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
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

Existing SGMA Legal Requirements
(GSP/Alternative Requirements Only)

Regulations
- Articles
  - A1
  - A2
  - A3
  - etc

GSAs/Local Agencies using BMPs to guide completion of GSPs

DWR can update Regulations to include BMPs

GSP Website
- Subpages
  - A1
  - A2
  - A3
  - etc

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)

Best Management Practices
- Guidance Document for use by GSAs or Local Agencies to promote SGMA

GSAs/Local Agencies using BMPs
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)
GSP Regulations – 10 Issue Topics

Phase 1 –
Scoping
(Collection of Issues)

1st Batch
(Jun-Jul)

2nd Batch
(Jul–Aug)

3rd Batch
(Aug-Sep)

Phase 2 –
Draft
Discussion Papers and
Public Informational Sessions

All 10 +
Topics
(May-Jun)

GSP Components

Adaptive Mgt. and Focus Areas

Measurable Objectives and Interim Milestones

Pre-SGMA Conditions and Undesirable Results

Land Use and County Involvement

Alternative GSP Submittals

Boundaries-Overlapping & managed Areas

Intra-Basin Coordination Agreements

Water Budgets and Coordination

State Agency Coordination

Data Collection, Mgmt., and Reporting

http://www.water.ca.gov/groundwater/sgm/gsp.cfm
## GSP Communication and Outreach

<table>
<thead>
<tr>
<th>Advisory Group</th>
<th>GSP Topics</th>
<th>GSP Batch 1</th>
<th>GSP Batch 2</th>
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<tr>
<td>2. ACWA (Statewide)</td>
<td>6/12/2015</td>
<td>7/16/2015</td>
<td>8/21/2015</td>
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</tr>
<tr>
<td>3. RCRC &amp; CSAC</td>
<td>6/10/2015</td>
<td>7/16/2015</td>
<td>8/12/2015</td>
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<tr>
<td>5. Non-Governmental Organizations (NGOs)</td>
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<tr>
<td>7. San Joaquin Tributaries Authority (Delta)</td>
<td>5/29/2015</td>
<td>7/17/2015</td>
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<td>9/24/2015</td>
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<tr>
<td>8. San Luis &amp; Delta-Mendota Water Authority</td>
<td>5/29/2015</td>
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<tr>
<td><strong>Public Meetings / Webcasts</strong></td>
<td>–</td>
<td>7/20/2015</td>
<td>8/27/2015</td>
<td>9/21/2015</td>
</tr>
</tbody>
</table>

40 meetings, >100 hours
Potential Regulation Components

Overview

Governance & Coordination
“Who is managing & participating”

Basin Setting
“What are the current conditions”

SGM Planning
“How will GW be managed & measured”

Evaluation
“Reporting, Evaluation, & Adaptive Management”

Equivalent GSPs

Potential Regulation Content

Governance Coordination Land Use

State of the Basin

Sustainability Goal (Sustainable Yield, SGM)
Measurable Objectives & Undesirable Results Monitoring Plan

Implementation & Reporting

Alternative GSPs & Fringe Areas

Stakeholder Input

All Topics
- 6 - Coordination Agreements
- 7 - State Agency Coordination
- 8 - Water Budgets and Coordination
- 3 - Land Use & County Involvement

2 - Pre SGMA Conditions and Undesirable Results
- 1 - Measurable Objectives
- 2 - Pre SGMA Conditions and UR's
- 8 - Water Budgets and Coordination
- 10 - Adaptive Mgt. and Focus Areas

9 - Data Collection, Mgt., & Reporting
- 9 - Data Collection, Mgt., & Reporting

4 - Alternative GSP
- 5 - Boundaries, Overlapping & Unmanaged Areas

Draft – For Discussion Purposes Only (Subject to Change)
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)

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

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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)
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

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)
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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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.

Inflows – Outflows = \( \triangle \text{Storage} \)

Inflows:
- Return Flows
- Mountain Front
- Imports
- Deep Percolation
- Rainfall
- Subsurface Inflows
- Surface Inflows

Outflows:
- Subsurface Outflows
- Surface Outflows
- Evapotranspiration
- Exports
- Pumping
- Environmental
State of the Basin (cont.)

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.
State of the Basin (cont.)

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.)

**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 discussion of how historic surface water supply reliability has impacted the ability to achieve basin sustainability.
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.
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.
State of the Basin (cont.)

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

Figure 10: North Basin Land Use Map.

Draft – For Discussion Purposes Only (Subject to Change)
Sustainable Groundwater Management Planning

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

Sustainability Goal
Entire Basin

Sustainable Groundwater Management
Entire Basin

Sustainable Yield
Entire Basin

Undesirable Results:
Significant and Unreasonable...

- Surface Water Depletion
- Reduction of Storage
- Degraded Quality
- Seawater Intrusion
- Land Subsidence
- Lowering GW Levels
Sustainability Goal (Sustainable Yield and Sustainable Groundwater Management) (cont.)

Undesirable Results

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

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

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

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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.
## Undesirable Results

### 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:

<table>
<thead>
<tr>
<th>Undesirable Result</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>GW elevation from mean sea level</td>
<td>Lowering GW Levels</td>
</tr>
<tr>
<td>Measurement of Land Subsidence in feet</td>
<td>Land Subsidence</td>
</tr>
<tr>
<td>Isocontour of appropriate constituent concentration</td>
<td>Seawater Intrusion</td>
</tr>
<tr>
<td>Degraded Quality</td>
<td>Extent GW extractions contribute to WQ degradation</td>
</tr>
<tr>
<td>Reduction of Storage</td>
<td>Change in Storage</td>
</tr>
<tr>
<td>Surface Water Depletion</td>
<td>Base flow Calculation, Monitoring, &amp; Extent of GW Dependent Ecosystems</td>
</tr>
</tbody>
</table>
Undesirable Results (cont.)

Initial Establishment of Minimum Threshold

Groundwater Levels

- Actual/Empirical
- Projected (no action)
- Projected (with action)
- Minimum Threshold

SGMA Accountability Date (Jan 1, 2015)

- 2022
- 2027
- 2032
- 2037

SGMA Sustainability Date (2042)

Past 30 Years

Measurable Objectives & Undesirable Results
Undesirable Results (cont.)

Identifying the Proposed Path to the Sustainability Goal

Groundwater Levels

SGMA Accountability Date (Jan 1, 2015)

SGMA Sustainability Date (2042)

Past 30 Years

Actual/Empirical
Projected (no action)
Projected (with action)
Minimum Threshold

Initial Start Date
Interim Milestones
Sustainability Goal

Undesirable Results

Draft – For Discussion Purposes Only (Subject to Change)
Undesirable Results (cont.)

Addressing Uncertainty

Groundwater Levels

SGMA Accountability Date (Jan 1, 2015)

2022 2027 2032 2037

SGMA Sustainability Date (2042)

Past 30 Years

Actual/Empirical
Projected (no action)
Projected (with action)
Minimum Threshold

Uncertainty Band

Actual/Empirical
Projected (no action)
Projected (with action)
Minimum Threshold

Uncertainty Band

Draft – For Discussion Purposes Only (Subject to Change)
Undesirable Results (cont.)

Minimum Thresholds Requirements

Actual/Empirical
Projected (no action)
Minimum Threshold

Initial Start Date
Sustainability Goal
Interim Milestones

SGMA Accountability Date (Jan 1, 2015)
SGMA Sustainability Date (2040)

Past 30 Years

Regulation Considerations
- Must adhere to framework
- Must pass reasonableness criteria

GSA Discretion/Flexibility
- Proposed by GSA
- Locally defined
- Site specific

Groundwater Levels

Actual/Empirical
Projected (no action)
Minimum Threshold

Draft – For Discussion Purposes Only (Subject to Change)
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
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
Monitoring Plan – Existing Network

127 High and Medium Priority Basins

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

Draft – For Discussion Purposes Only (Subject to Change)
CASGEM Monitoring Plans

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

Draft – For Discussion Purposes Only (Subject to Change)
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 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

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Monitoring Well Standards

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

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

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Compliance Wells:
• Representative of Basin (or focus area) conditions and adequate to monitor Undesirable Results
Minimum thresholds set for each compliance Site
Evaluation

(Implementation and Reporting)
### 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)

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<tr>
<th>Initial GSP Submission/GSP Updates and Annual and 5 Year Reporting</th>
<th>GSP Implementation</th>
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<td><strong>Completeness Check</strong></td>
<td><strong>Adequacy Check</strong></td>
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<tr>
<td>Immediate Inadequacy Determination</td>
<td>Due Process and Opportunity to Correct Deficiencies</td>
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<tr>
<td>(Examples - Missing Requirements or Deadlines, etc.)</td>
<td>(Examples – Inadequate GSP elements, etc.)</td>
</tr>
<tr>
<td><strong>Progress Check</strong></td>
<td></td>
</tr>
<tr>
<td>Tracking and Evaluating Progress</td>
<td></td>
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<tr>
<td>(Examples - Minimum Threshold continues to be exceeded without progress, GSP not being implemented, etc)</td>
<td></td>
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</tbody>
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Draft – For Discussion Purposes Only (Subject to Change)
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
Equivalent GSPs

(Alternatives and Fringe Areas)
Alternative Plans

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

Draft – For Discussion Purposes Only (Subject to Change)
Fringe 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)
Next Steps

Scoping

Draft Framework (Topic Based)

Draft Emergency Regulations

Adopt Emergency Regulations

Mar-15 Apr May Jun Jul Aug Sept Oct Nov Dec Jan Feb Mar Apr May Jun Jun-16

2015

2016

Periodic CWC Updates
GSP/ALT
Topics Discussions

July 20, Aug 27, Sept 21
GSP Mtgs/Webinars

CWC
Nov
and Dec
Summary of
Informal
Outreach

CWC
Jan. or
Feb.
GSP
Draft
Regs

CWC
March
Draft
Final
GSP
Regs

CWC
April
Adopt
Final
GSP
Regs

GSP Required Public Meetings
and 30 Comment Period

Submit GSP
Regs to OAL

Input from SWRCB

Input From Advisory Groups

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