

## Q&A – Carpinteria Groundwater Basin (CGB) August 20, 2014

- 1) **Does the District have a good process in place producing adequate information to monitor and assess the water quality and water level conditions of the Carpinteria Groundwater Basin? If no or yes, why?**

Answer: Yes.

The District's groundwater data collection program pursuant to the District's AB3030 Groundwater Management Plan and as documented in CGB Annual Reports produced by Fugro West Inc. over the past 20+ years generates a substantial amount of important data that is used to assess the CGB's condition. In particular, the data collection program monitors water quality and water level in 33 wells at various locations in the basin. These wells, for the most part, are privately owned and are volunteered as monitoring wells to the District on bimonthly basis.

In order to monitor and assess the hydrologic health of the CGB the District measures approximately 35 wells for static water level every 2 months. These data are compared to mean sea level and plotted against time. This arrangement of the data allows the staff and consulting hydrogeologists to assess the accretion or depletion of water stored in the CGB. Along with other information such as rainfall, stream flows and water extraction estimates the District makes estimates on changes to the water in storage annually.

The District also monitors the quality of the water in the CGB using most of the same wells used to measure water levels. Two samples are collected every year from about 30 wells (see map on Figure 1). The samples are analyzed at an accredited lab for 15 inorganic constituents including Nitrates, Chlorides and Sodium and five physical properties such as pH, TDS and Alkalinity. These data allow the staff and consulting hydrogeologists to assess potential issues such as seawater contamination or pollution from surface activities.

In addition to the 30 private wells, the District analyzes water quality from four District owned wells regularly. Constituents including volatile organic compounds (VOCs), synthetic organic compounds (SOC) and radionuclides are measured in addition to many inorganic constituents. These analyses are considered part of the monitoring program for the CGB

This process provides for an ongoing and systematic check on the overall “health” of the basin.

**2) Is the Carpinteria Groundwater Basin in long term overdraft<sup>1</sup>? If no or yes, why?**

Answer: No, based on both calculations and empirical evidence:

- a. Calculations-based evidence: The District has prepared, with the assistance of its consulting hydrogeologists, a water budget calculation covering the past 80 years. This water budget, calculated using commonly accepted hydrogeologic practices, shows long-term recharge (inflow) and discharge (outflow) in the basin are essentially in balance at approximately 4000 acre feet per year. While this is true over the long term, the CGB does experience short term periods of depletion (during dry periods) or accumulation (during wet periods) of water in storage. These short periods of depletion are not considered overdraft.
- b. Empirically-based evidence: The District has as many as 13 water level hydrographs with long (60+ yrs.) periods of record, which show that observed water levels (an indicator of storage) in the basin are not experiencing a long-term overall decline. Figures 2 and 3 show long term hydrographs indicating that the CGB is in balance over the period.

**3) What should the District do if long term overdraft appears to be occurring?**

Answer: The seemingly simple answer to this would be “reduce pumping and/or import additional water” to achieve balance.

From a practical standpoint, however, reducing pumping in a significant and meaningful way could mean following Ag lands (urban conservation probably can’t be stretched much more, at least not significantly), which is obviously a difficult proposition (both legally and politically). Importing additional water is a complex issue, particularly in the recent context of the District attempting to sell some of its existing State Water Project capacity.

---

1. *Overdraft is defined as the withdrawal of water from an aquifer in excess of the amount of water that recharges the basin over a period of years, during which if continued over time could eventually cause the underground supply to become exhausted, cause seawater intrusion, cause subsidence, cause the water table to drop below economically feasible pumping lifts, or cause a detrimental change in water quality. (Bachman S.)*

There are 3 “physical solutions” to increasing the inflow side of the equation that have been previously considered (to varying degrees):

- 1) Aquifer Storage and Recovery (ASR): Implementing an ASR program (e.g., that injects Cachuma “spill” and/or excess SWP waters) is a proven approach being taken in other basins.
- 2) Reclaimed Water Injection: An alternative approach to ASR is an injection well barrier along the coast that injects highly treated reclaimed water to raise/maintain water levels above sea level while allowing water levels to fall below sea level behind the barrier. This is effectively being done in LA and Orange Counties.
- 3) Offstream spreading of “excess” Carpinteria/Gobernador/Rincon Creek flow may be another possibility.

ASR has been investigated by the District. The District had the forethought to design its two new wells, HQ and EC#2, to be ASR-compatible and has conducted ASR testing at both of them and shown to be technically feasible, and could be implemented relatively easily if directed by some Board policy. The other two options have not been investigated in a meaningful way, and would require the expenditure of time and money to determine their feasibility.

**4) What is the main threat to the Carpinteria Groundwater Basin? Why? What should the District be doing to address this threat?**

Answer: Basin pumping leading to seawater intrusion.

As shown on the previously presented hydrographs, during drought periods (both past and current) when recharge is limited and pumping increases, water levels in the basin may be temporarily drawn down below sea level. In the western portion of the basin where the Rincon Creek Fault traces offshore, the basin aquifers may be in hydraulic contact with the ocean. These conditions create a potential threat for seawater intrusion to occur in this part of the basin. Although seawater intrusion has not been detected during past droughts, nor has it been detected during the current drought, there is and has been a lack of monitoring wells at the coast capable of detecting it, should it occur.

This lack of existing detection capability is a concern that the District takes very seriously, and has initiated discussions to drill and install at least one “sentinel” monitoring well cluster designed to be capable of detecting seawater intrusion. The District continues to pursue grant or low interest loan funding from the State for this, but may need to fund a “sentinel” well cluster at the coast from District revenues in the near future.

**5) What should the District do if seawater intrusion is detected?**

Answer: Water levels at the coast need to be maintained above sea level to ensure a sufficient seaward gradient is maintained to prevent seawater intrusion. See answers to question number two for further discussion on this question.

**6) Are there other threats to water quality in the Basin and if so, what should the District be doing about them?**

Answer: Yes.

The principal other threat is nitrates, which are primarily surface derived and human-induced from fertilizers and septic systems that migrate vertically downward into aquifers. The District should continue to monitor and inform the public about them.

A potential threat is posed by the proposed onshore oil/gas drilling and wells. This is not an existing threat, but a potential/theoretical future threat, depending on how it is implemented.

**7) Does the District have control of over private pumping?**

Answer: No

The CGB is a shared resource for all of the Carpinteria Valley. The District does not have legal authority to limit extractions of any of the basin users. This is why it is important for private pumpers to recognize that groundwater is a finite resource shared by many, including the District, and that the information generated by the District as the CGB managers is produced so that private well owners can know to limit their pumping when necessary to make the resource sustainable. The District has developed a working relationship with many of the private pumpers in order to gather data on the CGB and inform them when there are threats to the health of the CGB.

**8) What is the value of the District's Groundwater Model and what level of confidence does it provide?**

Answer: The principal value of the model is that it allows the District to simulate the effectiveness of various alternative basin management approaches (e.g., those described in Question 3 above), which in turn allows the District to make informed basin management decisions.

The model simulates the occurrence and movement of groundwater in the CGB. As with any mathematical simulation of what is in reality a very complex and dynamic natural system, a variety of simplifying assumptions have to be made, which understandably introduce some level of uncertainty into the model; however, the District's model was developed and calibrated in accordance with commonly accepted hydrogeologic practices, and is considered to be very well calibrated by any reasonable standard (refer to the Pueblo Water Resources June 2012 study for details on the model's development and calibration) . As such, the model serves as an important predictive tool that, with regular data updates, will provide the District and its customers with a critically important means of assessing and managing the resource.

Additional confidence can always be achieved through the development of additional data (e.g., the dedicated monitoring wells and pumping tests that Dr. Loaiciga has suggested to the Carpinteria Valley Association, and/or the various recommendations made in Pueblo's June 2012 report); however, the development of such data would require the District to expend significant additional time and financial resources. The expenditure of such resources needs to be weighed against the specific questions being asked of the model. The model has provided a high level of confidence in answering the questions that have been asked of it to date (i.e., the scenarios simulated in the Pueblo June 2012 study). Should the District desire to investigate additional alternative basin management scenarios with the model, the need for specific additional data can and should be evaluated at that time.