DRAFT
Groundwater Sustainability Plan (GSP)
and
Alternative Emergency Regulations

Department of Water Resources
Sustainable Groundwater Management Program
for
California Water Commission
February 17, 2016

Last Updated on February 18, 2016

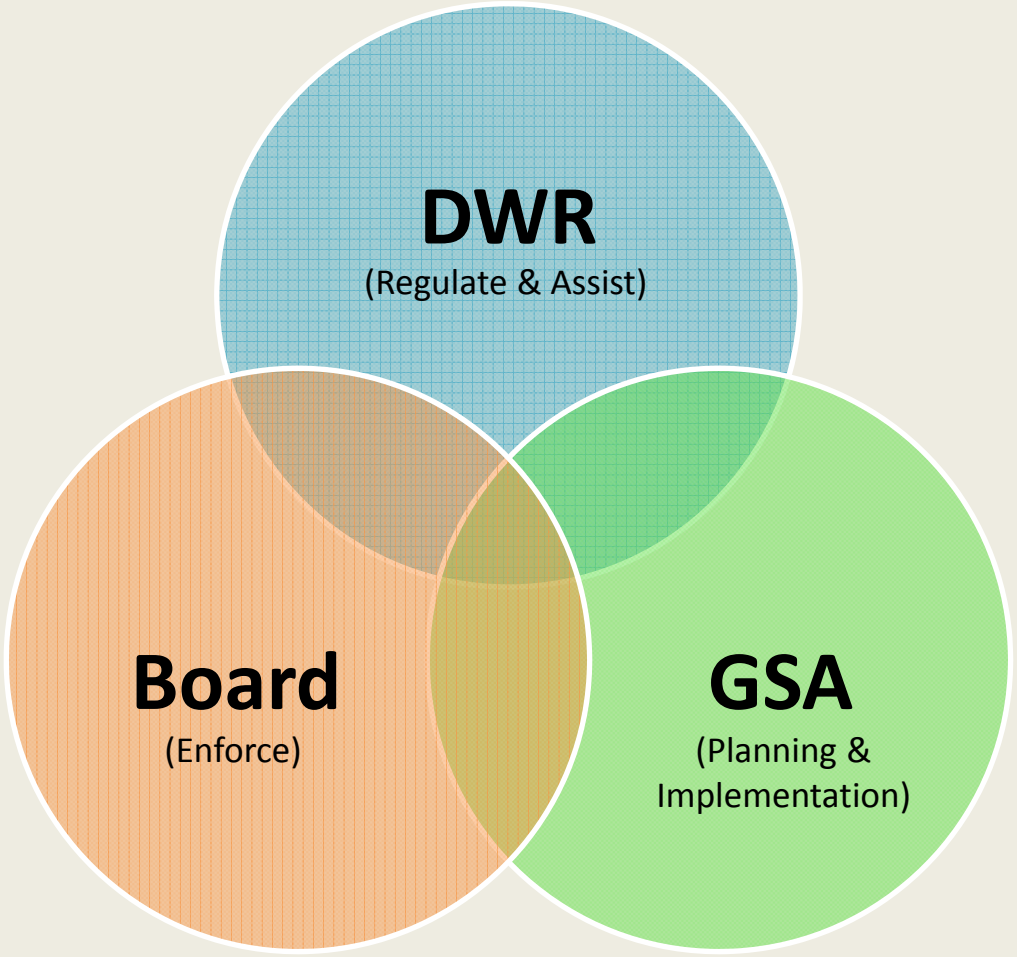
Presentation Overview

- Draft GSP/Alternative Emergency Regulations (Regulations)
  - Background
  - Overview of Regulations (Articles in 4 Phases)
  - Timeline and Next Steps

Background

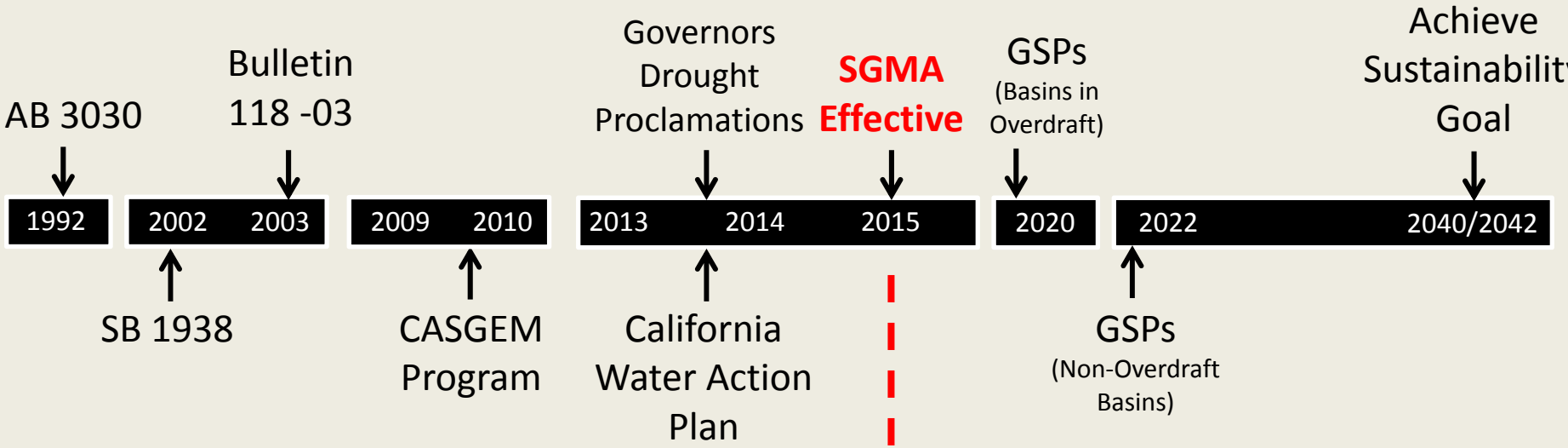
Background

General Roles and Responsibilities



Background (cont.)

California's Major Groundwater Milestones



Voluntary Groundwater Management

- Service Area Planning
- Mixed Levels of Implementation
- Variable Authority
- Grant Incentives

Required Groundwater Management

- Entire Basin Planning
- Required Implementation
- GSA Have New:
  - Authorities
  - Responsibilities
- State Backstop

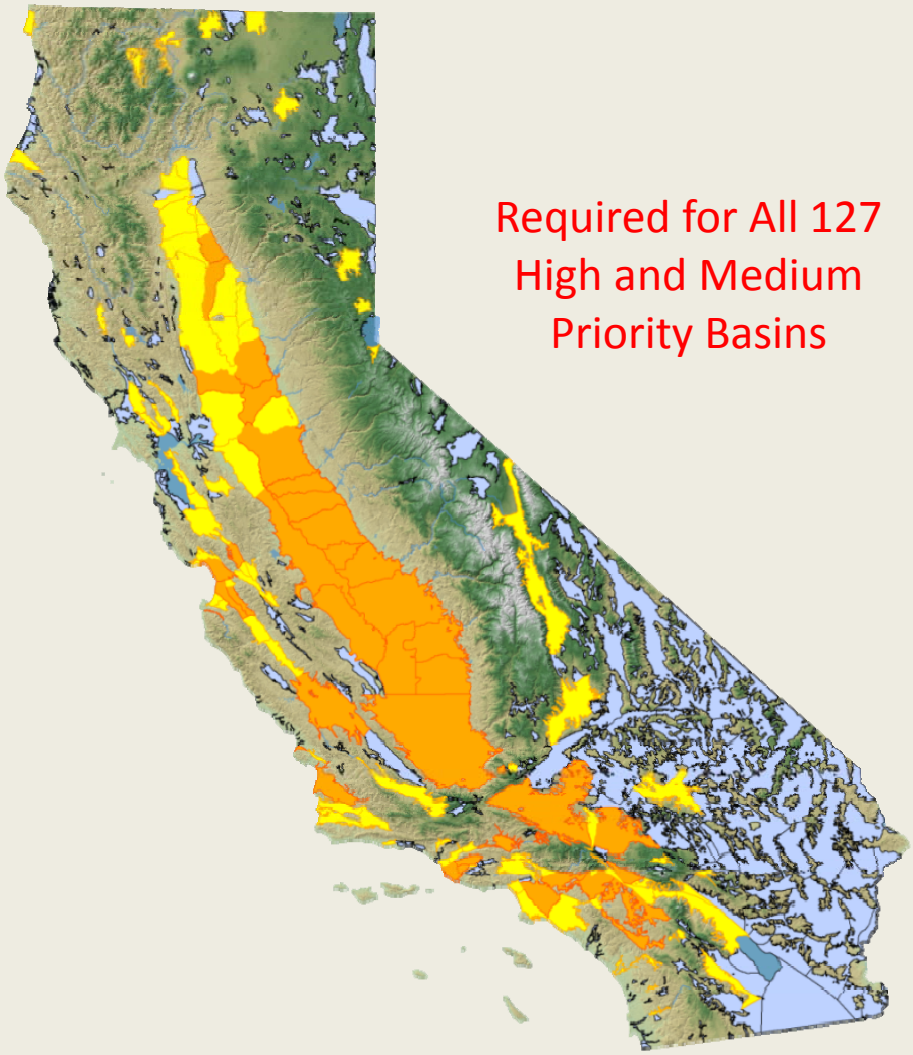
Background (cont.)
SGMA GSP Requirements

By June 1, 2016, DWR shall adopt regulations for:

- Evaluation of GSPs & Alternatives
- Implementation of GSPs & Alternatives
- 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



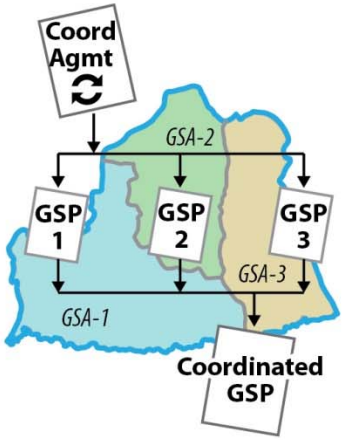
Required for All 127 High and Medium Priority Basins

Overview of Regulations (Articles in 4 Phases)

One GSA, One GSP

Multiple GSAs, One GSP with single Coordination Agreement

Multiple GSAs, Multiple GSPs with single Coordination Agreement



Overview of Regulations

"A central feature of these bills is the recognition that groundwater management in California is best accomplished locally."

Governor Jerry Brown, September 2014

Phases of GSP Development and Implementation

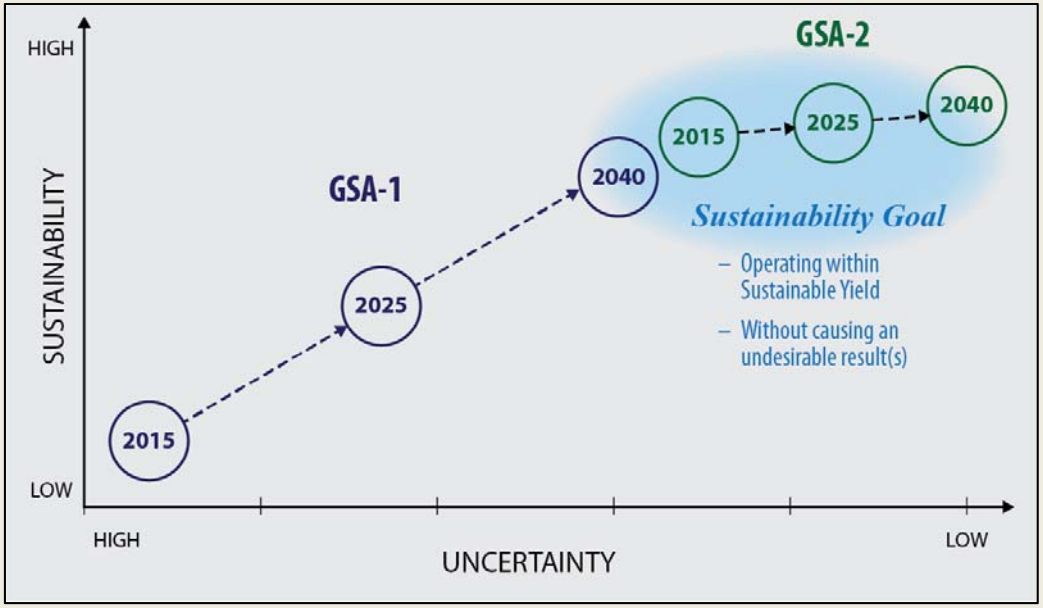
1. GSA Formation and Coordination
2. GSP Preparation and Submission
3. GSP Review and Evaluation
4. Implementation and Reporting

ARTICLE 1. INTRODUCTORY PROVISIONS

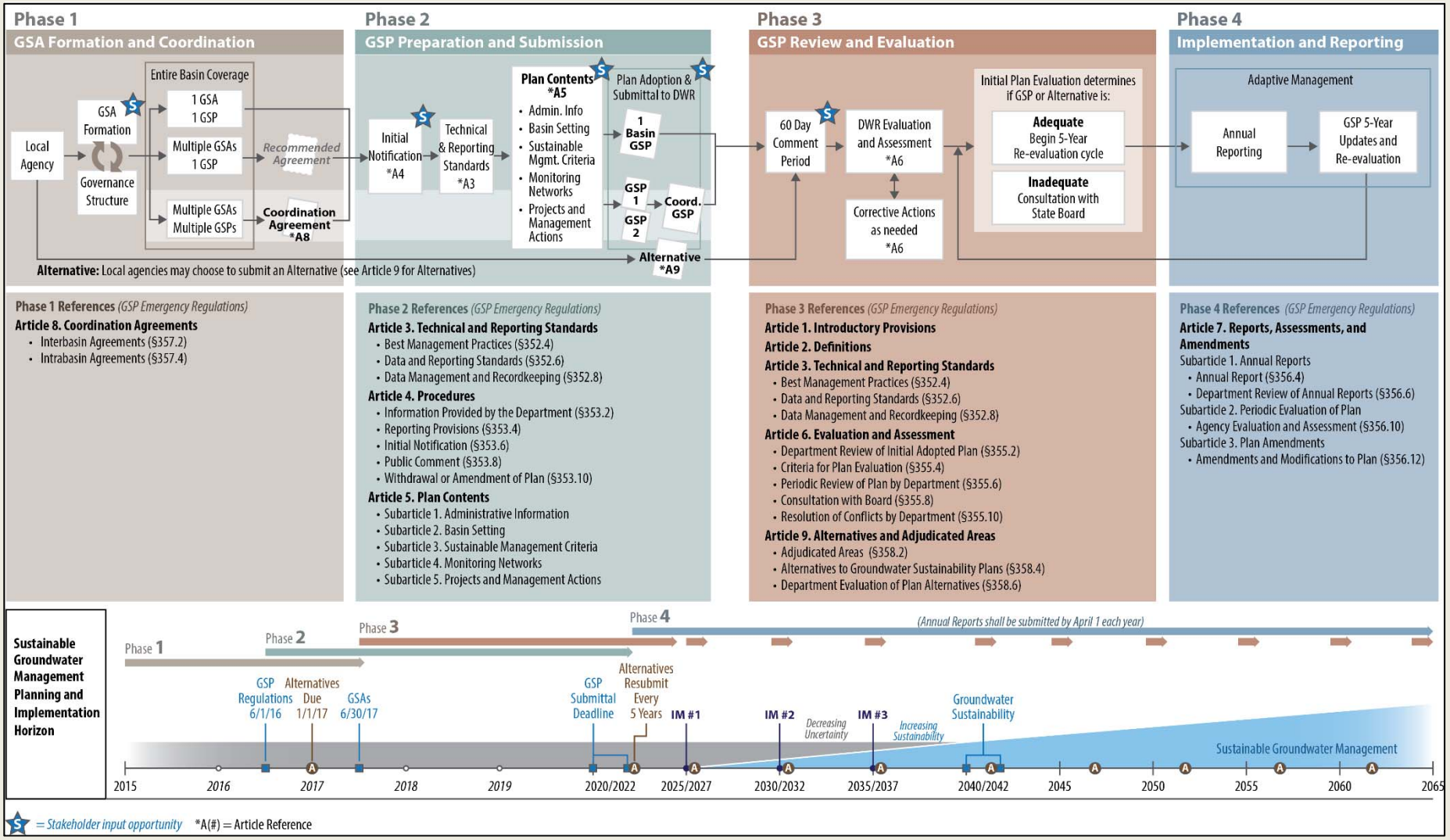
Article 1. Introductory Provisions
§ 350.2. General Principles

The GSP or Alternative:

- Must achieve the sustainability goal for the entire basin in 20 yrs
- Cannot adversely affect an adjacent basin
- Meet a substantial compliance standard
- Provide a description of basin-wide governance to reach sustainability
- Establish timeline and priority for filling data gaps
- Adaptive management



Sustainable Groundwater Management: 4-Phase Process



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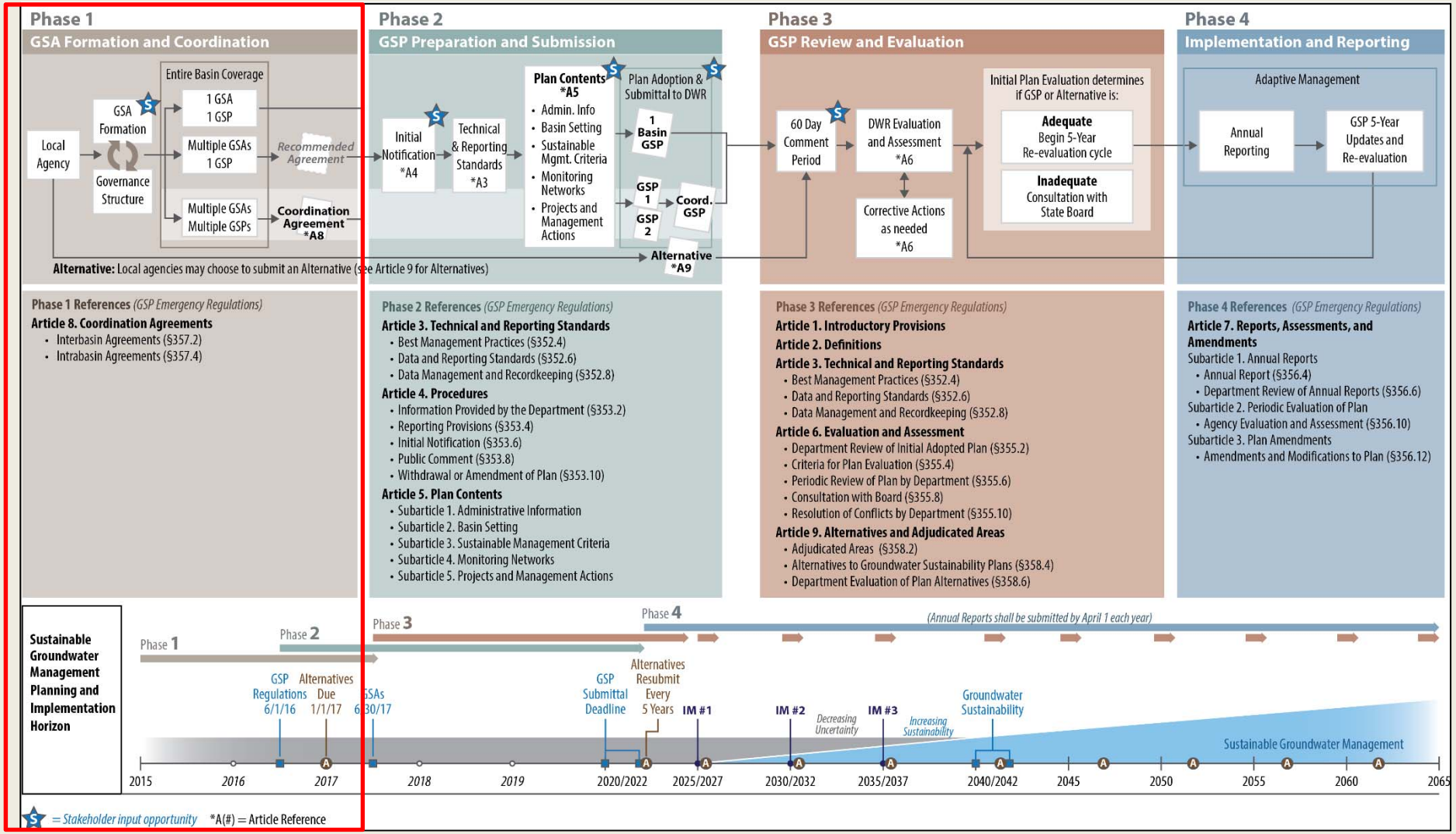
Phase 1:
GSA Formation and Coordination



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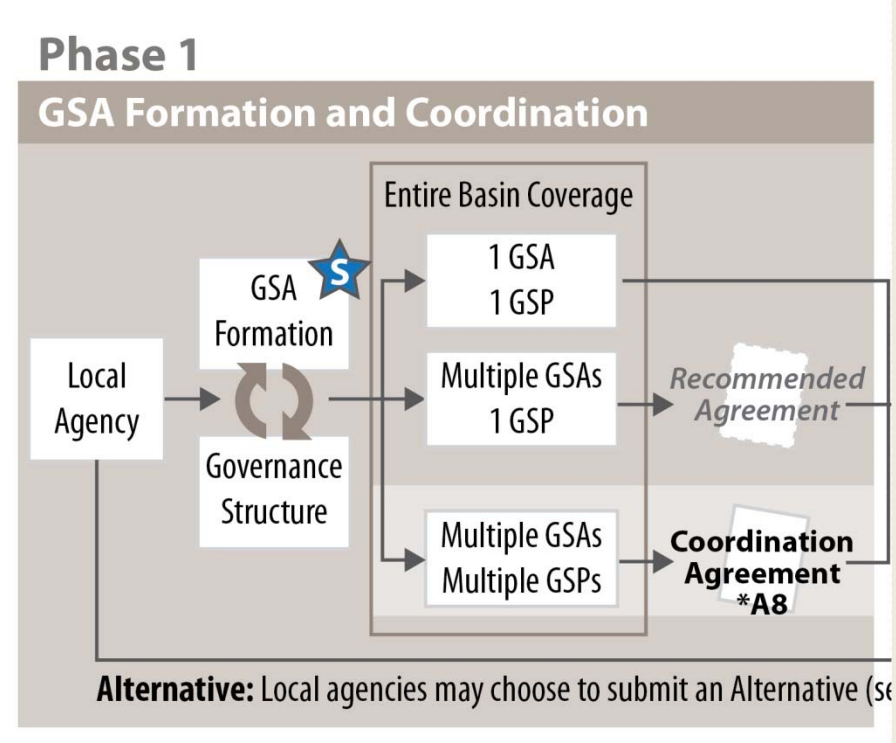
Phase 1:
GSA Formation and Coordination



Phase 1 References *(GSP Emergency Regulations)*

Article 8. Coordination Agreements

- Interbasin Agreements (§357.2)
- Intrabasin Agreements (§357.4)

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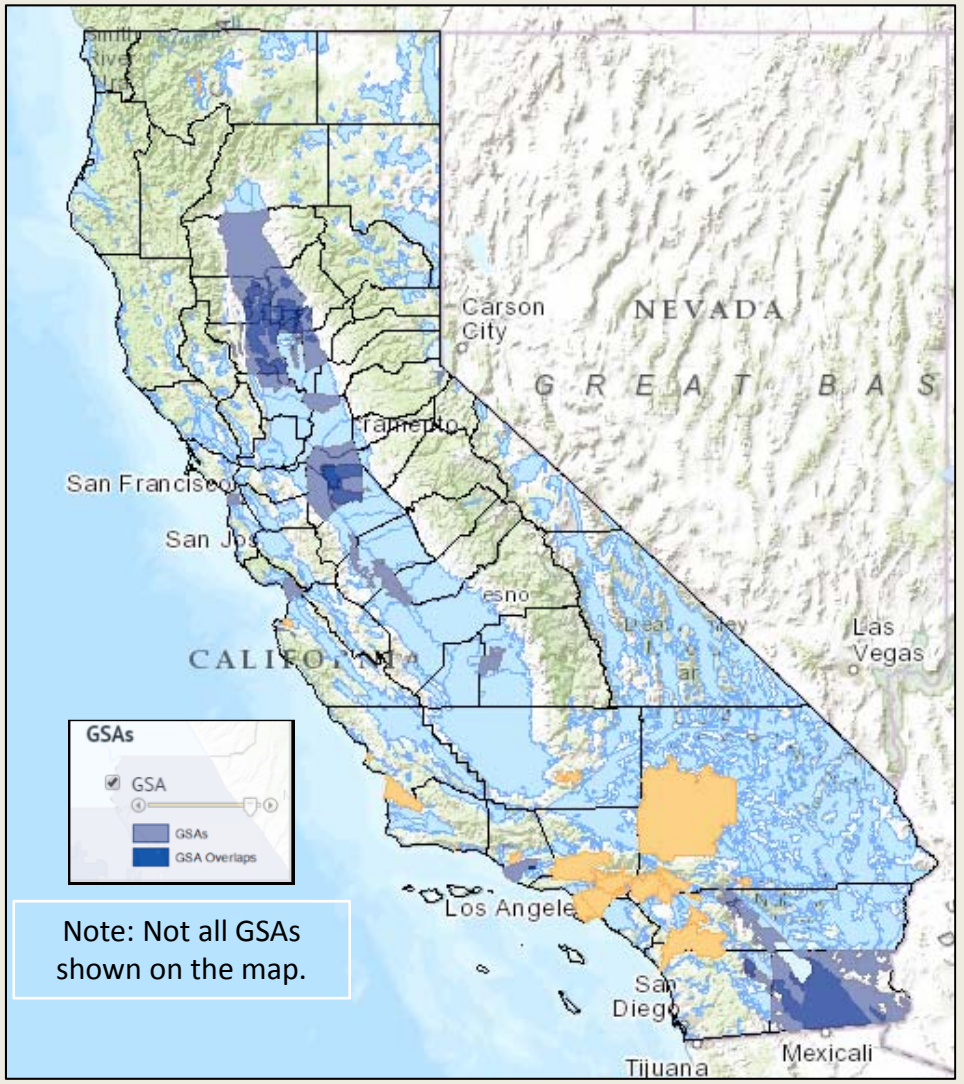
Status of GSA Formation

http://water.ca.gov/groundwater/sgm/gsa.cfm

- **61 GSAs** have been formed as of February 10, 2016
- Many need to resolve overlapping service area boundaries
- SB 13 requires DWR to review GSA notices for completeness
- DWR is identifying exclusive GSAs on its GSA Formation Table
- GSAs have a requirement to address stakeholder interests



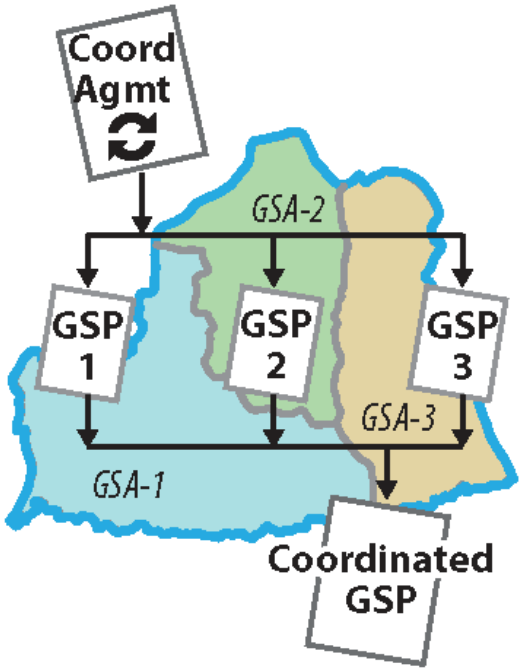
ARTICLE 8. COORDINATION AGREEMENTS

Phase 1:
GSA Formation and Coordination
Options for GSA Formation and GSP Development

One GSA, One GSP

Multiple GSAs, One GSP with optional Coordination Agreement

Multiple GSAs, Multiple GSPs with required Coordination Agreement



- Coordination agreement is optional, *but* recommended
- Identification of a *Coordinating Agency* is required

- A single coordination agreement that covers the entire basin is required
- Identification of a *Coordinating Agency* is required

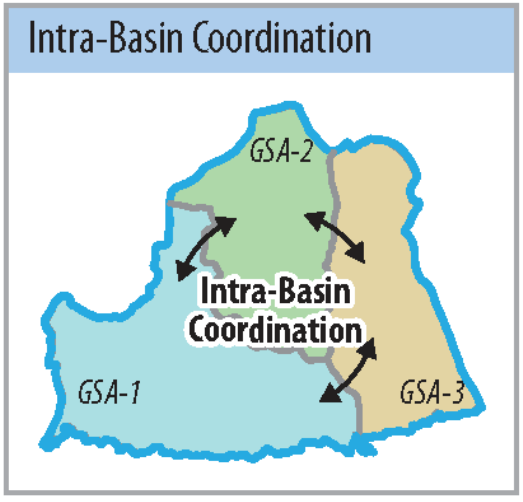
Article 8.
Coordination Agreements

§ 357.2. Inter-basin Coordination

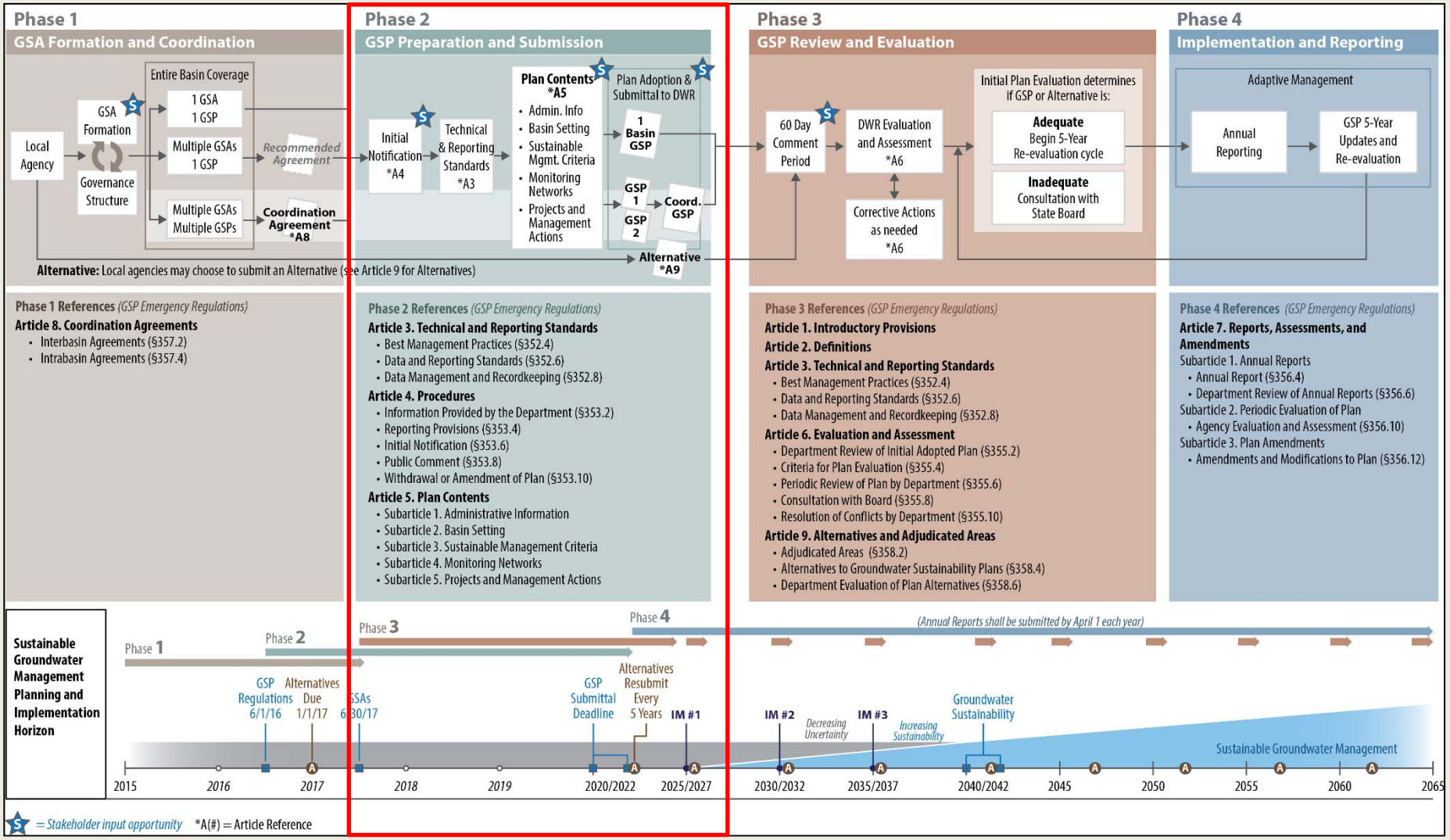
- Optional requirement
- Identification of all basins participating
- Technical information
- Process for resolving conflict

§ 357.4. Intra-basin Coordination

- Mandatory requirement for multiple GSPs
- Recommended if multiple GSAs intend to prepare a single GSP
- Identification of a *Coordinating Agency* that shall be the single point of contact for the entire basin
- Responsibilities of each GSA defined in the agreement



Phase 2:
GSP Preparation and Submission



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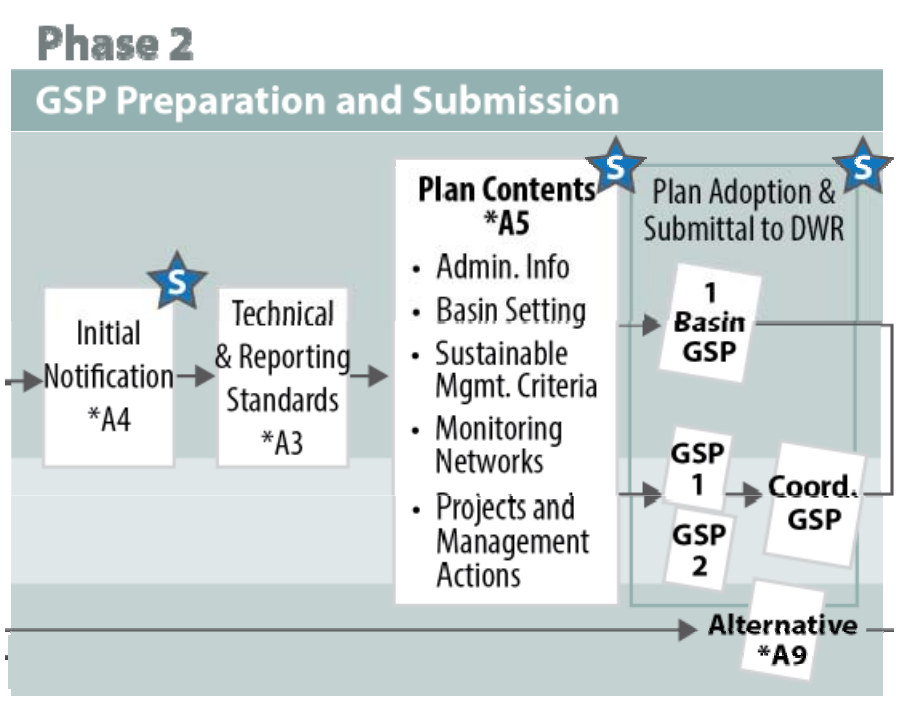

Phase 2 References *(GSP Emergency Regulations)*

Article 3. Technical and Reporting Standards
- Best Management Practices (§352.4)
- Data and Reporting Standards (§352.6)
- Data Management and Recordkeeping (§352.8)

Article 4. Procedures
- Information Provided by the Department (§353.2)
- Reporting Provisions (§353.4)
- Initial Notification (§353.6)
- Public Comment (§353.8)
- Withdrawal or Amendment of Plan (§353.10)

Article 5. Plan Contents
- Subarticle 1. Administrative Information
- Subarticle 2. Basin Setting
- Subarticle 3. Sustainable Management Criteria
- Subarticle 4. Monitoring Networks
- Subarticle 5. Projects and Management Actions

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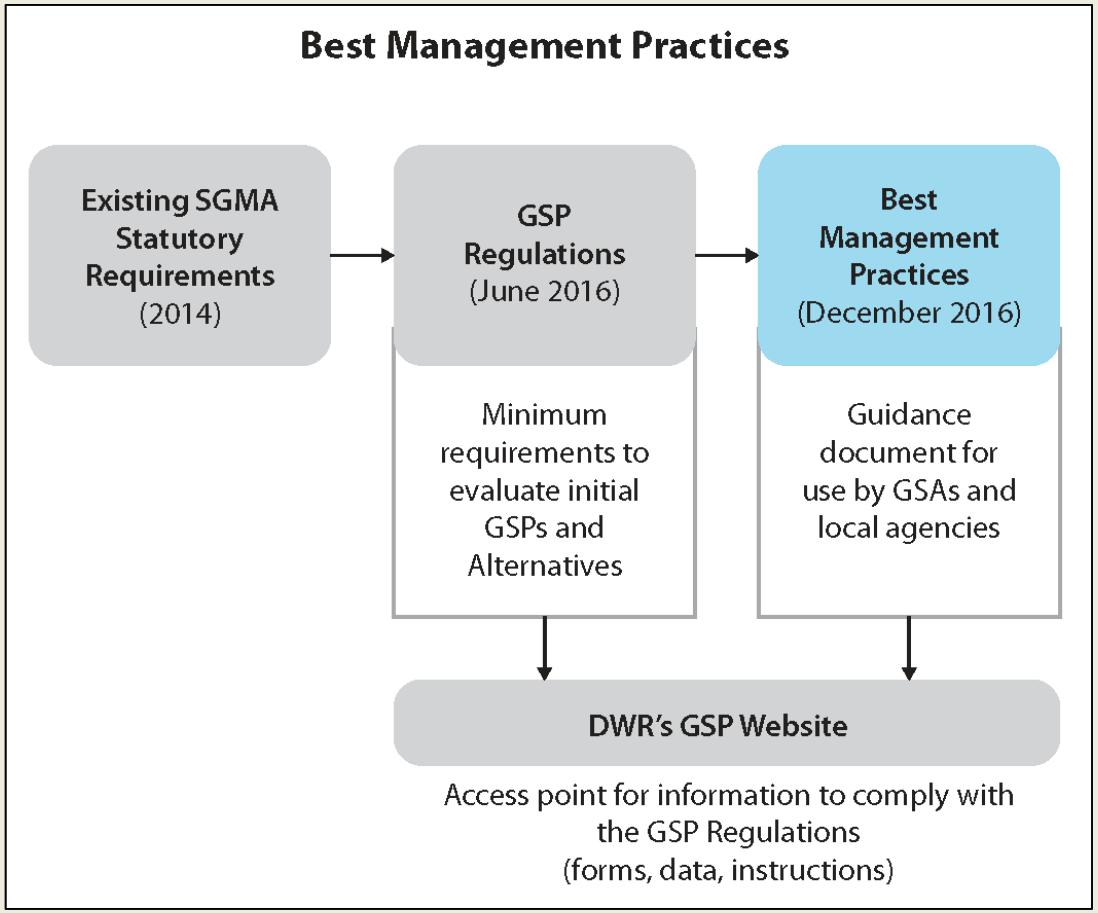
ARTICLE 3. TECHNICAL AND REPORTING STANDARDS

Article 3.
Technical and Reporting Standards

- § 352.4. Best Management Practices
- § 352.6. Data and Reporting Standards
- § 352.8. Data Management and Recordkeeping

Article 3.
§ 352.4. Best Management Practices

- DWR is required to publish a BMP document by January 1, 2017
- GSP may rely upon BMPs developed by DWR, or
- GSAs may use their own BMPs
  - Must include methods, protocols, or standards
  - Reviewed at least every 5 years
- DWR can update their BMPs



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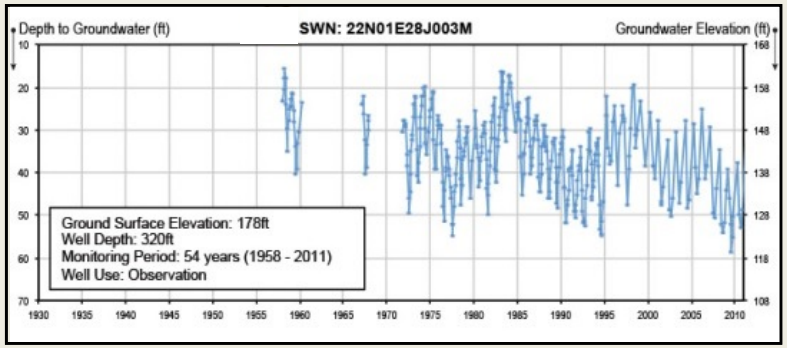
Article 3. Procedures
Technical and Reporting Standards

§ 352.6. Data and Reporting Standards

- Monitoring sites
- Wells used for monitoring
- Maps (GIS)
- Hydrographs
- Models (open source/public domain)



§ 352.8. Data Management and Recordkeeping

- GSA shall develop a coordinated Data Management System for the basin
- System must be capable of storing, maintaining, and reporting all information relevant to the GSP

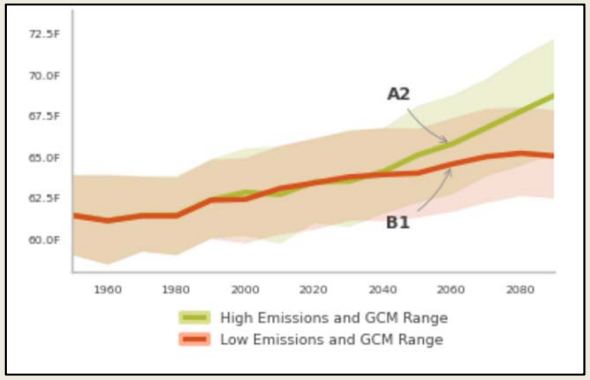
ARTICLE 4. PROCEDURES

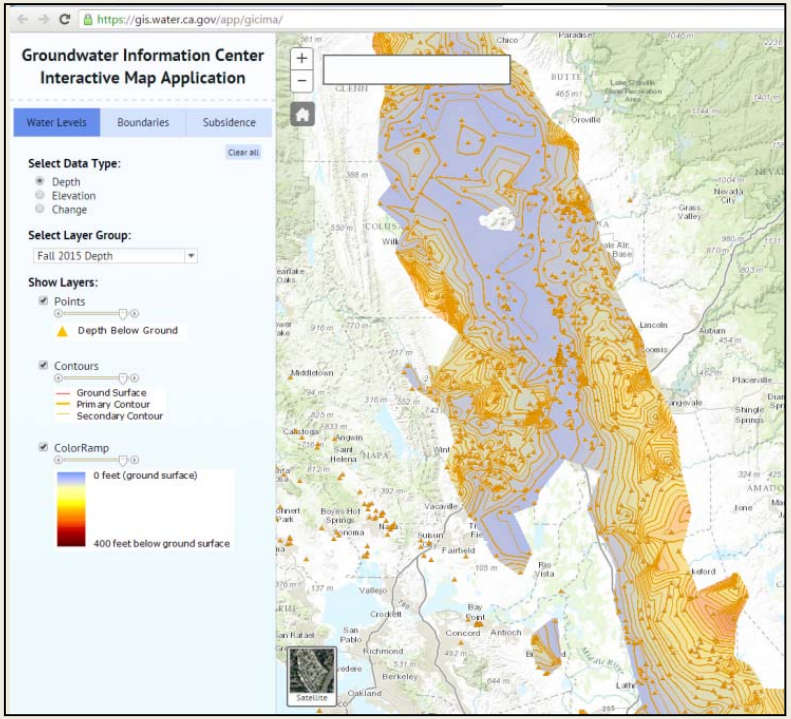
Article 4.
Procedures

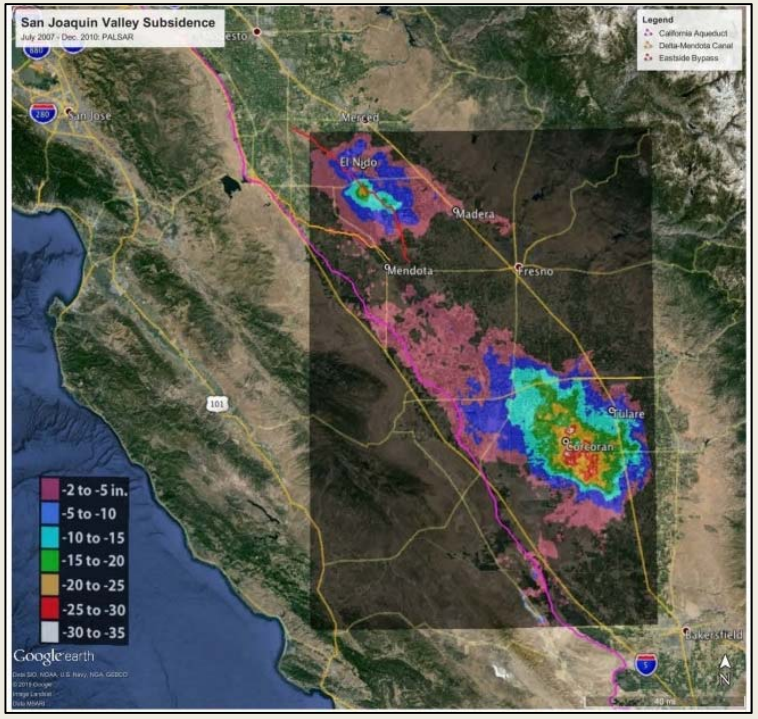
- § 353.2. Information Provided by Department
- § 353.4. Reporting Provisions
- § 353.6. Initial Notification
- § 353.8. Public Comment

Article 4. Procedures
§ 353.2. Information Provided by Department

- Selected datasets available on DWR's website
- Forms and instructions for submitting GSPs







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Article 4. Procedures

§ 353.6. Initial Notification

- Specify manner in which interested parties may contact GSA and participate in development and implementation of the GSP
- All information available on GSA Web site

§ 353.8. Public Comment

- Submit after Initial Notification
- By written notice including name, address, and electronic mail address of person or entity providing comment
- Clear comment on relevant issues and at same level of detail as provided in the GSP
- Comments posted on DWR's Web site

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ARTICLE 5. PLAN CONTENT

Article 5.
Plan Content

1. Administrative Information

- Executive Summary
- Agency Information
- Description of Plan Area
- Notice and Consultation

2. Basin Setting

- Hydrologic Conceptual Model
- Basin Conditions
- Water Budget/Baseline
- Management Areas

3. Sustainable Management Criteria

- Sustainability Goal
- Undesirable Results
- Minimum Thresholds
- Measureable Objectives

4. Monitoring Networks

- Representative Monitoring
- Assessment and Improvement

5. Projects and Management Actions

Undesirable Results

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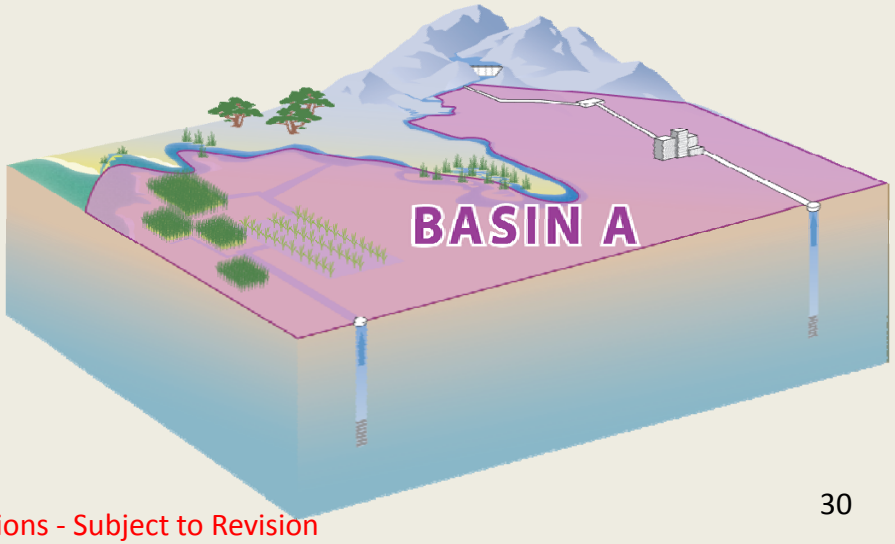
Article 5. Subarticle 1. Administrative Information

§ 354.4. Executive Summary

- Summary of GSP written in plain language

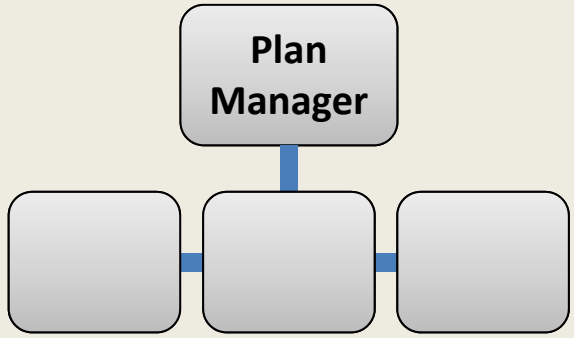


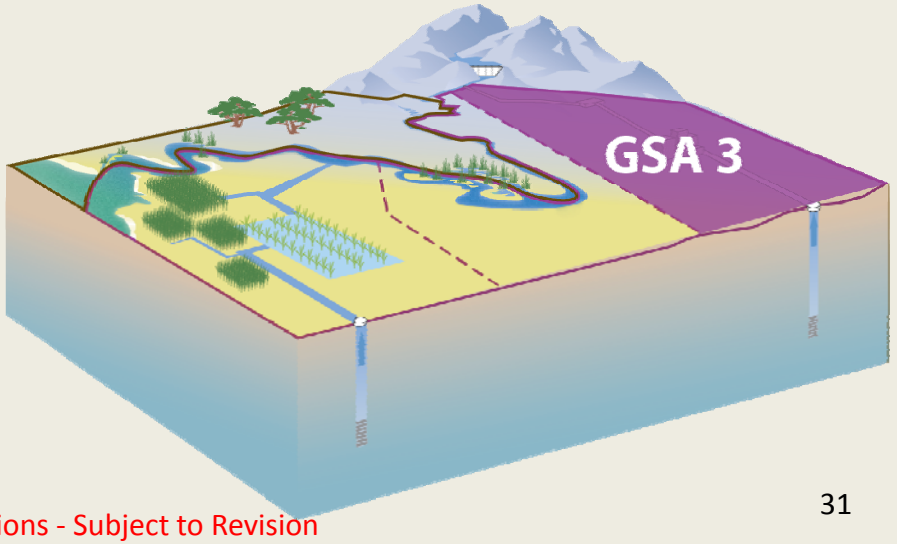
Article 5. Subarticle 1. Administrative Information

§ 354.4. Executive Summary

§ 354.6. Agency Information

- GSA Information
- Management structure
- Legal authority to implement the GSP
- Anticipated revenues and costs of GSP implementation





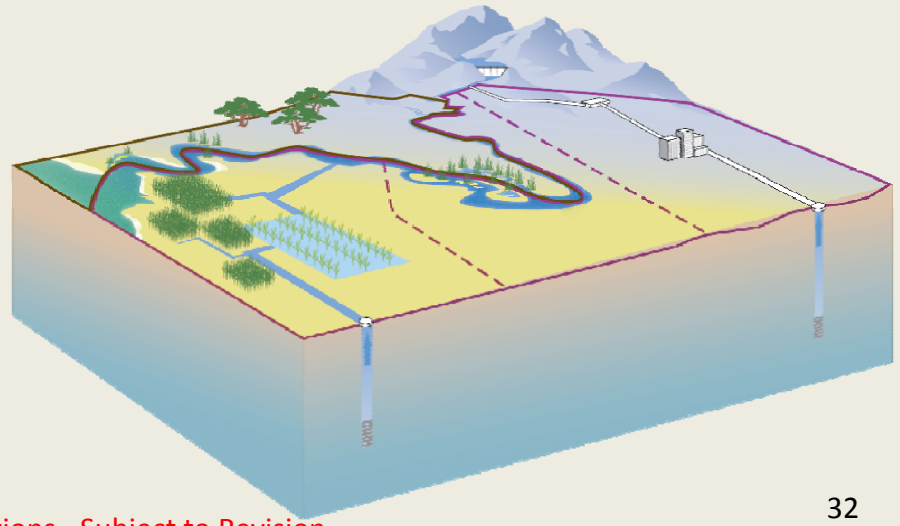
Article 5. Subarticle 1. Administrative Information

§ 354.4. Executive Summary

§ 354.6. Agency Information

§ 354.8. Description of Plan Area

- Jurisdictional Boundaries
- Delineation of Land Uses
- Well Distribution
- Existing Monitoring and Management Programs
- Summary of Land Use Plans
- Additional Plan Elements (10727.4)



Article 5. Subarticle 1. Administrative Information

§ 354.4. Executive Summary

§ 354.6. Agency Information

§ 354.8. Description of Plan Area

§ 354.10. Notice and Communication

- List of interested parties
- Description of beneficial uses and users of groundwater
- Summary of public meetings
- Communication Plan
  - Decision-making process and how stakeholder input will be used
  - Identification of opportunities for stakeholder engagement
  - Description of how Agency encourages active involvement of diverse social, cultural, and economic elements of the population within the basin
  - Schedule of milestones and projects and actions
  - Description of roles and responsibilities of local agencies and the public

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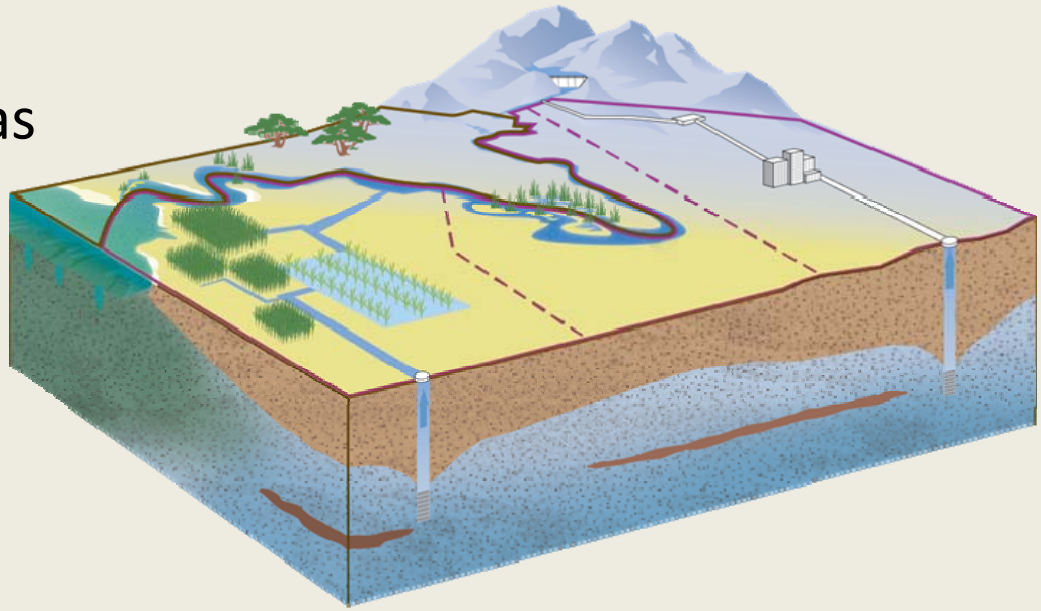
Article 5. Subarticle 2. Basin Setting

- § 354.14. Hydrogeologic Conceptual Model
- § 354.16. Basin Conditions
- § 354.18. Water Budget
- § 354.20. Management Areas



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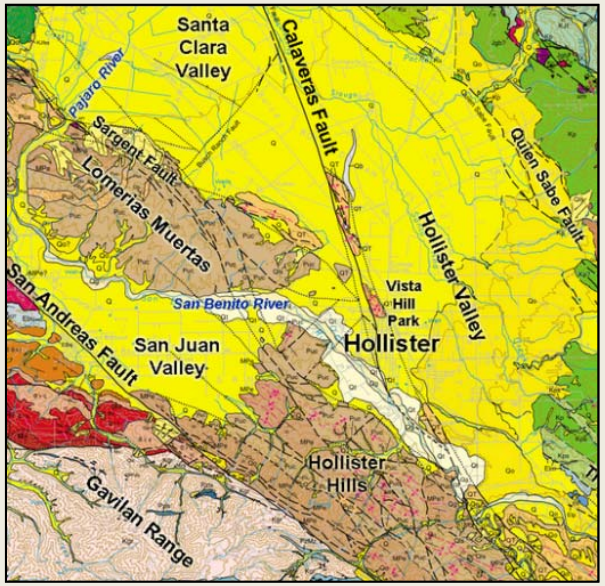
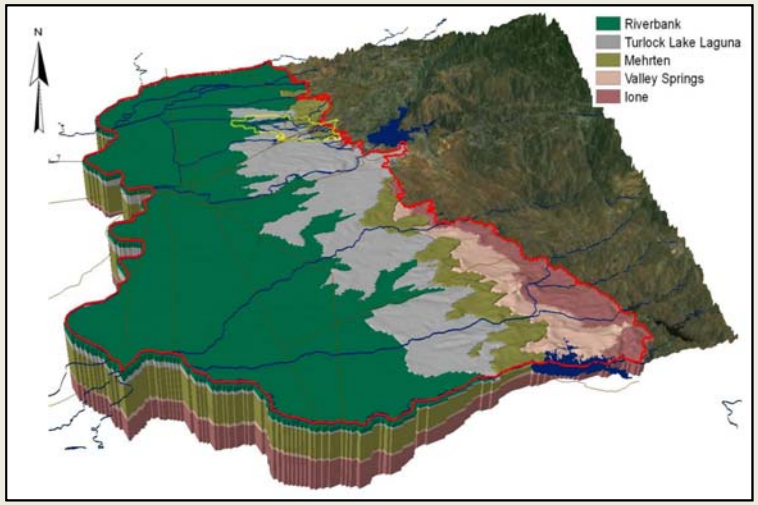
Article 5. Subarticle 2.
§ 354.14. Hydrogeologic Conceptual Model

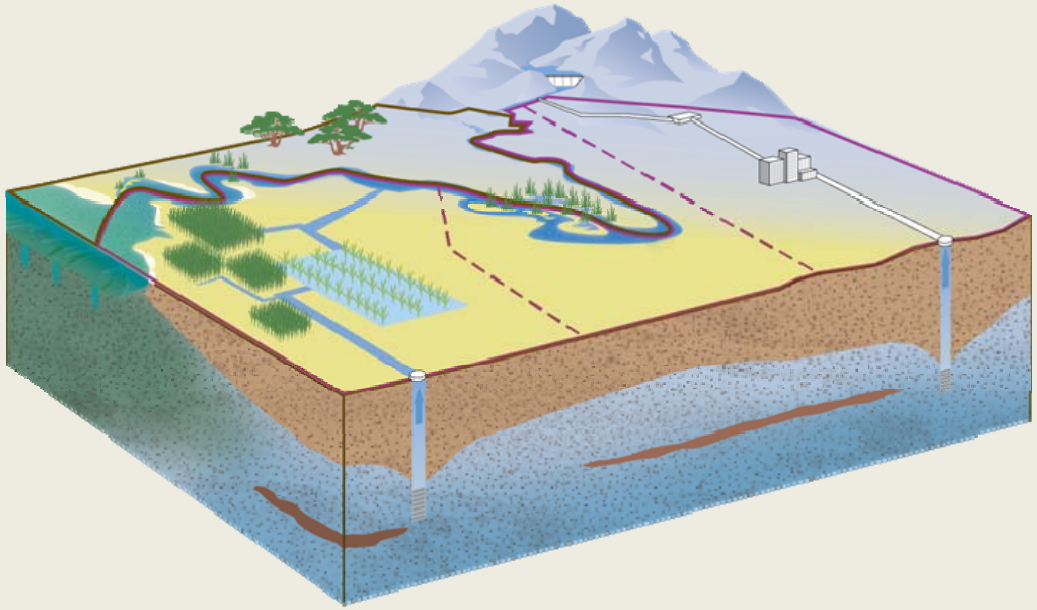
- Regional geologic and structural setting
- Principal aquifers and aquitards
  - Location and extent
  - Aquifer properties
  - Significant geologic or hydrologic features
  - Identification of aquifers used for domestic, irrigation, or municipal supply
- Cross-sections
- Maps
  - Topography
  - Surficial geology
  - Soil characteristics
  - Recharge and discharge areas
  - Surface water features
  - Imported water supplies



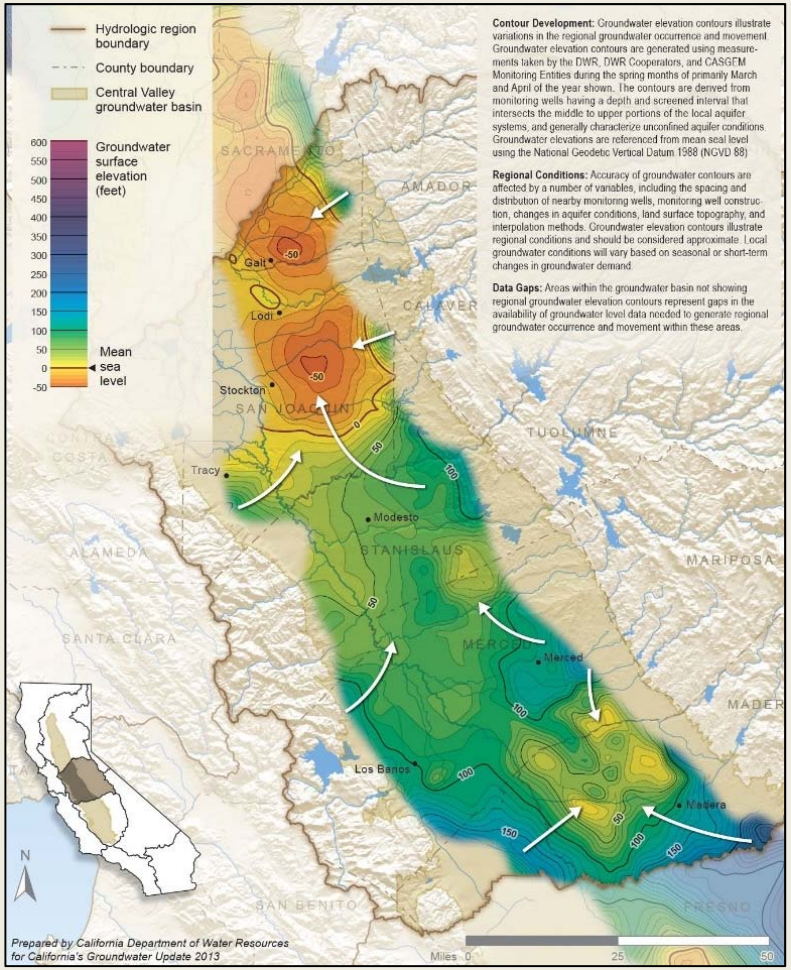


Article 5. Subarticle 2.
§ 354.16. Basin Conditions

- Historical and Current Conditions

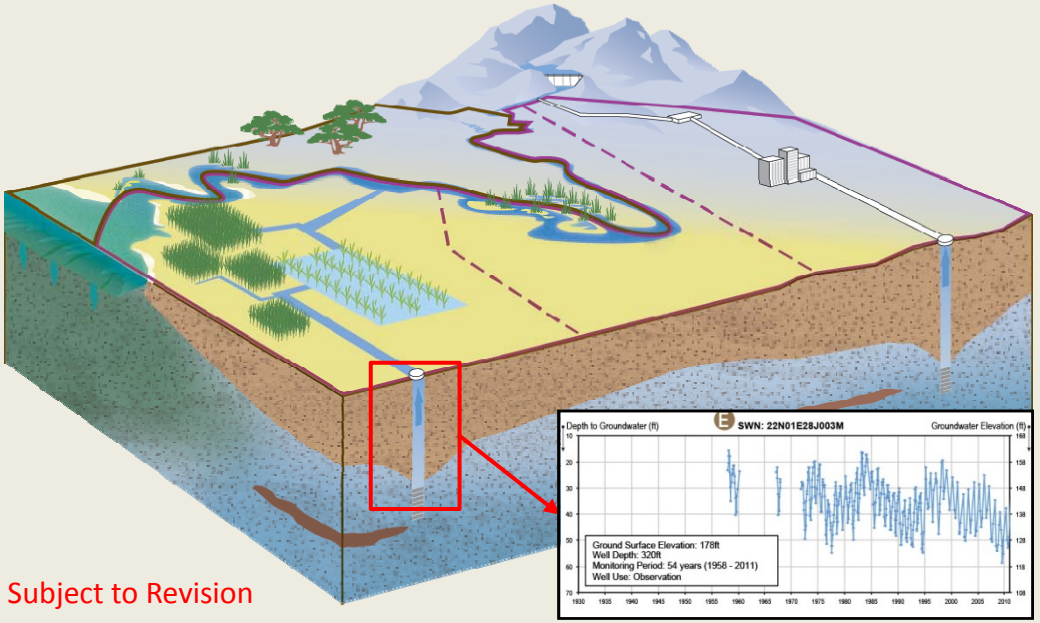


Article 5. Subarticle 2.
§ 354.16. Basin Conditions

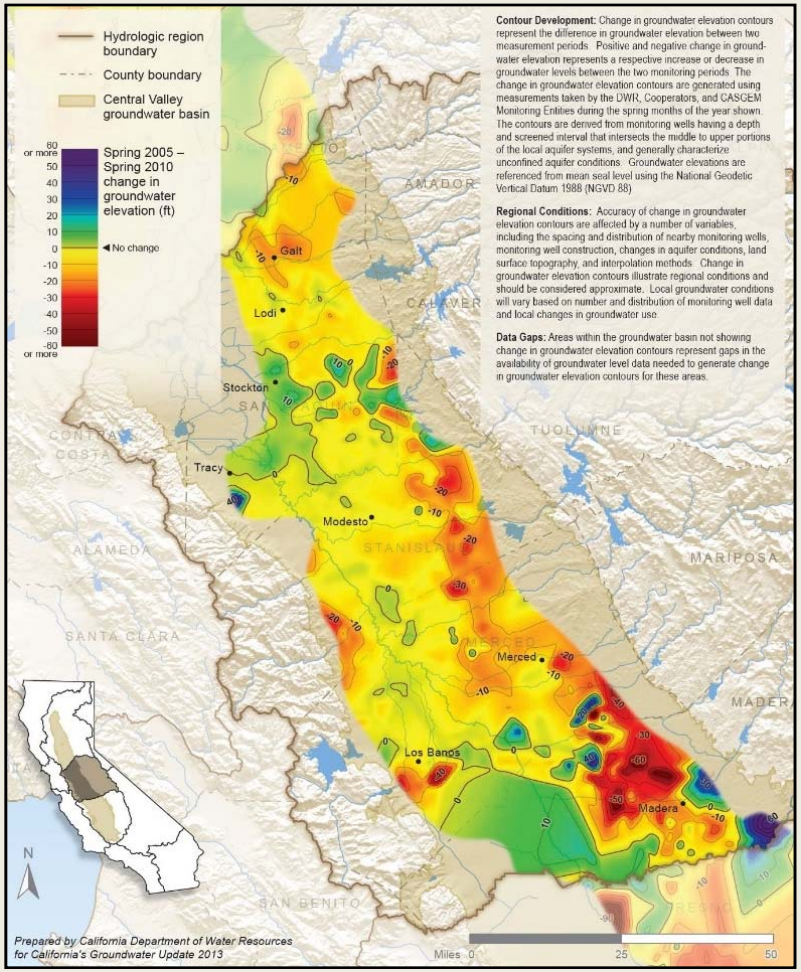


Groundwater Elevation Data:

- Contours: seasonal high, seasonal low, direction of flow, gradients
- Hydrographs: seasonal and long-term fluctuations

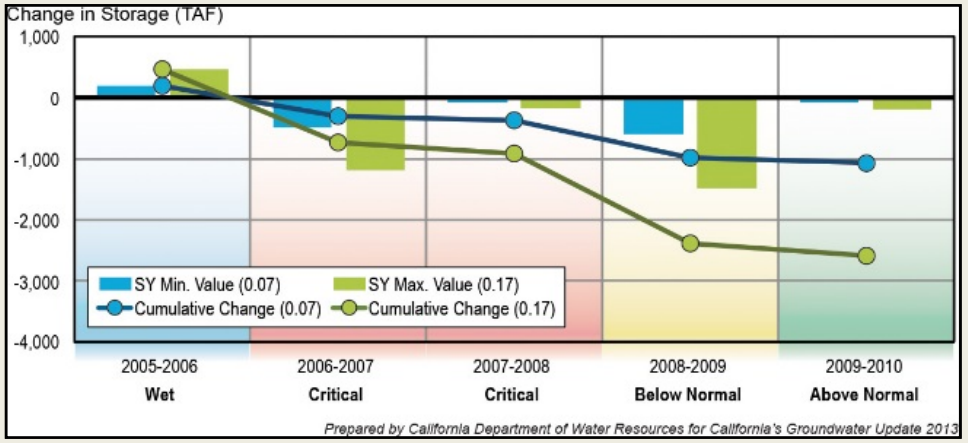


Article 5. Subarticle 2.
§ 354.16. Basin Conditions



Groundwater Storage Demonstrating Change in Storage:

- Annual change
- Cumulative change



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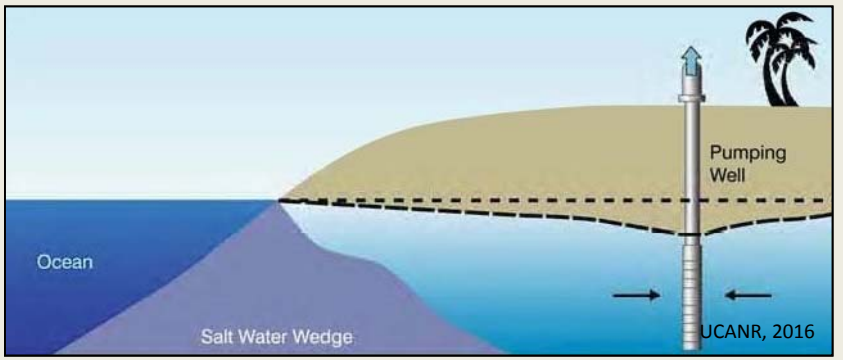
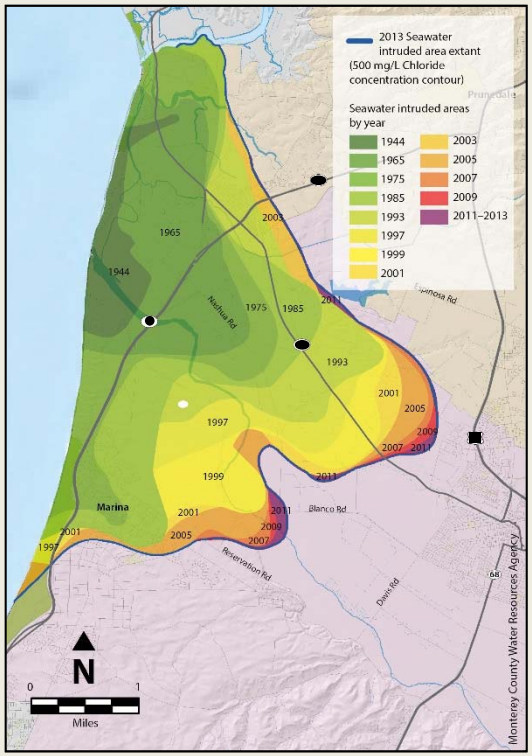
Article 5. Subarticle 2.
§ 354.16. Basin Conditions

Seawater Intrusion:

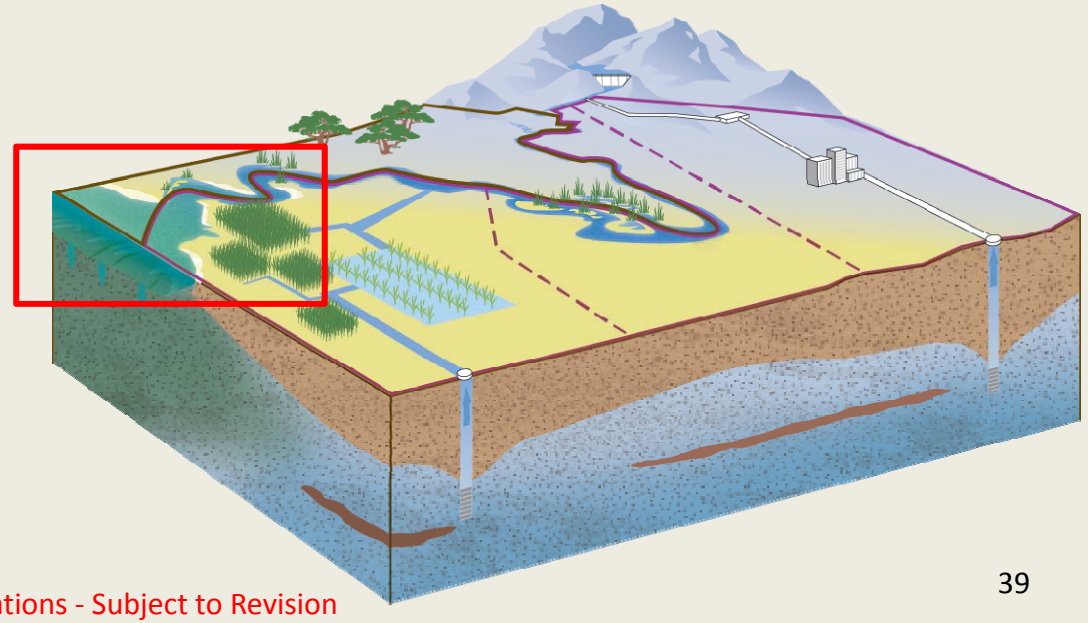
- Maps and cross section of seawater intrusion front



UCANR, 2016



Modified from Brown and Caldwell, 2015



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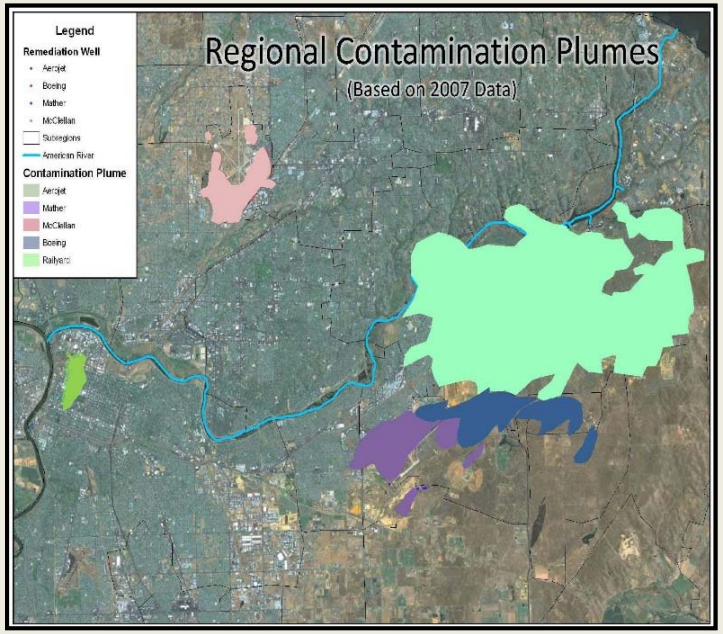
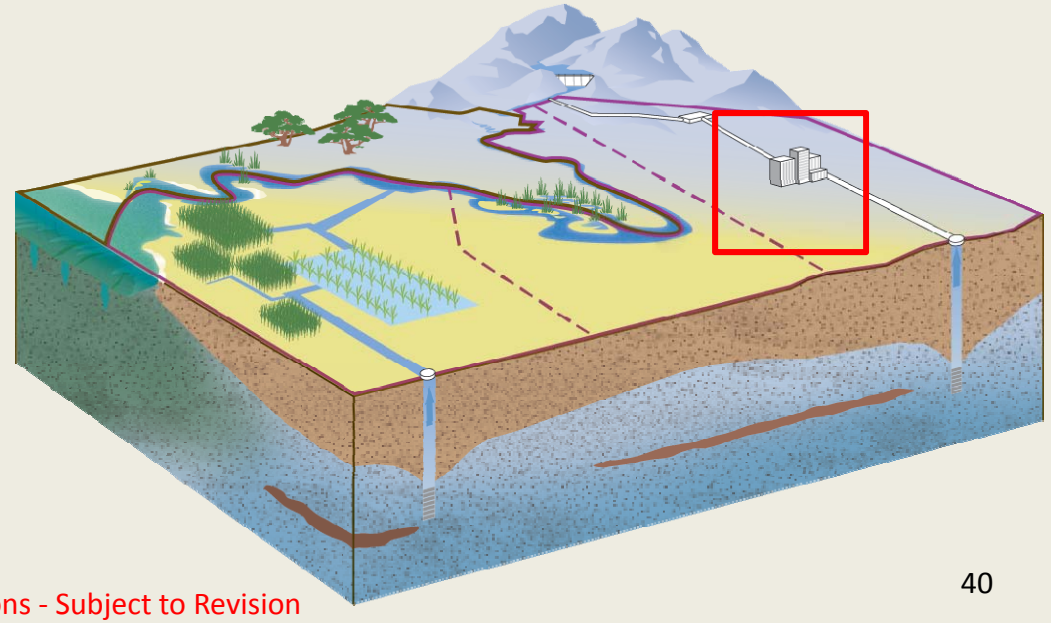
Article 5. Subarticle 2.
§ 354.16. Basin Conditions

Groundwater Quality:

- Sources of contamination that may impact supply and beneficial uses and users of groundwater.
- Horizontal and spatial trends
- Proximity of wells to potential sources of contamination

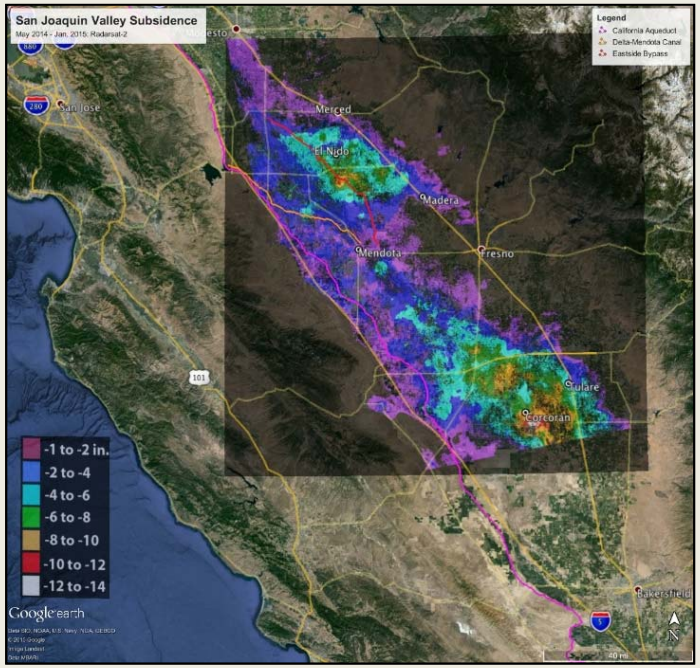




Article 5. Subarticle 2.
§ 354.16. Basin Conditions

Land Subsidence:

- Extent of subsidence
- Recent annual rate



NASA JPL

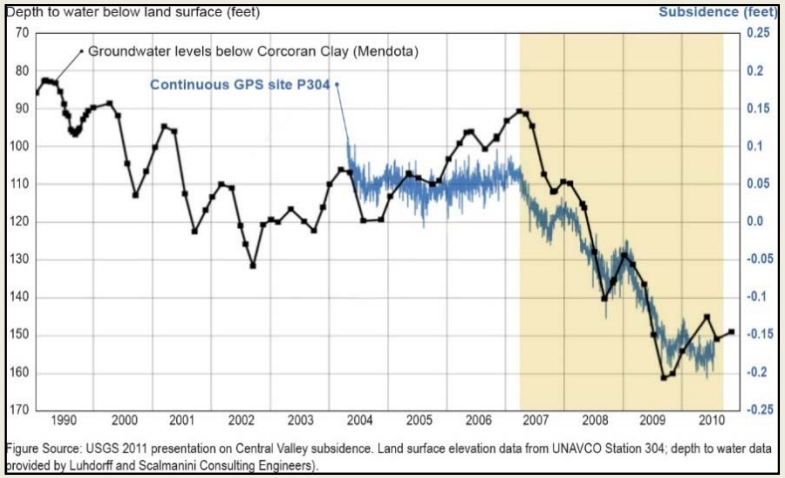
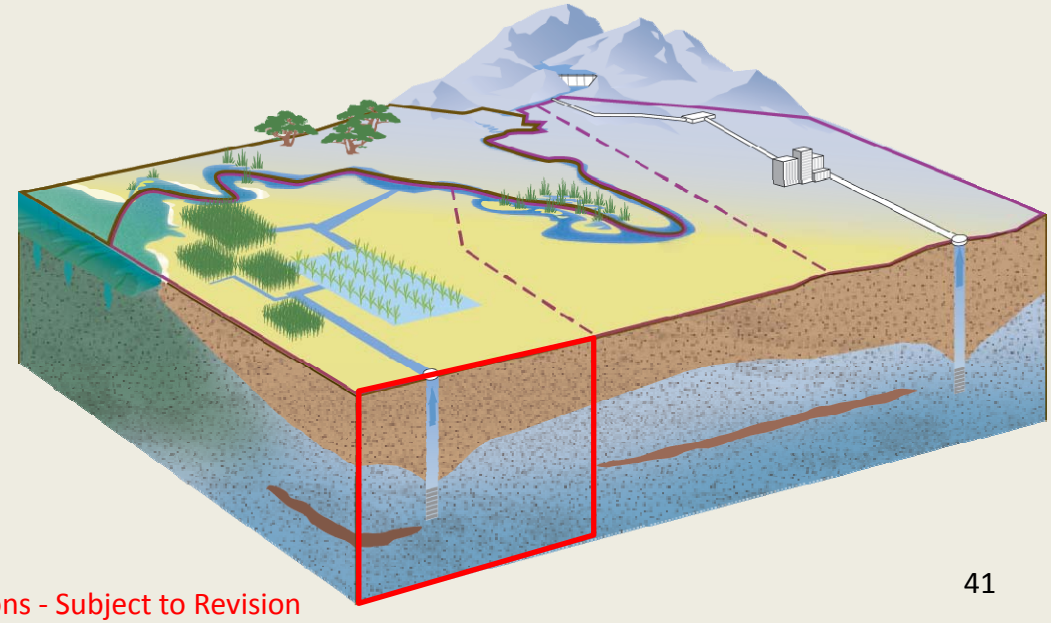


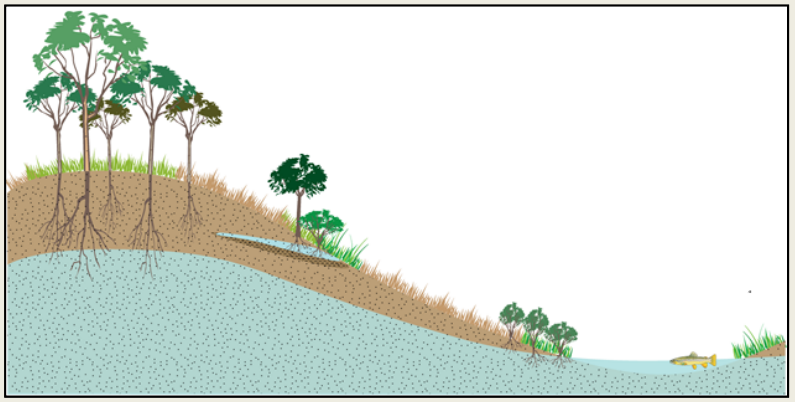
Figure Source: USGS 2011 presentation on Central Valley subsidence. Land surface elevation data from UNAVCO Station 304; depth to water data provided by Luhdorff and Scalmanini Consulting Engineers).

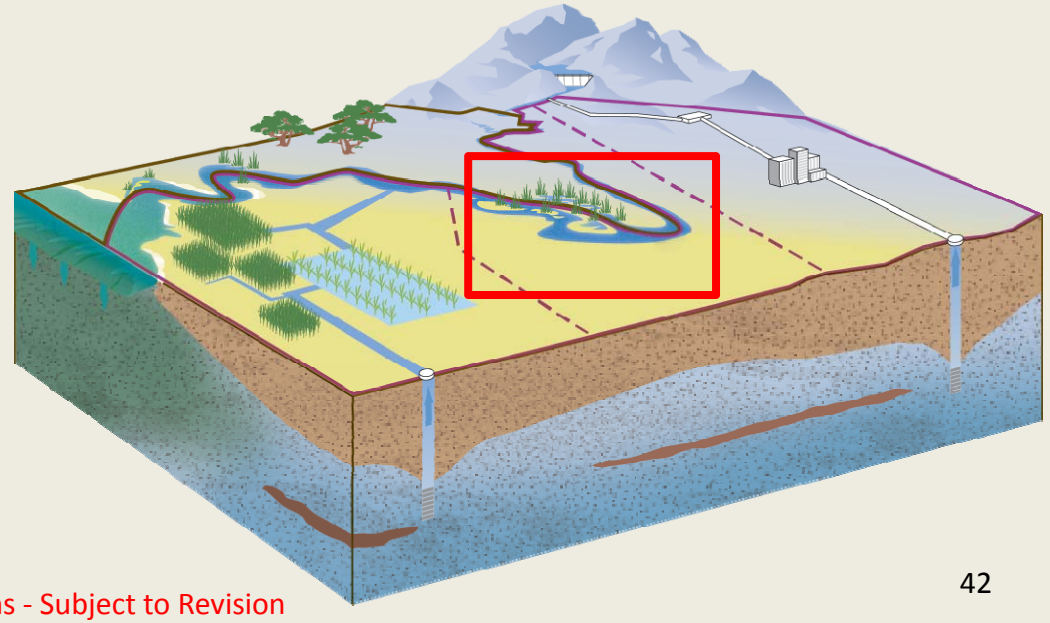


Article 5. Subarticle 2.
§ 354.16. Basin Conditions

Interconnected Surface Water Systems:

- Interconnected Streams
- Groundwater Dependent Ecosystems





Article 5. Subarticle 2.
§ 354.18. Water Budget (and Baseline)

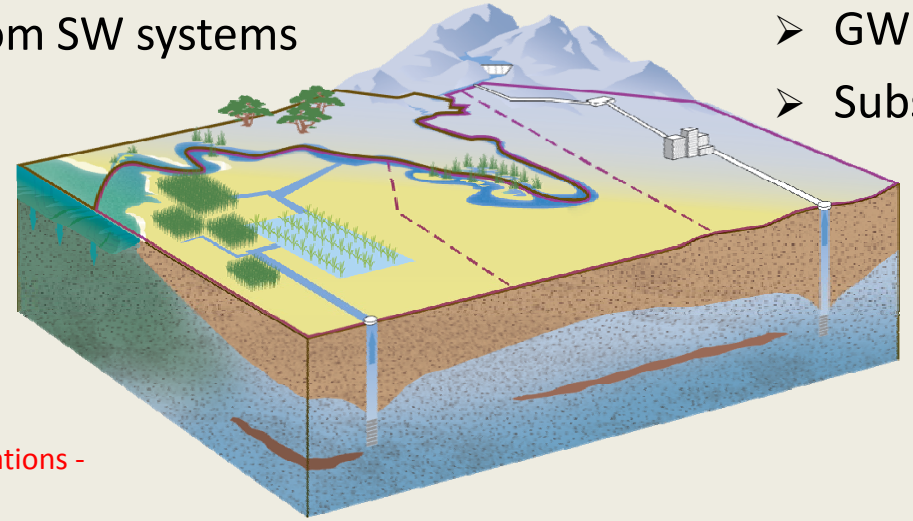
- Water Code §10721(y): "**Water budget**" means an accounting of the total groundwater and surface water entering and leaving a basin including the changes in the amount of water stored.

Inflow

- Precipitation
- Infiltration from applied water
- Infiltration from SW systems
- GW inflow

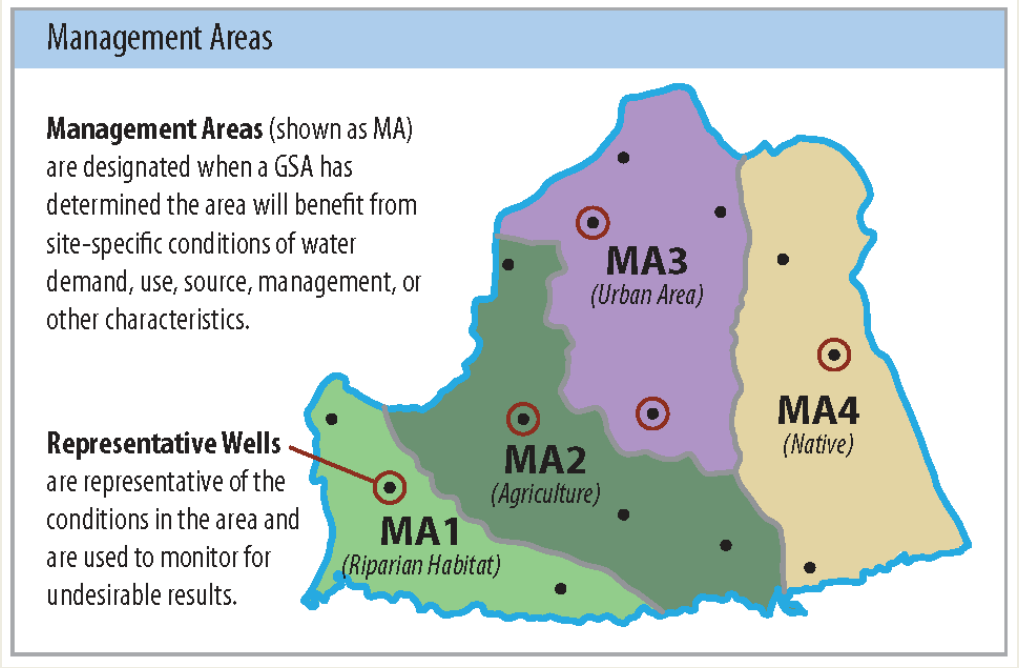
Outflow

- Evapotranspiration
- GW Extraction
- GW discharge to SW systems
- Subsurface GW outflow



Article 5. Subarticle 2.
§ 354.20. Management Areas

- One or more Management Areas per GSP
- May define separate minimum thresholds and measurable objectives – consistent with sustainability goal
- Management Areas in a Plan must include:
  - Minimum thresholds and measurable objectives
  - Monitoring and analysis
  - Maps and cross-sections



DRAFT GSP Emergency Regulations - Subject to Revision

Article 5. Subarticle 3. Sustainable Management Criteria

- § 354.24. Sustainability Goal ***(Basin wide – Goal)***
- § 354.26. Undesirable Results ***(Basin wide - Impacts)***
- § 354.28. Minimum Thresholds ***(Site specific - Impacts)***
- § 354.30. Measurable Objectives ***(Measures taken to achieve Goal)***

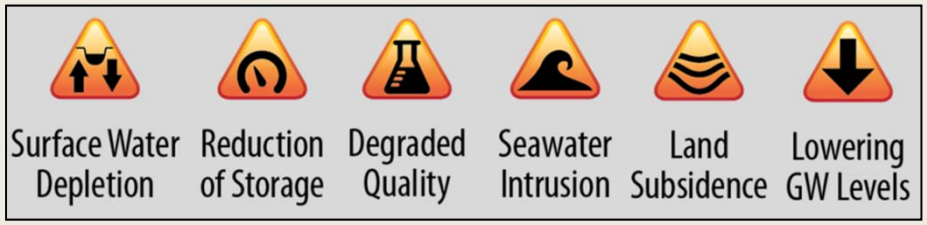
Article 5. Subarticle 3. Sustainable Management Criteria

§ 354.24. Sustainability Goal

- A single sustainability goal for each basin
- Achieved within 20 years of GSP implementation
- GSA must demonstrate that sustainability can be maintained through the planning and implementation horizon without causing undesirable results

Sustainability Goal	• Basin wide Goal • Achieved by 2040/42
Sustainable Groundwater Management	• During Plan Implementation • Avoid Undesirable Results
Sustainable Yield	• Achieved by 2040/42 • Avoid Undesirable Results

Undesirable Results
Significant and Unreasonable



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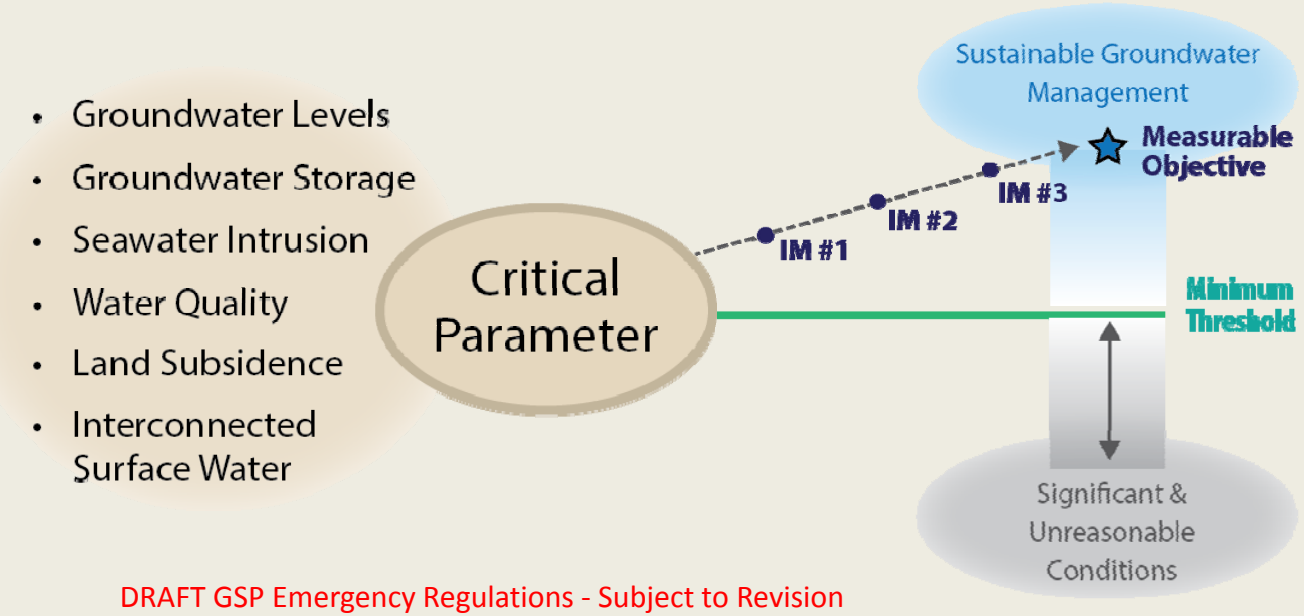
Article 5. Subarticle 3. Key Definitions

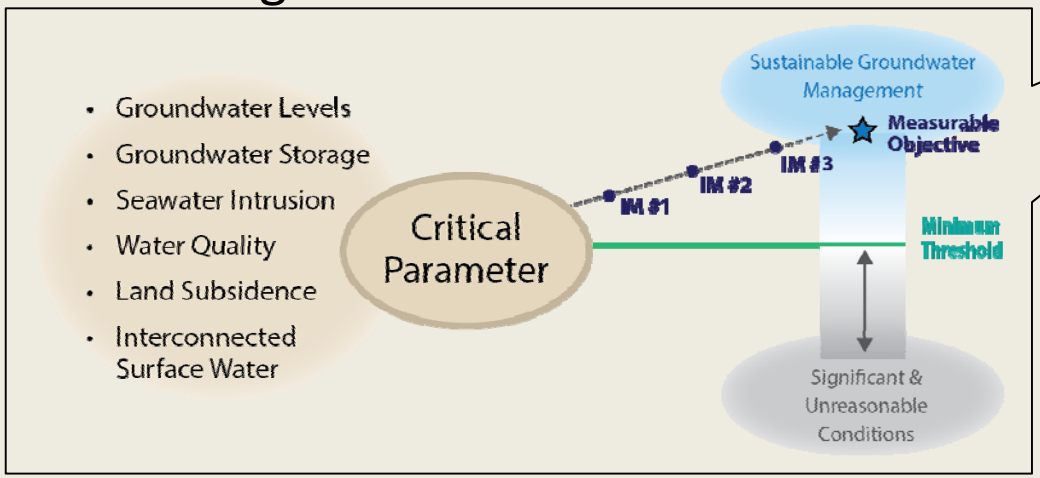
- **Critical Parameter -** Refers to any of the elements identified in Water Code Section 10721(x) that may lead to undesirable results.
- **Minimum Threshold -** Refers to the point at which conditions for a given critical parameter are significant and unreasonable.
- **Measurable Objectives -** Refers 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 in a basin.

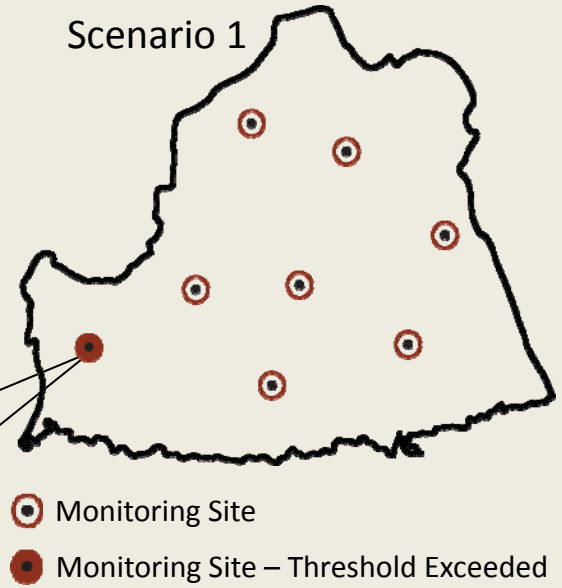


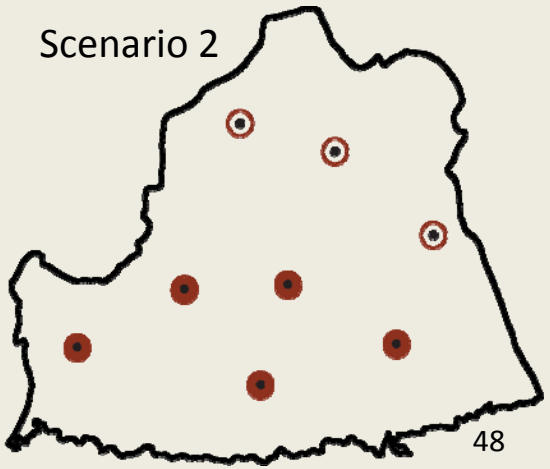
Article 5. Subarticle 3. Sustainable Management Criteria

§ 354.26. Undesirable Results

- Undesirable results exist when groundwater conditions throughout the basin result in significant and unreasonable effects for any critical parameter.
  - **Step 1:** Define groundwater conditions that are significant and unreasonable





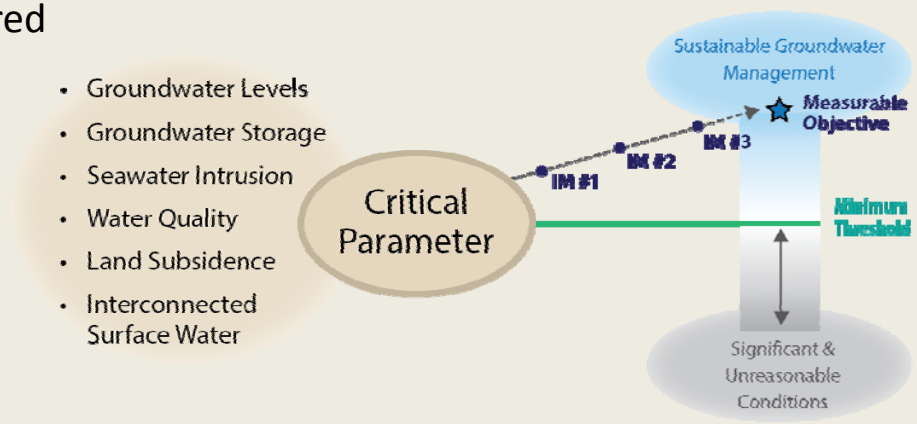


  - **Step 2:** Describe criteria used to define when and where the cumulative groundwater conditions in the basin create undesirable results.

Article 5. Subarticle 3. Sustainable Management Criteria

§ 354.28. Minimum Thresholds

- GSA shall establish minimum thresholds for each critical parameter.
- Minimum thresholds shall be numeric values that define conditions that, if exceeded, could lead to undesirable results
- Description based on the following:
  - Information and criteria used to establish the minimum threshold
  - Affects on the beneficial uses and users of groundwater.
  - How the minimum thresholds do not adversely affect the ability of adjacent basins to achieve sustainability goals
  - How minimum threshold will be measured
- Specific requirements for each critical parameter.



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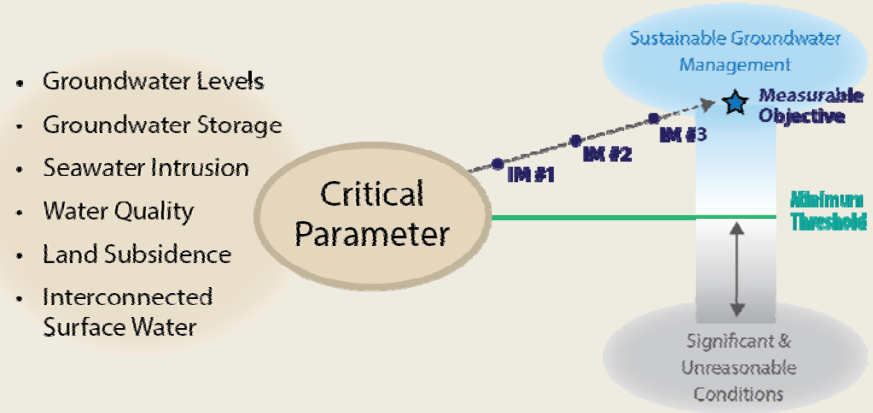
Article 5. Subarticle 3.
§ 354.30. Measurable Objectives

- Each Plan shall include one or more measurable objectives for each critical parameter
  - Represented by quantitative values using the same metrics
  - Shall be selected to provide operational flexibility under adverse conditions
  - May use representative minimum thresholds for groundwater levels that represent all critical parameters

- Each Plan shall include interim milestones for each measurable objective in increments of 5 years



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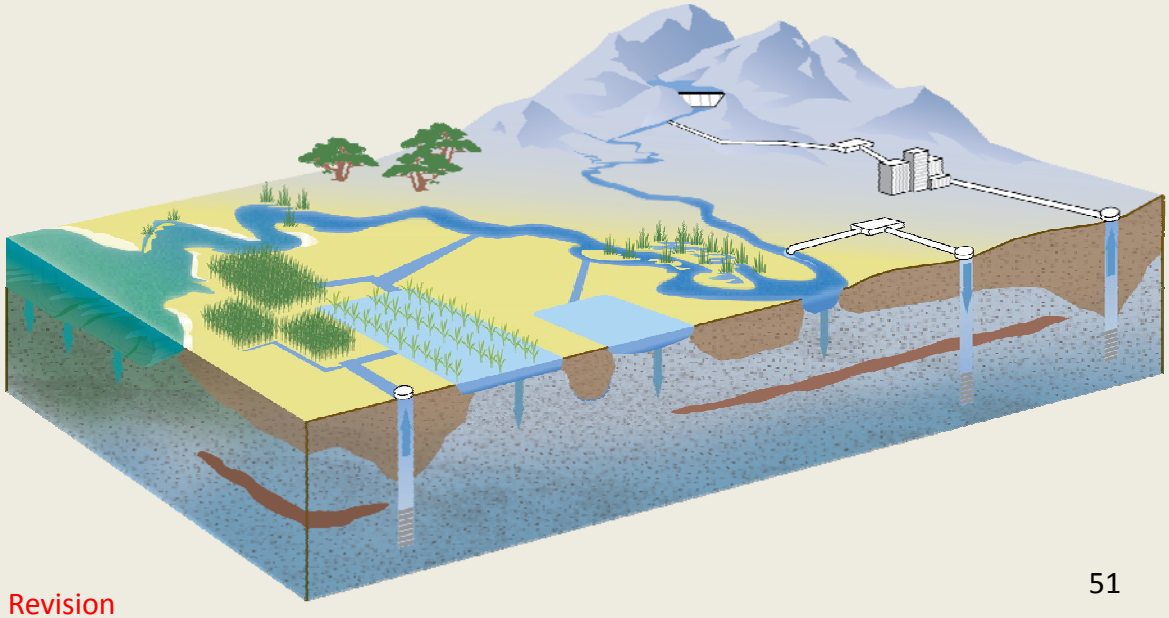
Article 5. Subarticle 4. Monitoring Networks

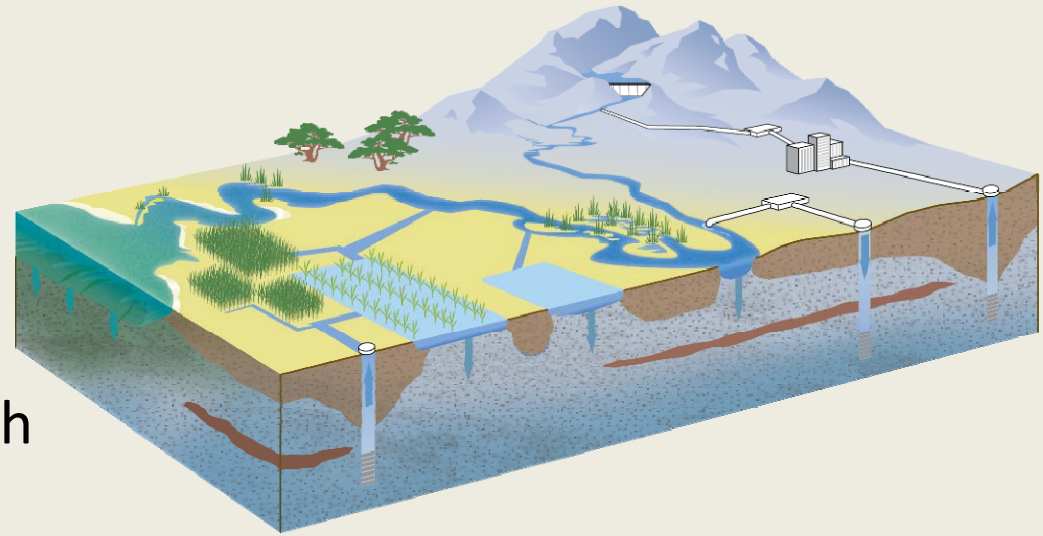
- § 354.34. Monitoring Network
- § 354.36. Representative Monitoring
- § 354.38. Assessment and Improvement of Monitoring Network



Article 5. Subarticle 4.
§ 354.34. Monitoring Network

§ 354.34. Monitoring Network

- Monitoring network must have sufficient data to:
  - Demonstrate seasonal, and long-term trends
  - Evaluate the affects and effectiveness of GSP implementation
- GSP may incorporate data from other programs (CASGEM, etc.)
- Monitoring density and frequency based on:
  - Groundwater use
  - Aquifer characteristics
  - Impacts
  - Uncertainty
- Minimum standards for each critical parameter

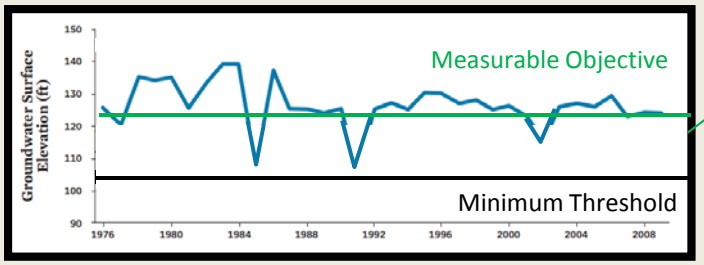


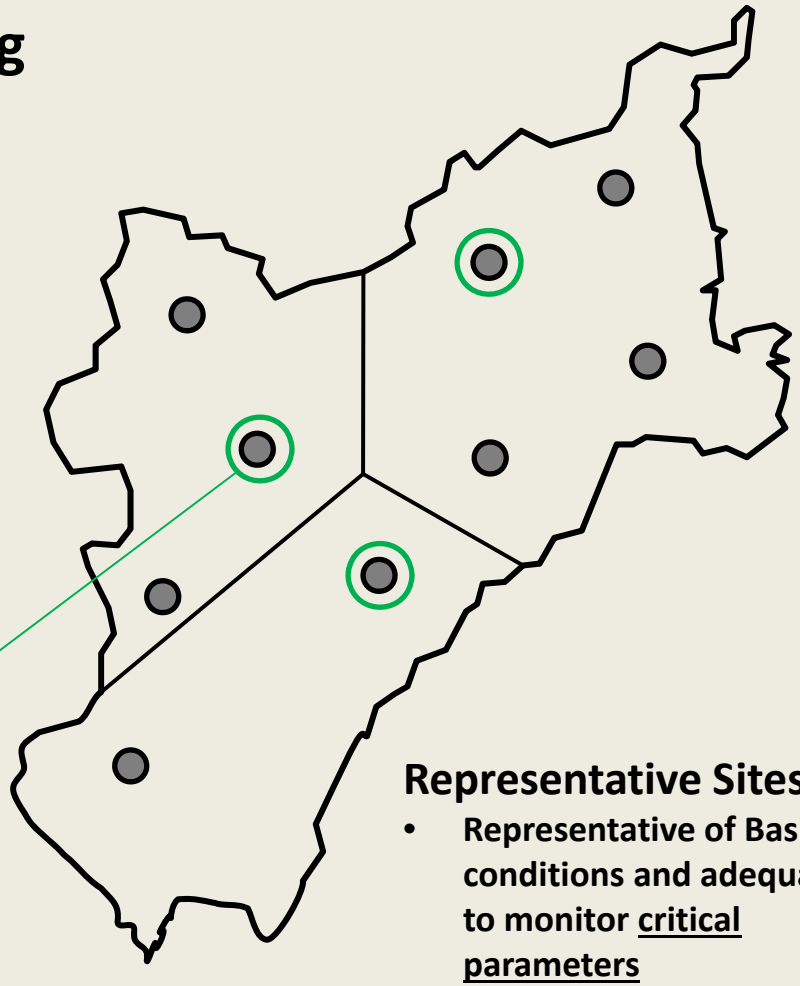
Article 5. Subarticle 4.
§ 354.34. Monitoring Network

§ 354.34. Monitoring Network

§ 354.36. Representative Monitoring

- Representative monitoring sites may be used
- Groundwater elevations may be used as proxy for other critical parameters





Representative Sites:

- **Representative of Basin conditions and adequate to monitor <u>critical parameters</u>**

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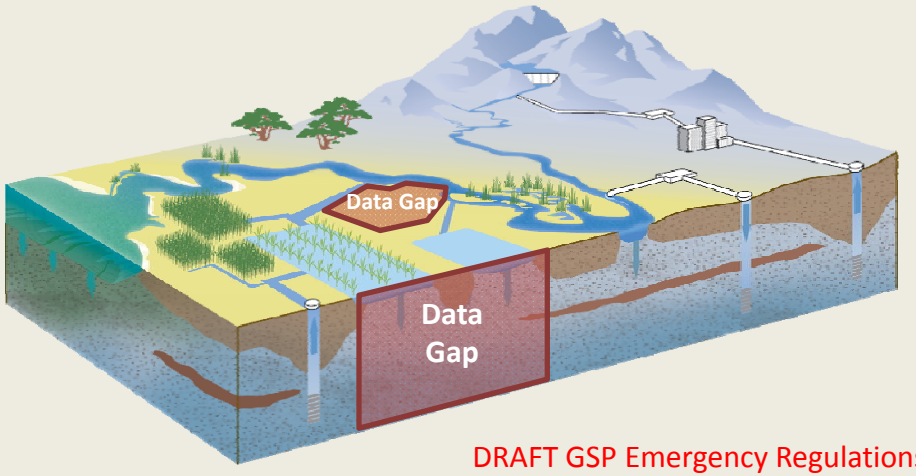
Article 5. Subarticle 4.
§ 354.34. Monitoring Network

§ 354.34. Monitoring Network

§ 354.36. Representative Monitoring

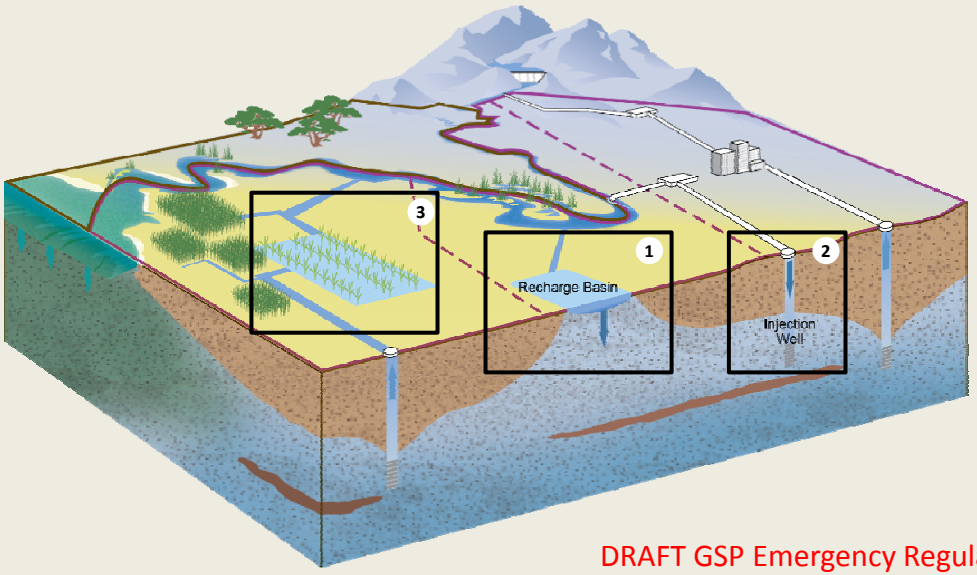
§ 354.38. Assessment and Improvement of Monitoring Network

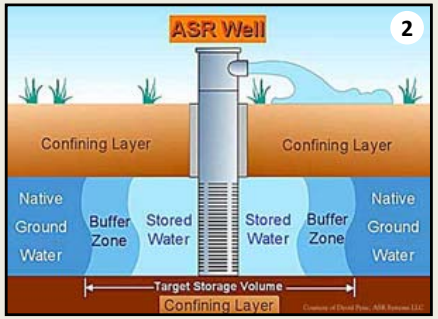
- Identification of data gaps
- Develop plan to address data gaps
- Monitoring frequency and density may adapt to provide greater detail about site-specific surface and groundwater conditions



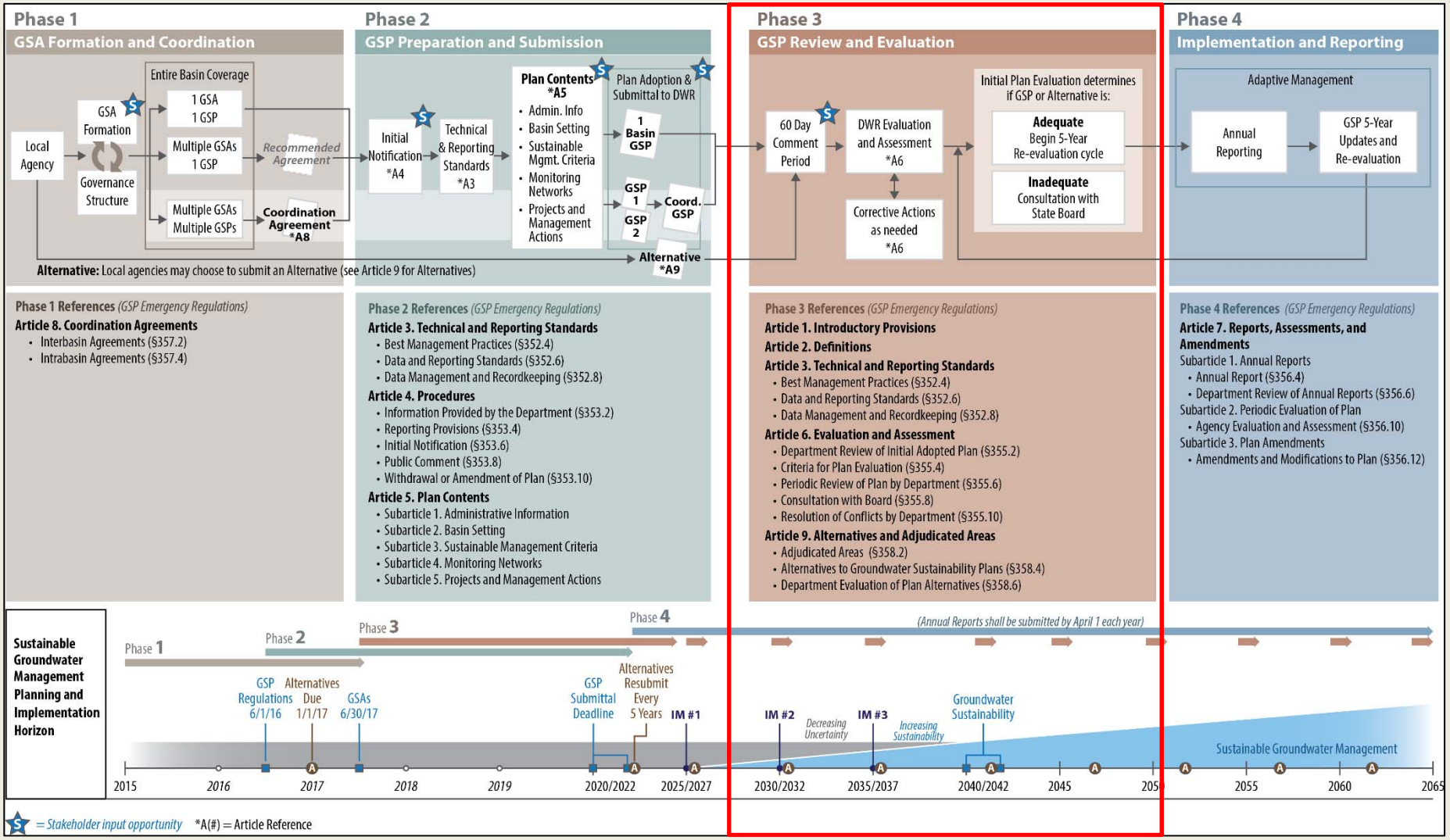
Article 5. Subarticle 5. Projects and Management Actions

- Developed and adopted to meet measurable objectives and prevent undesirable results
- Contingency projects or actions that would be triggered if groundwater conditions have not responded to previous management actions
  - Supported by available scientific data, analytical methods, and groundwater models, if available

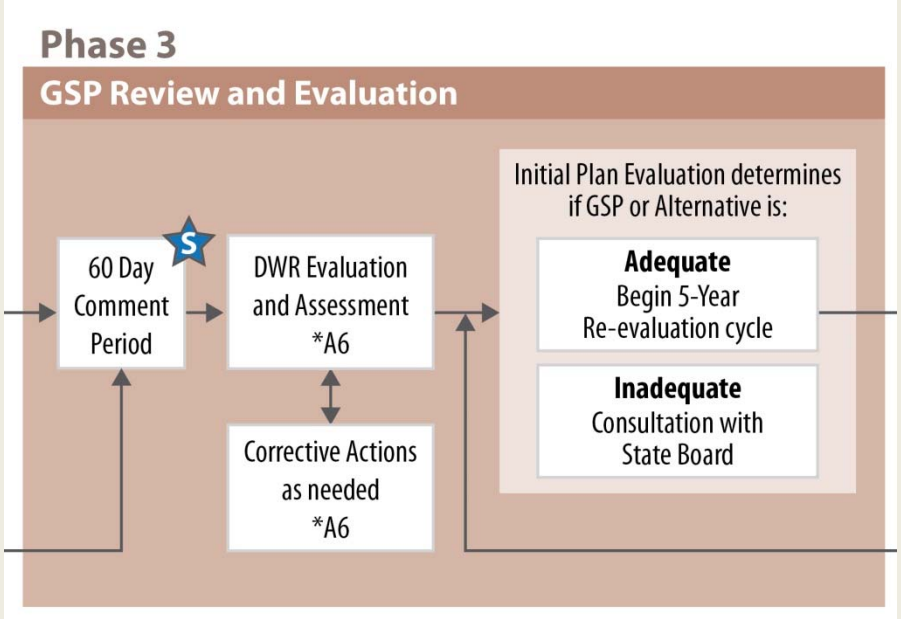




Phase 3:
GSP Review and Evaluation



Phase 3:
GSP Review and Evaluation



Phase 3 References *(GSP Emergency Regulations)*

Article 1. Introductory Provisions

Article 2. Definitions

Article 3. Technical and Reporting Standards

- Best Management Practices (§352.4)
- Data and Reporting Standards (§352.6)
- Data Management and Recordkeeping (§352.8)

Article 6. Evaluation and Assessment

- Department Review of Initial Adopted Plan (§355.2)
- Criteria for Plan Evaluation (§355.4)
- Periodic Review of Plan by Department (§355.6)
- Consultation with Board (§355.8)
- Resolution of Conflicts by Department (§355.10)

Article 9. Alternatives and Adjudicated Areas

- Adjudicated Areas (§358.2)
- Alternatives to Groundwater Sustainability Plans (§358.4)
- Department Evaluation of Plan Alternatives (§358.6)

ARTICLE 6: EVALUATION AND ASSESSMENT

Article 6.
Evaluation and Assessment

§ 355.2. Department Review of Initial Adopted Plan

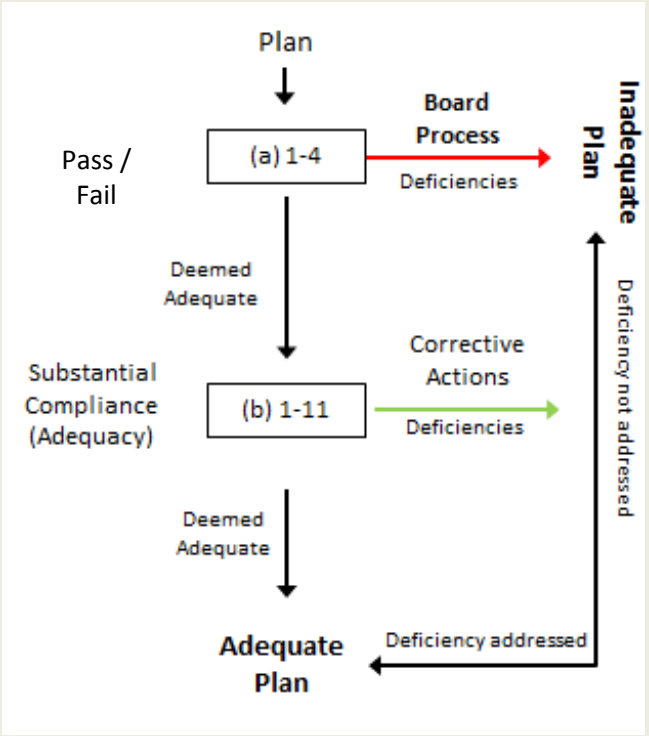
- Document the GSP submittal date.
- Post the GSP to DWR's website within 20 days of submittal date.
- Establish a 60 day public comment period.
- Conduct an evaluation of the GSP within two years of the submittal date.
- Make a determination of GSP adequacy.
  - If Inadequate, identify GSP deficiencies, may recommend corrective actions.

Article 6.
Evaluation and Assessment

§ 355.2. Department Review of Initial Adopted Plan

§ 355.4. Criteria for Plan Evaluation

- Achieve the sustainability goal for the basin, complies with SGMA, and is in substantial compliance with regulations.
- Pass/Fail Criteria
  - Submitted within timeframe established by the law.
  - Complete, includes all required data and information.
  - The Plan covers the entire basin.
  - GSA takes corrective actions to address plan deficiencies identified by DWR, within the timeframe identified by the law.



- Substantial Compliance (Adequacy) Criteria - means that the Agency (i.e. GSA or local Agency) has attempted to comply with these regulations in good faith, the supporting information is sufficiently detailed, thorough, and reasonable enough to evaluate the Plan, and that any discrepancy would not materially affect the ability of the Agency to achieve the sustainability goal for the basin.

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Article 6.
Evaluation and Assessment

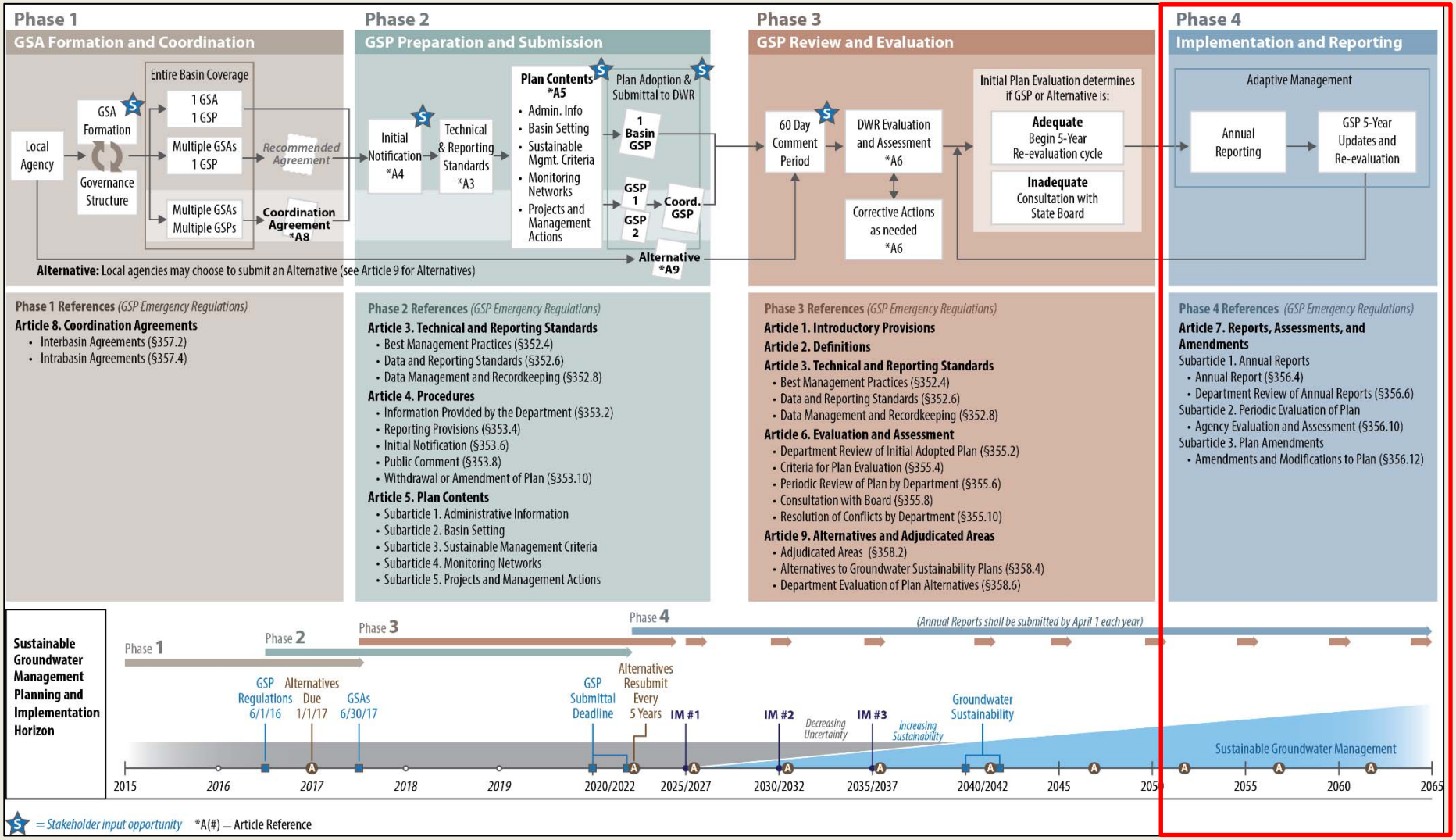
§ 355.2. Department Review of Initial Adopted Plan

§ 355.4. Criteria for Plan Evaluation

§ 355.6. Periodic Review of Plan by Department

- At least every five years and when amended
- DWR considerations during the review:
  - GSA is meeting all of its interim milestones, implementing Plan actions and contingencies, and is compliant with the annual reporting and periodic evaluation requirements.
  - DWR concludes that the Plan and its implementation are likely to achieve the sustainability goal and not likely to adversely affect the sustainability goals of adjacent basins.

Phase 4:
Implementation and Reporting



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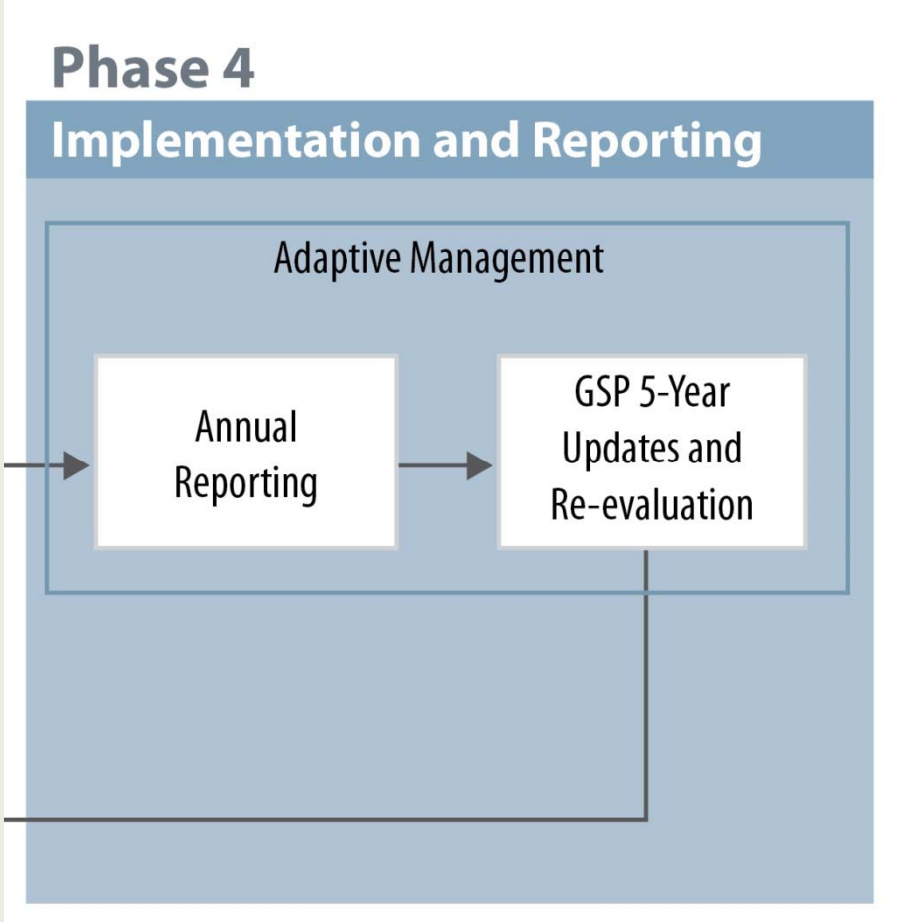
Phase 4:
Implementation and Reporting



Phase 4 References *(GSP Emergency Regulations)*

Article 7. Reports, Assessments, and Amendments

Subarticle 1. Annual Reports
- Annual Report (§356.4)
- Department Review of Annual Reports (§356.6)

Subarticle 2. Periodic Evaluation of Plan
- Agency Evaluation and Assessment (§356.10)

Subarticle 3. Plan Amendments
- Amendments and Modifications to Plan (§356.12)

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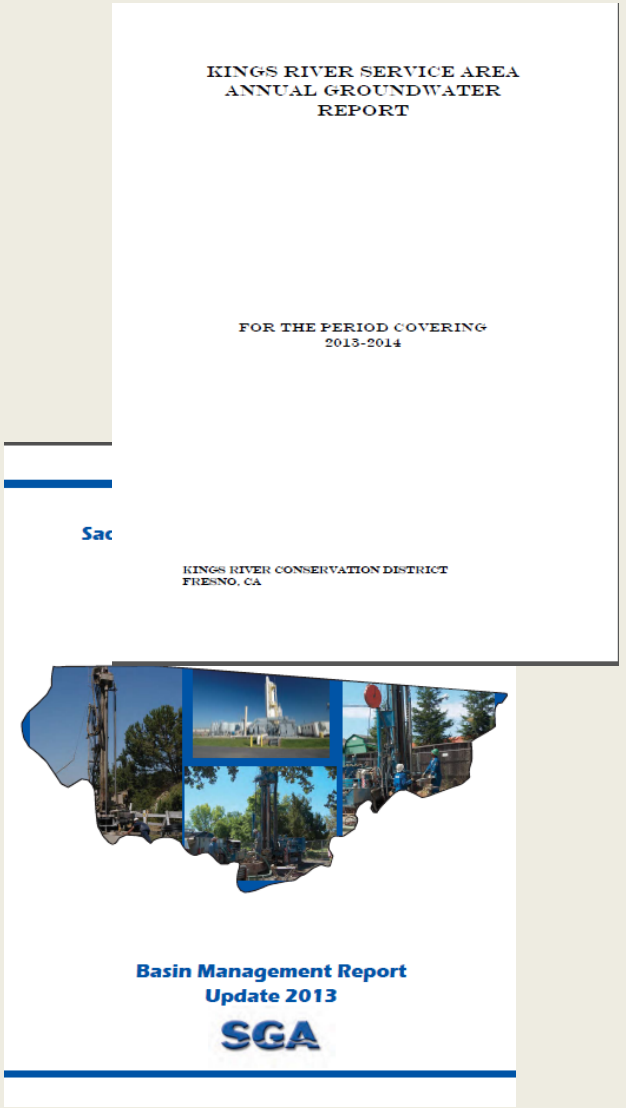
ARTICLE 7. REPORTS, ASSESSMENTS, AND AMENDMENTS

Article 7.
Reports, Assessments, and Amendments

§ 356.4. Annual Reports

- General information
- Description and graphical representation of conditions:
  - Groundwater elevation data
  - Annual aggregated data identifying groundwater extraction for the preceding water year.
  - Surface water supply used or available for use, for groundwater recharge
  - Total water use
  - Change in groundwater storage
- Description of progress toward implementing the GSP, achieve interim milestones and the implementation of any contingency measures.



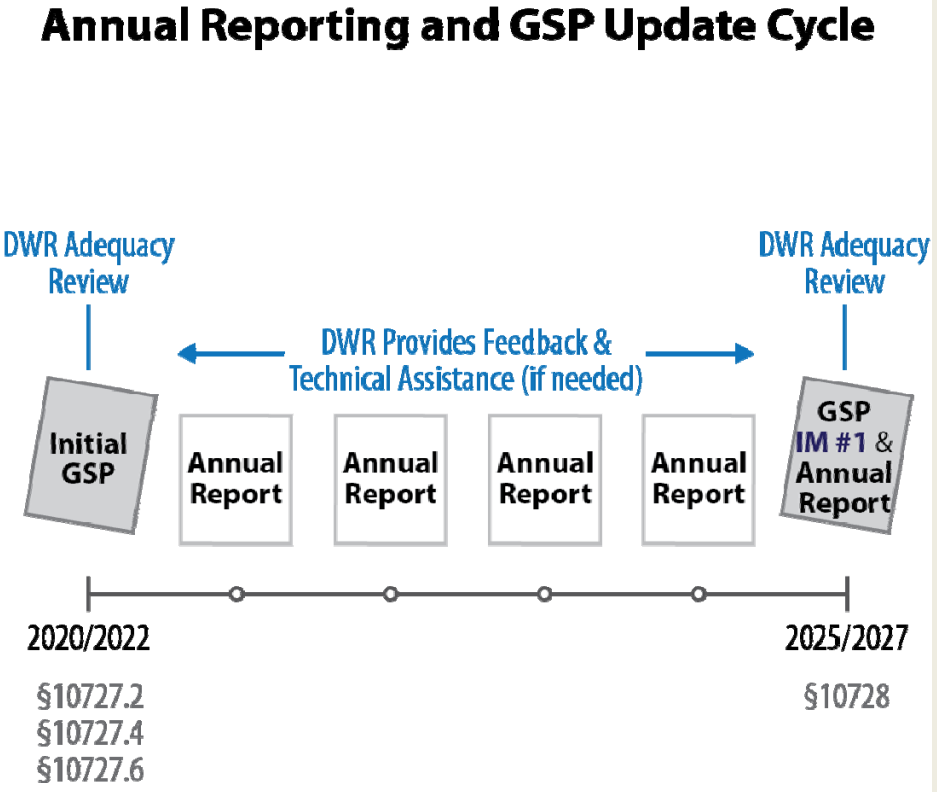
Article 7.
Reports, Assessments, and Amendments

§ 356.4. Annual Report

§ 356.6. Department Review of Annual Reports

§ 356.10. Agency Evaluation and Assessment

- Assess the GSP at least every five years
- Describe basin conditions relative to the previous five-year period and the long-term sustainability goal for the basin.
- Include an objective evaluation of GSP implementation and management of groundwater in the basin.



ARTICLE 9. ALTERNATIVES AND ADJUDICATED AREAS

Article 9.
Alternatives and Adjudicated Areas

§ 358.2. Adjudicated Areas

§ 358.4. Alternatives to Groundwater Sustainability Plans

- Local agency or GSA
- Applies to the entire basin
- Submitted by January 1, 2017*, and every five years thereafter
- CASGEM compliant
- Type of Alternative submitted:
  1. GWMP or law authorizing groundwater management
  2. Adjudication
  3. Analysis of 10 years of operation at sustainable yield
- Alternative “cooperation agreement”

* Excludes Adjudications

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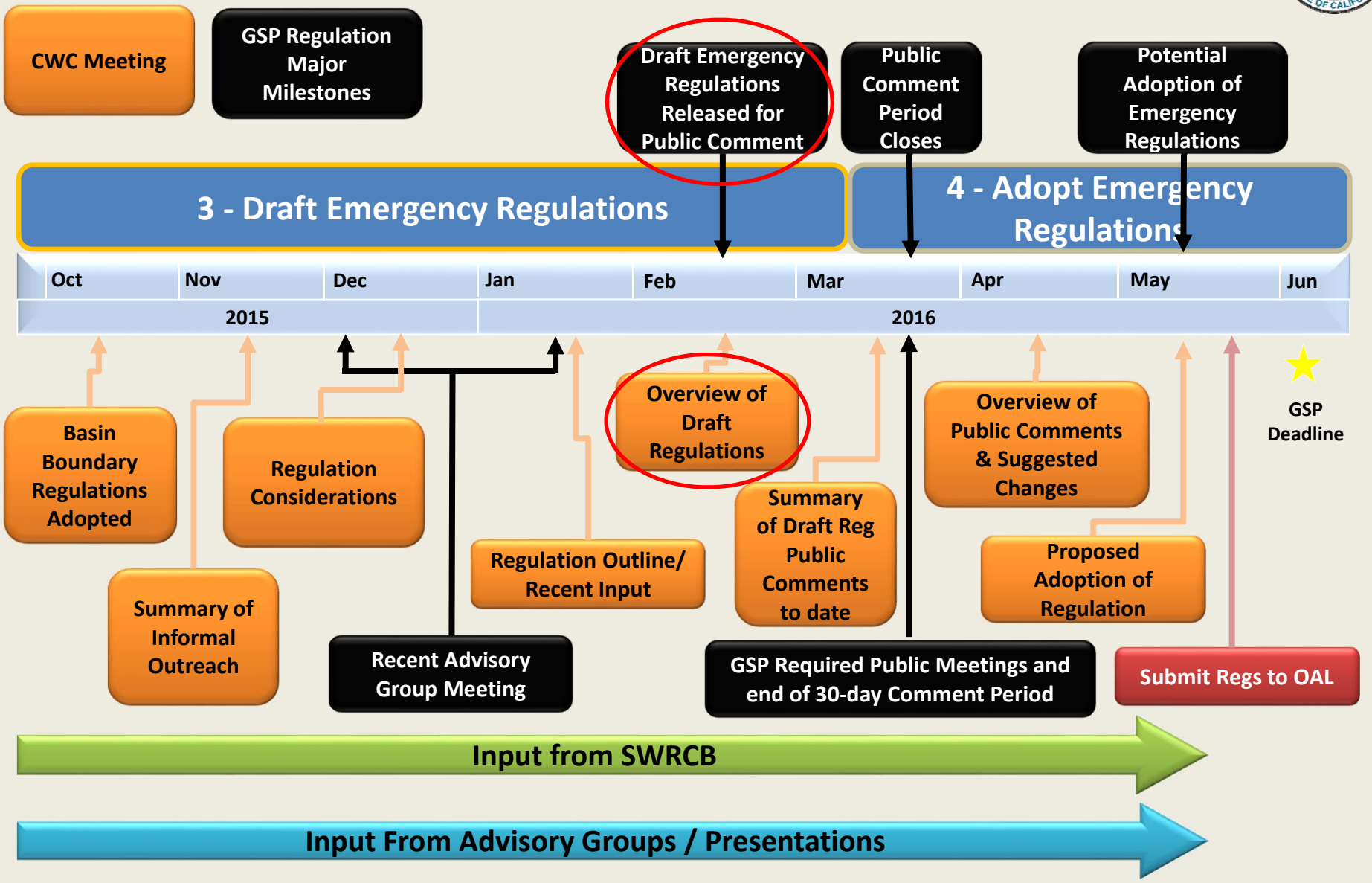
Timeline/Next Steps

Timeline/Next Steps



Dates and Durations are Subject to Change

How to Provide Input

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

DWR Welcomes Feedback on Draft Regulations

- Email & written comments
- California Water Commission meetings (February-May)

DWR will be Holding Three Public Meetings

- Visalia
- Orange County
- Sacramento