



May 17, 2023

**TO:** Utilities Advisory Committee  
**FROM:** Ron Munds, General Manager  
**SUBJECT:** **Agenda Item 3 – 05/17/2023 UAC Meeting**  
Basin Management Committee Updates

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### **DESCRIPTION**

Attached to this report is the Executive Summary from the Public Draft 2022 Los Osos Basin Annual Monitoring Report (AMR).

The 324-page Public Draft 2022 Los Osos Basin Annual Monitoring Report (AMR) is available on the District Website at:

<https://www.losososcsd.org/public-draft-2022-los-osos-basin-annual-monitoring-report-amr>

### **STAFF RECOMMENDATION**

Staff recommend that the Utilities Advisory Committee review the following sections of the Annual Monitoring Report:

**Section 7- Data Interpretation** (page 46): where detailed information on the water storage capacity and basin metrics can be found.

**Section 8- Basin Status** (page 85): which summarizes status of the basin and other general information in the report.

**Section 9- Recommendations** (page 86): which provides recommendations and reports on the progress of implementing the Basin Plan programs.

**Section 10- Status of Basin Metrics, BMC Initiatives and LOB Program Implementation** (page 87): which describes the adaptive management strategies being considered or implemented.

Provide comments on the overall report.

### **Attachment**

Executive Summary from Public Draft 2022 Los Osos Basin Annual Monitoring Report (AMR)

**PUBLIC DRAFT**

LOS OSOS BASIN PLAN  
GROUNDWATER MONITORING PROGRAM  
2022 ANNUAL MONITORING REPORT

Prepared for the

BASIN MANAGEMENT COMMITTEE

MAY 2023

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**EXECUTIVE SUMMARY**

The Los Osos Basin Plan Groundwater Monitoring Program – 2022 Annual Report (Annual Report) describes activities related to the Los Osos Basin Plan (LOBP) Groundwater Monitoring Program, and provides results and interpretation of these activities for calendar year 2022. The LOBP Groundwater Monitoring Program is necessary to accomplish the following continuing goals set forth in Section 2.4 of the LOBP (ISJ Group, 2015):

1. Provide for a continuously updated hydrologic assessment of the Los Osos Groundwater Basin (Basin), its water resources and sustainable yield.
2. Create a water resource accounting which is able to meet the information needs for planning, monitoring, trading, environmental management, utility operations, land development and agricultural operations.

The LOBP Groundwater Monitoring Program is also necessary to support other goals of the LOBP, including halting or reversing seawater intrusion, establishing a long-term environmentally and economically sustainable and beneficial use of the Basin, and the equitable allocation of costs associated with Basin management.

**Groundwater Production**

Groundwater production for calendar year 2022 is summarized in Table ES-1 below. Purveyor (Los Osos Community Services District, Golden State Water Company, and S&T Mutual Water Company) production has decreased by one percent compared to 2021, while total Basin production increase slightly compared to 2021.

<b>Table ES-1. Groundwater Production</b>		
<b>Description</b>	<b>2021 Production in Acre-Feet</b>	<b>2022 Production in Acre-Feet</b>
Los Osos Community Services District	503	496
Golden State Water Company	491	491
S&T Mutual Water Company	32	29
<b>Purveyor Subtotal (metered)</b>	<b>1,026</b>	<b>1,016</b>
Domestic wells <sup>1</sup>	220	220
Community facilities <sup>1</sup>	130	90
Agricultural wells <sup>1</sup>	620	680
<b>Total Estimated Production<sup>1</sup></b>	<b>2,000</b>	<b>2,010</b>

<sup>1</sup> Rounded to the nearest 10 acre-feet. Production from non-metered wells (Domestic, Community, Agricultural) estimated per methods described in Appendix F and LOBP Section 4 and Section 7.5.



## **Basin Status**

The status of the Basin in terms of key parameters and metrics are listed below, along with the page reference for definitions and additional details on each key parameter:

**Precipitation (p. 43).** The Basin received below average rainfall in 2022. The drought condition for San Luis Obispo County ranged from moderate drought to severe drought conditions during 2022 (NDMC/USDA/NOAA, 2023).

**Seawater intrusion front (p. 58).** The seawater intrusion front in Zone D retreated toward the coast between Fall 2021 and Fall 2022 (an improvement). This interpretation is based on localized conditions contoured to represent regional trends. The seawater intrusion front in Zone E advanced toward LA11 between Fall 2021 and Fall 2022 (a deterioration).

**Basin Yield Metric (p. 70).** The Basin Yield Metric increased between 2021 and 2022 (a deterioration) and does not meet the LOBP goal in 2022 due to updated Sustainable Yield methodology implemented in 2022 (discussed in Section 7.5.1).

**Water Level Metric (p. 74).** The Water Level Metric increased between Spring 2021 and Spring 2022 (an improvement) and has not reached the target value.

**Chloride Metric (p. 76).** The Chloride Metric decreased between Fall 2021 and Fall 2022 (an improvement) and has not reached the target value.

**Nitrate Metric (p. 77).** The Nitrate Metric increased between Winter 2021 and Winter 2022 (a deterioration) and has not reached the target value.

**Upper Aquifer Water Level Profile (p. 81).** Water levels in the Upper Aquifer along the bay remain safely above the Protective Elevation, except for near well UA5, where an increase in chloride concentrations warrants further investigation.

Recommendations for improving the quality and availability of data are contained in Section 9 of the Annual Report. Recommendations from the 2021 Annual Report that are on-hold or in progress include re-evaluating the Water Level, Chloride, and Nitrate Metrics (on-hold), developing a rating curve for stream flow sensor 751 on Los Osos Creek (in progress), and developing a transient Basin model (scheduled to start in 2023). Additional recommendations include continued close monitoring of UA5 water quality, locating and salvaging well FW7 at the Broderson site, and installation of a new Lower Aquifer monitoring well at the east end of Skyline Avenue.

## **LOBP Metrics**

As described in Section 7.5 (“Basin Metrics”) of this Annual Report, the LOBP established several Basin metrics to evaluate nitrate impacts to the Upper Aquifer, seawater intrusion into the Lower Aquifer, and the effect of management efforts of the Basin Management Committee (BMC). These metrics allow the BMC, regulatory agencies, and the public to evaluate the status of nitrate levels and seawater intrusion, and the impact of implementation of the LOBP programs in the Basin through objective, numerical criteria that can be tracked over time. The status of key Basin metrics is summarized in Table ES-2.



**Table ES-2. LOBP Metric Summary**

<b>Metric<sup>1</sup></b>	<b>LOBP Goal</b>	<b>Calculated Value from 2022 Data</b>	<b>Change in Condition from 2021</b>
<b>Basin Yield Metric<sup>2</sup></b>	80 or less	84	Increase from 72 (deterioration)
<b>Water Level Metric</b>	8 feet above mean sea level or higher	2.5 feet above mean sea level	Increase from 2.1 ft. (improvement)
<b>Chloride Metric</b>	100 mg/L or lower	184 mg/L	Decrease from 202 mg/L (improvement)
<b>Nitrate Metric</b>	10 mg/L or lower	17.5 mg/L (NO <sub>3</sub> -N)	Increase from 17 mg/L (deterioration)

<sup>1</sup>Revisions to the Water Level, Chloride, and Nitrate Metrics were initiated in 2021 and are currently on hold as the BMC Staff evaluates opportunities to improve the Basin Monitoring Network.

<sup>2</sup>On October 27<sup>th</sup>, 2021 the BMC unanimously adopted a new methodology for calculating the Sustainable Yield for Basin that reduced the Sustainable Yield estimate from 2,760 to 2,380 AF for Calendar Year 2022. Reducing the Sustainable Yield estimate increased the Basin Yield Metric from 72 to 84, assuming a consistent amount of pumping.

Approval of the Annual Monitoring Report by the BMC does not constitute unanimous approval of actions listed under Section 5.11.4 (Approval Requirements) of the Stipulated Judgment or setting the Sustainable Yield for a given year. These actions require a separate action and unanimous approval by the BMC.

**Adaptive Management Program**

In addition to the programs described in the LOBP, the following additional measures are recommended in the context of adaptive management. Details regarding each program are provided in Section 10 of this Annual Report.

- Lower Aquifer Monitoring Improvements
- Updated Metric Evaluation
- Program C Adaptive Management
- Lower Aquifer Nitrate Investigation
- Los Osos Basin Well Database
- Evaluation of Water Conservation Measures
- WRF/Transient Groundwater Model
- Discussion and Recommendation of Criteria for Future Growth



**LOBP Infrastructure Programs**

The status of LOBP infrastructure programs is summarized Table ES- 3.

<b>Table ES-3. Basin Infrastructure Projects</b>				
<b>Project Name</b>	<b>Parties Involved</b>	<b>Funding Status</b>	<b>Capital Cost</b>	<b>Status</b>
<b>Program A</b>				
Water Systems Interconnection	LOCSD/ GSWC			Completed
Upper Aquifer Well (8 <sup>th</sup> Street)	LOCSD			Completed
South Bay Well Nitrate Removal	LOCSD			Completed
Palisades Well Modifications	LOCSD			Completed
Blending Project (Skyline Well)	GSWC			Completed
Water Meters	S&T			Completed
<b>Program B</b>				
LOCSD Wells	LOCSD	Not Funded	BMP: \$2.7 mil	Project not initiated
GSWC Wells	GSWC	Not Funded	BMP: \$3.2 mil	Project not initiated
Community Nitrate Removal Facility	LOCSD/GSWC/S&T	GSWC Portion Funded	GSWC: \$1.23 mil	GSWC’s Program A Blending Project might be capable of expanding to be the first phase of the Program B Community Nitrate Removal Facility.

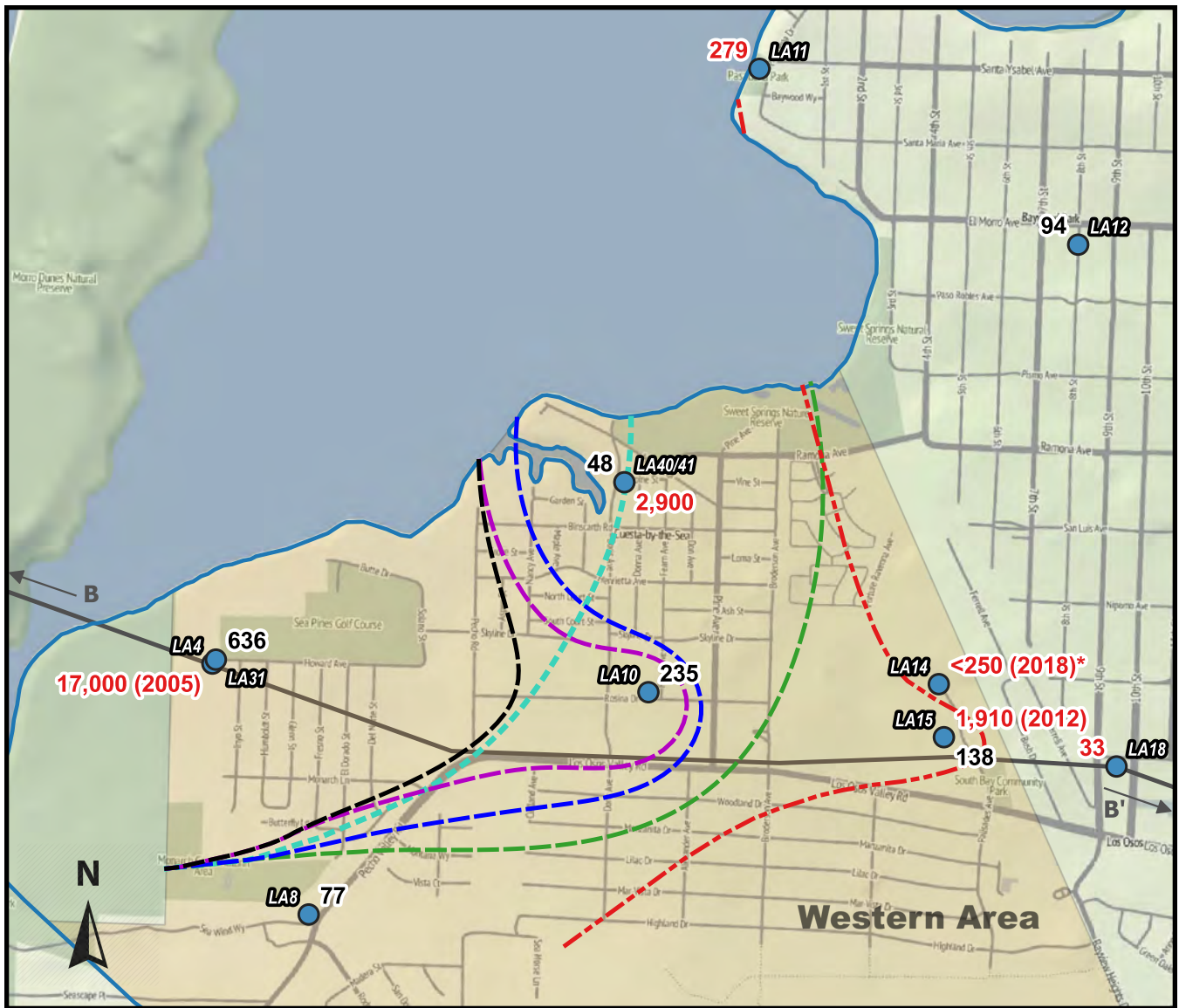


Project Name	Parties Involved	Funding Status	Capital Cost	Status
<b>Program C</b>				
Expansion Well No. 1 (Los Olivos)	GSWC			Completed
Expansion Well No. 2	LOCSD	LOCSD	BMP: \$2.5 mil	The well construction and development activities are completed. Construction of the water transmission main to connect the well to the LOCSD system and design of the well equipping is anticipated to be completed in 2023. Completion of all phases of the project is estimated to be June 2024.
Expansion Well 3 and LOVR Water Main Upgrade	GSWC/LOCSD	Cooperative Funding	BMP: \$1.6 mil	This project has been deferred under Adaptive Management.
LOVR Water Main Upgrade	GSWC	May be deferred	BMP: \$1.53 mil	Project may not be required, depending on the pumping capacity of the drilled Program C wells. It may be deferred to Program D.
S&T/GSWC Interconnection	S&T/ GSWC	Pending	BMP: \$30,000	Currently on hold pending further evaluation of the project.



Project Name	Parties Involved	Funding Status	Capital Cost	Status
<b>Program M</b>				
New Zone D/E Lower Aquifer monitoring well in Cuesta by the Sea	All Parties			Completed
<b>Program U</b>				
Creek Discharge Program	All Parties		TBD	These activities are currently on hold. The Transient Model and Water Recycling Funding Study are intended to better inform the BMC on the most effective opportunities for increasing the sustainable yield of the Basin.
8 <sup>th</sup> and El Moro Urban Storm Water Recovery Project	All Parties		TBD	These activities are currently on hold. The Transient Model and Water Recycling Funding Study are intended to better inform the BMC on the most effective opportunities for increasing the sustainable yield of the Basin.





Base Image: Stamen-Terrain

0 750 1,500 2,250 3,000 ft



Scale: 1 inch ≈ 1,500 feet

### Explanation

— Cross-section alignment (Figures 5 and 19)

□ Bulletin 118 Basin Boundary

● Well with **Zone D** and/or **Zone E** chloride concentration (mg/L)  
 (Value for Fall 2021 except where year noted)

\* LA14 Zone E value based on geophysics

### Seawater intrusion front in Western Area (250 mg/L chloride isopleth)

- Winter 2005 - Zone D (Pre LA40/41)
- Fall 2016 - Zone D (Pre LA40/41)
- Fall 2020 - Zone D
- Fall 2021 - Zone D
- Fall 2022 - Zone D
- Zone E (Generalized with data from various years)

**Figure 18**  
**Seawater Intrusion Front**  
**Western Area**  
**Lower Aquifer Zone D and E**

**Los Osos Groundwater Basin**  
**2022 Annual Report**

**Cleath-Harris Geologists**

# Chloride and Water Level Metric Lower Aquifer

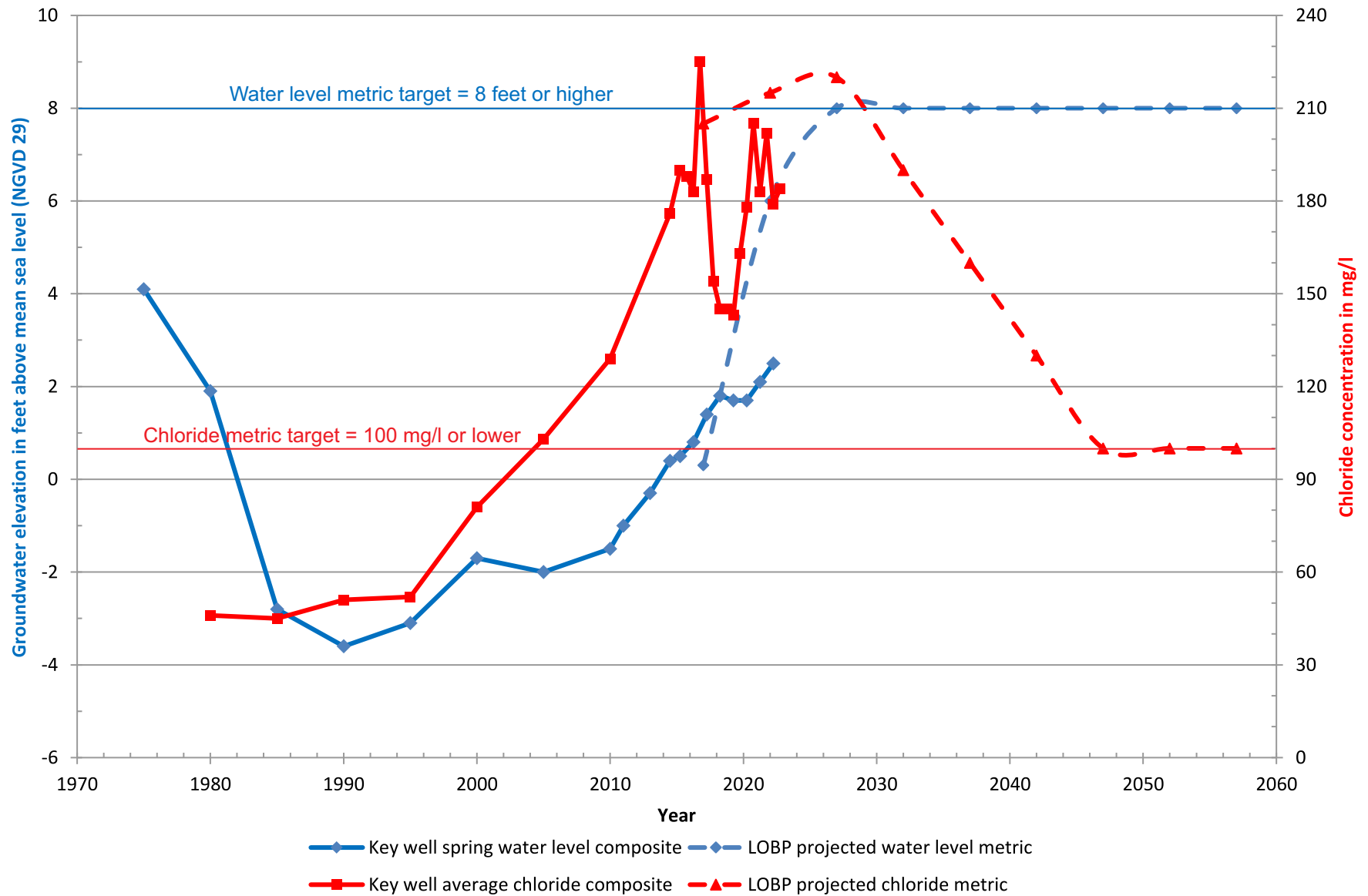


Figure 23  
Chloride and Water Level Metric  
Los Osos Groundwater Basin  
2022 Annual Report



## 8. BASIN STATUS

The status of the Basin in 2022 is summarized as follows:

- The Basin received below normal rainfall in 2022. San Luis Obispo County started 2022 with severe drought conditions, and ended 2022 with severe drought conditions, trending to extreme on the eastern border, and moderate in the northwest corner of the county (NDMC/USDA/NOAA, 2023).
- Groundwater production for the Basin totaled an estimated 2,010 acre-feet in the 2022 calendar year, which is 10 acre-feet more than in 2021. Purveyor groundwater production decreased by an estimated 10 acre-feet, while production for community facilities decreased by an estimated 40 acre-feet in 2022, compared to 2021. Production for agricultural irrigation increased by an estimated 60 acre-feet in 2022, compared to 2021.
- Long-term water level trends over the last 10 years in representative First Water wells averaged 0.05 feet of decline per year. Long-term water level trends over the last 10 years in representative Upper Aquifer wells averaged 0.20 feet of decline per year, and in Lower Aquifer wells averaged 0.36 feet of rise per year.
- The seawater intrusion front in Zone D retreated toward the coast between 2021 and 2022, with a corresponding 500 acre-feet of increase in freshwater storage in the Western Area of the Lower Aquifer. There was an estimated net loss of 500 acre-feet of Basin freshwater storage in other areas due to continuing drought conditions, resulting in no net change in Basin storage between Spring 2021 and Spring 2022. The seawater intrusion front in Zone E is interpreted as moving inland toward LA11.
- Beginning in 2022, the updated Sustainable Yield methodology has resulted in a lower Sustainable Yield. This has increased the Basin Yield Metric to 84, which is above the LOBP goal of 80.
- The Basin Development Metric was not estimated in 2022, pending application of the updated Sustainable Yield methodology to all LOBP programs. There is no LOBP objective for the Basin Development Metric.
- The Water Level Metric increased between 2021 and 2022 from 2.1 to 2.5 feet, indicating a slight improvement, but still remains several feet below the target value of 8 feet.
- The Chloride Metric decreased relative to the 100 mg/L target value between Fall 2021 (202 mg/L) and Fall 2022 (184 mg/L), indicating improvement in 2022.
- The Nitrate Metric remains above the 10 mg/L target value, increasing from 17 mg/L NO<sub>3</sub>-N in 2020 to 17.5 mg/L NO<sub>3</sub>-N in 2022, indicating slightly deteriorating conditions in 2022.
- Upper Aquifer water levels were above the Protective Elevation along the bay, except for near UA5, where an increase in chloride concentrations warrants close monitoring.



## 9. RECOMMENDATIONS

The following LOBP Groundwater Monitoring Program recommendations from the 2021 Annual Report were completed in 2022, or are in progress and planned for completion in 2023:

- Evaluate feasibility and cost of modifying up to four existing program wells to become dedicated Zone E water quality monitoring locations (Section 7.3). – **Completed**
- In conjunction with the above evaluation of well modifications, prepare a list of feasible sites where new Lower Aquifer monitoring wells may be constructed to improve seawater intrusion definition and monitoring in both Zone D and Zone E (Section 7.3). – **Completed**
- Updating the Maximum Sustainable Yield now that the location of the second Program C expansion well is finalized in order to incorporate changes to the LOBP, including revised expectations for recycled water availability and revisions to the sustainable yield methodology (Section 7.5.2). – **Completed for Program C**
- Re-evaluate Water Level Metric target after completion of wellhead surveys (Section 7.5.3). This task has been expanded to include Water Level, Chloride, and Nitrate Metric updates – **On hold, pending new monitoring well construction**
- Develop a rating curve for stream flow Sensor 751 on Los Osos Creek (Section 6) – **In Progress**
- A peer review of the Basin model is required by the Stipulated Judgement every 10 years. Upgrading to a fully transient Basin model would be recommended prior to the next peer review (Section 7.5.2). Planning and funding efforts for a transient Basin model was initiated in 2021. The transient Basin model would replace the existing steady-state model, once completed. – **Budget approved – transient model work to begin in 2023**

The following additional LOBP Groundwater Monitoring Program recommendations are provided for BMC consideration. Recommendations on Adaptive Management are provided in Section 10:

- Water levels at UA5 are below the Protective Elevation for the second consecutive year and chloride concentrations are increasing. Continued close monitoring of UA5 water quality by the water purveyor is recommended (Section 7.5.4).
- Attempt to locate and salvage well FW7 for monitoring groundwater mounding beneath the Broderson leach field (Section 7.2).
- Install a Lower Aquifer monitoring well at the east end of Skyline Avenue in order to better monitor the movements of the seawater intrusion front (Section 7.2).