

## **10. Adaptive Management Program and Status of LOBP Program Implementation**

The Adaptive Management Program is a process to review the BMC's implementation of the LOBP Programs on a regular basis to ensure that the overall objectives of the LOBP are being met. The Adaptive Management Program allows the BMC to do the following:

- Evaluate trends of key basin parameters;
- Identify additional data needs;
- Report the data analysis to various interested parties;
- Modify the LOBP programs and schedule if necessary in response to current conditions and visible trends of the groundwater basin;
- Modify procedures to utilize current best management practices; and
- Modify pumping, treatment, and/or reuse procedures in response to groundwater basin conditions and trends are showing signs of degradation of water quality, including increased levels of contamination and/or increased levels of seawater intrusion.

The Adaptive Management Program will provide a status update on the implementation of the LOBP Programs, assess of the overall effectiveness of the LOBP and offer a tool with which to modify the LOBP programs to better meet overall LOBP objectives.

### **10.1 Basin Metrics**

As noted in Chapter 7 ("Data Interpretation") of this Annual Report, the LOBP established several metrics to measure nitrate impacts to the Upper Aquifer, seawater intrusion into the Lower Aquifer, and the effect of management efforts the BMC. These metrics allow the Parties, 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 2015 metric values are summarized in Table 10-1 for easy reference during discussion and evaluation of the LOBP programs.

<b>Table 10-1: LOBP Metric Summary</b>			
<b>Metric</b>	<b>LOBP Goal</b>	<b>Calculated Value from 2015 Data</b>	<b>Additional Actions in Addition to LOBP Programs</b>
<b>Nitrate Metric:</b> Average concentration in 5 key wells in the upper aquifer	10 mg/L	25.4 mg/L (NO3-N)	None recommended
<b>Water Level Metric:</b> Weighted average concentration from 5 key wells in the lower aquifer	8 feet above mean sea level	0.6 feet above mean sea level	Implement additional conservation measures to reduce indoor and outdoor demands (See Section 10.3.2)
<b>Chloride Level Metric:</b> Average chloride concentration from 4 key wells in the lower aquifer	100 mg/L	188 mg/L	Implement additional conservation measures to reduce indoor and outdoor demands (See Section 10.3.2)
<b>Basin Yield Metric:</b> Comparison of current well production to sustainable yield	80	86	Implement additional conservation measures to reduce indoor and outdoor demands (See Section 10.3.2)

## 10.2 Future Adaptations to LOBP Programs

The BMC intends to develop and pursue additional measures during the remainder of 2016, including the following:

**Potential Adaptation of Urban Water Use Efficiency Program.** The BMC plans to take a close look at the Urban Water Use Efficiency Program to determine which conservation measures are the most efficient and effective to meet the LOBP's goals. This analysis may result in adaptation of some of the conservation measure set forth in the LOBP.

**Development of Contingency Plan.** The BMC plans to develop a contingency plan and related actions in the event Basin Metric trends fail to demonstrate progress toward LOBP goals, including defined schedules and milestones.

**Discussion and Development of Metrics for Future Growth.** The BMC plans to provide input into the Los Osos Community Plan, including consideration of Basin Metrics and defined goals as they relate to the timing of future growth.

**Additional Water Quality Metrics.** The BMC intends to consider developing additional metrics and/or numerical goals to protect the upper aquifer from water quality threats, such as seawater intrusion and chromium-6 contamination.

### 10.3 LOBP Programs

The LOBP outlines a number of programs developed to meet the goals of the various metrics outlined above. The BMC has analyzed the impacts of implementing various combinations of programs on the Basin.<sup>1</sup> In particular, the BMC modeled the impact of each combination on the Basin Yield Metric, Water Level Metric and Chloride Metric. Based on that analysis, the LOBP recommends the following programs for immediate implementation:<sup>2</sup>

- Groundwater Monitoring Program;
- Urban Water Use Efficiency Program;
- Urban Water Reinvestment Program;
- Basin Infrastructure Programs A and C; and
- Wellhead Protection Program.

#### 10.3.1 Groundwater Monitoring Program

In order to allow calculation of the above metrics with a higher degree of accuracy, the BMC has implemented the Groundwater Monitoring Program. The Groundwater Monitoring Program is designed to collect, organize and report data regarding the health of the Basin from a current network of 73 wells.<sup>3</sup> In addition to facilitating the calculation of metrics, this data provides information needed to manage the Basin for long-term sustainability. Implementation of the Groundwater Monitoring Program also satisfies various external monitoring requirements, such as the California Statewide Groundwater Elevation Monitoring Program (CASGEM) and waste discharge and recycled water permits for the LOWWP. Monitoring under the program began in

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<sup>1</sup> The LOBP analyzed the following seven potential programs: (1) Groundwater Monitoring Program; (2) Urban Water Use Efficiency Program; (3) Water Reinvestment Program; (4) Basin Infrastructure Program; (5) Supplemental Water Program; (6) Imported Water Program; (7) Wellhead Protection Program.

<sup>2</sup> The LOBP also recommends the following programs for potential implementation if the County and the Coastal Commission were to allow future development in Los Osos as part of the LOCP and LOHCP: (1) Basin Infrastructure Program B; and (2) either Basin Infrastructure Program D or the Agricultural Water Reinvestment Program. Since additional development has not been authorized, these additional programs have not been included in this Annual Report.

<sup>3</sup> The wells are distributed laterally across the Western, Central and Eastern Areas and vertically among First Water and the Upper and Lower Aquifers.

2014 and will continue to occur in the spring and fall of each year when water levels are typically at their highest and lowest. This Annual Report represents the first monitoring event under the Groundwater Monitoring Program. The BMC plans to continue to report the values for all Basin metrics and other relevant, non-proprietary data to the Parties, the Court and the public in its future annual reports. Additional recommendations and planned actions relating to the Groundwater Monitoring Program are described in Chapter 9. Table 10-2 summarizes the status of the various implementation tasks set forth in the LOBP that related to the Groundwater Monitoring Program.

<b>Table 10-2: Basin Groundwater Monitoring Program Status</b>			
<b>Recommended Implementation Measure</b>	<b>Current Status</b>	<b>Funding Status</b>	<b>Projected Completion</b>
<b>Wellhead Surveys:</b> Perform wellhead surveys to establish reference point elevations and locations	Not initiated	Anticipated in 2017 Budget	April, 2017
<b>Protocols and Objectives:</b> Establish well monitoring protocols and data quality objectives	Complete		
<b>Water Level Monitoring:</b> Assign water level monitoring responsibilities to the Parties or other stakeholders	Complete		
<b>Access to Private Wells:</b> Contact private well owners to request permission for participation in the groundwater elevation and water quality portions of the Groundwater Monitoring Program	List is prepared, no contact has been made.	Fully funded	December, 2016
<b>Water Quality Monitoring:</b> Assign water quality monitoring responsibilities. The BMC will adopt a set of procedures for recording groundwater elevations and sampling for water quality.	Complete		
<b>Data:</b> Assign data compilation, organization and reporting duties	Complete		

### 10.3.2 Urban Water Use Efficiency Program

In order to reduce annual groundwater production from the Basin, and thus reduce the Basin Yield Metric, the LOBP recommends implementation of the Urban Water Use Efficiency Program. In October 2012, the San Luis Obispo County Board of Supervisors adopted a Water Conservation Implementation Plan (“County Water Conservation Plan”), the details of which are described in Table 10-3. The County Water Conservation Plan was configured to provide detailed financial and administrative structure, while substantially conforming to the LOBP.

**Table 10-3  
Summary from Adopted 2012 County Water Conservation Plan**

<b>Implementation Program Plan Measure Number</b>	<b>Measure</b>	<b>Customer Category</b>	<b>Program Length</b>	<b>Total Estimated Activities</b>	<b>Total Estimated Budget</b>
<b>Category 1. Residential Programs</b>					
1A	Subsidize Partial Community Retrofit, Residential	Single-Family Residential Toilets	3 Years	8,000	\$2,061,375
		Single-Family Residential Showerheads	3 Years	8,000	\$368,575
		Single-Family Residential Faucet Aerators	3 Years	13,500	\$100,769
1B	Residential Clothes Washer Rebate	Single-Family Residential Washer	5 years	2,000	\$385,000
1C	Options for Fully Retrofitted Residences	Hot Water on Demand; Dishwashers,	3 years	500	199,525
1D	Retrofit on Resale	Single-Family Residential: Owners complete retrofits through this ongoing water conservation measure.			\$0
<b>Category 2 - Commercial and Institutional</b>					
2A	Subsidize Partial Community Retrofit, Commercial	Commercial	3 years	141	\$192,223
2B	Replace Restaurant Spray Nozzles	Commercial	3 years	45	\$3,649
2C	Institutional Building Retrofit	Institutional	3 years	13	\$38,588
2D	Commercial High Efficiency Clothes Washer Rebate	Commercial	3 years	40	\$14,280
<b>Category 3 - Education and Outreach Program</b>					
3A	Residential Water Surveys	Single-Family Residential	3years	5,000	\$824,250
3B	Commercial, Industrial and Institutional Surveys	Commercial	3 years	141	\$35,102
3C	Public Information Program	Single-Family Residential	10 years	23,000	\$220,500

**Table 10-3  
Summary from Adopted 2012 County Water Conservation Plan**

<b>Implementation Program Plan Measure Number</b>	<b>Measure</b>	<b>Customer Category</b>	<b>Program Length</b>	<b>Total Estimated Activities</b>	<b>Total Estimated Budget</b>
3D	Media Campaign	Single-Family Residential	10 years	7,000	\$178,500
<b>Category 4 - New Development (developer pays to implement water conservation measures)</b>					\$0
<b>Contingency for Additional Measures in Years 4-10</b>					\$327,600
Plan Development Cost to Date					\$50,000
<b>Total Funding Commitment</b>					\$5,000,000

The County Conservation Program outlined above was implemented through the Los Osos Wastewater Project (LOWWP) beginning in October 2012. Under this program, all properties connecting to the sewer project are required to be retrofitted prior to connection, and completion is expected by end of 2017. By that time, it is anticipated that all properties will be connected to the sewer and all indoor water fixtures subject to the County Conservation Program will be upgraded. The following table shows the total fixtures retrofitted and the total rebates provided as of May 2016:

<b>Table 10-4: Summary of Conservation Rebates Provided through May, 2016</b>	
<b>Fixture</b>	<b>Total</b>
Toilets	3,246
Showerheads	2,362
Faucet aerators	3,211
Clothes washers	101
Total Value of Provided Rebates	\$907,270

In addition to the County Conservation Program, the BMC is currently considering additional measures that incorporate expanded indoor conservation, as well as outdoor conservation measures. Measures currently under consideration include the following:<sup>4</sup>

<sup>4</sup> These measures were originally presented to the BMC at its April 2016 meeting.

<b>Table 10-5: Additional Conservation Measures Under Consideration</b>		
<b>Item No.</b>	<b>Conservation Measure Name</b>	<b>Draft Rebate Amount</b>
PR - 1	Cash for grass outreach	Existing Statewide Rebate
PR - 2	Clean and close outreach for septic tank repurposing	N/A
PR - 3	Outside PZ information and rebate	N/A
PR - 4	Conservation audits	N/A
Indoor-1	Hot water recirculation system	\$300
Indoor -2	High efficiency clothes washer	\$250
Indoor - 3	Replace 1.6 gpf toilets with 1.28 or below	\$250
Indoor - 4	Replace 2.0 gpm showerheads with 1.5 gpm	\$40
Outdoor - 1	Septic tank repurpose - roof water only	\$500
Outdoor - 2	Septic tank repurpose - with recycled water hauling	\$500
Outdoor - 3	Gray water system	\$500
Outdoor - 4	Recycled water fill station(s)	N/A
Outdoor - 5	Laundry to landscape program	\$50

An additional 100 to 200 AFY (estimated) could be saved through the implementation of the above programs. Funding and responsibility for implementation of these additional measures is currently under consideration.

### **10.3.3 Urban Water Reinvestment Program**

Implementation of the Urban Water Reinvestment Program was recommended in the LOBP to increase the sustainable yield of the Basin (and thus reduce the Basin Yield Metric). The Water Reinvestment Program will accomplish the LOBP's goal of reinvesting all water collected and treated by the LOWWP in the Basin, either through direct percolation to the aquifers or reuse. Water treated by the LOWWP will be of a sufficient quality to directly percolate into the Basin

or to reuse for landscape or agricultural irrigation purposes. The planned uses of that water are listed in Table 10-5 below.<sup>5</sup> The LOWWP is expected to produce up to approximately 780 AFY under current conditions.<sup>6</sup>

<b>Table 10-6: Recycled Water Uses in the Urban Water Reinvestment Program</b>	
Potential Use	Estimated Annual Volume (AFY)
Broderson Leach Fields	448
Bayridge Estates Leach Fields	33
Urban Reuse	63
Sea Pines Golf Course	40
Los Osos Valley Memorial Park	50
Agricultural Reuse	146
<b>Total</b>	<b>780</b>

The LOWWP construction was completed in March 2016. The system treatment and collection system are currently in the testing and commissioning phase. The testing phase should be completed by the end of 2016. Phasing of sewer connections have begun and should be completed by mid-2017. When there are sufficient flows to generate disinfected tertiary treated effluent, recycled water for irrigation will be provided to the schools, park, and various agricultural areas. Recycled water will also be disposed at the Broderson leachfield for percolation to replenish the upper aquifer of the groundwater basin. The water reinvestment program is anticipated to be in full operation by mid-2017. Although the LOWWP has been completed and is currently in operation, it is not yet running at full capacity. As of completion of the LOWWP this past March, all treated water is currently being transported to Broderson Leach Fields.

#### **10.3.4 Basin Infrastructure Programs A and C**

Implementation of the Basin Infrastructure Program is designed to reduce Purveyor groundwater production from the Lower Aquifer in the Western Area and replace it with additional pumping from the Upper Aquifer and Central and Eastern Areas. This shift will also increase the Basin’s sustainable yield, which in turn will help to drive down the Basin Yield Metric.

The Basin Infrastructure Program is divided into four parts, designated Programs A through D. Initially, only Programs A and C of the LOBP recommended for immediate implementation. Programs B and D may be implemented in the future based on need and financing.<sup>7</sup>

<sup>5</sup> This Table was reproduced (with slight edits) from Table 2 of the LOBP.

<sup>6</sup> This estimate increases to 1,120 AFY under the LOBP’s at buildout scenario.

<sup>7</sup> Program B improvements would allow the Purveyors to maximize production from the Upper Aquifer. To allow increased use of groundwater from the Upper Aquifer, the Purveyors would need to remove nitrate from water



Program A consists of actions that have already been taken by the Purveyors or for which the Purveyors have funding. Those actions are designed to allow the Purveyors to increase groundwater production from the Upper Aquifer to the greatest extent practicable without construction of large-scale nitrate removal facilities.

Program C includes a set of infrastructure improvements that would allow the Purveyors to shift some groundwater production within the Lower Aquifer from the Western Area to the Central Area. The status of the various program elements are summarized below in Table 10-7.

<b>Table 10-7: Basin Infrastructure Program Status</b>				
<b>Basin Infrastructure Program</b>	<b>Description</b>	<b>Current Status</b>	<b>Funding Status</b>	<b>Projected Completion</b>
<b>A</b>	Water Systems Interconnection (GSWC/LOCSD)	Inter-party agreement approved June, 2016. Design complete.	Fully funded	March, 2017
<b>A</b>	Upper Aquifer Well (LOCSD/8 <sup>th</sup> Street)	Permitted and in the process of public bidding for well drilling	Fully funded	June, 2017
<b>A</b>	South Bay Well Nitrate Removal	Complete		
<b>A</b>	Palisades Well Modifications	Complete		
<b>A</b>	Blending Project (GSWC/ Skyline Well)	Blending facilities and pipeline complete. Nitrate removal system is currently planned to	Fully funded	June, 2017

produced by new Upper Aquifer wells, including two for LOCSD, one for GSWC and, potentially, one or two for S&T. The BMC has determined that the necessary quantity of groundwater would be treated most economically and effectively through construction of a single, community nitrate facility rather than two or more separate facilities. Accordingly, Program B includes the construction of a shared nitrate removal facility. The technology for such a facility has not been finally determined. Program D includes three additional wells that would allow the Purveyors to shift some groundwater production into the Eastern Area. Since groundwater production from the Central and Eastern Areas induces less seawater intrusion than the same amount of production from the Western Area, this landward shift increases the Sustainable Yield of the Basin.

**Table 10-7: Basin Infrastructure Program Status**

<b>Basin Infrastructure Program</b>	<b>Description</b>	<b>Current Status</b>	<b>Funding Status</b>	<b>Projected Completion</b>
		increase production from system. <sup>8</sup>		
<b>A</b>	Water Meters (S&T)	Complete		
<b>C</b>	Expansion Well No. 1 (GSWC/Los Olivos)	In construction	Fully funded	September, 2016
<b>C</b>	Expansion Well No. 2 and 3, LOVR water main upgrade	Conceptual design and property acquisition	Pending funding vote	2018 to 2019
<b>C</b>	Water Systems Interconnection (S&T/GSWC)	Conceptual design	Pending funding vote	2017

### 10.3.5 Wellhead Protection Program

The Wellhead Protection Program is designed to protect water quality in the Basin by managing activities within a delineated source area or protection zone around drinking water wells. This program consists primarily of the Purveyors conducting Drinking Water Source Assessment and Protection surveys for each of their wells, as well as construction and operation of the LOWWP. The BMC will identify specific actions to protect water quality in the Basin as deemed appropriate in the future, though no specific actions are recommended at this time.

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<sup>8</sup> Construction of a nitrate removal system is technically a program B project. In order to respond to changing circumstances and proactively manage the basin, however, construction of this facility was prioritized and is being included in implementation of program A projects.