PROJECT SUMMARY

Requirement for a Salt & Nutrient Management Plan

In February 2009, the State Water Resources Control Board (SWRCB) established a statewide Recycled Water Policy to encourage increased use of recycled municipal wastewater as a safe, local, drought-proof, and highly reliable source of water supply. The Policy also required local water and wastewater entities (stakeholders) to develop a Salt & Nutrient Management Plan (SNMP) by May 2014 for each groundwater basin in California, including the Central Basin and West Coast Basin (CBWCB).

The purpose of the SNMP is to identify all sources of salts and nutrients (S/Ns) in the groundwater basins and manage those S/Ns in a manner that preserves, enhances, and restores the quality of groundwater for drinking and all other beneficial uses.

Groundwater Basins Description

The CBWCB, as shown in Figure 1, are located in southern Los Angeles County and cover an area of approximately 420 square miles. This area is mostly urbanized with nearly 4 million residents, which is greater than 10% of the State's population. The water supply in this region is comprised of groundwater, imported water (from Northern California, Colorado River, and Owens River Valley), and recycled water. Stormwater is also utilized for groundwater replenishment.

Major Accomplishments in the Groundwater Basins

From 1900 through the 1950s, groundwater was an important factor in urbanization of the CBWCB. Historical over pumping of the basins caused groundwater level declines, seawater intrusion, and other groundwater management problems related to supply and quality. To remedy these problems, the courts adjudicated the two basins in the early 1960s and set a limit on allowable groundwater production.

In addition, multiple measures were implemented and continue today to manage groundwater supply and quality and prevent seawater intrusion, as described below.

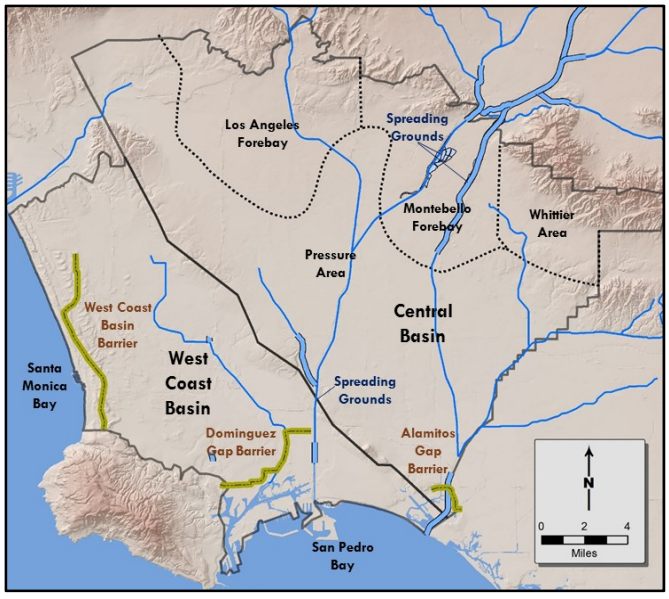

Figure 1 Central Basin and West Coast Basin

Montebello Forebay Spreading Grounds (MFSG) – The MFSG, as shown in Figure 2, are located in the northeastern portion of the Central Basin. Recharge water is comprised of stormwater (since 1930s), imported water (since 1950s), and recycled water (since 1960s).

West Coast Basin Barrier (WCBB) – In the 1950s, a series of injection wells were constructed by Los Angeles County (LAC) along the western coast of the West Coast Basin to create a pressure ridge or subsurface water wall to block further seawater intrusion. Currently, treated imported water and advanced treated recycled water are injected.

Dominguez Gap Seawater Intrusion Barrier (DGB) – In the 1970s, a series of injection wells were constructed by LAC along the southern coast of the West Coast Basin. Currently, treated imported water and advanced treated recycled water are injected.

Alamitos Gap Seawater Intrusion Barrier (AGB) – In the 1960s, a series of injection wells were constructed by LAC along the southern coast of the Central Basin. Currently, treated imported water and advanced treated recycled water are injected.

Water Replenishment District of Southern California (WRD) – Established in 1959 to provide artificial replenishment water and manage groundwater in the CBWCB.

Figure 2
Montebello Forebay Spreading Grounds

Desalters – For salinity management in the West Coast Basin, the Brewer Desalter and Goldsworthy Desalter began operating in 1993 and 2002, respectively, to pump and treat brackish groundwater for potable supply.

Monitoring Programs – The CBWCB are aggressively managed and monitored by multiple agencies. Millions of dollars are expended annually for monitoring and compliance programs for recycled water, groundwater, stormwater, imported water, wastewater, and surface water.

SNMP Analysis – Salt & Nutrient (S/N) Sources and Modeling

As part of the analysis for the SNMP, total dissolved solids (TDS), chloride and nitrate were determined to be the indicator compounds for S/Ns.

In accordance with the Recycled Water Policy, all major sources of S/Ns to groundwater and their fate and transport were assessed in the SNMP. The average S/N concentrations in each basin were calculated and a mixing model was utilized to estimate future S/N concentrations in groundwater.

All recharge to the groundwater basins typically contributes to S/N loading. However, if the S/N concentrations in the recharge water are less than the average concentrations existing in groundwater, this recharge will reduce S/N loads and improve groundwater quality. Pumping wells also remove S/Ns from the basins.

In the Central Basin, sources of S/N loading that were modeled include the MFSG, irrigation percolation, the AGB, subsurface groundwater inflow from adjacent basins, precipitation infiltration, and mountain front recharge.

In the West Coast Basin, sources of S/N loading that were modeled include the DGB, the WCBB, subsurface groundwater inflow including seawater intrusion, irrigation percolation, mountain front recharge, precipitation percolation, and the Dominguez Gap Spreading Grounds (DGSG).

SNMP Results – Salt & Nutrient Groundwater Quality

In the Central Basin, average TDS and chloride concentrations in groundwater are currently below their respective Water Quality Objectives (WQOs) and will continue to be below WQOs in the future. Thus, there is assimilative capacity in the Central Basin.

In the West Coast Basin, current average TDS and chloride concentrations in groundwater exceed their respective WQOs due to historical seawater intrusion. Thus, there is no assimilative capacity in the basin due to the brackish groundwater that exists near the coast. However, because of existing and planned implementation measures, TDS and chloride concentrations in the West Coast Basin are declining and are expected to be below WQOs in the future.

Average nitrate concentrations in groundwater in both the Central Basin and West Coast Basin are well below the WQO and are projected to remain low in the future. This is because there are not significant nitrate sources in the CBWCB.

Central Basin – Major Recycled Water Projects

In accordance with the Recycled Water Policy, the impacts to S/N groundwater quality due to existing and planned future recycled water projects are quantified and assessed in the SNMP. There are three main existing/planned uses of recycled water in the Central Basin, as described below.

Groundwater Reliability Improvement Project (GRIP) – Due to increasing costs and unreliability of imported water supplies, plans are being developed to replace imported water with recycled water for recharge at the MFSG. Two scenarios are currently being assessed for GRIP. In the first scenario, tertiary treated recycled water would replace imported water for recharge at the MFSG. Under this condition, S/N concentrations in groundwater would increase slightly, but will remain below the WQOs. In the second scenario, a blend of

What are Water Quality Objectives (WQOs)?

WQOs are numerical objectives established by the California Regional Water Quality Control Board, Los Angeles Region, in the Basin Plan. WQOs must be attained or maintained to protect the beneficial uses designated in the Basin Plan.

What is assimilative capacity (AC)?

A groundwater basin has AC when the existing water quality is better than that required to support the most sensitive beneficial uses of the basin. AC is calculated as the difference between the WQO of a certain constituent and its existing average concentration in groundwater.

tertiary and advanced treated recycled water will replace the imported water used for recharge. Under this condition, S/N concentrations remain essentially unchanged and will remain below WQOs in the future.

100% Advanced Treated Recycled Water at the Alamitos Gap Barrier (AGB) – Future plans call for increased injection volumes and replacement of imported water with advanced treated recycled water. The low S/N concentrations in the advanced treated recycled water will improve groundwater quality.

Increased Recycled Water for Irrigation – Tertiary treated recycled water is currently used for irrigation and future plans are to increase the volumes of recycled water for irrigation to reduce reliance on imported water and groundwater supplies. As part of the SNMP analysis, two future irrigation scenarios were modeled, one where S/N concentrations in recycled water were at average historical concentrations and the second where S/N concentrations were at regulatory limits. Both irrigation scenarios increase S/N concentrations very slightly in groundwater, but concentrations remain below WQOs and are not expected to be exceeded in groundwater in the future.

West Coast Basin – Major Recycled Water Projects

There are three main existing/ planned uses of recycled water in the West Coast Basin that potentially impact groundwater, as described below.

100% Advanced Treated Recycled Water at the West Coast Basin Barrier (WCBB) – Injection volumes will be increased and imported water will be replaced with advanced treated recycled water. The low S/N concentrations in the advanced treated recycled water will improve groundwater quality.

100% Advanced Treated Recycled Water at the Dominguez Gap Barrier (DGB) – Future plans include increased injection volumes and replacement of imported water with advanced treated recycled water. The low S/N concentrations in the advanced treated recycled water will improve groundwater quality.

Increased Recycled Water for Irrigation – Tertiary treated recycled water is used for irrigation and future plans are to increase the volumes of recycled water for irrigation to reduce reliance on imported water and groundwater supplies. The same two scenarios evaluated for the Central Basin were also evaluated for the West Coast Basin. Both scenarios increase S/N concentrations very slightly in groundwater. However, S/N concentrations in groundwater continue to decline in the West Coast Basin due to existing and planned implementation measures, as further discussed below. Also, SNMP modeling results show that S/N concentrations in groundwater will be below WQOs in the future.

What is the difference between tertiary treated recycled water and advanced treated recycled water?

Recycled water is municipal wastewater that has been purified through multiple levels of treatment. Recycled water is required to comply with stringent State regulations to ensure that it is safe for approved uses such as irrigation and groundwater replenishment.

The tertiary treatment process replicates and accelerates nature's way of water recycling. Municipal wastewater progresses through three stages of treatment and disinfection at water reclamation plants and the effluent typically meets all drinking water standards. In the CBWCB, tertiary treated recycled water is delivered to facilities for irrigation or industrial uses and is also delivered to recharge ponds located in the Montebello Forebay for groundwater replenishment. This water undergoes Soil Aquifer Treatment and then mixes with groundwater as it slowly moves through the aquifers. It can eventually get pumped out of production wells for potable or other uses. By the time the recycled water reaches any wells, it has undergone numerous treatment steps to clean, polish, blend, and purify the water.

Recycled water can be further purified through an advanced treatment process that includes at a minimum reverse osmosis membranes. In the CBWCB, this highly purified recycled water is delivered to the seawater water intrusion barriers for injection. Because S/N levels in advanced treated recycled water are significantly lower than S/N concentrations in groundwater, it improves groundwater quality.

Implementation Measures

Implementation measures are projects or programs that are established to control S/N loading on a sustainable basis. As more recycled water is utilized in the basins, implementation measures will help protect groundwater and beneficial uses. The CBWCB are highly managed and monitored basins. There are many existing and planned projects and programs designed to manage S/Ns, as described below.

Basin Adjudication – As discussed earlier, there is a limit on how much groundwater can be pumped from the basins, so significant groundwater depletion is prevented which reduces the potential for seawater intrusion.

Three Seawater Intrusion Barriers – The barriers will continue to operate to prevent seawater intrusion. The barriers further improve groundwater quality due to the very low S/N concentrations in the advanced treated recycled water that is injected.

Two Desalters & Expansion – The desalters will continue to extract and treat brackish groundwater for potable supply. One of the desalters, the Goldsworthy Desalter will be expanded, so a greater volume of brackish groundwater will be removed in the near future.

WRD & SNMP Monitoring Program – As the groundwater basins manager, WRD will continue to monitor S/N concentrations in groundwater and plans to submit this S/N data to the SWRCB GeoTracker online database.

MFSG & GRIP – GRIP, as described earlier, may lower TDS levels in groundwater through the potential use of advanced treated recycled water for recharge at the MFSG.

Monitoring Programs for All Source Waters – The existing robust and accessible monitoring programs for all the source waters in the CBWCB will continue, thereby helping to maintain the health of the groundwater basins.

Stormwater Programs – Because stormwater is typically lower in S/Ns than groundwater, stormwater quality protection and recharge projects (summarized below) improve groundwater quality.

- Spreading Grounds – A significant volume of stormwater is and will continue to be recharged at the MFSG. Stormwater is also recharged at the DGSG in the West Coast Basin.
- Municipal Separate Storm Sewer System (MS4) Program – There are rigorous management and monitoring requirements associated with this program, resulting in the improvement of surface water quality and thus, recharge water quality at the spreading grounds and at other stormwater capture projects.
- Other Stormwater Capture Projects – These projects include Low Impact Development technologies and best management practices to increase the volumes of stormwater recharged, as well as improving the quality of the recharged stormwater.

Wastewater Source Control Programs – These types of programs are currently in place to reduce S/Ns in recycled water, such as nitrogen removal processes for recycled water and pretreatment programs that regulate commercial and industrial discharges to the wastewater system.

Salinity Control Program – The Metropolitan Water District of Southern California has a Salinity Source Water Control Program to reduce salinity in its imported water supplies (Colorado River and San Joaquin Delta) used in the CBWCB.

Public Outreach – The Council for Watershed Health is a non-profit organization that conducts research and analysis and promotes an integrated approach to managing the local watersheds. The Southern California Salinity Coalition (SCSC) consists of water and wastewater agencies dedicated to managing salinity in all water supplies. The SCSC conducts research, seminars, and prepares publications with the goal of reducing salt levels in water supplies.

SNMP Performance Evaluation - The SNMP will be reviewed every 10 years and will be updated as necessary. Implementation measures may be revised to reflect current conditions.

Summary of Current and Future Groundwater Quality

Central Basin – Currently, average S/N concentrations in groundwater are below WQOs and existing and planned implementation measures ensure that S/N groundwater quality will comply with WQOs in the future.

West Coast Basin – Currently, average S/N concentrations in groundwater do not meet WQOs due to historical seawater intrusion. However, existing and planned implementation measures ensure that S/Ns in groundwater will achieve WQOs in the future.

Next Steps

A California Environmental Quality Act (CEQA) Scoping Meeting will be held on September 25, 2013 to describe the SNMP findings and implementation measures and elicit public comments on the environmental analysis. A Draft SNMP and Draft Substitute Environmental Document (SED) are expected to be submitted to the California Regional Water Quality Control Board, Los Angeles Region (LARWQCB) for review in November 2013. A Final SNMP is expected to be submitted to LARWQCB by May 2014.

How can I get more information regarding the SNMP for the CBWCB?

Please refer to the website below for additional information regarding the SNMP, including project documents, stakeholder meetings, related weblinks, etc.

http://www.wrd.saltnutrient.com/

Feel free to e-mail us at wrd@saltnutrient.com if you have any questions/comments or would like to join our mailing list. We encourage and greatly appreciate public participation in the SNMP development process.