

Sustainable Management Criteria

Chronic Lowering of Groundwater Levels Considerations and Guiding Questions

Introduction

This document has been prepared to support initial Advisory Committee discussions and considerations for the establishment of sustainable management criteria (SMC) for the Lowering of Groundwater Levels sustainability indicator. This document provides:

1. Guiding questions;
2. A summary of available data and information;
3. Some examples of potential significant and unreasonable effects; and
4. Example ranges of options for potential minimum thresholds.

DWR has established requirements and guidance for developing SMCs in the GSP Emergency Regulations and SMC Best Management Practices (BMP), which Advisory Committee members are encouraged to review. Additionally, a Cheat Sheet of SMC plain language terms and definitions has been prepared to serve as a quick reference guide. (Links to all of these materials can be found at [http://sonomavalleygroundwater.org/gsp/.](http://sonomavalleygroundwater.org/gsp/))

Lowering of Groundwater Levels is the first sustainability indicator being addressed in the SMC process, as it contains the most straightforward and robust dataset and is related to most of the other indicators. For example, groundwater levels could be used as proxy for other sustainability indicators. In addition, this indicator will best help us move forward with other related considerations (e.g., representative monitoring sites and management areas).

The full process for establishing SMCs will be highly iterative and considerations for other sustainability indicators (e.g., land subsidence, surface water depletion, seawater intrusion etc.) may later override or replace initial thresholds and objectives related to groundwater levels in some areas of the Basin. Therefore, please defer any considerations of these other sustainability indicators and focus your answers to guiding questions and thoughts regarding significant and unreasonable effects and minimum thresholds solely to the Lowering of Groundwater Levels sustainability indicator. Once some preliminary SMCs are developed for Lowering of Groundwater Levels, the discussion will be expanded to cover all other sustainability indicators.

Guiding Questions

Please review the following guiding questions and be prepared to discuss at the January Advisory Committee meeting. The answers should include consideration of the constituent group that you specifically represent on the Advisory Committee, as applicable.

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1. What would you consider unacceptable or intolerable when it comes to groundwater level declines? For example:
 - Groundwater levels falling below pumping depths of water supply wells
2. What would be desirable conditions in the basin related to groundwater-levels? For example:
 - Groundwater levels always recover after droughts
 - Groundwater levels increase to enhance basin habitat
3. What particular elements potentially affected by groundwater levels are you most concerned about? For example, a particular well type or specific beneficial use/user? Long-term versus short-term, seasonal, or drought?
4. Do you think there are specific areas of the basin that have unique or different concerns or issues, than other parts of the basin?

Summary of Data and Information Available

In order to support the development of SMCs for Lowering Groundwater Levels, available information has been described in the current version of the Basin Setting section of the working [draft Sonoma Valley GSP](#). Additionally, the following data and information have been compiled in the form of maps and graphs that include, but are not limited to:

- Tables and maps of existing monitoring wells to assist the evaluation of potential Representative Monitoring Points (RMPs);
- Groundwater level hydrographs and groundwater contours maps showing groundwater level trends over time and the spatial distribution of the groundwater potentiometric surface (top) of the shallow and deep aquifers;
- Groundwater level trend and change maps for the last five years (2015-2019), last ten years (2010-2019), and longer-term 1980s-2019;
- Water well depth maps showing the location of water wells by total well depth
- Map of simulated or estimated pumping density for the shallow and deep aquifers (*under development*);
- Graphs of basin historical climatic data from rainfall illustrating water year type (wet, normal and dry hydrologic cycles)

The above-described information will be used to develop initial or preliminary SMCs for Lowering of Groundwater Levels. In addition to the above empirical data and analyses, an assessment of future conditions (climate and land use), is needed to establish SMCs. These future projected conditions will be simulated using the Sonoma Valley Integrated Hydrologic Model (SVIHM) developed by Sonoma Water based on a previous model developed by the U.S. Geological Survey. The SVIHM will be used to simulate groundwater conditions and processes in the basin, including:

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- Historic, current, and future water budgets
- Preliminary and final SMCs
- Projects and management actions to achieve/maintain sustainability over the planning horizon

Description of Some Significant and Unreasonable Effects related to Groundwater Levels

For Lowering of Groundwater Levels, SGMA defines an “undesirable result” as the chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply if continued over the planning and implementation horizon. Possible causes of lowering of groundwater levels may include changes in basin pumping, surface water diversions in areas of losing streams and reduction in natural recharge from changing climatic conditions. The first step in developing an SMC is to narratively describe significant and unreasonable effects related to Lowering of Groundwater Levels (i.e., qualitative statements of what local interests want to avoid). These qualitative significant and unreasonable effects would then be translated into quantitative metrics for establishing minimum thresholds and measurable objectives. Some specific significant and unreasonable effects related to groundwater level declines may include but not be limited to:

- Declining groundwater levels limit the ability of well owners to access groundwater for beneficial uses (e.g., falling below pumping depths of water supply wells)
- Groundwater levels falling near basin boundaries that indicate impacts to or from neighboring basins
- Falling groundwater levels cause impacts to groundwater-dependent vegetation (shallow aquifer only)
- Cause significant and unreasonable economic burden on those who rely on basin groundwater
- Others?

Example Options for Groundwater Level Minimum Thresholds

A minimum threshold refers to a numeric value for each sustainability indicator used to define undesirable results. DWR defines the minimum thresholds for the groundwater level sustainability indicator as follows:

- Chronic Lowering of Groundwater Levels. The minimum threshold for chronic lowering of groundwater levels shall be the groundwater elevation indicating a depletion of supply at a given location that may lead to undesirable results. Minimum thresholds for chronic lowering of groundwater levels shall be supported by the following:
 - The rate of groundwater elevation decline based on historical trends, water year type, and projected water use in the basin
 - Potential effects on other sustainability indicators

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Some examples of groundwater level minimum thresholds may include:

- Water supply well total depths or top of perforations (or surrogate)
 - Groundwater levels may decline **only** to such a point where everybody's wells are able to withdraw groundwater (i.e. water levels cannot decline below any well screen)
 - Groundwater levels may decline **only** to such a point where 95% (or 90%, 80%, etc.) of well users can withdraw groundwater
 - Groundwater levels are set to be protective of rural domestic wells (domestic wells receive more protection than other types)
 - Groundwater levels are set to a factor of safety or buffer in order to protect well users — i.e. don't let water levels decline more than 20 feet *above* all well-screens
- Estimated rooting depths of sensitive groundwater-dependent vegetation (shallow aquifer only)
- 2015 hydrologic conditions – SGMA does not require Groundwater Sustainability Agencies to address undesirable results that occurred before 2015
- Lowest historical groundwater level on record - may be considered suitable in an area where chronic depletion is not an issue
- Lowest historical groundwater level on record plus a projected value that estimates the additional level of decline until projects and management actions are developed to mitigate chronic declines – may be considered suitable in an area where chronic depletion is an ongoing issue
- Lowest historical groundwater elevations and future groundwater flow model simulations that show groundwater elevations recover during multi-year cycles of drought and recovery