

LYNETTE BROOKS BACKGROUND AND QUALIFICATIONS

Masters in Civil and Environmental Engineering.

Licensed Professional Engineer in Hawaii (2017-current) and Utah (1990-2019).

Developed nine USGS models using MODFLOW, MODFLOW-LGR, and SUTRA (salt-water intrusion), and documented the construction, calibration, and results of those models.

Author of total of 25 USGS reports.

Peer review for 8 other reports, including USGS, state agencies, and consulting firms.

PUBLIC COMMENT FOR ITEM 7: ITEMS NOT APPEARING ON THE AGENDA

Urban Water Use Efficiency Program

Water conservation is a great idea, but the Executive Summary in the Basin Plan gives the impression that efficiency will allow purveyors to pump more water and still meet the established metrics. The Updated Basin Plan for the Los Osos Groundwater Basin January 15 (p. 7) states that the ultimate goal is to limit urban water use to 2,100 acre-ft/yr at buildout. Only on page 204 does the basin plan state that all water conservation efforts at buildout would lead to a basin yield metric of 122. Even with no increase in population, the Basin Yield Metric would be 96 and allow salt-water intrusion. The goal would be to keep salt water out of production wells. This will likely lead to increased costs as new wells are drilled farther and farther from the coast and old wells are abandoned. At urban use of 2,100 acre-ft/yr, the stresses on the groundwater system may be worse than previously because household and landscaping efficiencies have reduced recharge. Recharge is also now concentrated at select locations and not distributed evenly as with septic systems and lawn watering; it is possible the mound created by the Broderson Basin will do little to reduce salt-water intrusion at locations distant from the basin. The 2023 Annual Report (CHG 2024, p. 88) states “the BMC modeled the impact of each combination [of the Los Osos Basin Plan] on the Basin Yield Metric, Water Level Metric and Chloride Metric,” but does not show the results of those model simulations.

Lack of Publicly Available Reports, Data, and Information

Despite the promise of transparency on the Los Osos BCM webpage (<https://www.losososbmc.org/>), some things are not available. A lot of consultant and government reports are referenced in the Basin Plan and in the Annual Report. All of those should be added to the BCM webpage. The most glaring omission from the webpage is any documentation about model construction and model calibration. The model is being used to make decisions, and the public (people paying the water bills that are funding the model) have a right to know more details about the model. I realize a transient model is being constructed, but the steady-state model has been used to make decisions and needs to be documented and archived on the LOBCM webpage.

My understanding of the Annual Report is that the groundwater model is updated yearly to reflect annual recharge and withdrawals and is ran to a new steady-state solution. In that case, published figures should include the following changes from one year to the next: 1) change in water levels for each model layer, 2) change in the location of the salt-water interface (or 250 mg/L chloride) for each

model layer, 3) change in withdrawals from each model cell for each layer. This would provide a much broader understanding of the system than metrics collected and simulated at four wells.

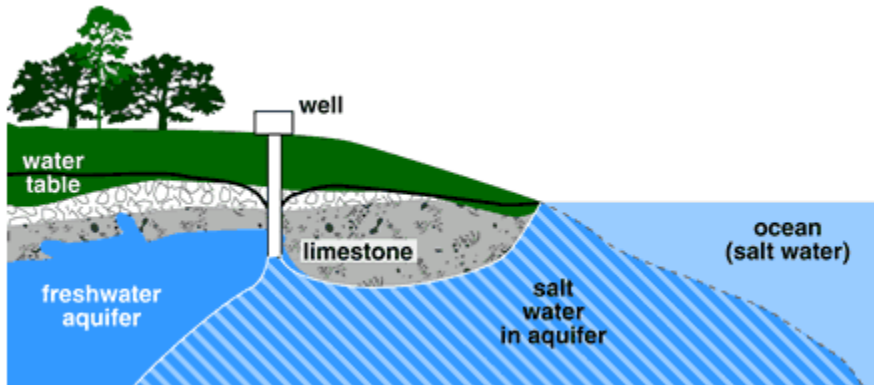
The desire to keep well information private is a hindrance to the public's understanding of the Annual Reports. Because the Water Level Metric and Chloride Metric are based on only four wells, understanding the withdrawals near those wells is critical. Did water levels go up or chloride levels go down simply because pumping was shifted away from those wells? Individual domestic wells are probably spread out enough that they do not make a large difference in the metrics, but pumpage information for the water purveyors should be published.

PUBLIC COMMENT FOR ITEM 8: EXECUTIVE DIRECTORS REPORT

Los Osos Community Plan

The decision to allow more development should be delayed until the following have occurred:

- Transient model is constructed, calibrated, reviewed, documented, and presented to the public.
- Transient model is used to predict long-term effects of full development and different climate scenarios.
- Airborne Electromagnetic (AEM) survey report is completed and provided to the public.
- Monitoring wells LA 14 and LA 16 are completed. If possible, these wells should be turned into multi-layer monitoring wells by putting multiple PVC pipes with different depths of perforations and bentonite between the perforated locations.
- Incorporation of new monitoring wells into the Basin Metric. Salt-water intrusion can be caused by rising levels of salt water below fresh water even if wells are farther from the coast. Monitoring wells near the new wells in the Lower Aquifer and Upper Aquifer need to be added to the chloride network and water-level metric.



<https://h2ocare.com/salt-water-intrusion-well-water/>

Los Osos Water Recycling Facility Project Update

The 2023 Annual Report (CHG 2024, p. 62) states “seawater intrusion in Zone E is anticipated to be halted through a combination of reduced pumping in the Western Area together with increased recharge across the regional aquitard, following development of the groundwater mound beneath the Broderson disposal site.” If the regional aquitard is permeable enough to allow downward movement, then it is also permeable enough to allow upwelling of salt water if pumping is increased in the upper aquifer.

The Basin Management Plan is not increasing recharge. The wastewater system, increased fixture efficiency, and changes to drought-tolerant landscaping and drip irrigation have all decreased water use by almost 1,500 acre-ft/yr since 1990. Much of that previously applied water was going to septic systems and lawn watering and contributing recharge to the basin.

PUBLIC COMMENT FOR ITEM 9A: SUSTAINABLE YIELD VOTE

Chloride and Water Level Metrics

The chloride metric has not decreased, even with withdrawals being 69 percent of estimated sustainable yield, so it appears the estimated sustainable yield is too high. It is true that water levels increased, but it was a good water year with less pumping. The projected lines on Figure 23 of the Draft 2023 Annual Report need better explanation. They cannot be model output, because steady-state models cannot simulate changes through time. It is possible that a steady-state model is being used for current conditions, and then a different steady-state model (same aquifers, different well locations, withdrawals, and recharge) is being used for the flat projected lines of water levels and chloride concentrations. The time to achieve those levels cannot be determined with any steady-state model.

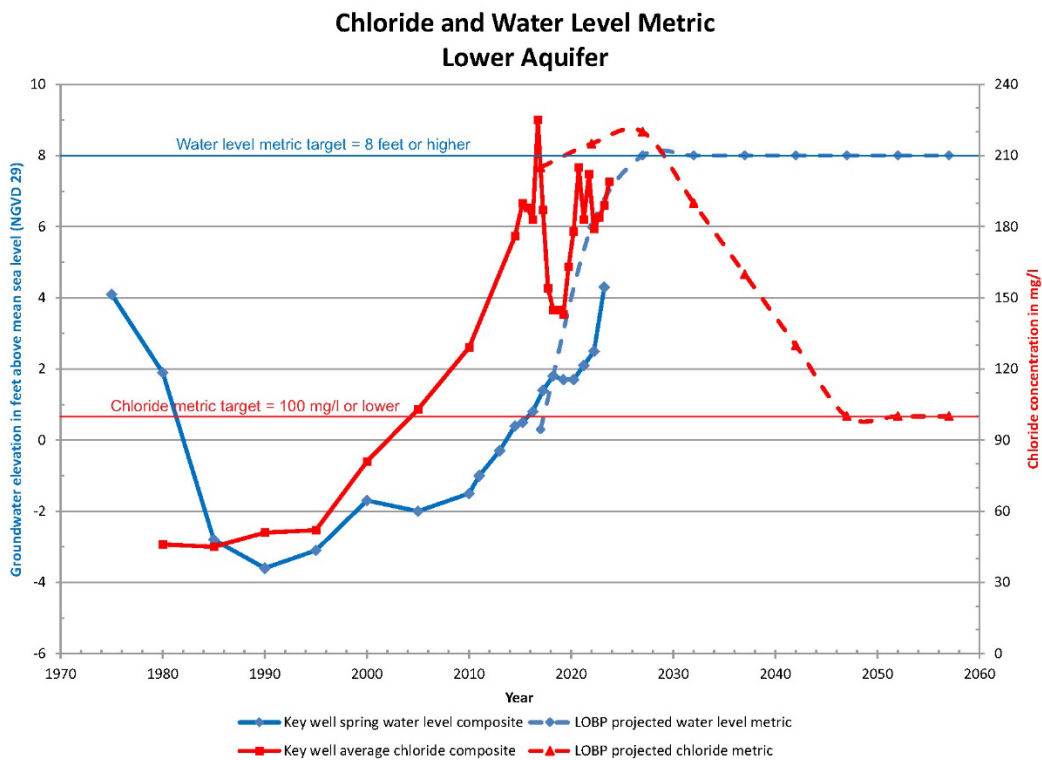


Figure 23
Chloride and Water Level Metric
Los Osos Groundwater Basin
2023 Annual Report

FINAL DRAFT

Cleath-Harris Geologists

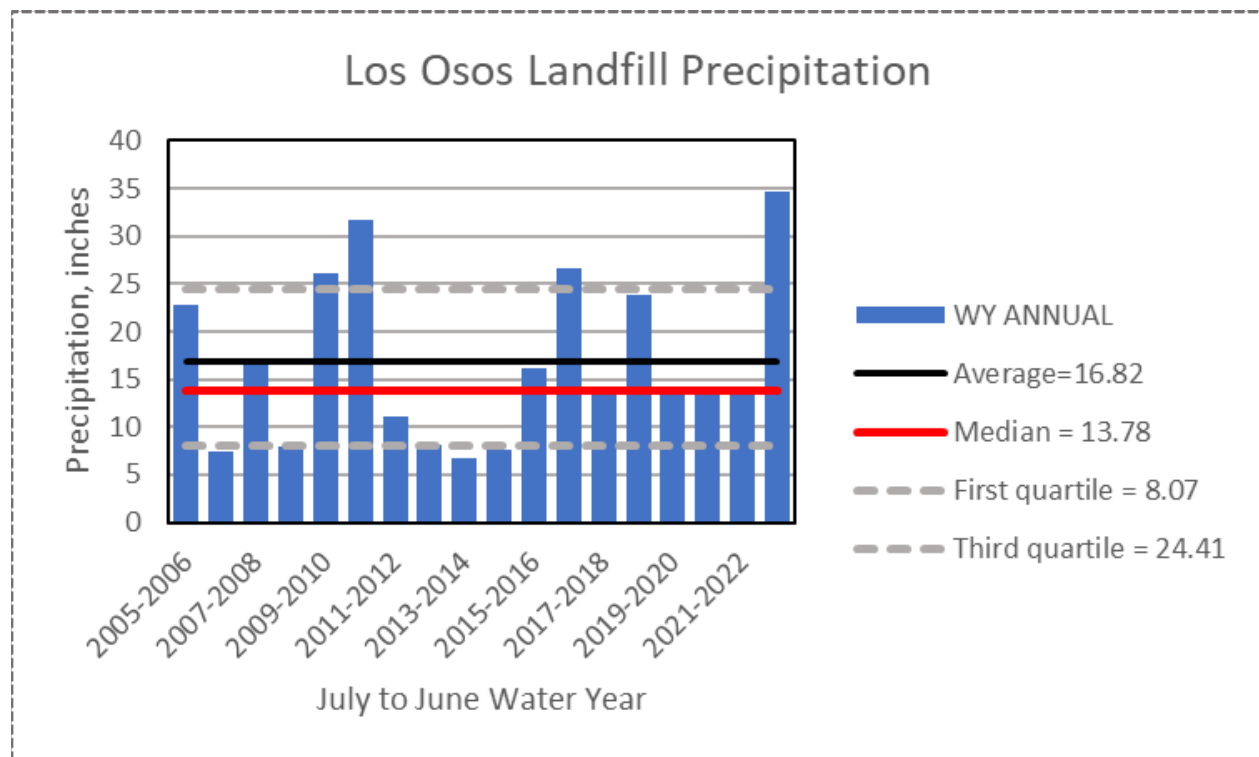
Whatever the method used to draw the projected lines, it appears to be incorrect. The actual water level metric has not risen nearly as fast as the projected water level metric, and most of the rise was because of the of the high precipitation and low withdrawals in 2023.

The current estimate of sustainable yield appears to be too high and a new estimate should be developed. The new estimate needs to include reductions in recharge that will occur if more water-conservation efforts are undertaken.

Precipitation

Using 17.3 inches/yr of precipitation to determine water budgets and model input may be too high. Page 42 of the 2023 Draft Annual Report states the Los Osos Landfill precipitation gage has “a lower average due to short period of record that includes seven years of below normal rainfall.” Through water year 2023 (July 2022 to June 2023), the gage had 18 years of record. If seven years were below normal, then 11 years were above normal. The report does not clarify what data were used to determine “normal”.

Most hydrologic studies use median rainfall, not average, because median is less influenced by extreme events. For the period of record, the median rainfall at the Los Osos Landfill was 3 inches less than the average rainfall. The median being substantially lower than the average is true across all of San Luis Obispo County as shown in a hydrologic report prepared by SLO County 2002 Hydrologic Report (<https://www.slocounty.ca.gov/departments/public-works/forms-documents/water-resources/groundwater-reports>). It is important to use water year for hydrologic studies because often the period December through February or so is the wettest period. Using calendar year divides those months, which does not make hydrologic sense.



Source for data: https://wr.slocountywater.org/site/?site_id=40&site=245bdf9f-fd62-4f2c-8f46-f556e593d81f

Compared to precipitation, recharge from precipitation has larger annual variations—higher during very wet years and greatly diminished during very dry years (Gates, 2007). During wet periods more water is available than is needed by vegetation, and during dry periods vegetation tries to maintain its rate of evapotranspiration. Transient soil-moisture accounting and transient groundwater models can simulate these changes, which could be important in understanding groundwater levels and salt-water intrusion.