Measuring What Matters

The Sustainable Groundwater Management Act: Measurable Objectives

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Climate Scientist
Union of Concerned Scientists
What’s new?

You have arrived at the most exciting destination of your life...

Why you need to be specific with a G.P.S.

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Measuring What Matters

Setting Measurable Objectives to Achieve Sustainable Groundwater Management in California
Past Plan Requirements

- Maps and hydrology
- **Basin Management Objectives (BMOs)**
- Monitoring of groundwater
- Plan to involve other agencies
- Documentation of public involvement

New Plan Requirements

- Physical description of the basin (water level, quality etc.)
- **Measurable Objectives and Interim Milestones**
- Description of how these will be achieved
- Monitoring and management provisions
- How the plan will affect other county/city general plans
Measurable Objectives
Effective Measureable Objectives

- Define clear baselines
- Set quantitative thresholds
- Develop protective triggers
- Incorporate regular measurement and monitoring
- Account for uncertainty
- Adapt to changing conditions and new information
### Set Quantitative Thresholds

**TABLE 1. Examples of Measurable Objectives and Corresponding Thresholds in Groundwater Management**

<table>
<thead>
<tr>
<th>Measurable Objective</th>
<th>Document</th>
<th>Threshold Example</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Groundwater Levels</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limit groundwater extraction.</td>
<td>Central Sacramento County Groundwater Management Plan</td>
<td>The long-term average groundwater extraction rate should not exceed 273,000 AF/year.</td>
</tr>
<tr>
<td></td>
<td>Orange County Water District (OCWD) Groundwater Management Plan</td>
<td>OCWD does not have a “hard cap” on groundwater extractions, but uses economic disincentives to encourage groundwater producers to limit production to the amount established by OCWD.</td>
</tr>
<tr>
<td></td>
<td>Madera Regional Groundwater Management Plan</td>
<td>Reduce groundwater extractions by 150,000 AF/year.</td>
</tr>
<tr>
<td>Limit the decline in groundwater elevation to provide for sustainable yield.</td>
<td>Groundwater Management Area 1: Desired Future Conditions (Dockum Aquifer)</td>
<td>Average decline in groundwater levels must not exceed 30 feet over the next 50 years.</td>
</tr>
<tr>
<td><strong>Groundwater Storage</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Achieve a target storage volume in the future.</td>
<td>Monterey Peninsula Water Management District</td>
<td>27,360 AF of usable storage required.</td>
</tr>
<tr>
<td></td>
<td>Groundwater Management Area 1: Desired Future Conditions (Blaine Aquifer)</td>
<td>50% of the volume in storage will remain in 50 years.</td>
</tr>
<tr>
<td></td>
<td>Orange County Water District Groundwater Management Plan</td>
<td>Managed groundwater basin within a 500,000 AF volume with triggers when storage levels reach various points, including reducing pumping.</td>
</tr>
</tbody>
</table>
Develop Protective Triggers

FIGURE 2. Fixed Thresholds and Triggers for Groundwater Management

In this example, the threshold for chronic lowering of groundwater levels is the lowest groundwater elevation recorded (black line). Fixed triggers have been set at one standard deviation (yellow-light trigger) and two standard deviations (red-light trigger) below the average groundwater elevation (black).
Measurement & Monitoring
Account for Uncertainty

Decreasing California Snowpack

Historical Average (1961–1990)

100% remaining

2070–2099

Lower Warming Range
Drier Climate

40% remaining

Medium Warming Range
Drier Climate

20% remaining

April 1 snow water equivalent (inches)

~0 15 30 45

Adapt to Change

1. Assess the problem
2. Establish Goals and Objectives
3. Model Linkages Between Objectives and Proposed Actions
4. Select Management Actions
5. Implement Actions
6. Monitor
7. Analyze, Synthesize & Evaluate
8. Communicate Current Understand
9. Adapt
Shared resources, lacking direction
Shared resources, with direction
Common Framework

- Does the threshold exceed an existing standard?
- Does the threshold conflict with thresholds for other undesirable results?
- Was the threshold developed through a transparent public process?
- Are there potential negative impacts associated with the threshold?
- Does the threshold violate the threshold of neighboring basins?
- Are there high levels of uncertainty regarding proposed actions?
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For more information

www.ucsusa.org/measuringwhatmatters

www.ucsusa.org/sustainablegroundwater

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