Corning Subbasin GSP Water Budget Section

- Overview and purpose of section, how to read it and what to expect

Overview:

The GSP Regulations require the development of a subbasin-wide groundwater budget, and a subbasin-wide surface water budget. In agricultural areas such as the Corning Subbasin, a land surface budget is an additional useful element to review to assess changes in water demands over time and evaluate the water demand versus water supply balance due to climatic variations and land use changes.

The GSP requires the detailed tracking and summary of each individual inflow and outflow component for each water budget type.

The water budget section includes an overview to describe how water budgets are developed, define each component and the applicable time frames.

The water budget descriptions are divided into three subsections: (1) historical water budgets, (2) current water budgets, and (3) projected water budgets. Within each subsection, a groundwater budget, a land surface budget, and a surface water budget are presented. Each water budget is described by providing a brief summary of key observations of trends over time, and relative contribution to the water budget by different components, to emphasize what portions of the water budget have the most and least influence on the water resources conditions in the Subbasin. A table summarizing the amount of water contributed by each component is provided in addition to a graphical representation of the water budget components over time, on an annual basis. Each subsection follows the same format. This may seem a bit repetitive, but this section is aimed at following GSP requirements and formatted for ease of comparison between different timeframes.

Water budgets were developed using a modified version of the California Central Valley Groundwater-Surface Water Simulation Model (C2VSimFG) Version 1.0, developed by the Department of Water Resources (DWR), as described at previous CSAB meetings.

Interpretation:

When reviewing water budgets, the individual numbers in the tables are less important than understanding relative magnitudes of each component's contribution to the overall water budget, and recognizing general historical and projected trends.

The tables provide average annual values, including summaries for different water year types, to show effects of climate on the historical water budget.

The graphs provide a compact view of all the inflows and outflows for each type of water budget, over time, for each year simulated with the model. The stacked bars allow for a view of the relative magnitude of the different components to overall annual inflows and outflows. Inflows are shown on the positive side of the figure (over the x-axis) and outflows are shown below the x-axis. Opposite inflow and outflow types are shown with the same color, with outflows shown with white dots (for example, groundwater discharge to streams is always negative in groundwater budgets, and streambed recharge is always positive; so they are shown with the same color, above and below the x-axis).

Some graphs summarize the net flows to combine several of the inflows and outflows together to better see the relative magnitudes of inflows and outflows, but they are the same values as the detailed flow graphs.

The annual change in groundwater storage, shown as a solid black line on the bar charts, is derived from subtracting inflows from outflows; if the line is above the x-axis, it means there was a net positive gain in storage for that water year; if the line is below the x-axis, there was a net decline in storage in that water year. Therefore, the annual change in storage is an accounting of how much water is added or subtracted from the basin aquifer in any one year in the model simulation. The cumulative change in storage, shown as the dashed black line, is derived from adding the annual storage changes over time to show how much water has been cumulatively added (or subtracted from storage) over the simulation time frame. Cumulative change in storage often tracks well with observed groundwater elevations and shows overall health of the basin aquifer.

Water Budgets and the GSP Development:

The water budget is considered to be part of the Basin Setting of the GSP, as shown within the GSP Regulations requirements. The Corning Subbasin GSP shows the water budget as a separate section for ease of review and because it is such a long and detailed section.

The water budget provides additional background information on the basin, simialr to the hydrogeologic conceptual model and the observed groundwater conditions summarized for each sustainability indicator. All this information is together used to help make decisions on sustainable management criteria (SMC), which are the main focus of the GSP. The water budget is another data point to consider when developing SMC. However, water budgets are developed on a basin-wide scale, while SMC need to be developed at geographically dispersed representative monitoring points, and set to protect all beneficial users in the Subbasin.