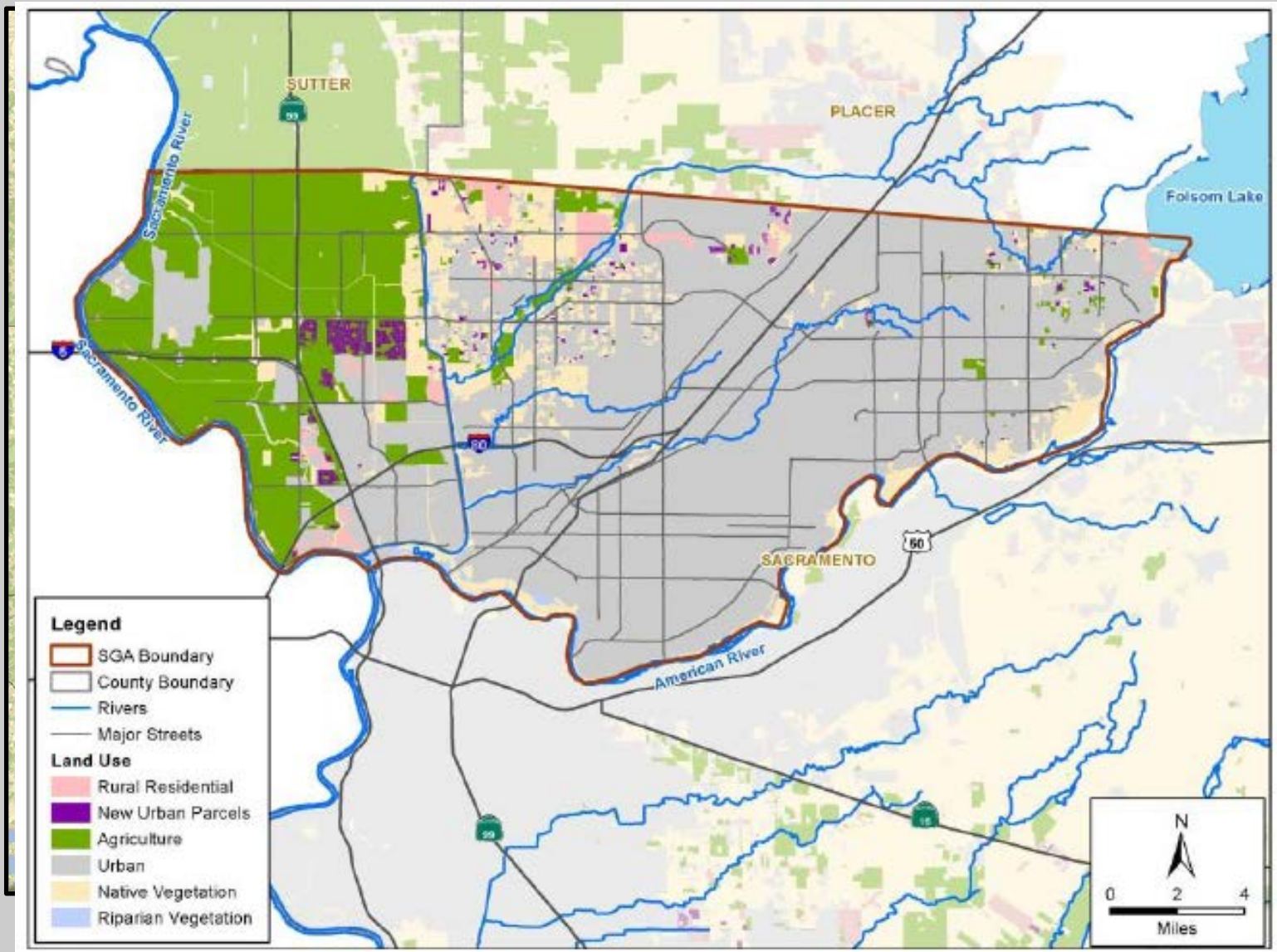

Figure 10: North Basin Land Use Map.

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State of the Basin (cont.)

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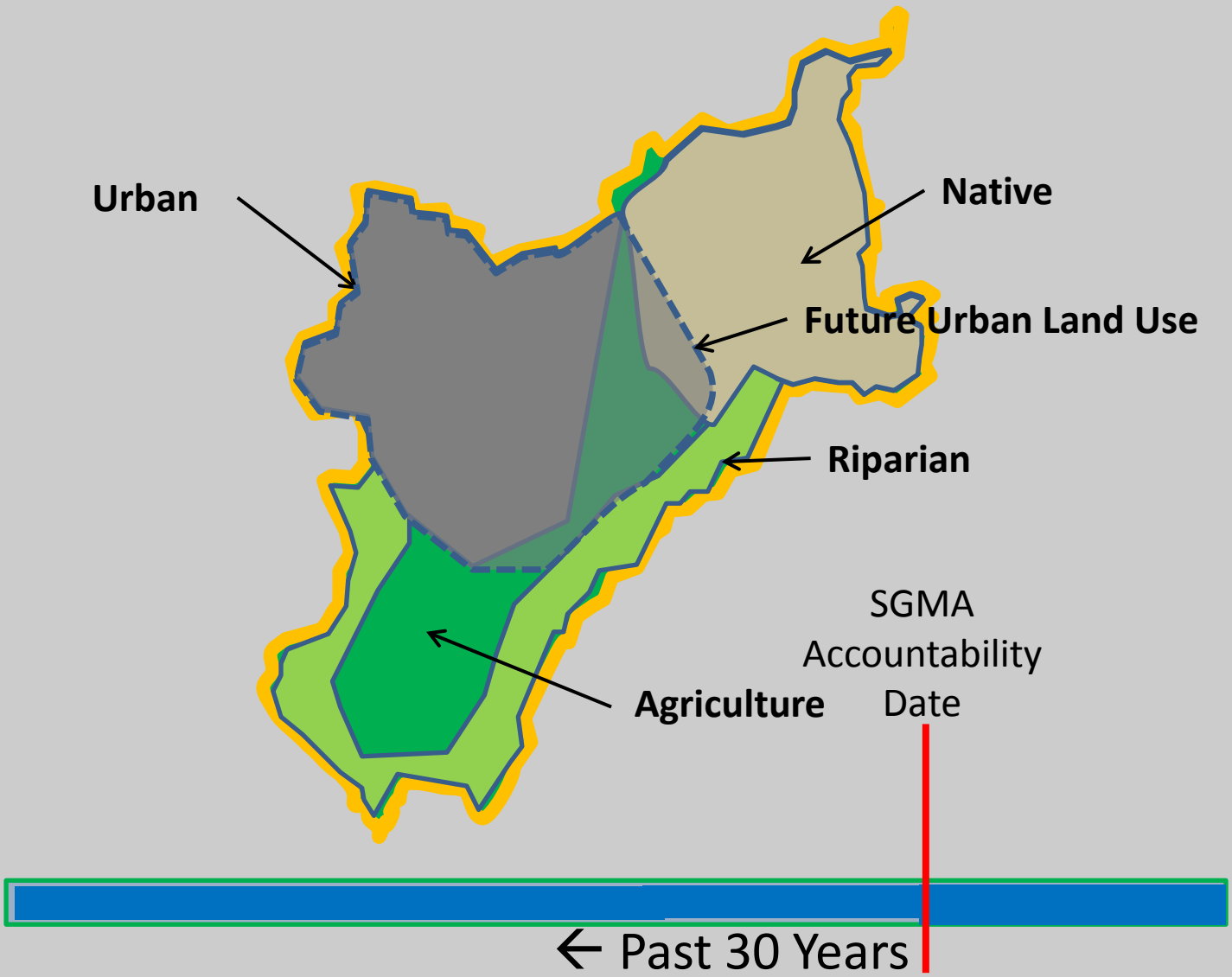

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Sustainable Groundwater Management Planning

(Undesirable Results, Measurable Objectives, Minimum Thresholds, Actions, & Monitoring Plans)

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Groundwater Sustainability

Undesirable Results:
Significant and Unreasonable…

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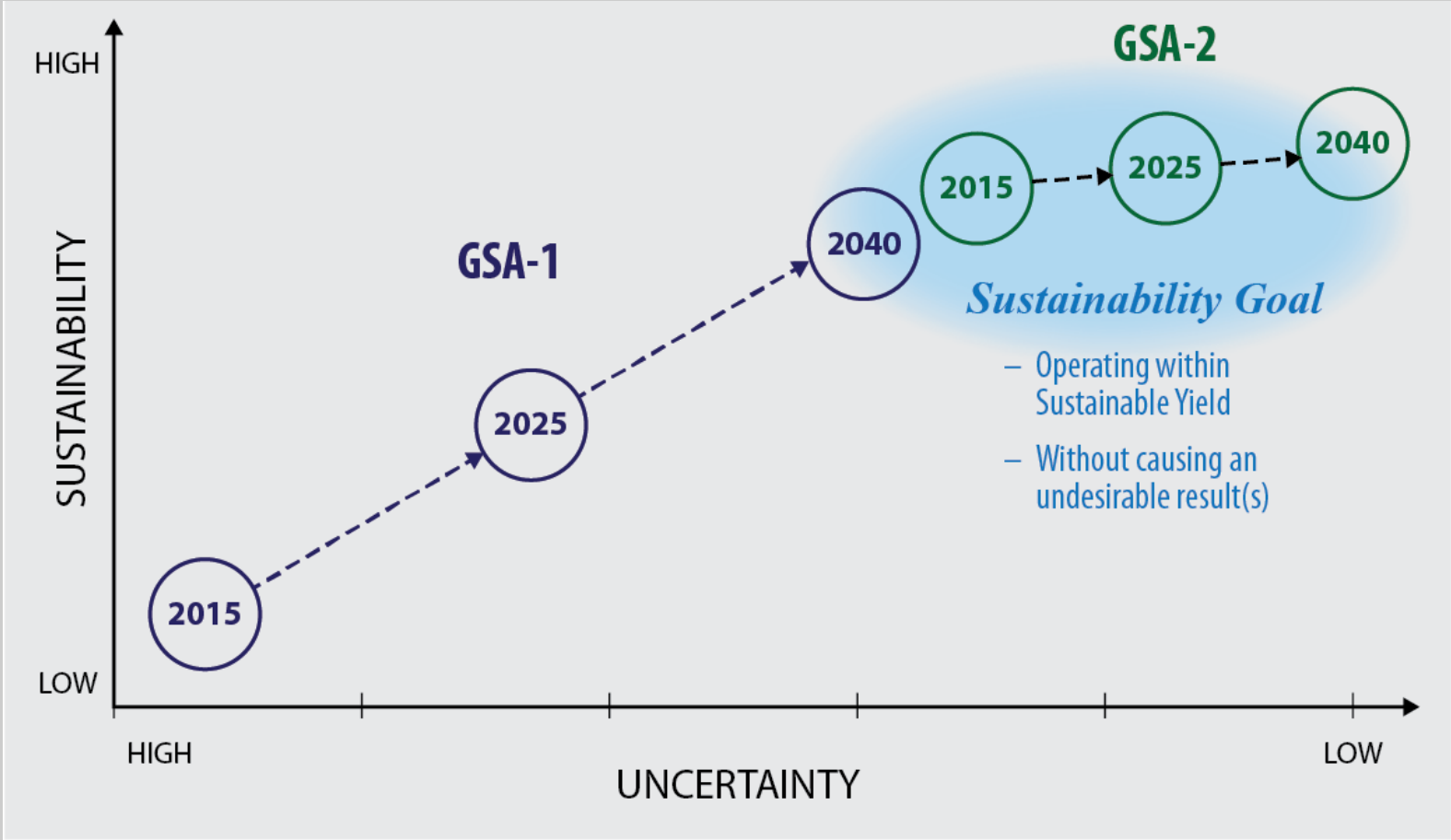
Sustainability Goal (Sustainable Yield and Sustainable Groundwater Management) (cont.)



Sustainability Goal --> SGM --> SY--> Undesirable Results

Undesirable Results --> SY--> SGM --> Sustainability Goal

Measurable Objectives

Measurable Objectives & Interim Milestones (§10727.2 (b))

- GSPs shall include Measurable Objectives, as well as Interim Milestones in increments of five years, to achieve the sustainability goal in the basin within 20 years of the implementation of the plan

Considerations

- **Measurable Objective (MO) –** 1) Management statement and 2) Measurable metric (at Interim Milestones) for each Undesirable Results to achieve the basin-wide Sustainability Goal
- **Minimum Threshold (MT) –** The point below which Undesirable Results (significant and unreasonable) are occurring in basin

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Undesirable Results

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Framework Considerations

- At least one Minimum Threshold for each Undesirable Results
- Description of how beneficial use was considered and users of groundwater were engaged & considered in setting Minimum Thresholds
- Represents a quantitative value measured in terms of:

Lowering GW Levels	GW elevation from mean sea level	Degraded Quality	Extent GW extractions contribute to WQ degradation
Land Subsidence	Measurement of Land Subsidence in feet	Reduction of Storage	Change in Storage
Seawater Intrusion	Isocontour of appropriate constituent concentration	Surface Water Depletion	Base flow Calculation, Monitoring, & Extent of GW Dependent Ecosystems ???

★ Threshold shall not conflict with existing State standard

Or other appropriate quantitative metric

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Undesirable Results (cont.)

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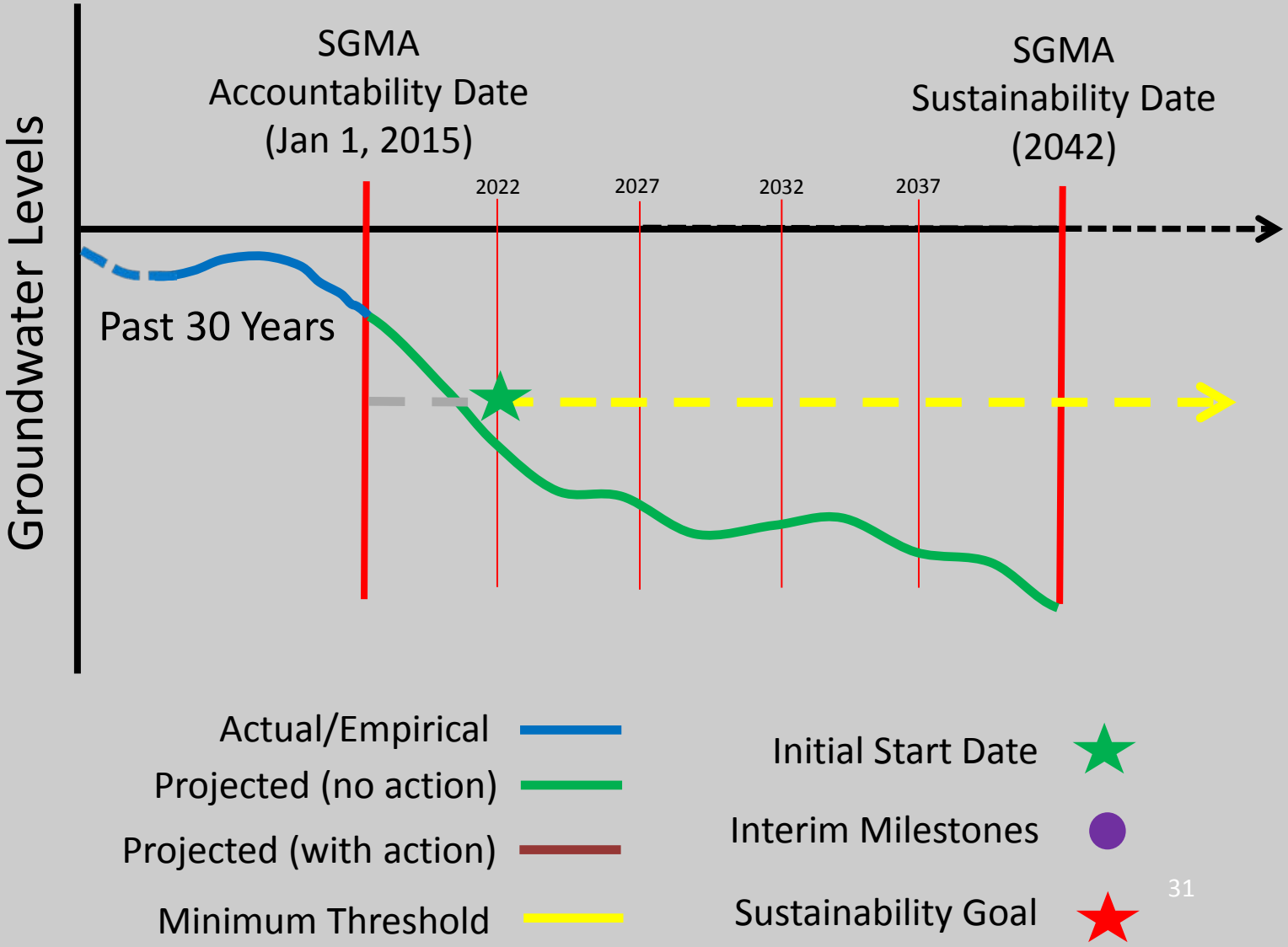
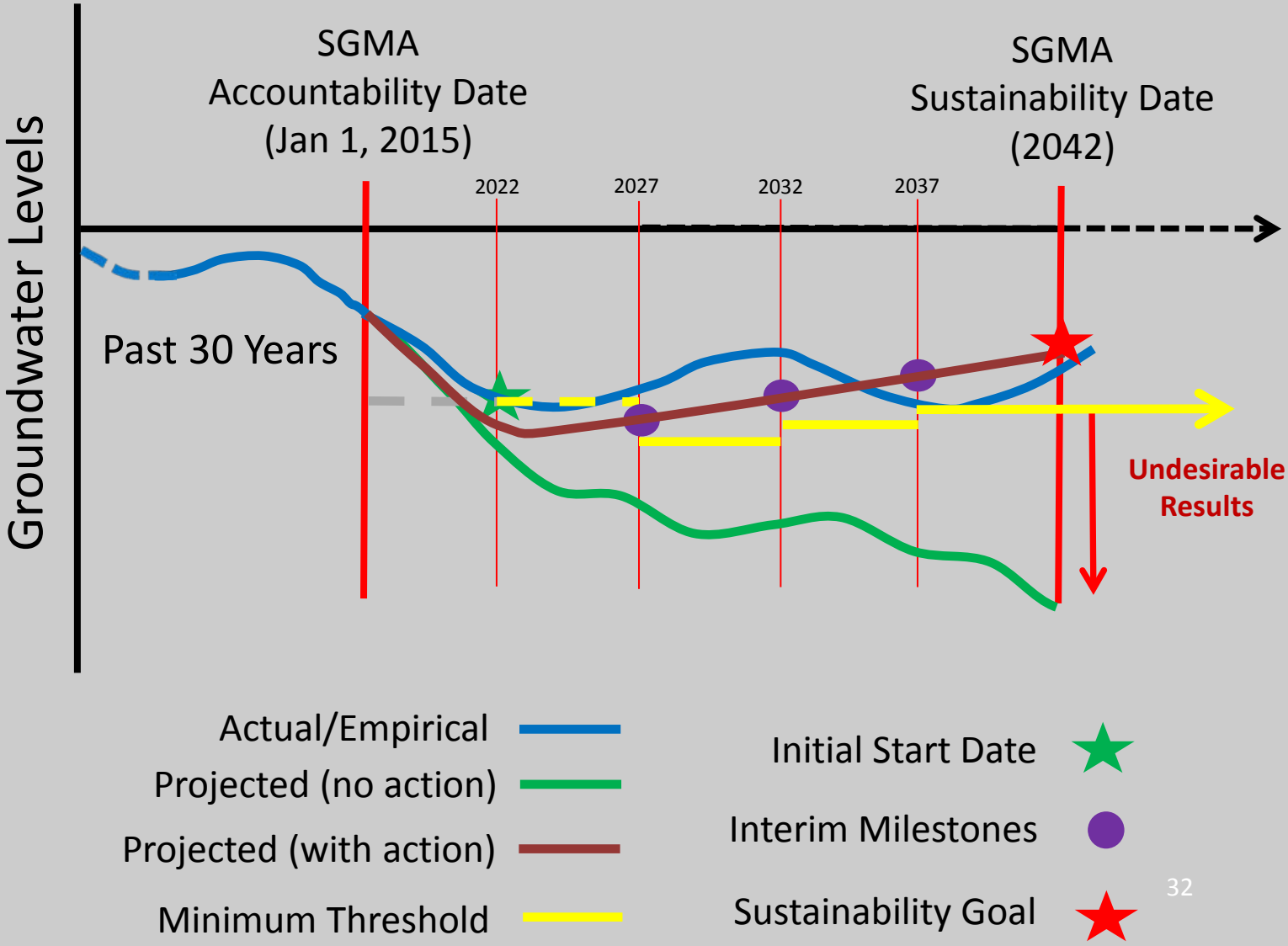
Initial Establishment of Minimum Threshold



Undesirable Results (cont.)

Identifying the Proposed Path to the Sustainability Goal



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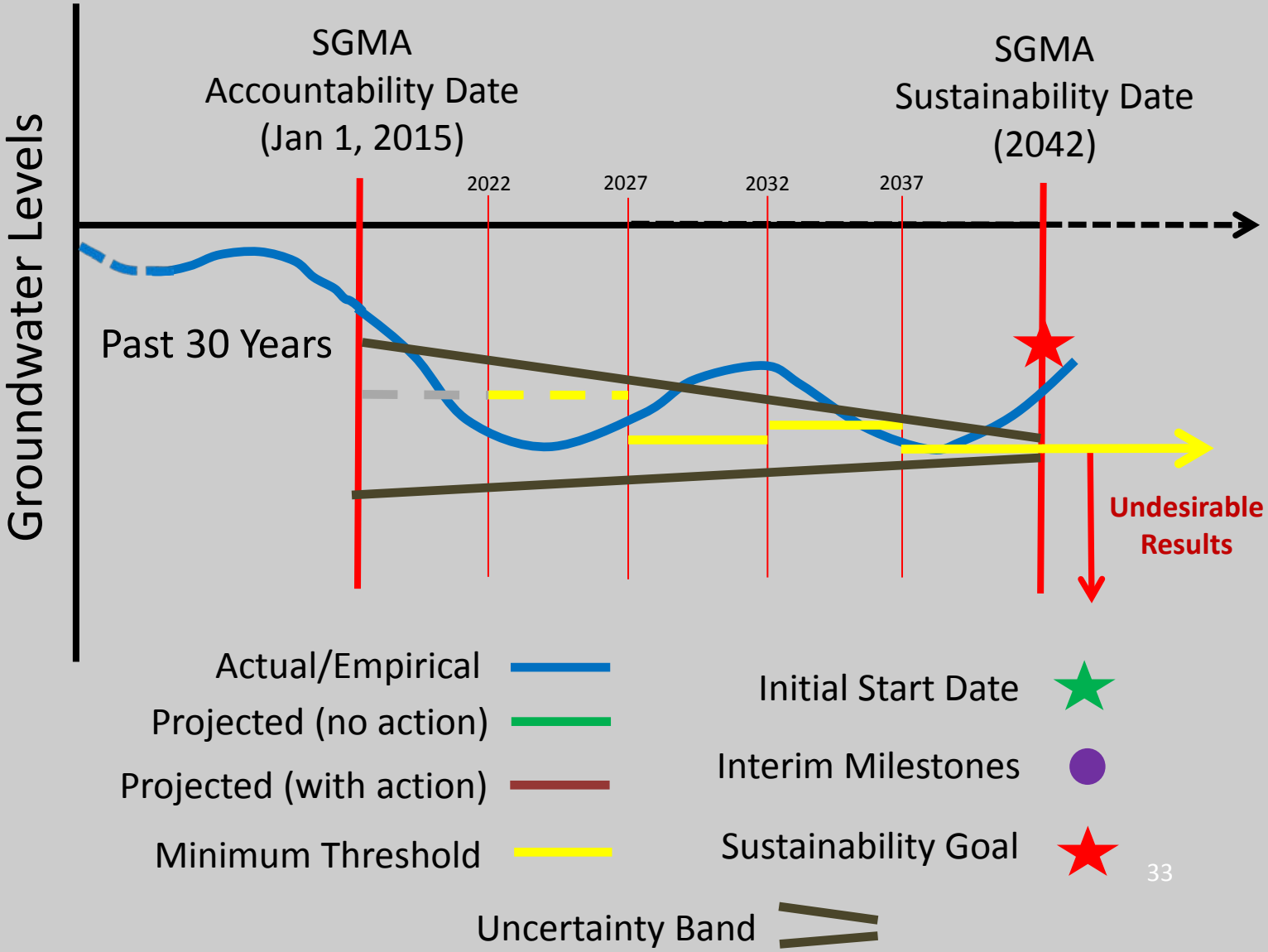
Undesirable Results (cont.)

Addressing Uncertainty



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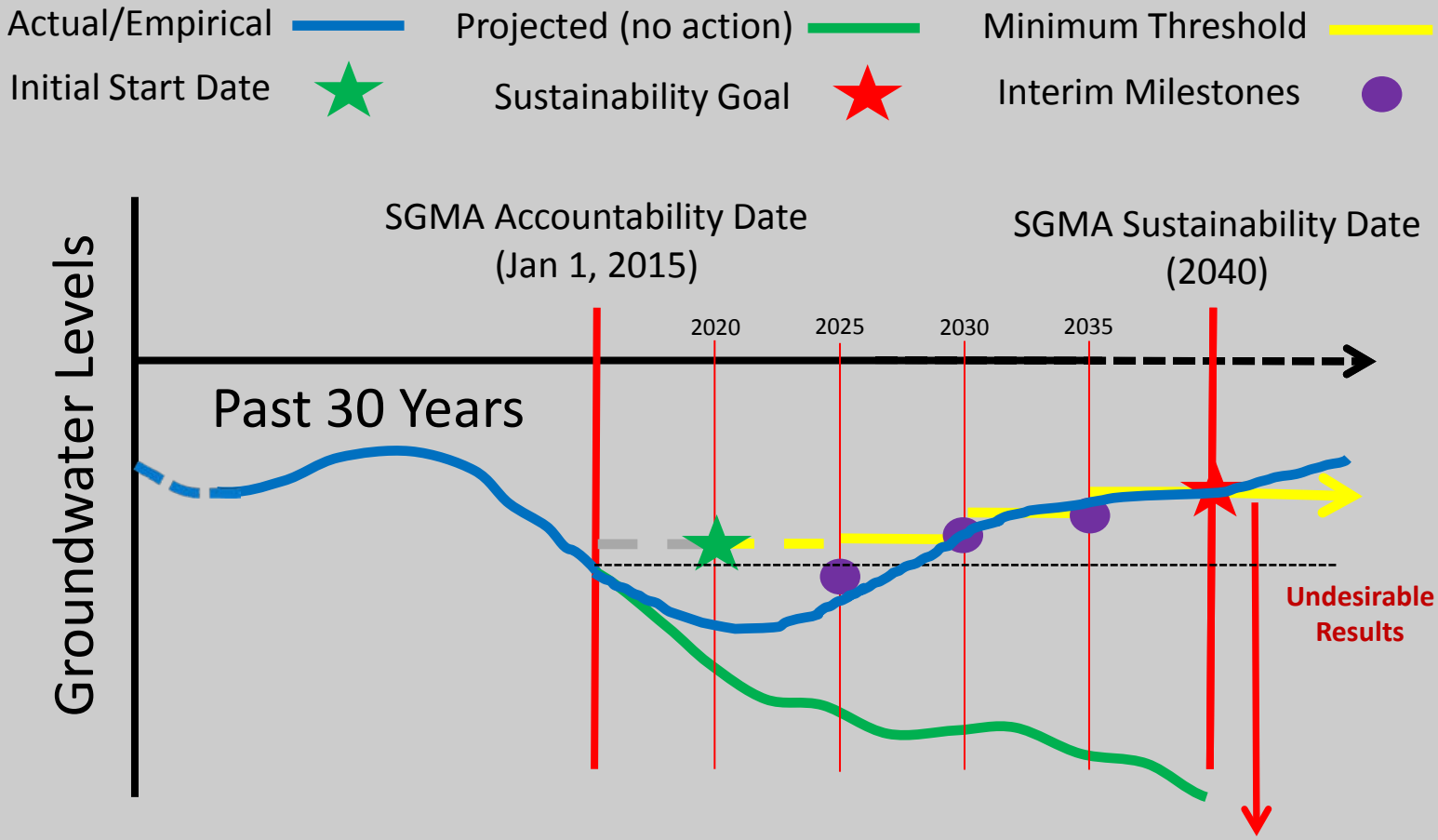
Undesirable Results (cont.)

Minimum Thresholds Requirements



<u>Regulation Considerations</u>

- Must adhere to framework
- Must pass reasonableness criteria

<u>GSA Discretion/Flexibility</u>

- Proposed by GSA
- Locally defined
- Site specific

Undesirable Results (cont.)

Governance

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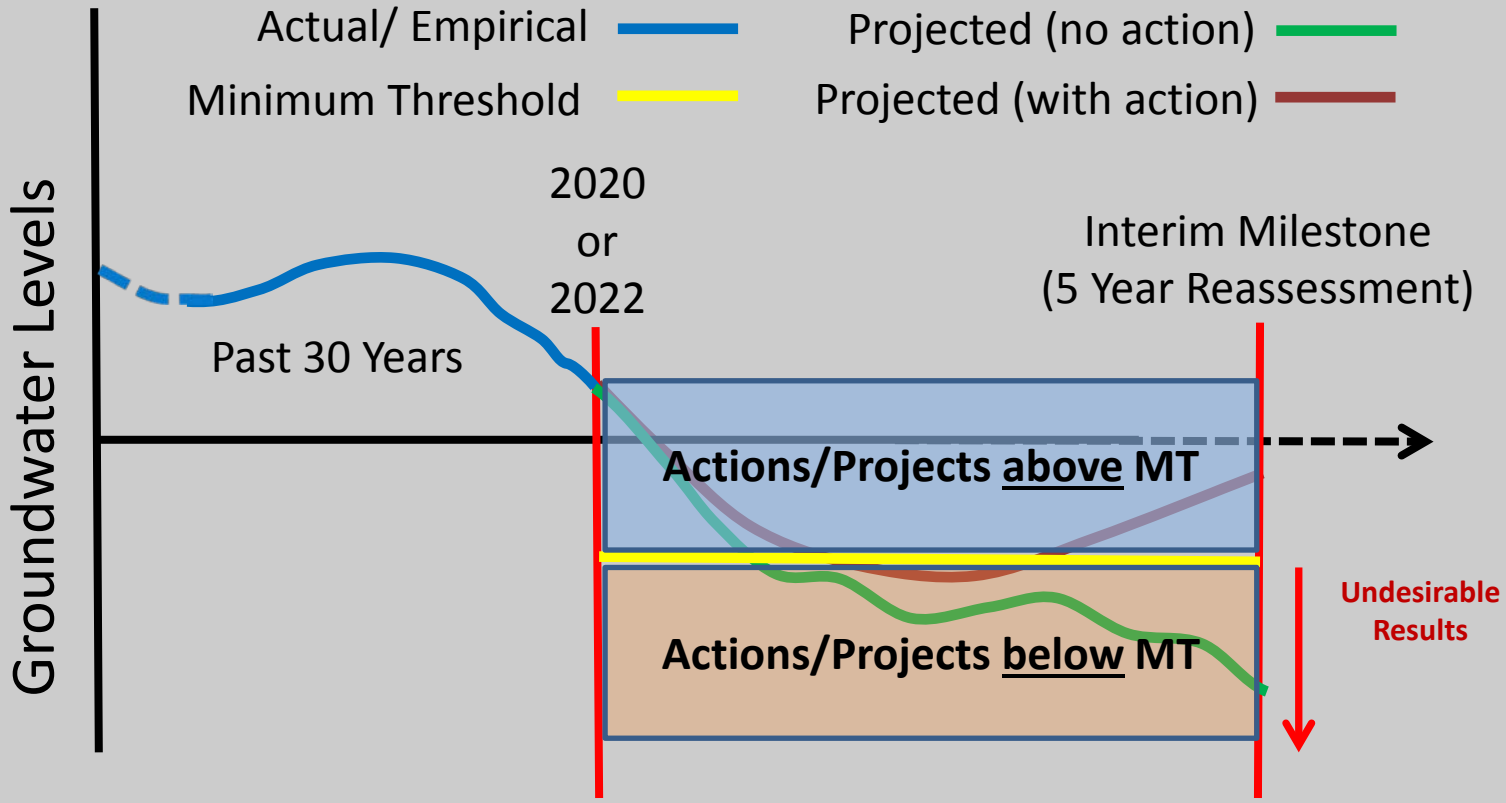

Regulation Considerations

- Description of Types of Actions or Projects
- Action/Projects will differ based on the severity of conditions (whether above or below MT)
- Contingency Plan Requirement (Demand Reduction Actions)

GSA Discretion/Flexibility

- Outcome based - Up to GSA to identify effective actions or projects to avoid the minimum thresholds and reach the Sustainable Goal

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Monitoring Plan

Monitoring Summary (§10727.2 (e)(f))

- Existing monitoring sites (identification of data gaps)
- Types of measurements, frequency, and protocols

Regulation Considerations

- Monitoring Plan – Adequate number of monitoring sites:
  - To evaluate and implement SGM (Measurable Objectives)
  - Characterize hydraulic gradients and boundary flux
- CASGEM monitoring well network provides foundation
- Quarterly frequency minimum standard *(seasonal trends)*
- Increased density and frequency of monitoring may be necessary based on severity of the undesirable results

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Monitoring Plan – Existing Network

Governance

Coordination

Land Use

State of the Basin

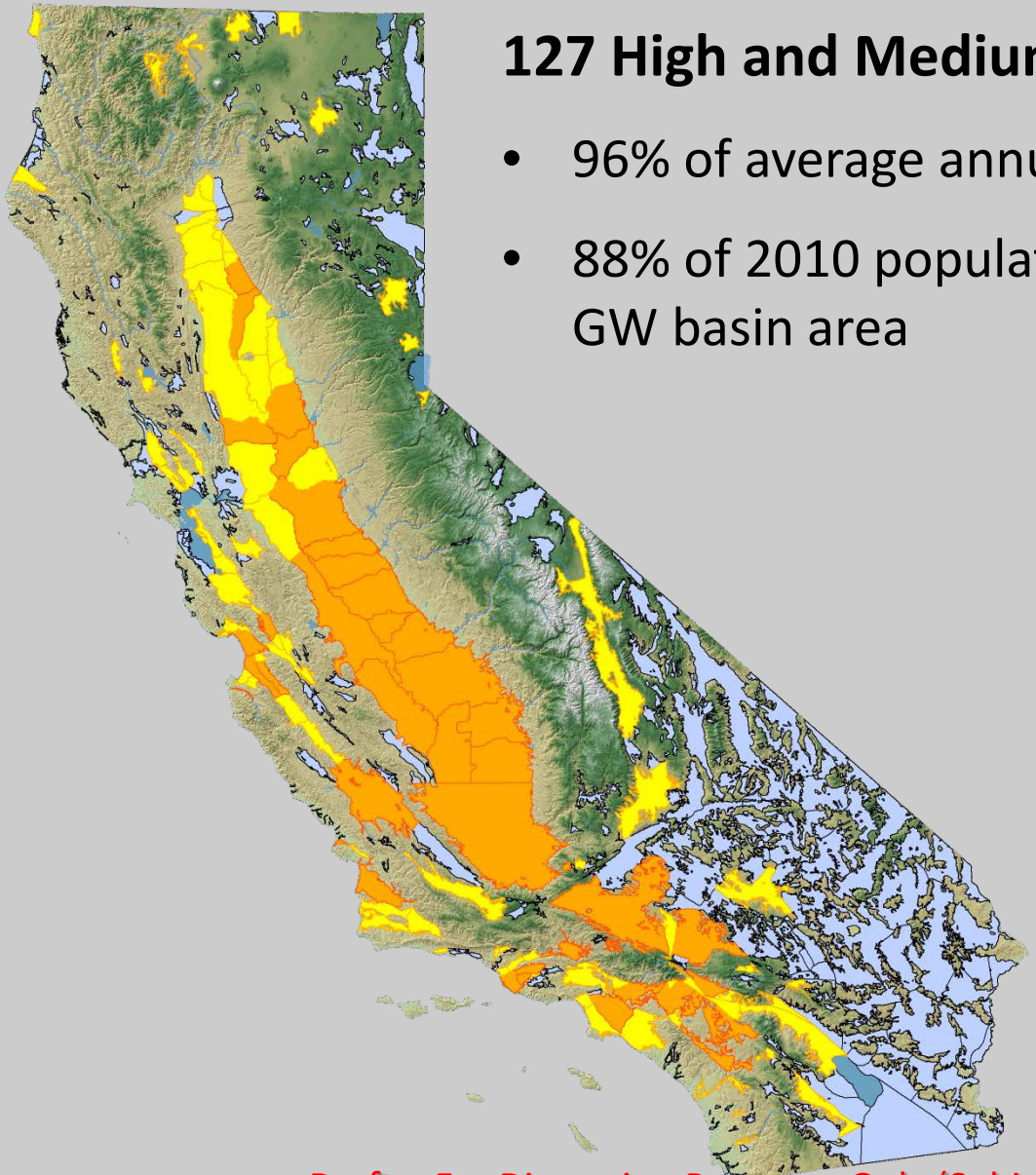
Sustainability Goal

Measurable Objectives & Undesirable Results

Monitoring Plan

Implementation & Reporting

Alternative Plans & Frings Areas



127 High and Medium Priority Basins

- 96% of average annual GW supply
- 88% of 2010 population overlying the GW basin area

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Monitoring Plan – Existing Network

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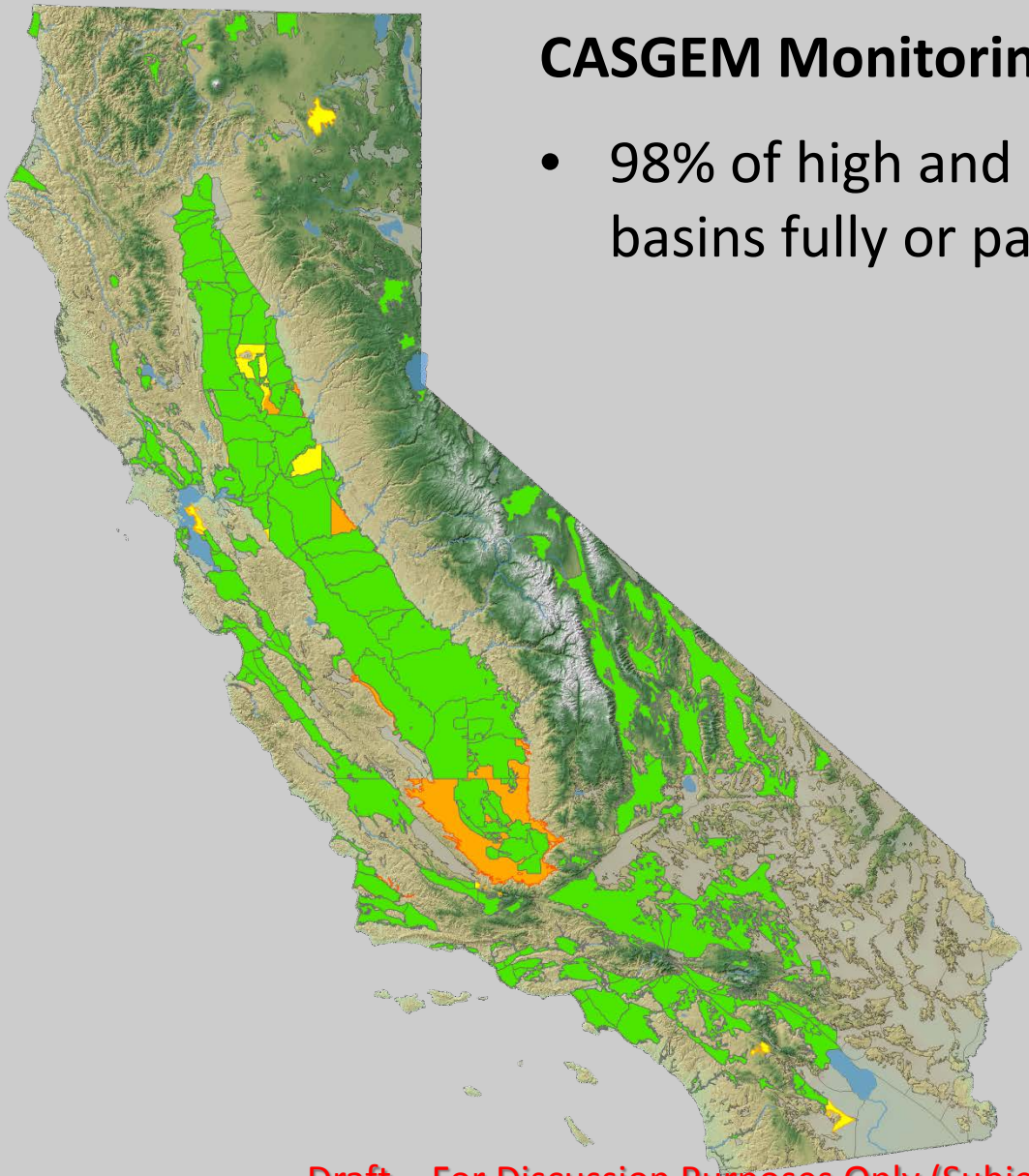

CASGEM Monitoring Plans

- 98% of high and medium priority basins fully or partially designated

CASGEM

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Monitoring Plan – Existing Network

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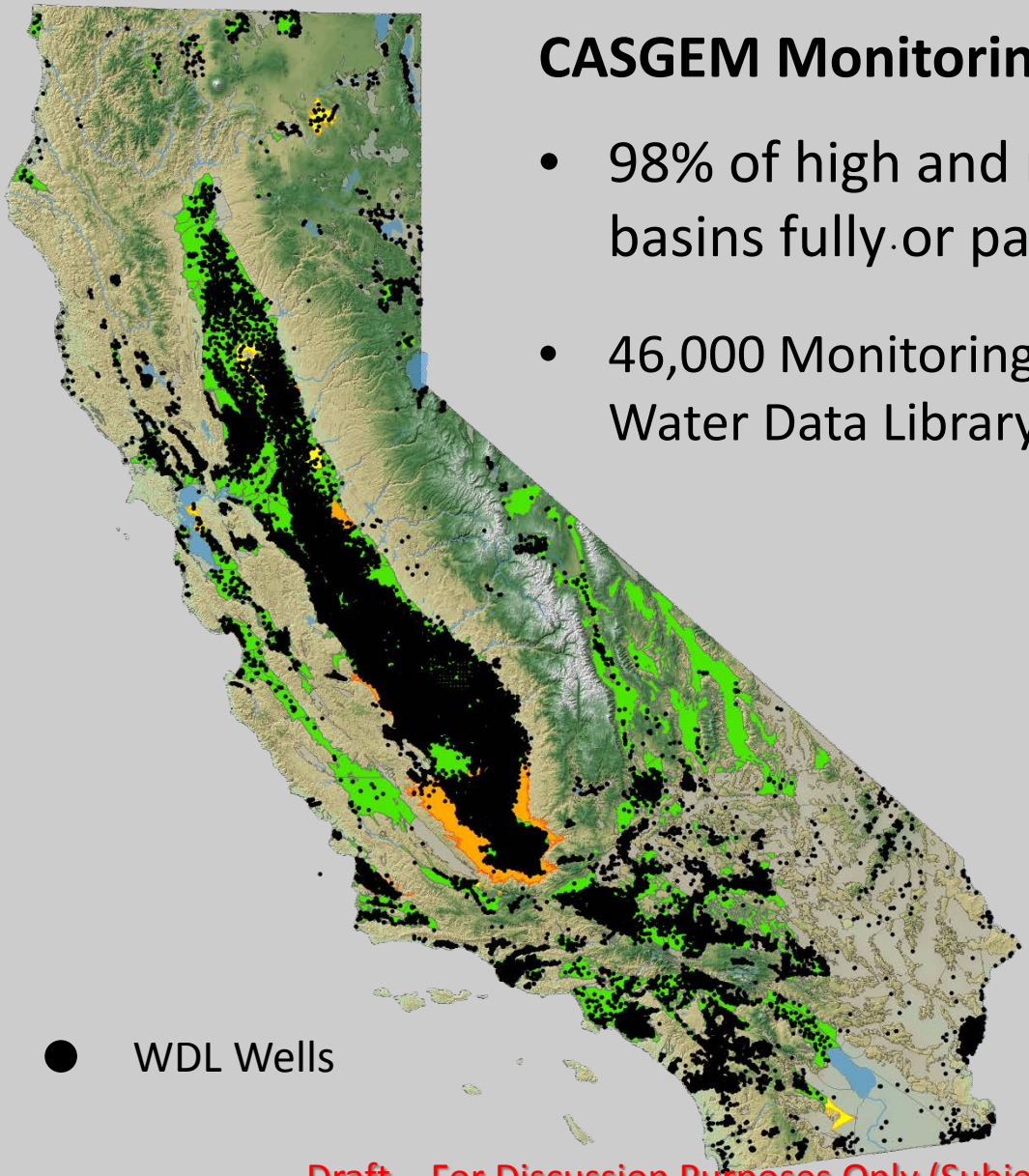

CASGEM Monitoring Plans

- 98% of high and medium priority basins fully or partially designated
- 46,000 Monitoring Wells in DWR Water Data Library (Past & Present)

CASGEM

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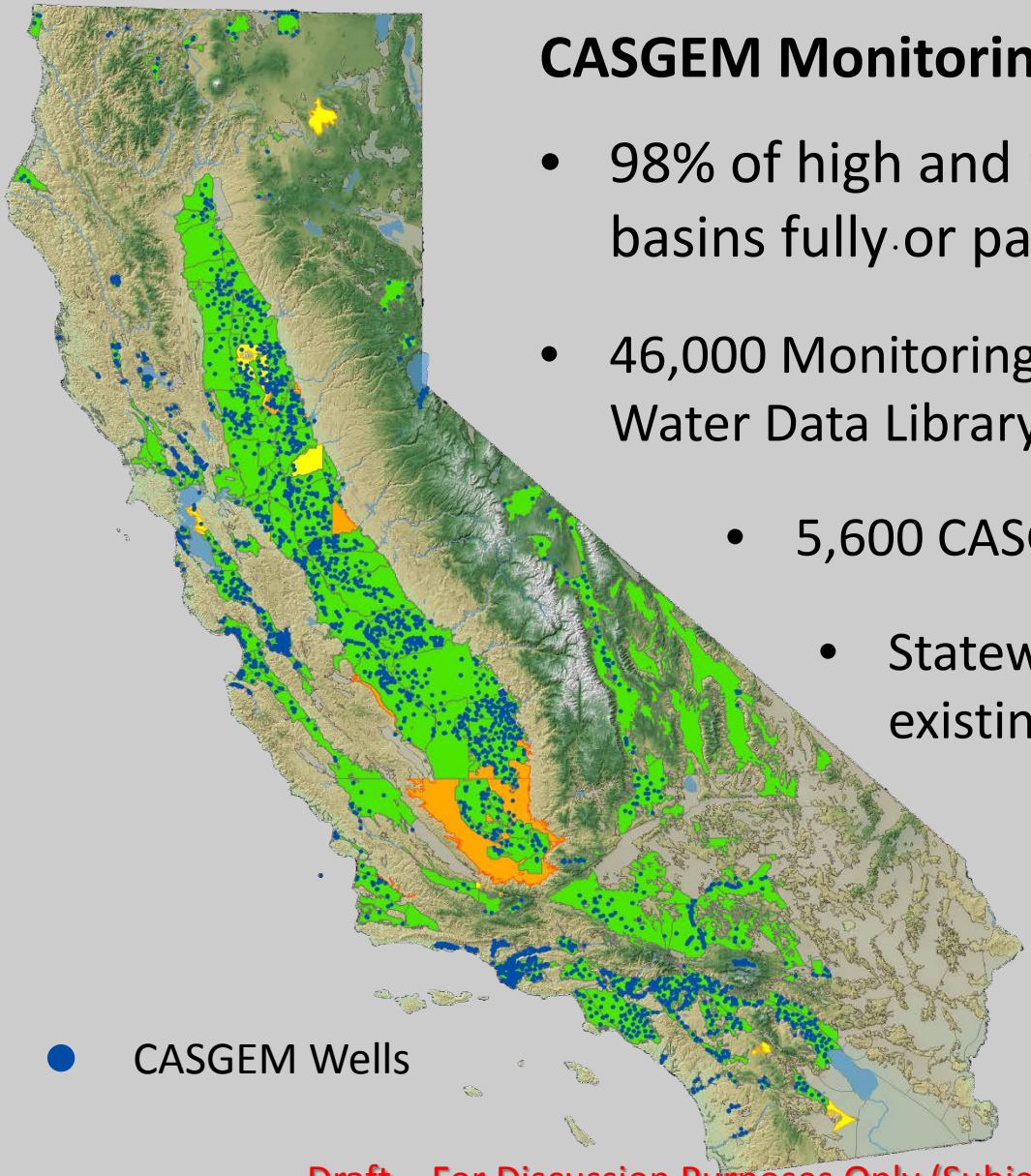
Monitoring Plan – Existing Network



CASGEM Monitoring Plans

- 98% of high and medium priority basins fully or partially designated
- 46,000 Monitoring Wells in DWR Water Data Library (Past & Present)
  - 5,600 CASGEM Wells
    - Statewide Variability in existing monitoring plans

CASGEM

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Monitoring Well Standards

Governance

Coordination

Land Use

State of the Basin

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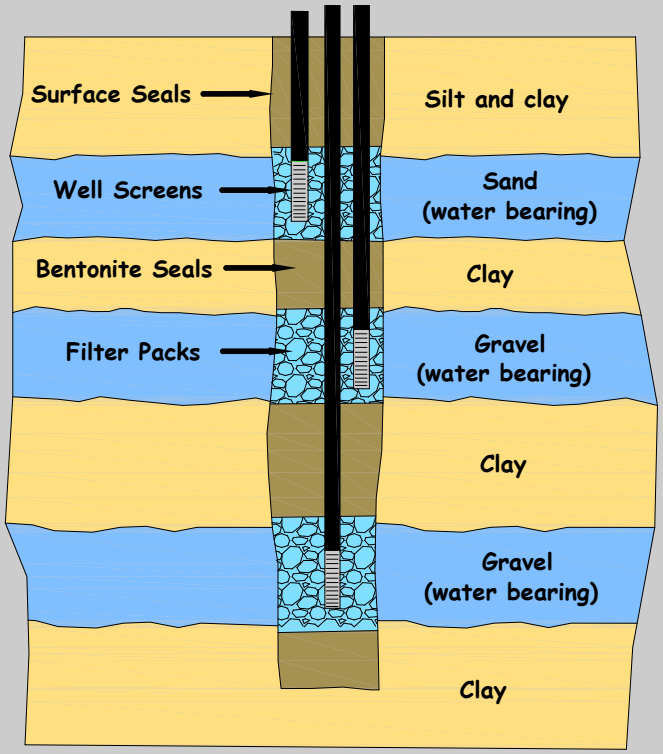

Regulation Consideration

Well Location (X,Y,Z)

- Reference point elevation (ft msl)
- Groundwater surface elevation

Well Details

- Screened intervals
- Total depth
- Well type
- Well Completion Report
- Geophysical investigations and supporting data
- Aquifer Information

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Monitoring Plan – Existing Monitoring Wells

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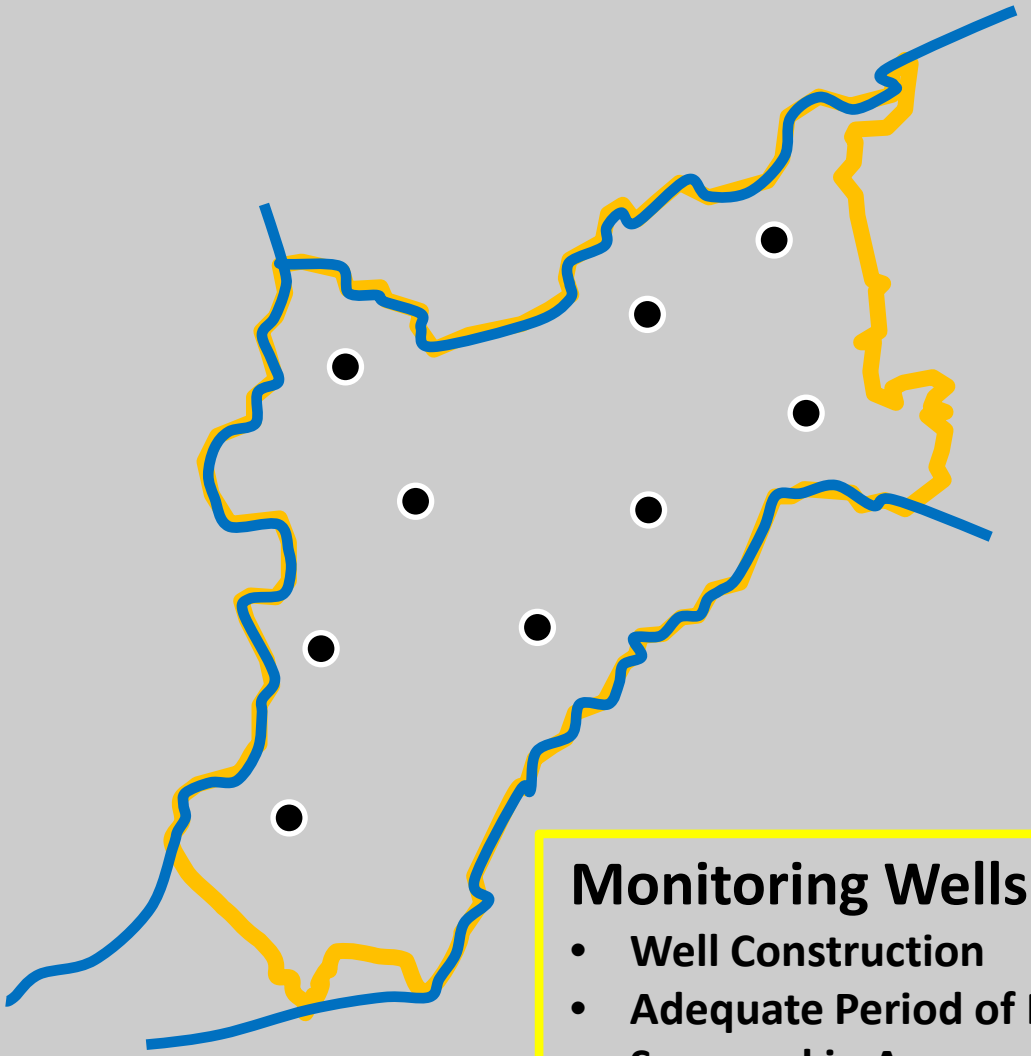

Monitoring Wells:

- Well Construction
- Adequate Period of Record
- Screened in Appropriate Aquifer(s)

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Monitoring Plan – Compliance Monitoring Sites

Governance

Coordination

Land Use

State of the Basin

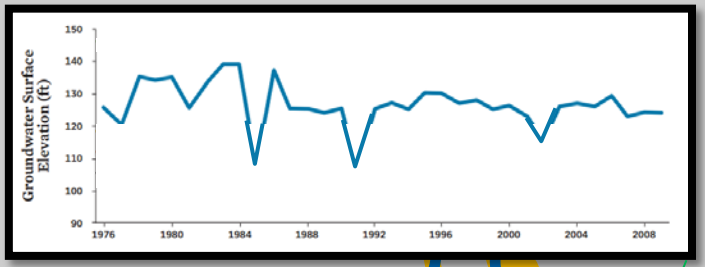
Sustainability Goal

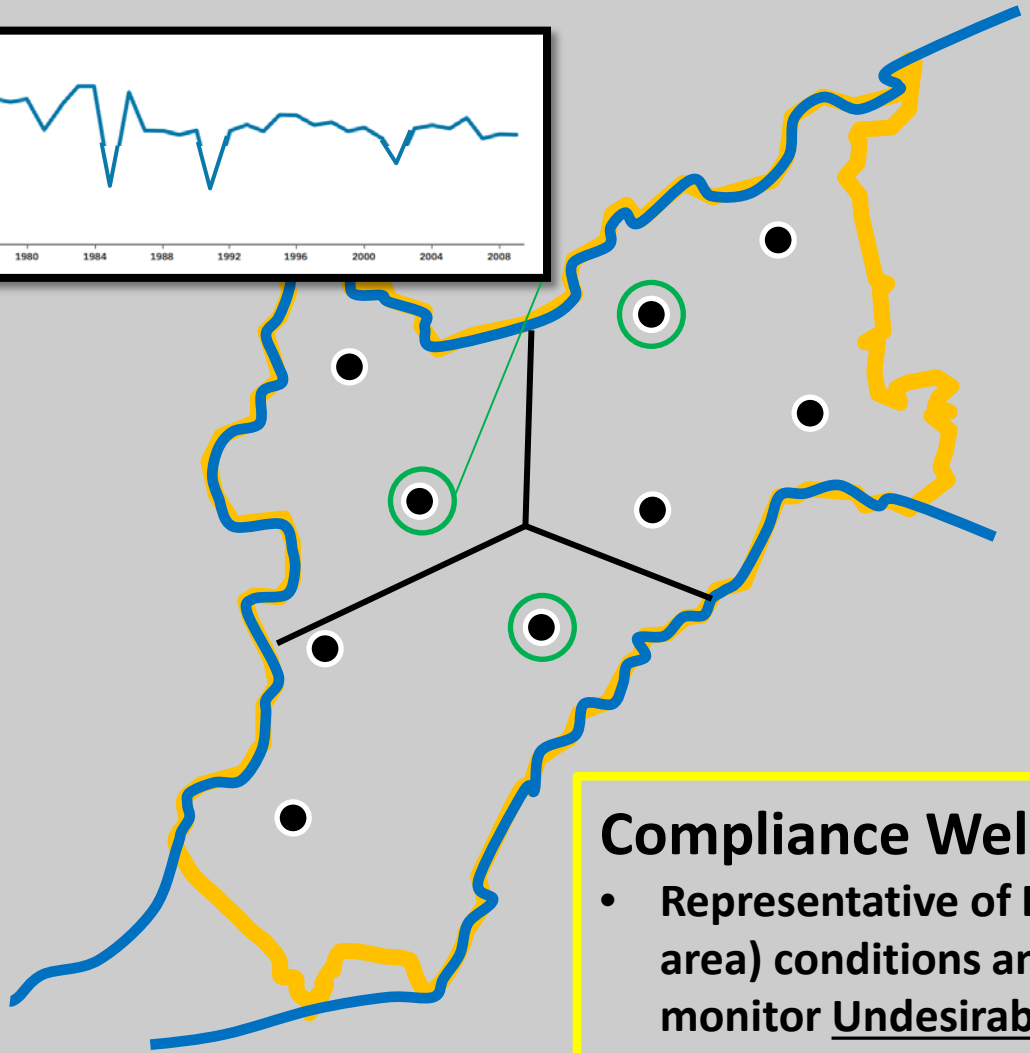
Measurable Objectives & Undesirable Results

Monitoring Plan

Implementation & Reporting

Alternative Plans & Frings Areas





Compliance Wells:

- Representative of Basin (or focus area) conditions and adequate to monitor <u>Undesirable Results</u>

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Monitoring Plan – Compliance Monitoring Sites

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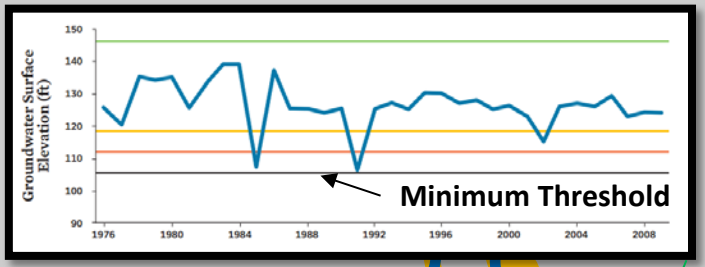

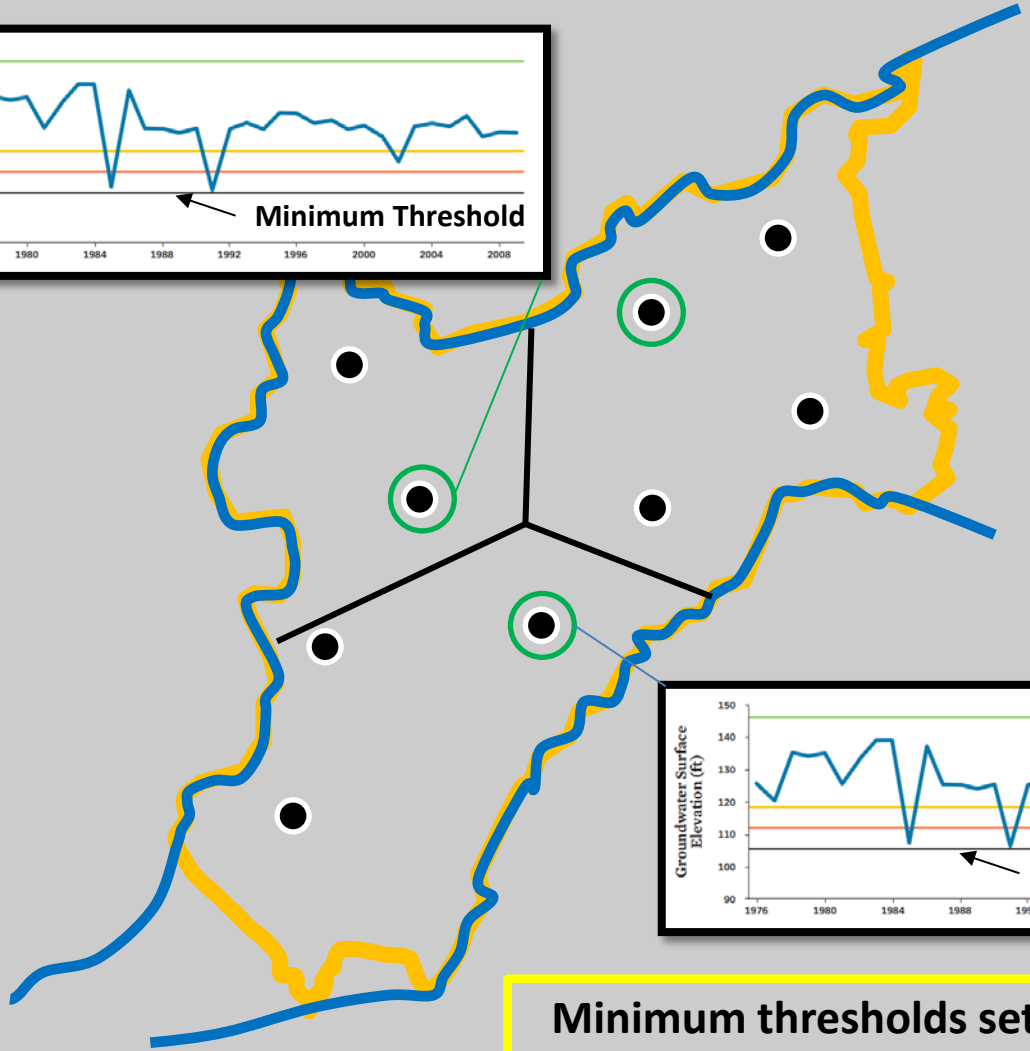

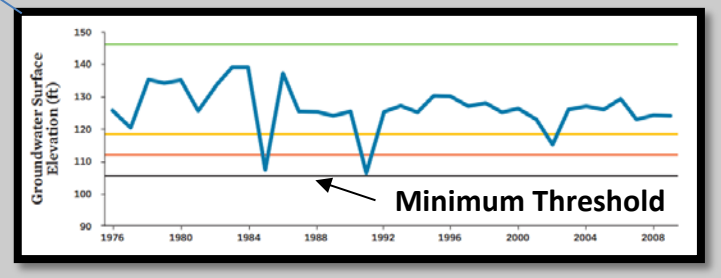

Minimum thresholds set for each compliance Site

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Evaluation

(Implementation and Reporting)

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Implementation

Levels of DWR Assessment

1. Adequate Plan OR Adequate Progress
2. Pending Inadequacy Determination
   (Deficiencies/Corrective Actions)
3. Inadequate Determination (subject to SWRCB authority)

Initial GSP Submission/GSP Updates and Annual and 5 Year Reporting		GSP Implementation
Completeness Check	**Adequacy Check**	**Progress Check**
Immediate Inadequacy Determination (Examples - Missing Requirements or Deadlines, etc.)	Due Process and Opportunity to Correct Deficiencies (Examples – Inadequate GSP elements, etc.)	Tracking and Evaluating Progress (Examples - Minimum Threshold continues to be exceeded without progress, GSP not being implemented, etc)

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Annual Reporting

Governance
Coordination
Land Use
State of the Basin
Sustainability Goal
Measurable Objectives & Undesirable Results
Monitoring Plan
Annual Reporting
Alternative Plans & Frings Areas

Annual Reporting (§ 10728) – Compatible with Water Budget Requirements

1. Groundwater elevations
2. Annual aggregated groundwater extraction (*by use sector type*)
3. Surface water supply used for groundwater recharge
4. Total water use (*by water use type and sector*)
5. Change in groundwater storage

Additional Reporting Components (10728.2 *GSA* & 10733.8 *DWR*)

- Executive Summary
- Measurable Objective and Sustainability Goal Performance
- GSP Amendments
- Monitoring Plan and Data Gap Assessment
- Coordination

Additional Components show Progress toward Sustainability Goal Between 5 years Assessments

Governance
Coordination
Land Use
State of the Basin
Sustainability Goal
Measurable Objectives & Undesirable Results
Monitoring Plan
Annual Reporting
Alternative Plans & Frings Areas

Annual Reporting

DWR Adequacy Review

Initial GSP

§ 10727.2
§ 10727.4
§ 10727.6

DWR Provides Feedback & Technical Assistance (if needed)

Annual Report § 10728

Annual Report § 10728

Annual Report § 10728

Annual Report § 10728

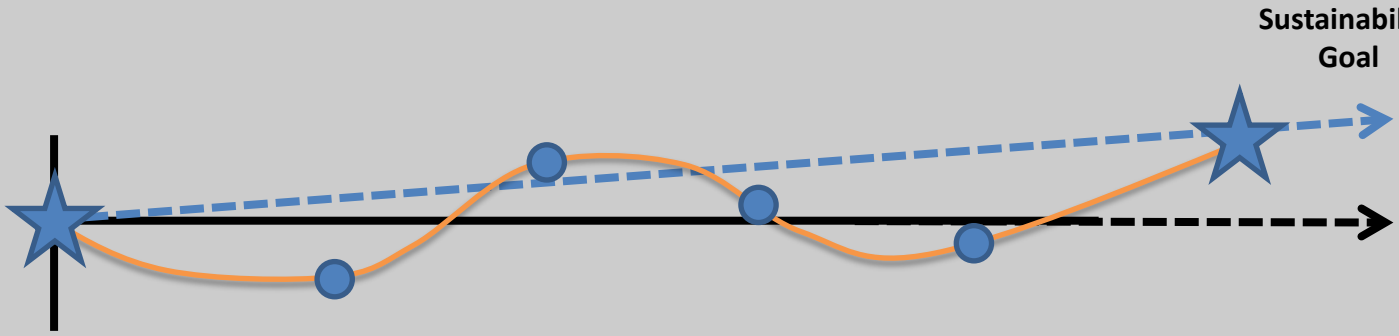
DWR Adequacy Review

GSP
Interim Milestone 1

Annual Report § 10728

2020/2022

2025/2027



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Equivalent GSPs

(Alternatives and Fringe Areas)

Alternative Plans

Governance
Coordination
Land Use
State of the Basin
Sustainability Goal
Measurable Objectives & Undesirable Results
Monitoring Plan
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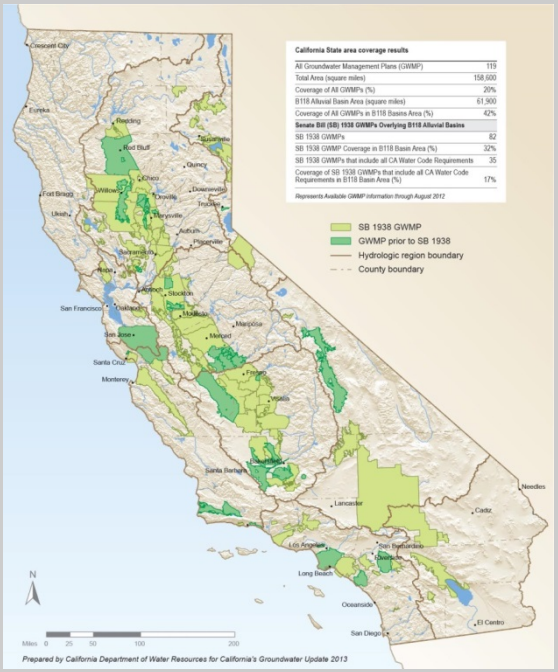
Alternative Plans & Frings Areas

Alternatives (§10733.6)

- Existing GMP or law authorizing groundwater management (with or without Undesirable Results)
- Adjudication action
- Analysis that basin has operated within its sustainable yield for 10 years (No Undesirable Results)



Alternative Considerations

- SGMA entire basin or subbasin requirement
- Technical Requirements the same as GSP – Elements from Governance, Coordination, Land use, State of the Basin, SGM Planning, and Reporting

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Fringe Areas

Governance

Coordination

Land Use

State of the Basin

Sustainability Goal

Measurable Objectives & Undesirable Results

Monitoring Plan

Implementation & Reporting

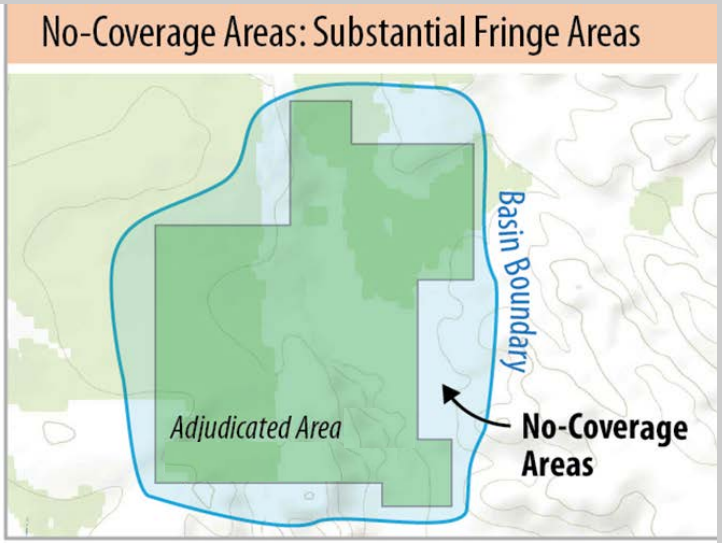
Alternative Plans & Frings Areas

Fringe Areas

- Small portions of a basin not fully covered within boundaries of an Adjudication
- County possibly only eligible GSA
- Fringe areas not defined in SGMA

Fringe Considerations

- Use of Alternative (10 years of operating at a Sustainable Yield)



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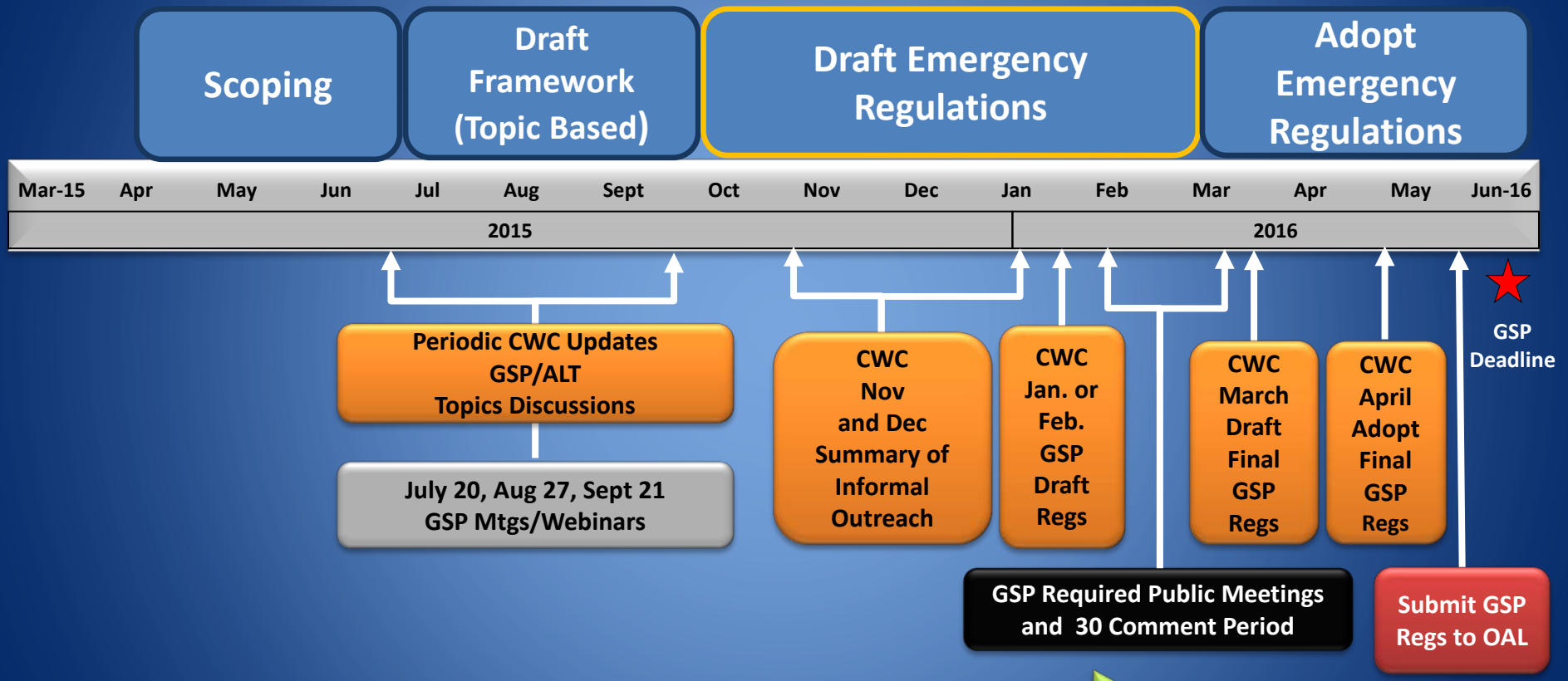
Next Steps



Dates and Durations are Subject to Change

Web Resources

- DWR Sustainable Groundwater Management (SGM)
  http://www.water.ca.gov/groundwater/sgm/index.cfm
- DWR GSP Emergency Regulation Website
  http://www.water.ca.gov/groundwater/sgm/gsp.cfm
- Subscribe to DWR SGM Email List
  http://www.water.ca.gov/groundwater/sgm/subscribe.cfm
- DWR Region Office Contacts
  http://www.water.ca.gov/groundwater/gwinfo/contacts.cfm
- Questions or Comments
  sgmps@water.ca.gov