CALIFORNIA DEPARTMENT OF WATER RESOURCES

SUSTAINABLE GROUNDWATER MANAGEMENT OFFICE

*901 P Street, Room 313-B | Sacramento, CA 95814 | P.O. Box 942836 | Sacramento, CA 94236-0001*

November 18, 2021

Kimball Loeb, Plan Manager
Fox Canyon Groundwater Management Agency
800 South Victoria Avenue
Ventura, CA 93009
kim.loeb@ventura.org

RE: Oxnard Subbasin – 2020 Groundwater Sustainability Plan

Dear Kimball Loeb,

The Department of Water Resources (Department) has evaluated the groundwater sustainability plan (GSP) submitted for the Oxnard Subbasin and has determined the GSP is approved. The approval is based on recommendations from the Staff Report, included as an exhibit to the attached Statement of Findings, which describes that the Oxnard Subbasin GSP satisfies the objectives of the Sustainable Groundwater Management Act (SGMA) and substantially complies with the GSP Regulations. The Staff Report also proposes recommended corrective actions that the Department believes will enhance the GSP and facilitate future evaluation by the Department. The Department strongly encourages the recommended corrective actions be given due consideration and suggests incorporating all resulting changes to the GSP in future updates.

Recognizing SGMA sets a long-term horizon for groundwater sustainability agencies (GSAs) to achieve their basin's sustainability goals, monitoring progress is fundamental for successful implementation. GSAs are required to evaluate their GSPs at least every five years and whenever the Plan is amended, and to provide a written assessment to the Department. Accordingly, the Department will evaluate approved GSPs and issue an assessment at least every five years. The Department will initiate the first five-year review of the Oxnard Subbasin GSP no later than January 13, 2025.

Please contact Sustainable Groundwater Management Office staff by emailing sgmps@water.ca.gov if you have any questions about the Department's assessment or implementation of your GSP.

Thank You,

Paul Gosselin
_____

Paul Gosselin
Deputy Director for Sustainable Groundwater Management

Attachment:

1. Statement of Findings Regarding the Approval of the Oxnard Subbasin Groundwater Sustainability Plan

# STATE OF CALIFORNIA
# DEPARTMENT OF WATER RESOURCES

## STATEMENT OF FINDINGS REGARDING THE APPROVAL OF THE OXNARD SUBBASIN GROUNDWATER SUSTAINABILITY PLAN

The Department of Water Resources (Department) is required to evaluate whether a submitted groundwater sustainability plan (GSP or Plan) conforms to specific requirements of the Sustainable Groundwater Management Act (SGMA or Act), is likely to achieve the sustainability goal for the basin covered by the Plan, and whether the Plan adversely affects the ability of an adjacent basin to implement their GSP or impedes achievement of sustainability goals in an adjacent basin. (Water Code § 10733.) The Department is directed to issue an assessment of the Plan within two years of its submission. (Water Code § 10733.4.) This Statement of Findings explains the Department's decision regarding the Plan submitted by the Oxnard Subbasin (Subbasin No. 4-004.02).

Department management has reviewed the Department Staff Report, entitled Sustainable Groundwater Management Program Groundwater Sustainability Plan Assessment Staff Report, attached as Exhibit A, recommending approval of the GSP. Based on its review of the Staff Report, Department management is satisfied that staff have conducted a thorough evaluation and assessment of the Plan and concurs with staff's recommendation and all the recommended corrective actions. The Department thus approves the Plan based on the Staff Report and the findings contained herein.

A. The Plan satisfies the required conditions as outlined in § 355.4(a) of the GSP Regulations (23 CCR § 350 et seq.):

    1. The Plan was submitted to the Department on January 13, 2020, and thus within the statutory deadline of January 31, 2020. (Water Code § 10720.7(a)(1); 23 CCR § 355.4(a)(1).)

    2. The Plan is complete, meaning it includes the information required by the Act and the GSP Regulations sufficient to warrant a thorough evaluation by the Department. (23 CCR § 355.4(a)(2).)

    3. The Plan covers the entire Subbasin. (23 CCR § 355.4(a)(3).)

B. The Plan conforms with Water Code §§ 10727.2 and 10727.4 in the Act and substantially complies with the GSP Regulations. It is likely to achieve the sustainability goal for the Subbasin. In making this determination, the Department considered the following:

1. The Plan's goal to improve groundwater levels to prevent seawater intrusion and its associated impacts related to groundwater storage, groundwater quality, and subsidence beyond 2015 conditions is reasonable and consistent with SGMA and the GSP Regulations. The Plan relies on credible information and science to sufficiently detail the hydrogeologic conceptual model, groundwater conditions, and water budget for the Subbasin, which provides a reasonable assessment of overdraft and serves as the sufficient basis for defining and assessing reasonable sustainable management criteria and projects and management actions.

2. The Plan identifies data gaps exist and describes reasonable measures to eliminate those data gaps. The Department recommends the agencies investigate further the hydraulic connectivity between the surface water bodies, semi-perched aquifer, and principal aquifers to reduce the uncertainty regarding the impacts groundwater extraction has on surface water and beneficial uses and users of surface water. Notwithstanding this recommendation, the Department finds that, at this time, the GSP contains a sufficient understanding of the groundwater conditions in the Subbasin and that implementation of the Plan during the collection and evaluation of additional information is not likely to cause serious or irreparable harm.

3. The projects and management actions designed to eliminate overdraft by increasing surface water supplies and decreasing groundwater production demand, if implemented in a reasonable and timely manner, will likely achieve the sustainability goal defined for the Subbasin.

4. The Plan provides a detailed explanation of how the varied interests of groundwater uses and users in the Subbasin were considered in developing the sustainable management criteria and how those interests would be impacted by the chosen minimum thresholds.

5. The Oxnard Subbasin GSP will not adversely impact the ability of the adjacent basins to be operated sustainably and will not impede the adjacent basins' ability to achieve their respective sustainability goals. Fox Canyon Groundwater Management Agency (Agency) took a regional approach to determine the combined sustainable yield of the Subbasin and adjacent Pleasant Valley Basin and Las Posas Subbasin, and then determined the sustainable yield for each groundwater subbasin. The minimum thresholds for each respective groundwater sustainability plan were established with consideration for the sustainability goals of the

adjacent basins and to operate each groundwater basin within its sustainable yield.

6. The Agency, along with other local agencies have implemented numerous projects and management actions to address groundwater conditions in the Subbasin. The Agency's legal authority and history of managing groundwater provides a reasonable level of confidence that the Agency, Camrosa Water District-Oxnard Subbasin GSA, and County of Ventura GSA (collectively, the GSAs) have the legal authority and financial resources necessary to implement the Plan.

7. Through review of the Plan and public comments, the Department determines that the GSAs adequately responded to comments that raised credible technical or policy issues with the Plan, sufficient to warrant approval of the Plan at this time. The Department also notes that the recommended corrective actions included in the Staff Report are important to addressing certain technical or policy issues that were raised and, if not addressed before future, subsequent plan evaluations, may preclude approval of the Plan in those future evaluations.

C. In addition to the grounds listed above, DWR also finds that:

1. The Plan's compliance with the requirements of SGMA and substantial compliance with the GSP Regulations is congruent with the state policy regarding the human right to water (Water Code § 106.3). The Department developed its GSP Regulations consistent with and intending to further the policy through implementation of SGMA and the Regulations, primarily by achieving sustainable groundwater management in a basin. By ensuring substantial compliance with the GSP Regulations, the Department has considered the state policy regarding the human right to water. (23 CCR § 350.4(g).)

2. The Plan defines the undesirable result associated with depletion of interconnected surface water in the Oxnard Subbasin as a loss of groundwater dependent ecosystem (GDE) habitat. According to the Plan, because historical groundwater elevations have maintained the GDE in the past, the goal of maintaining groundwater levels at or above historical lows is, expected to protect against the undesirable result of depletion of interconnected surface water. The Department determines that in attempting to avoid the further loss of GDE habitat beyond any historic losses, the GSAs considered public trust resources in development of the Plan.

3. The California Environmental Quality Act (CEQA) does not apply to the Department's evaluation and assessment of the Plan.

Based on the above, the GSP submitted by the Agency for the Oxnard Subbasin is approved as being found to satisfy the requirements of SGMA and to be in substantial compliance with the GSP Regulations. Recommended corrective actions identified in the Staff Report will assist the Department's review of the Plan's implementation for consistency with SGMA and are thus recommended to be addressed in the GSP by the time of the Department's five-year review, which is set to begin on January 13, 2025, as required by Water Code § 10733.8.

Signed:

Karla Nemeth

Karla Nemeth, Director

Date: November 18, 2021

Exhibit A: Groundwater Sustainability Plan Assessment Staff Report – Oxnard Subbasin

# State of California
# Department of Water Resources
# Sustainable Groundwater Management Program
# Groundwater Sustainability Plan Assessment Staff Report

| | |
|---|---|
| Groundwater Basin Name: | Oxnard Subbasin (Subbasin No. 4-004.02) |
| Submitting Agency: | Fox Canyon Groundwater Management Agency, Camrosa Water District, County of Ventura |
| Recommendation: | Approve |
| Date: | November 18, 2021 |

The Fox Canyon Groundwater Management Agency (FCGMA or Agency) Groundwater Sustainability Agency (GSA), Camrosa Water District-Oxnard Subbasin GSA, and County of Ventura GSA (collectively, the GSAs) submitted the Oxnard Subbasin (Subbasin) Groundwater Sustainability Plan (GSP or Plan) to the Department of Water Resources (Department) for evaluation and assessment as required by the Sustainable Groundwater Management Act (SGMA).[1] The GSP covers the entire Subbasin for the implementation of SGMA.

After evaluation and assessment, Department staff find the Oxnard Subbasin GSP includes the required components of a GSP, demonstrates a thorough understanding of the Subbasin based on the best available science and information, sets reasonable sustainable management criteria to prevent undesirable results as defined in the Plan, and proposes a set of projects and management actions that will likely achieve the sustainability goal defined for the Subbasin, as required by SGMA and the GSP Regulations.[2] Department staff will continue to monitor and evaluate the Subbasin's progress toward achieving the sustainability goal through annual reporting and future periodic GSP evaluation. Based on the current evaluation of the Plan, Department staff recommend approval of the Plan with recommended corrective actions described herein.[3] This assessment includes five sections:

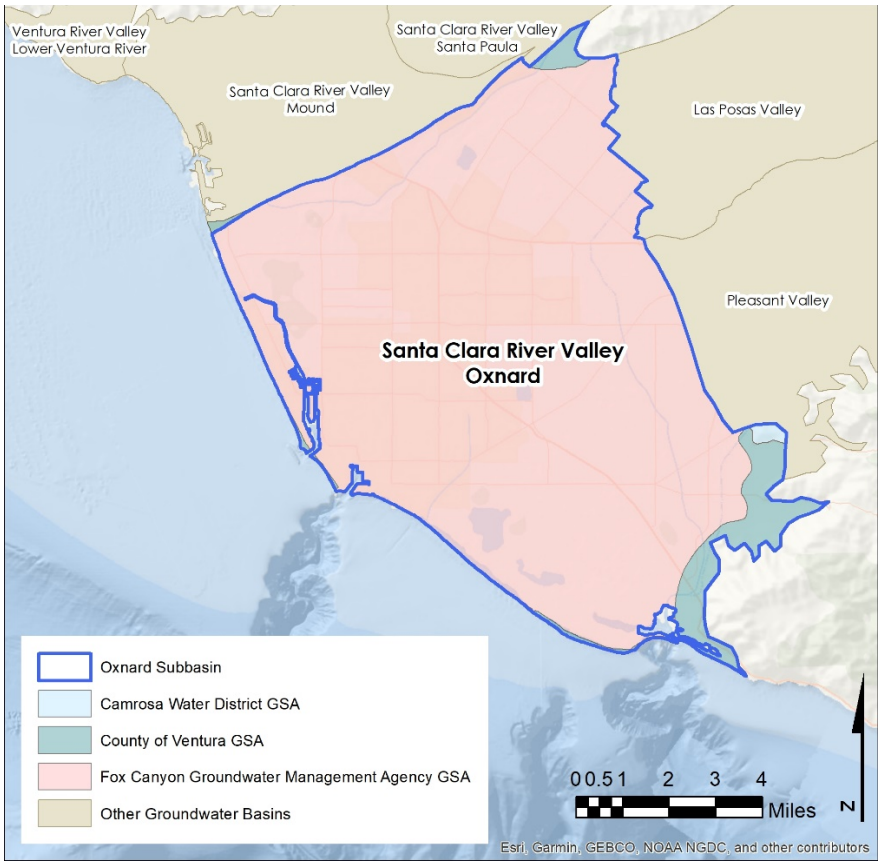
[1] Water Code § 10720 *et seq*.
[2] 23 CCR § 350 *et seq*.
[3] The Department recognizes that litigation, including a comprehensive adjudication of the Basin under Code of Civil Procedure section 830 et seq., has been filed. The filing of litigation does not alter or affect the Department's mandate to issue its assessment of the Agency's groundwater sustainability plan (GSP or Plan) for the basin within two years of its submission. (Water Code §10733.4(d).) The Department's assessment consists of a technical review of the submitted Plan, as required by SGMA and the GSP Regulations, and the filing of the adjudication or other litigation did not in any way influence or affect the Department's evaluation of the Plan. The Department expresses no opinion on the claims of the parties in the pending litigation involving the GSP or the groundwater basin. The role of a GSP in the adjudication process is addressed in Chapter 12 of SGMA (Water Code § 10737 et seq.).

- **Section 1 – Summary:** Provides an overview of the basin setting, GSP contents, and overview of the Department's assessment and recommendations.
- **Section 2 – Evaluation Criteria:** Describes the legislative requirements and the Department's evaluation criteria.
- **Section 3 – Required Conditions:** Describes the submission requirements, plan completeness, and basin coverage required for a GSP to be evaluated by the Department.
- **Section 4 – Plan Evaluation:** Provides a detailed assessment of the contents included in the GSP organized by each subarticle outlined in the GSP Regulations.
- **Section 5 – Staff Recommendation:** Includes the staff recommendation for the Plan and any recommended or required corrective actions, as applicable.

# 1 SUMMARY

A single GSP covering the entire Oxnard Subbasin was submitted to the Department by three GSAs on January 13, 2020. FCGMA is the lead GSA covering the majority of the Subbasin; a smaller portion of the Subbasin is covered by Camrosa Water District GSA, with remaining outlying areas covered by County of Ventura GSA.

The Oxnard Subbasin is a coastal groundwater basin located in Ventura County and is part of the Santa Clara River Valley Groundwater Basin (4-004) within the South Coast Hydrologic Region. The Subbasin is bounded by the Santa Monica Mountains to the southeast and by the Pacific Ocean to the west and southwest. Additionally, the Subbasin is bounded to the north by the Santa Paula Subbasin (4-004.04) and the Mound Subbasin (4-004.03)—both are part of Santa Clara River Valley Groundwater Basin—, and to the east by the Las Posas Valley Basin (4-008) and the Pleasant Valley Basin (4-006). The Santa Paula Subbasin is an adjudicated subbasin managed by the United Water Conservation District which is a court-appointed watermaster. The Oxnard Subbasin and the Pleasant Valley Basin are designated as critically overdrafted groundwater basins and were, therefore, required to be covered by GSPs submitted in 2020. The Las Posas Basin and the Mound Subbasin are designated as high-priority groundwater basins required to be covered by GSPs submitted in 2022. In 2020, the GSAs submitted GSPs covering the Oxnard Subbasin and the Pleasant Valley Basin, as well as a GSP covering the Las Posas Basin two years ahead of the statutory deadline of 2022. A vicinity map showing the Oxnard Subbasin, adjacent groundwater basins, and GSA boundaries is provided as Figure 1.




Water supply in the Subbasin comes from four sources: surface water, groundwater, recycled/reclaimed water, and imported water. The agricultural sector is the largest user of groundwater and accounts for 60 percent of the annual groundwater use. According to the GSP, the Subbasin's main land uses are agriculture and urban uses, each covering 47 percent of land area. The remaining land use is categorized as open space or water.

According to the GSP, seawater intrusion has been observed since the 1930s, and continues to be an issue due to ongoing conditions of groundwater overdraft. The current extent of seawater intrusion appears to reach as much as three miles inland. The Agency also recognizes seawater intrusion is one of the sources of water quality problems in the Subbasin that has resulted in higher concentrations of total dissolved solids (TDS) and chloride in the coastal area.

FCGMA has been implementing groundwater management actions since it was formed by the California Legislature in 1982. As examples, the Agency has instituted ordinances and programs that require groundwater extraction reporting and extraction fees, implemented a groundwater storage credit program, and approved a resolution through which recycled water discharged to Conejo Creek is delivered in lieu of groundwater pumping. Furthermore, local agencies such as United Water Conservation District

(UWCD), the City of Oxnard, and Calleguas Municipal Water District (CMWD) have implemented water supply projects that contributed new water sources in the Subbasin for municipal use, industrial use, agricultural use, and groundwater recharge to offset groundwater production, limit the decline in storage, and alleviate seawater intrusion. The GSP states that a history of interagency collaboration has resulted in the implementation of various conjunctive use programs which contributed to the groundwater elevation recovery in the 1990s. The Agency intends to implement the GSP alongside existing and planned conjunctive use programs in the Subbasin.

The GSP describes many existing surface water and groundwater monitoring programs in the Subbasin administered by other agencies such as the United States Geological Survey (USGS), Ventura County Watershed Protection District, UWCD, and CMWD. Groundwater quality in the Subbasin is monitored by multiple state and local agencies for various programs. The data provided by these monitoring programs and other investigations conducted in the Subbasin since the 1930s have been used to understand the groundwater conditions and develop sustainable management criteria for the GSP. FCGMA intends to continue to rely on groundwater elevation data collected by the Ventura County Watershed Protection District to assess the groundwater conditions for GSP annual reports and the 5-year GSP evaluations.

The sustainability goal for the Subbasin is to "increase groundwater elevations inland of the Pacific coast, to prevent landward migration of the 2015 saline water impact front,[5] and to prevent net seawater intrusion in the Upper Aquifer System and the Lower Aquifer System." As stated in the GSP, seawater intrusion is the primary sustainability indicator in the Oxnard Subbasin and sustainable management criteria were established based on information gathered over several decades from the monitoring programs investigations described above and with input from beneficial users of groundwater in the Subbasin. The GSPs of the neighboring Pleasant Valley Basin and Las Posas Basin were also developed by FCGMA, demonstrating a regional approach.

The GSP will use groundwater levels as a proxy to manage all applicable sustainability indicators and establishes sustainable management criteria that aim to either significantly improve groundwater conditions or not worsen them. For instance, minimum thresholds for seawater intrusion aim to limit net landward migration of the 2015 saline water impact front beyond the already impacted area while the measurable objectives aim to halt seawater flow into and freshwater flow out of the Upper Aquifer System or the Lower Aquifer System. Similarly, the expansion of areas impacted by degraded water quality that limit beneficial uses of groundwater is defined as an undesirable result. To manage depletions of interconnected surface water, the GSP establishes management criteria for the Oxnard aquifer which underlies and, as the GSAs claim, supports groundwater

[5] The GSP uses a term "2015 saline water impact front" to describe the 2015 extent of the seawater intrusion in the Oxnard Subbasin. The area of the Subbasin impacted by chloride concentrations greater than 500 milligrams per liter in 2015 is referred to as the saline water impact area. The Agency's reasoning to use the term saline water impact front rather than seawater intrusion is to reflect all potential sources of chloride to the aquifer, which are not limited to seawater.

elevations in the shallowest aquifer. The shallowest aquifer, locally referred to as the semi-perched aquifer, supports groundwater dependent ecosystems (GDEs) but is not considered a principal aquifer due to low groundwater production in the basin. The GSP proposes to continue monitoring the semi-perched aquifer to evaluate the depletion of interconnected surface water. The GSP recognizes significant and unreasonable lowering of groundwater levels and reduction of groundwater storage has occurred historically or is currently occurring in the Subbasin and defines the groundwater condition related to significant and unreasonable seawater intrusion.

To meet the sustainability goal of the Subbasin, the GSP proposes to implement a series of projects and management actions. Four proposed projects are related to the expansion of current water supply and groundwater recharge, and one project relates to temporary agricultural land fallowing. The GSP identifies two management areas that are vulnerable to seawater intrusion and chronic decline of groundwater levels. Management actions proposed to protect these vulnerable areas include reducing groundwater production and limiting the transfer of pumping allocations; FCGMA has the legislative authority to restrict groundwater production and conducted a pilot program for limiting transfer pumping allocations in 2019. The GSP acknowledges that the current revenue generated from pumpers of the Subbasin through extraction and sustainability fees would not be enough to fund the projects and management actions and, therefore, the Agency intends to increase the sustainability fee and impose a replenishment fee.

After reviewing the GSP, Department staff conclude that the best available science and information were relied on to analyze and describe the GSP elements, including the hydrogeologic conceptual model (HCM), groundwater conditions, and water budgets. The GSP has effectively identified where the data gaps exist. For example, one of the data gaps identified is the limited understanding of the extent and location of hydraulic connectivity between surface water bodies and the semi-perched and principal aquifers. Department staff believe that the GSA's further investigation of the hydraulic connectivity between surface water bodies and groundwater will improve the understanding of the impact(s) of groundwater production on the related sustainability indicators.

Department staff believe the GSP's goal to improve groundwater levels to prevent seawater intrusion and its associated impacts related to groundwater storage, groundwater quality, and subsidence beyond 2015 conditions are reasonable and consistent with SGMA and the GSP Regulations. The GSP proposes mitigating overdraft by implementing various projects and management actions, including reducing groundwater production and augmenting water supplies. As stated earlier, the Agency's primary management action is to implement pumping reductions, for which it has legislative authority.

The GSP's projects and management actions are an integral component for achieving the sustainability goal for the Subbasin; therefore, Department staff will monitor the progress and performance of these actions through annual reporting and five-year GSP updates (at a minimum). While the Plan does not include specific implementation details

regarding projects and management actions, Department staff find the overall approach described in the GSP to mitigate overdraft is reasonable, and if the proposed projects and management actions are implemented in a reasonable and timely manner, the GSP is likely to achieve the sustainability goal of the Subbasin.

For the reasons outlined above, Department staff recommend approval of the Oxnard Subbasin GSP. The GSP identifies several data gaps (e.g., HCM, interconnected surface water, and monitoring networks), which Department staff agree should be addressed. Department staff have also identified additional recommended corrective actions that should be considered by the GSAs for the first periodic evaluation of its GSP (see Section 5). Addressing these recommended corrective actions will be critical for the GSAs to demonstrate, on an ongoing basis, that implementation of the GSP is progressing toward achieving the sustainability goal.

# 2 EVALUATION CRITERIA

The GSAs submitted a single GSP to the Department to evaluate whether the Plan conforms to SGMA's requirements[6] and is likely to achieve the sustainability goal for the Oxnard Subbasin.[7] To achieve the sustainability goal for the Subbasin, the GSP must demonstrate that implementation of the Plan will lead to sustainable groundwater management, which means the management and use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results.[8] Undesirable results are defined quantitatively by the GSA(s).[9] The Department is also required to evaluate whether the GSP will adversely affect the ability of an adjacent basin to implement its GSP or achieve its sustainability goal.[10]

For the GSP to be evaluated by the Department, it must first be determined that the Plan was submitted by the statutory deadline,[11] and that it is complete and covers the entire Subbasin.[12] If these conditions are satisfied, the Department evaluates the Plan to determine whether it complies with SGMA and substantially complies with the GSP Regulations.[13] "Substantial compliance means that the supporting information is sufficiently detailed and the analyses sufficiently thorough and reasonable, in the judgment of the Department, to evaluate the Plan, and the Department determines that any discrepancy would not materially affect the ability of the Agency to achieve the sustainability goal for the basin, or the ability of the Department to evaluate the likelihood of the Plan to attain that goal."[14]

When evaluating whether the Plan is likely to achieve the sustainability goal for the Subbasin, Department staff reviewed the information provided and relied upon in the GSP for sufficiency, credibility, and consistency with scientific and engineering professional standards of practice.[15] The Department's review considers whether there is a reasonable relationship between the information provided and the assumptions and conclusions made by the GSAs, including whether the interests of the beneficial uses and users of groundwater in the Subbasin have been considered; whether sustainable management criteria and projects and management actions described in the Plan are commensurate with the level of understanding of the basin setting; and whether those projects and management actions are feasible and likely to prevent undesirable results.[16]

[6] Water Code §§ 10727.2, 10727.4.
[7] Water Code § 10733(a).
[8] Water Code § 10721(v).
[9] 23 CCR § 354.26 *et seq*.
[10] Water Code § 10733(c).
[11] 23 CCR § 355.4(a)(1).
[12] 23 CCR §§ 355.4(a)(2), 355.4(a)(3).
[13] 23 CCR § 350 *et seq*.
[14] 23 CCR § 355.4(b).
[15] 23 CCR § 351(h).
[16] 23 CCR § 355.4(b)(1), (3), (4) and (5).

The Department also considers whether the GSA(s) has the legal authority and financial resources necessary to implement the Plan.[17]

To the extent overdraft is present in a basin, the Department evaluates whether the Plan provides a reasonable assessment of the overdraft and includes reasonable means to mitigate the overdraft.[18] The Department also considers whether the Plan provides reasonable measures and schedules to eliminate identified data gaps.[19] Lastly, the Department's review considers the comments submitted on the Plan and evaluates whether the GSA(s) adequately responded to the comments that raise credible technical or policy issues with the Plan.[20]

The Department is required to evaluate the Plan within two years of its submittal date and issue a written assessment of the Plan.[21] The assessment is required to include a determination of the Plan's status.[22] The GSP Regulations provide three options for determining the status of a Plan: Approved,[23] Incomplete,[24] or Inadequate.[25]

Even when review indicates that the GSP satisfies the requirements of SGMA and is in substantial compliance with the GSP Regulations, the Department may recommend corrective actions.[26] Recommended corrective actions are intended to facilitate progress in achieving the sustainability goal within the basin and the Department's future evaluations, and to allow the Department to better evaluate whether the Plan adversely affects adjacent basins. While the issues addressed by the recommended corrective actions do not, at this time, preclude approval of the Plan, the Department recommends that the issues be addressed to ensure the Plan's implementation continues to be consistent with SGMA and the Department is able to assess progress in achieving the sustainability goal within the basin.[27] Unless otherwise noted, the Department proposes that recommended corrective actions be addressed by the submission date for the first five-year assessment.[28]

The staff assessment of the GSP involves the review of information presented by the GSA(s), including models and assumptions, and an evaluation of that information based on scientific reasonableness. The assessment does not require Department staff to recalculate or reevaluate technical information provided in the Plan or to perform its own geologic or engineering analysis of that information. The staff recommendation to approve a Plan does not signify that Department staff, were they to exercise the professional

[17] 23 CCR § 355.4(b)(9).
[18] 23 CCR § 355.4(b)(6).
[19] 23 CCR § 355.4(b)(2).
[20] 23 CCR § 355.4(b)(10).
[21] Water Code § 10733.4(d), 23 CCR § 355.2(e).
[22] Water Code § 10733.4(d), 23 CCR § 355.2(e).
[23] 23 CCR § 355.2(e)(1).
[24] 23 CCR § 355.2(e)(2).
[25] 23 CCR § 355.2(e)(3).
[26] Water Code § 10733.4(d).
[27] Water Code § 10733.8
[28] 23 CCR § 356.4 *et seq*.

judgment required to develop a GSP for the basin, would make the same assumptions and interpretations as those contained in the Plan, but simply that Department staff have determined that the assumptions and interpretations relied upon by the submitting GSA(s) are supported by adequate, credible evidence, and are scientifically reasonable.

Lastly, the Department's review and approval of the Plan is a continual process. Both SGMA and the GSP Regulations provide the Department with the ongoing authority and duty to review the implementation of the Plan.[29] Also, GSAs have an ongoing duty to reassess their plans, provide reports to the Department, and, when necessary, update or amend their plans.[30] The passage of time or new information may make what is reasonable and feasible at the time of this review to not be so in the future. The emphasis of the Department's periodic reviews will be to assess the progress toward achieving the sustainability goal for the basin and whether Plan implementation adversely affects the ability of adjacent basins to achieve their sustainability goals.

[29] Water Code § 10733.8, 23 CCR § 355.6 *et seq*.
[30] Water Code §§ 10728 *et seq*, 10728.2.

# 3 REQUIRED CONDITIONS

A GSP, to be evaluated by the Department, must be submitted within the applicable statutory deadline. The GSP must also be complete and must, either on its own or in coordination with other GSPs, cover the entire basin. If corrective actions have been identified by the Department, in the context of an Incomplete assessment, the GSAs must also have sufficiently addressed those corrective actions within the period of time provided.

## 3.1 SUBMISSION DEADLINE

SGMA required basins categorized as high- or medium-priority as of January 1, 2017 and that were subject to critical conditions of overdraft to submit a GSP no later than January 31, 2020.[31]

The GSAs submitted their GSP on January 13, 2020, in compliance with the statutory deadline.

## 3.2 COMPLETENESS

GSP Regulations specify that the Department shall evaluate a GSP if that GSP is complete and includes the information required by SGMA and the GSP Regulations.[32]

The GSAs submitted an adopted GSP for the entire Subbasin. Department staff found the GSP to be complete and include the required information, sufficient to warrant an evaluation by the Department. The Department posted the GSP to its website on January 31, 2020.

## 3.3 BASIN COVERAGE

A GSP, either on its own or in coordination with other GSPs, must cover the entire basin.[33] A GSP that intends to cover the entire basin may be presumed to do so if the basin is fully contained within the jurisdictional boundaries of the submitting GSA(s).

The GSP intends to manage the entire Subbasin and the jurisdictional boundaries of the submitting GSA(s) cover the entire Oxnard Subbasin.[34] However, the GSP acknowledges that it uses the Subbasin boundary defined by the 2016 version of the Department's Bulletin 118 instead of the 2018 version to maintain consistency with the GSP's groundwater model. The GSP discusses the differences between the two boundary versions and concluded that the 2018 administrative modification to the Subbasin boundary had a limited impact on the water budget, from a sustainable management

[31] Water Code § 10720.7(a)(1).
[32] 23 CCR § 355.4(a)(2).
[33] Water Code § 10727(b), 23 CCR § 355.4(a)(3).
[34] Oxnard Subbasin GSP, Figure 1-2, p. 103.

perspective, because the change in Subbasin areas did not include or exclude representative monitoring sites or production wells and does not affect the groundwater model conditions and parameters.[35] Department staff generally agree with the GSP's statement that the boundary modification was primarily administrative and results in negligible changes to the water budget. Staff acknowledge that much of the groundwater model and the GSP were developed prior to the Department adopting the modified boundary and, therefore, find the Agency's approach to use the 2016 boundary to be reasonable and not likely to affect the Agency's ability to implement the GSP across the entire Subbasin.

[35] Oxnard Subbasin GSP, Section 1.3.1, p. 38-39.

# 4 PLAN EVALUATION

As stated in Section 355.4 of the GSP Regulations, a basin "shall be sustainably managed within 20 years of the applicable statutory deadline consistent with the objectives of the Act." The Department staff's evaluation of the likelihood of the GSP to attain the sustainability goal for the Subbasin is provided below.

## 4.1 ADMINISTRATIVE INFORMATION

The GSP Regulations require each GSP to include administrative information identifying the submitting agency, describing the plan area, and demonstrating the legal authority and ability of the submitting agency to develop and implement a plan for that area.[36]

### 4.1.1 Evaluation Summary

The detailed administrative information included in the GSP substantially complies with the requirements outlined in the GSP Regulations. The GSP adequately describes the Subbasin coverage by the three GSAs and the legal authority of the GSAs to manage groundwater within the Subbasin. The GSP provides detailed information on the various water resources management programs, monitoring programs, conjunctive-use programs, regulatory programs, urban water management plans, general plans, and additional plan elements that are relevant to sustainable groundwater management. The GSP also provides detailed information on FCGMA's past and current groundwater management activities in the Subbasin. Based on the information provided, Department staff conclude that the Agency's past and ongoing collaboration with local agencies to implement various water resources management programs demonstrate that the FCGMA, along with Camrosa Water District GSA and County of Ventura GSA, will likely continue to manage groundwater in the Subbasin to meet the requirements of SGMA.

The GSP sufficiently describes the geographic areas covered by the GSP, including the types of land use based on 2015 data, sources of water, and existing water resources management programs. The beneficial uses and users of groundwater in the Subbasin are adequately described, as well as how interested parties were consulted regarding the status and development of the GSP.[37] The GSP was developed through participation of other agencies and beneficial users and was revised and finalized based on the feedback received from the interested parties.

### 4.1.2 Agency Information

Three GSAs worked together to complete a single GSP for the Subbasin (Oxnard GSP). FCGMA is the lead GSA, which covers the majority (94.1 percent) of the Subbasin's geographical area. SGMA specifically permitted FCGMA to become the exclusive GSA

[36] 23 CCR § 354.2 *et seq*.
[37] Oxnard Subbasin GSP, Section 1.8, p. 73-77.

within its statutory boundary.[38] Formed as a special district in 1982 to manage groundwater, FCGMA has been collaboratively managing groundwater in the Subbasin for over three decades. The groundwater management activities include oversight of various water resources management programs such as groundwater storage and injection credits programs, extraction limitations, extraction surcharges, the prohibition of groundwater exports, and municipal, industrial, and agriculture allocation programs.[39] Camrosa Water District (CWD) GSA and County of Ventura - Oxnard Outlying Areas GSA cover areas of the Subbasin outside the jurisdiction of FCGMA.

The GSP describes the Agency's funding plans and the three types of costs associated with GSP implementation, consisting of basic operation costs, implementation costs, and project costs.[40] The GSP states that the Agency collects a groundwater extraction fee to fund its basic operations and collects a sustainability fee, which is expected to generate additional revenue to cover the implementation costs and a portion of the project costs. The GSP estimates that it will cost $21,265,000 per year to cover the project and water supply costs for the first five years of implementation. Because the Agency developed the GSPs for the adjacent Pleasant Valley and Las Posas basins, the GSP provides the Agency's estimated implementation cost for all three groundwater basins. Collectively, the implementation cost for all three basins is estimated to be $79,302,272 for the period of 2020 through 2040. Given FCGMA's legal authority and history of groundwater management, the Department staff are reasonably confident that the Agency has the means to generate financial resources to implement the GSP.

### 4.1.3 Description of Plan Area

The GSP shows that the three main types of land use in the Subbasin are agriculture (47 percent), urban (47 percent), and open space or water (6 percent).[41] The cities of Oxnard and Port Hueneme overlie the Subbasin. The cities of Ventura and Camarillo lie primarily outside the Subbasin; however, the cities' outer edges are crossed by the Subbasin boundary. Naval Base Ventura County is federal land, which occupies 10 percent of the Subbasin's area.

The beneficial users of groundwater are agricultural, municipal, industrial, and environmental users. The GSP states that approximately 60 percent of the groundwater is used by the agricultural sector, and the remaining 40 percent is used by other sectors. The GSP identifies GDEs as the primary environmental user of groundwater in the Subbasin.

The Oxnard Subbasin has a complex network of water supply, water management, and delivery projects, including diversions of Santa Clara River and Conejo Creek; importing

[38] Water Code § 10723(c)(1)(D).
[39] Oxnard Subbasin GSP, Section 1.4, p. 46-49, Table 1-11, p. 92-95.
[40] Oxnard Subbasin GSP, Section 1.2.6, p. 33-36, Section 5, 538-551.
[41] Oxnard Subbasin GSP, Table 1.8, p. 88.

water from the State Water Project and Metropolitan Water District; and various recycled and reclaimed water treatment programs.

The main sources of water in the Subbasin are surface water, groundwater, recycled/reclaimed water, and imported water. Diverted surface water from the Santa Clara River and Conejo Creek is used for managed aquifer recharge in spreading basins and for non-potable applications. Recycled water produced by the Advance Water Purification Facility is used for agriculture, whereas recycled water produced by the Hill Canyon Wastewater Treatment Plant is discharged into Conejo Creek and diverted for use in lieu of groundwater pumping.

Many of the existing monitoring programs, including groundwater level and groundwater quality monitoring, surface water quality monitoring, stormwater quality monitoring, precipitation monitoring, and streamflow monitoring, are administered by other agencies.[42] Few of the existing monitoring programs are overseen by FCGMA, who collect and analyze data for annual groundwater extraction and analyze water quality data to track the progress toward meeting Basin Management Objectives. The GSP states that these monitoring programs are anticipated to continue, and the data from these programs will continue to be used to assess groundwater conditions in the Subbasin. The GSP lists several existing groundwater management programs that operate in the Subbasin.[43] Programs include groundwater recharge projects, recycled water programs, a surface water diversion project, allocation programs, water conservation programs, groundwater storage and injection credit programs, prohibition of groundwater export, extraction limitation and surcharge programs, extraction fee and reporting programs, water credit transfer program, salinity management program and imported water program.

The GSP describes how the four existing urban water management plans (UWMP) may affect sustainable groundwater management within the Subbasin and how the GSP may impact the assumptions of these UWMPs.[44] The GSP also provides descriptions of existing conjunctive use programs and additional plan elements.[45] The GSP states that the three UWMP discussed as the additional plan elements do not interface with SGMA or affect the Subbasin's sustainability because the implementation agencies do not directly pump groundwater from the Subbasin. The GSP further states that Naval Base Ventura County groundwater use currently represents approximately 1 percent of groundwater pumped in the Oxnard Subbasin and Pleasant Valley Basin and may voluntarily agree to an allocation under the GSP less than its full federal reserved water rights.

The GSP discusses three general plans that are applicable in the Oxnard Subbasin.[46] The Agency is planning to coordinate with Ventura County on the next update of the

[42] Oxnard Subbasin GSP, Table 1-10 and Table 1-11, p. 91-95.
[43] Oxnard Subbasin GSP, Table 1-11, p. 92-95.
[44] Oxnard Subbasin GSP, Section 1.6.2, p. 57-65.
[45] Oxnard Subbasin GSP, Section 1.5, p. 49-52, Section 1.6.3, p. 65-69.
[46] Oxnard Subbasin GSP, Sections 1.6.1, p. 53-57.

general plan to ensure that the GSP and the general plan update are mutually consistent.[47] The GSP also states that the City of Oxnard's General Plan does not contain water supply assumptions, which would conflict with the sustainable management criteria or the projects and management actions proposed in Oxnard GSP. However, the City of Oxnard submitted a comment to the Department claiming that the GSP's statement is inaccurate because there are fundamental inconsistencies between the City's 2030 General Plan and the GSP. The City further states that water demand in the City could increase by 50 percent due to population growth, so the GSP's management action to reduce groundwater pumping by 40 percent is inconsistent with the City's growth assumptions, long-term strategy for groundwater management, water supply assumption, and the land use plan. Department staff encourage FCGMA to work with the City of Oxnard to rectify the difference in policies that could potentially impact SGMA implementation in the Subbasin.

### 4.1.4 Notice and Communication

The GSP describes notification and communication efforts made by the Agency during Plan development and includes a Public Outreach and Engagement Plan.[48] Parties who would be potentially affected by the use of groundwater use in the Subbasin are listed in the Plan as 1. Surface water suppliers, 2. Municipal well operators and water purveyors, 3. Agricultural, Domestic, and Environmental users, 4. Local land-use planning agencies, 5. The Federal government, and 6. Disadvantaged Communities (DACs).[49]

Based on the Agency governance structure provided in the GSP, most of these interested parties, along with agricultural groups, have direct representation through membership on the FCGMA Board. The GSP states that although environmental users, the U.S. Navy, and DACs do not have representation on the Agency board, they had various opportunities to participate in the GSP development process. For example, environmental user interests were represented through the appointment of an environmental representative on the Technical Advisory Group (TAG). Additionally, representatives from the DACs and the U.S. Navy participated in the Agency's public meetings and are on the list of interested parties who receive electronic newsletters regarding the status and development of the Oxnard GSP. The GSP also states that, in addition to the U.S. Navy's participation during public meetings, the Agency coordinated with the U.S. Navy during GSP development.

The Agency conducted over 100 public meetings and five public workshops to discuss the GSP between March 2015 and November 2019,[50] including a special TAG meeting to discuss potential GDEs.[51] During the TAG meeting, comments were accepted from the

[47] Oxnard Subbasin GSP, Sections 1.6.1, p. 54.
[48] Oxnard Subbasin GSP, Appendix B, p. 890-916.
[49] Oxnard Subbasin GSP, Section 1.8.2, p. 73-76.
[50] Oxnard Subbasin GSP, Table 1-12, p. 97-100.
[51] Oxnard Subbasin GSP, Section 1.8.2, p. 75.

public regarding potential impacts to surface water bodies. Additional means of outreach include a survey for input on sustainability indicators, a public call for project ideas for incorporation in the GSP, circulating electronic newsletters, and regularly posting updates on the Agency website. During GSP implementation, the Agency intends to use the same tools of communication that were used during GSP development. The opportunities and efforts regarding outreach, collaboration, and communication with interested parties are provided in the GSP.[52]

During GSP development, FCGMA received several written comment letters.[53] The GSP describes that, in consideration of some of these comments, the Agency completed an independent peer review of the numerical groundwater models, completed additional analysis for the water quality approach, and extended the timeline for completion of the GSP.[54]

Given the GSP's description of the Agency's robust engagement efforts with other agencies and interested parties throughout the GSP development process and its proposed commitment to continue with the same engagement mechanisms during GSP implementation, Department staff are satisfied that the GSP substantially complies with the requirements pertaining to Notice and Communication.[55]

## 4.2 Basin Setting

GSP Regulations require information about the physical setting and characteristics of the basin and current conditions of the basin, including a hydrogeologic conceptual model; a description of historical and current groundwater conditions; and a water budget accounting for total annual volume of groundwater and surface water entering and leaving the basin, including historical, current, and projected water budget conditions.[56]

### 4.2.1 Evaluation Summary

The description of the basin setting in the GSP substantially complies with the requirements outlined in the GSP Regulations. The GSP describes in sufficient detail the hydrogeologic conceptual model, groundwater conditions, and water budget for the Subbasin, which appear to be based on the best information and science available at the time the GSP was prepared. The GSP identifies data gaps in the basin setting and describes actions that could be taken to fill data gaps. Department staff find the descriptions of groundwater levels, groundwater in storage, seawater intrusion, and water quality sufficiently demonstrate that the Agency understands the groundwater conditions in the Subbasin.

[52] Oxnard Subbasin GSP, Appendix B, p. 890-916.
[53] Oxnard Subbasin GSP, Appendix A-5, p. 587-889.
[54] Oxnard Subbasin GSP, Section 1.8.4, p. 76.
[55] 23 CCR § 354.10.
[56] 23 CCR § 354.12 *et seq.*

The GSP includes historical, current, and projected water budget estimates for the Subbasin which were developed using a numerical model. The Agency used the water budgets to determine the historical and projected sustainable yield and overdraft. Department staff believe that the water budget components provided in the GSP were developed using the best available tools and information available at the time the GSP was prepared and substantially comply with the GSP Regulations. Overall, the GSP's description of the Subbasin's physical characteristics and current conditions is sufficient to serve as the basis for defining and assessing reasonable sustainable management criteria and projects and management actions.

### 4.2.2 Hydrogeologic Conceptual Model

The GSP identifies six aquifers in the Subbasin. Five of these aquifers are considered primary or principal aquifers in the GSP and are grouped into the Upper Aquifer System and the Lower Aquifer System. The Upper Aquifer System includes the Oxnard and Mugu aquifers and the Lower Aquifer System contains the Hueneme, Fox Canyon, and Grimes Canyon aquifers.[57] The GSP states that, in most of the Subbasin, a hydraulic connection exists between the Mugu aquifer in the Upper Aquifer System and the Hueneme aquifer in the Lower Aquifer System; the hydraulic connection between the Mugu and Hueneme aquifers is absent in the southwestern portion of the Subbasin, where seawater intrusion has affected the Mugu aquifer.[58] The GSP states that both of the aquifer systems in the Subbasin extend offshore and are believed to have direct hydraulic connection with the Pacific Ocean.

The GSP explains that the uppermost aquifer, referred to as the semi-perched aquifer, is excluded from the Upper Aquifer System and is not considered a primary aquifer because of limited groundwater production.[59] A clay layer separates the semi-perched aquifer from the underlying Oxnard aquifer.[60] The GSP states that the clay layer functions as an aquitard, restricting the flow of groundwater between the aquifers; however, water can still migrate vertically under conditions of differential head and through improperly abandoned wells.[61] The GSP states that both the semi-perched aquifer and the clay layer are absent in the Forebay area of the Subbasin, which makes the Forebay area the most desirable for groundwater recharge, but also the most vulnerable for contaminants to migrate into the principal aquifers.[62]

The Santa Clara River runs through the Subbasin and provides groundwater recharge to the Upper Aquifer System and the semi-perched aquifer. The Santa Clara River also delivers State Water Project water for managed aquifer recharge in spreading grounds

[57] Oxnard Subbasin GSP, Section 2.2, p. 118.
[58] Oxnard Subbasin GSP, Section 2.2.3, p. 126.
[59] Oxnard Subbasin GSP, Section 2.2.3, p. 122.
[60] Oxnard Subbasin GSP, Section 2.2.3, p. 123.
[61] Oxnard Subbasin GSP, Section 2.2.3, p. 123.
[62] Oxnard Subbasin GSP, Section 2.2, p. 118, Section 2.5, p. 192, Section 2.3.4.3, p. 153, Section 3.3.4.2, p. 414-415.

and irrigation for agricultural users.[63] Calleguas Creek also provides groundwater recharge to the semi-perched aquifer, but does not directly recharge the Upper Aquifer System due to a lack of hydraulic connectivity.[64] The GSP identifies potential recharge areas mainly located near or along the Santa Clara River and in sandy sediments along the northern coastal areas of the Subbasin.[65]

The Agency's understanding of the geographic, geologic, and structural settings along with other physical attributes (such as lateral and vertical boundaries) of the Subbasin, its aquifers, and aquitards are represented graphically and through written descriptions in the GSP. The GSP includes various maps such as surficial geology, cross-sections, rivers and drainages, impaired surface water bodies, water conveyance and treatment infrastructure, recharge basins, and stream gauges to thoroughly describe the hydrogeologic conceptual model and the supporting information as required by the GSP Regulations.

The GSP does identify data gaps in the hydrogeologic conceptual models as uncertainties associated with aquifer-specific data, the distinct sources of high TDS concentrations in the Lower Aquifer System, the relative impact of groundwater pumping in specific areas on seawater intrusion, and the interaction between the semi-perched aquifer and GDEs. The Plan states that these uncertainties are due to a lack of wells screened solely in a single aquifer and limited temporal and spatial distribution of the available monitoring wells.[66] Despite the uncertainties caused by limited data availability, in certain circumstances, Department staff find the Agency had credible data spanning several decades to rely on and uses the best available information to provide a sufficient understanding of the physical characteristics of the Subbasin, including the geologic and hydrogeologic conditions.

### 4.2.3 Groundwater Conditions

Hydrographs provided in the GSP for the five principal aquifers show groundwater level trends from the 1980s to 2015 with additional groundwater elevation data for the Oxnard aquifer dating as far back as the 1930s.[67] The hydrographs from all principal aquifers show a pattern of decline and recovery in groundwater elevation until the 1990s, followed by a significant recovery in the early 1990s that resulted in artesian conditions observed in wells screened in the western portions of the Oxnard aquifer.[68] The GSP states that the recovery in groundwater elevation was likely due to a combination of several wet years during the 1990s, the effects of management actions, and the construction of water conservation facilities in the 1980s and 1990s.

[63] Oxnard Subbasin GSP, Section 2.4.1.1, p. 165.
[64] Oxnard Subbasin GSP, Section 2.4.1.1, p. 166.
[65] Oxnard Subbasin GSP, Section 2.3.8, p. 162, Figure 2-57, p. 349.
[66] Oxnard Subbasin GSP, Section 2.2.4, p. 128, Section 2.3.1.1, p. 130, Section 4.6.1, p. 485.
[67] Oxnard Subbasin GSP, Figure 2-9A – Figure 2-21, p. 241-267.
[68] Oxnard Subbasin GSP, Section 2.3, p. 132-141, Section 2.3, p. 139.

The hydrographs also show that the groundwater levels were relatively stable from 1990 to 2010 then experienced a significant decline after 2010. Between 2011 and 2015, groundwater elevations declined by up to 100 feet in some areas. Though the historical trends suggest groundwater levels in the Subbasin tend to decline during periods of drought and recover, groundwater elevations have not yet recovered from the drought beginning in 2011.[69] Some of the hydrographs show that the groundwater elevations have continued to decline after 2015. The Forebay area appears to be highly impacted by the recent drought, as the water level declines in the Oxnard and Mugu aquifers have been the most pronounced. Another area greatly affected by droughts appears to be the coastal Grimes Canyon aquifer, where groundwater elevations have remained below mean sea level since the 1990s.[70]

In addition to the hydrographs, groundwater elevation contour maps for principal aquifers are provided for 2015 fall and spring groundwater conditions. The GSP states that the groundwater elevations in all of the principal aquifers were higher than those in the underlying aquifers, resulting in a downward vertical gradient, with an exception in the Port Hueneme area where groundwater elevations in the Grimes Canyon aquifer are higher than those in the overlying Fox Canyon aquifer. The GSP does not explain the reason for this difference in vertical gradient in Port Hueneme. However, the GSP states that the vertical gradients along the coast are generally lower than they are inland.[71]

The UWCD used a numerical groundwater flow model to estimate the change in groundwater storage from 1986 to 2015 for the Subbasin.[72] The GSP states that the cumulative change in storage (i.e., the Upper Aquifer System and Lower Aquifer System were replenished by seawater) over this period was a net loss of approximately 101,400 acre-feet (i.e., an average decrease of 3,400 acre-feet per year).[73] The GSP states that the annual change in storage ranges from a maximum decrease of approximately 48,700 acre-feet during 1987 and a maximum increase of approximately 81,000 acre-feet during 2005.[74]

Without seawater intrusion (i.e., if the Upper Aquifer System and Lower Aquifer System were not replenished by seawater), the cumulative change in freshwater storage between 1986 and 2015 for the Subbasin was a loss of approximately 380,200 acre-feet (i.e., an average decrease of approximately 12,700 acre-feet per year).[75] The annual change of freshwater in storage ranges from a maximum increase of approximately 74,700 acre-feet in 2005 to a maximum decrease of approximately 73,500 acre-feet in 1990.[76] During

[69] Oxnard Subbasin GSP, Section 2.3.1.2, p. 134.
[70] Oxnard Subbasin GSP, Section 2.3.1.5, p. 141; Figure 2-21, p. 267.
[71] Oxnard Subbasin GSP, Section 2.3.1.1, p. 131.
[72] Oxnard Subbasin GSP, Appendix C, p. 918-1271.
[73] Oxnard Subbasin GSP, Section 2.3.2, p. 142, Figure 2-22, p. 269.
[74] Oxnard Subbasin GSP, Section 2.3.2, p. 142.
[75] Oxnard Subbasin GSP, Section 2.3.2, p. 143.
[76] Oxnard Subbasin GSP, Section 2.3.2, p. 143.

the model period, there was approximately 9,400 acre-feet per year of seawater intrusion into the principal aquifers of the Oxnard Subbasin.[77] The UWCD groundwater model estimates suggest that between 1985 and 2015, approximately 1,800 acre-feet per year of groundwater flowed to the Pacific Ocean from the semi-perched aquifer, which is not considered a principal aquifer.[78]

According to the GSP, seawater intrusion in the Subbasin was first observed in the 1930s and the impacted area continued to expand through the 1970s. Seawater intrusion into the Subbasin preferentially occurs near Port Hueneme and Point Mugu due to the direct contact and hydraulic connection of onshore freshwater aquifer units with deeply incised submarine canyons.[79] In Port Hueneme, which has groundwater elevations below sea level, the saline water impact front reached as much as three miles inland by the early 1980s. The GSP states that in the late 1970s and early 1980s, the area of the Upper Aquifer System affected by seawater intrusion was reduced due to the management actions by the Agency along with above-average rainfall. The historical progression of seawater intrusion from 1985 to 2015 in Upper Aquifer System and Lower Aquifer System are graphically presented in the GSP[80], which shows that seawater intrusion was mitigated in the Upper Aquifer System during the 1990s when a surface water diversion project was completed.[81] During this time, seawater intrusion began to affect the Lower Aquifer System. Between 2000 and 2012, there was no significant change in the extent of seawater intrusion. However, beginning in 2013, seawater intrusion has increased in both aquifer systems.[82]

The GSP uses the phrase “saline water impact area” to describe the area of the Subbasin impacted by chloride concentrations greater than 500 milligrams per liter and the phrase “saline water impact front” to describe the landward extent of the saline water impact area.[83] The Agency uses the phrase “saline water impact area”, rather than “seawater intrusion impact area”, to include other potential sources of chloride in the aquifer. The other contributors of salinity are identified as non-marine high-salinity connate water released during compaction of aquitards and older geologic formations beneath the freshwater aquifers, and vertical groundwater movement between major aquifers due to mergence between aquifers, and wells screened across multiple aquifers.[84] The areal extent of chloride concentration in all six aquifers and the current extent of saline water intrusion in the Upper Aquifer System and the Lower Aquifer System are shown on a

[77] Oxnard Subbasin GSP, Section 2.3.3.2, p. 145.
[78] Oxnard Subbasin GSP, Section 2.3.3.2, p. 145.
[79] Oxnard Subbasin GSP, Executive Summary, p. 19.
[80] Oxnard Subbasin GSP, Figure 2-33 - 2-34, p. 291-293.
[81] Oxnard Subbasin GSP, Section 2.3.3.3, p. 146.
[82] Oxnard Subbasin GSP, Figure 2-33 - 2-34, p. 291-293.
[83] Oxnard Subbasin GSP, Executive Summary, p. 17.
[84] Oxnard Subbasin GSP, Section 2.3.3.1, p. 144.

series of maps and a cross-section.[85] The GSP states that the chloride concentrations in wells near the coast are close to those of seawater and that the current area of seawater intrusion is smaller than the area of high chloride concentrations shown in maps because seawater intrusion is only one of the three reasons for the elevated salinity in the Subbasin.

The GSP identifies the primary reasons for degraded water quality as contaminated groundwater from the semi-perched aquifer, seawater intrusion, connate water from fine-grained lagoonal deposits, brines migrating via faults or upwelling from older geologic formations, mineral dissolution in groundwater, historical septic discharges, and agricultural fertilizer application practices.[86] The Agency has been conducting water quality monitoring and reporting to the Los Angeles Regional Water Quality Control Board (LARWQCB). The GSP discusses the elevated concentration of key constituents of concern for water quality and provides concentration maps that show elevated concentrations of TDS, sulfate, and boron are present throughout the basin, with a higher concentration of chloride near the coast and a higher concentration of nitrate near the Forebay area.[87]

The GSP states that during 2011 to 2015, TDS and chloride concentrations in the Lower Aquifer System were higher in the southern part of the Subbasin compared to the northern part. The primary areas of concern for groundwater quality degradation in the Subbasin are identified as the Forebay Management Area, the Saline Intrusion Management Area, and the Oxnard Pumping Depression Management Area.[88] The GSP also discusses groundwater quality impacts from other operations in the Subbasin, such as petroleum extraction and contaminated sites. However, the GSP concludes that the impact on groundwater quality from these sites is either not identified by beneficial users or the impacts are mitigated due to the presence of a confining layer. Furthermore, the Agency reviewed active contamination cases in GeoTracker and EnviroStor databases and concluded that existing groundwater contamination in the semi-perched aquifer do not pose a substantial threat to beneficial use of groundwater in the Upper Aquifer System and Lower Aquifer System.[89]

The GSP identifies three possible causes of land subsidence as groundwater pumping, petroleum reservoir compaction, and tectonic activity, but acknowledges groundwater pumping as the major cause of land subsidence in the Oxnard Subbasin. The GSP states that land subsidence in the Subbasin has been documented since the 1930s but provides limited information on the current extent and rate of subsidence. The GSP provides historical data from 1939 to 1992 measured at two USGS monitoring sites[90] which indicate that 1.6 feet of subsidence occurred from 1939 to 1960 and between 1960 and

[85] Oxnard Subbasin GSP, Figure 2-28 - 2-32, p. 277-289.
[86] Oxnard Subbasin GSP, Section 2.3.4, p. 150-154.
[87] Oxnard Subbasin GSP, Figure 2-36 - 2-46, p. 297-327.
[88] Oxnard Subbasin GSP, Section 2.3.4, p. 149-156.
[89] Oxnard Subbasin GSP, Section 2.3.4.7, p. 156.
[90] Oxnard Subbasin GSP, Section 2.3.5, p. 157.

1978 subsidence ranged from 0.3 to 1 foot. The most recent subsidence data provided in the GSP is from a study by Farr et al. (2017) that analyzed interferometric synthetic aperture radar (InSAR) data.[91] The study showed that up to one inch of subsidence occurred throughout the Subbasin between May 2015 and August 2016 and up to two inches of subsidence occurred in isolated areas.[92] Department staff find the GSP's discussion of the rate of historical subsidence, based on observed data, to be reasonable.

Using information from a 2003 USGS modeling study, the GSP predicts that areas within the Oxnard Plain may experience an additional 0.1 to 1 feet of subsidence by 2040, depending on whether future water levels decline below previous low levels and remain there for a considerable amount of time. Based on this assumption, the Agency plans to limit future subsidence by maintaining water levels above historical low levels.[93]

The GSP states that all surface water bodies in the Subbasin may have a connection to the semi-perched aquifer. These surface water bodies include the Santa Clara River, Calleguas Creek, Revolon Slough, Mugu Lagoon, Ormond Beach, and McGrath Lake. The GSP states that the connection between these surface water bodies and underlying groundwater is not fully understood due to limited groundwater elevation data for the semi-perched aquifer and the absence of monitoring sites near surface water bodies.[94] Nevertheless, as described in the hydrogeological conceptual model, a previous investigation found that water can migrate vertically between the Semi-perched Aquifer and the underlying Oxnard Aquifer.[95] Furthermore, Appendix C of the GSP includes a numerical modelling study which provides an estimate of groundwater-surface water connections for a few surface water systems. The numerical model simulates leakage from major surface water bodies using data from stream gauges and estimated aquifer properties. The model shows that the Santa Clara River exhibited recharge to the semi-perched aquifer for 19 out of 31 years [96] and recharged the Upper Aquifer System for 27 out of 31 years [97]; Calleguas Creek exhibited recharge to the semi-perched aquifer in all modeled years. Determining the location of interconnected surface water with groundwater, including the semi-perched aquifer with the Upper Aquifer System, will be necessary to understand and manage the depletion of interconnected surface water in the Subbasin. (see Recommended Corrective Action 1).[98]

The GSP identifies six surface water bodies within the Subbasin as GDEs and potential GDEs. The GDEs include the Lower Santa Clara River, McGrath Lake, Ormond Beach, and Mugu Lagoon, whereas the potential GDEs include Revolon Slough and Lower

[91] Oxnard Subbasin GSP, Section 2.3.5, p. 158.
[92] Farr et al., 2017, p. 24.
[93] Oxnard Subbasin GSP, Section 2.3.5, p. 157.
[94] Oxnard Subbasin, Section 2.3.6, p. 158.
[95] Oxnard Subbasin, Section 2.2.3, p. 123.
[96] Oxnard Subbasin GSP, Table 2-7a, p. 207-208.
[97] Oxnard Subbasin GSP, Table 2-7b, p. 208-209.
[98] 23 CCR § 354.16(f), 355.4 (b)(1) and (3).

Calleguas Creek. Revolon Slough and Lower Calleguas Creek are identified as potential GDEs due to a lack of groundwater level data to confirm whether riparian vegetation are supported by groundwater.[99] The location and the extent of GDEs are shown in maps based on data made available by the Department and other sources.[100] The GSP provides detailed descriptions of the types of ecosystems, the habitat supported by the ecosystems, and the connection of the ecosystem to the underlying semi-perched aquifer. The GSP states that additional data need to be collected within the boundaries of two potential GDEs to understand their connection to the underlying aquifer.

### 4.2.4 Water Budgets

The GSP used the Ventura Regional Groundwater Flow Model to develop the water budgets for the Subbasin. The Regional Groundwater Flow Model is based on USGS's numerical groundwater flow model (MODFLOW) and was created by UWCD for the Oxnard Subbasin, Mound Basin, the western part of the Las Posas Valley Basin, and Pleasant Valley Basin.[101] The GSP states that the UWCD model was revised, peer reviewed, and finalized in June 2018 for the Oxnard Subbasin GSP[102] and was used to estimate historical, current, and projected water budgets and the sustainable yield.

The GSP provides detailed descriptions of the sources of inflows, outflows, and the use of imported water and recycled water in the Subbasin. The GSP defines the period of 1985 to 2015 as the historical water budget, with the year 2015 as the current water budget.[103] The GSP includes a historical water budget for the semi-perched aquifer, the Upper Aquifer System, and the Lower Aquifer System. It also provides estimates of annual inflows, outflows, and change in storage.[104] Additional data pertaining to the water budget components, such as summary of water deliveries, detailed accounting of recharge by source type, and groundwater use by beneficial uses for each aquifer system are provided in the GSP as required by the GSP Regulations.

The GSP quantified overdraft in the Subbasin using the water year during which water supply conditions approximated average conditions. This calculation method excluded wet, dry, and critically dry water years. The GSP estimates that the overdraft in the Subbasin was about 2,300 acre-feet per year. Based on historical water supply conditions, the GSP evaluates the availability and reliability of water supply deliveries and states that most of the surface water supply sources are reliable and are not significantly affected by the water year type, other than the diversions from the Santa Clara River, which vary widely depending on climate conditions.

The GSP discusses the current water budget for calendar year 2015 and states that the Subbasin had greater outflows than inflows, resulting in a storage loss of 38,703 acre-

[99] Oxnard Subbasin GSP, Section 2.3.7, p. 159-162, Figure 2-52, p. 339.
[100] Oxnard Subbasin GSP, Figure 2-52 - 2-56, p. 339-347.
[101] Oxnard Subbasin GSP, Appendix C, p. 918-1271.
[102] Oxnard Subbasin GSP, Appendix E, p. 1664-1740.
[103] Oxnard Subbasin GSP, Section 2.4.3.2, p. 173-174.
[104] Oxnard Subbasin GSP, Table 2-7a - 2-7c, p. 207-210.

feet.[105] This change in groundwater storage includes seawater intrusion, meaning the groundwater storage decline would have been larger if seawater had not infiltrated the aquifers in the Subbasin. The GSP states that the net seawater intrusion in 2015 was approximately 19,200 acre-feet and affected the Upper Aquifer System and the Lower Aquifer System, whereas the semi-perched aquifer experienced net outflow of water to the Pacific Ocean and was not affected by seawater intrusion.

The Agency developed eight model scenarios to assess the projected water budget and future sustainable yield.[106] The scenarios incorporated existing projects, variable amounts of reduced groundwater production, various climate and precipitation projections, both the 2030 and 2070 climate-change factors, and covered a 50-year time frame, from 2020 to 2069. The GSP states that none of the modeled scenarios successfully eliminated seawater intrusion[107] and, therefore, none of the direct model scenarios were used to determine the sustainable yield of the Oxnard Subbasin. Instead, the findings from six model scenarios were plotted graphically and a statistical method of linear regression was used to calculate the future sustainable yield that would result in zero seawater intrusion.[108] This groundwater production volume with no seawater intrusion is provided in the GSP as the future sustainable yield. The future sustainable yield of the Upper Aquifer System is estimated to be 32,000 acre-feet per year, and the Lower Aquifer System is estimated to be 7,000 acre-feet per year.[109] Therefore, the combined future sustainable yield of Upper Aquifer System and Lower Aquifer System would be 39,000 acre-feet per year, which is equal to the modeled historical sustainable yield of the Subbasin.[110] The future sustainable yield, which is equivalent to the future groundwater production rate of 39,000 acre-feet per year, is substantially lower than the groundwater production in 2015, which was 80,814 acre-feet.[111]

Department staff note that the approach the Agency used to estimate sustainable yield was the subject of several comments. The comments in general questioned the statistical method used and how modeling outputs were utilized. Department staff reviewed the approach and determined that, while novel, the approach to estimate sustainable yield appears to be reasonable. The model relied on is peer-reviewed and is reasonably well-calibrated, and the statistical method utilized is consistent with scientific standards of practice. While other methods could have been employed to estimate sustainable yield, Department staff do not believe that, at this time, the Agency erred in its approach.

Overall, Department staff believe the rationale and information utilized to develop the water budgets is sufficiently thorough and substantially complies with the GSP Regulations. The components of the water budgets, the accounting of the inflows and

[105] Oxnard Subbasin GSP, Section 2.4.3.3, p. 174.
[106] Oxnard Subbasin GSP, Section 2.4.5, p. 177-190.
[107] Oxnard Subbasin GSP, Section 2.4.5.9, p. 190.
[108] Oxnard Subbasin GSP, Section 2.4.5.9, p. 190-191, Appendix E, Figures 4 and 5, p. 1711-1712.
[109] Oxnard Subbasin GSP, Section 2.4, p. 191.
[110] Oxnard Subbasin GSP, Section 2.4, p. 176.
[111] Oxnard Subbasin GSP, Section 2.4.2.1, p. 171.

outflows to the Subbasin, and availability of water supply for the future are sufficiently detailed and substantially comply with the GSP Regulations. The estimated overdraft, sustainable yield, and change in storage appear to be reasonable and based on the best available information and science. The GSP adequately discusses uncertainties in the water budget and the impact of population growth and future land use on the projected water budget.

### 4.2.5 Management Areas

The Agency divided the Oxnard Subbasin into five management areas. It appears to Staff that these management areas were created primarily for purposes of implementing the GSP's proposed projects and management actions. The Subbasin is divided into the Forebay, West Oxnard Plain, Oxnard Pumping Depression, Saline Intrusion, and East Oxnard Plain Management Areas.[112] The GSP states that these areas are separated by hydrogeologic properties, groundwater quality, or historical groundwater elevations (see Table 1). Based on information in the Plan, Staff believe that the Agency does not intend to use these management areas to establish differing minimum thresholds or measurable objectives.

Table 1: Summary of Oxnard Subbasin management areas as described in the Oxnard Subbasin GSP

| Name | Description |
|---|---|
| Forebay Management Area | An unconfined part of the Subbasin and a key recharge area where most of the spreading grounds are located. |
| West Oxnard Plain Management Area | Jurisdictional area that includes the FCGMA and the City of Oxnard. |
| Oxnard Pumping Depression Management Area | Established based on the low groundwater elevations historically recorded in both the Upper Aquifer System and the Lower Aquifer System in the area. |
| Saline Intrusion Management Area | Part of the Subbasin where saline intrusion has historically occurred and has impacted wells in both the Upper Aquifer System and Lower Aquifer System. |
| East Oxnard Plain Management Area | Established based on differences in groundwater elevation and chloride concentration across the Bailey Fault, which acts as a barrier to groundwater flow. |

## 4.3 SUSTAINABLE MANAGEMENT CRITERIA

GSP Regulations require each Plan to include a sustainability goal for the basin and to characterize and establish undesirable results, minimum thresholds, and measurable objectives for each applicable sustainability indicator, as appropriate.[113]

### 4.3.1 Evaluation Summary

Department staff find the sustainable management criteria included in the GSP were developed using sufficient and credible information and science, and substantially comply

[112] Oxnard Subbasin GSP, Section 2.5, p. 191-192.
[113] 23 CCR § 354.22 *et seq*.

in form and presentation with the requirements outlined in the GSP Regulations. Significant and unreasonable conditions, as defined in the GSP, are based on historical conditions in the Subbasin and their avoidance represents a reasonable approach to achieving the sustainability goal for the Subbasin. The GSP establishes minimum thresholds and measurable objectives that, over time, aim to substantially maintain or improve groundwater conditions in comparison to those present in 2015. Groundwater elevations that achieve the sustainability goal for seawater intrusion were, in turn, used as a proxy for other sustainability indicators. Department staff find this approach is reasonably likely to limit further seawater intrusion and degradation of groundwater quality, avoid land subsidence that substantially interferes with surface land uses, and not worsen impacts to interconnected surface water from current conditions.

While Department staff find, at this time, that the GSP's approach and rationale for establishing sustainable management criteria to be reasonable, further work will be necessary to support the approach and appropriately define the scope of the GSP's evaluation of water quality, subsidence and depletions of interconnected surface water, and potential undesirable results. Department staff strongly encourage the GSAs to address any recommended corrective actions no later than the first five-year update.

### 4.3.2 Sustainability Goal

The sustainability goal for the Subbasin is to increase groundwater elevations inland of the Pacific coast in order to prevent landward migration of the 2015 saline water impact front and to prevent net seawater intrusion in the Upper Aquifer System and the Lower Aquifer System.[114] The GSP includes multiple projects and management actions that, if implemented, will allow the Subbasin to operate within its sustainable yield and achieve its sustainability goal. The primary management action that will be implemented to achieve the sustainability goal is reducing groundwater production from both the Upper Aquifer System and the Lower Aquifer System,[115] which is anticipated to begin during the first five years following GSP adoption.[116] Department staff find that the GSP sets reasonable sustainability goals and adequately describes the measures to be implemented to achieve sustainable management of groundwater within 20 years and substantially complies with the GSP Regulations.

### 4.3.3 Sustainability Indicators

GSP Regulations specify that an agency define conditions that constitute sustainable groundwater management for a basin, including the characterization of undesirable results and the establishment of minimum thresholds and measurable objectives for each applicable sustainability indicator.[117]

Sustainability indicators are defined as any of the effects caused by groundwater conditions occurring throughout the basin that, when significant and unreasonable, cause

[114] Oxnard Subbasin GSP, Section 3.2, p. 408.
[115] Oxnard Subbasin GSP, Section 5.1, p. 536.
[116] Oxnard Subbasin GSP, Section 3.2, p. 408.
[117] 23 CCR § 354.22 *et seq*.

undesirable results.[118] Sustainability indicators thus correspond with the six undesirable results – chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply if continued over the planning and implementation horizon, significant and unreasonable reduction of groundwater storage, significant and unreasonable seawater intrusion, significant and unreasonable degraded water quality, including the migration of contaminant plumes that impair water supplies, land subsidence that substantially interferes with surface land uses, and depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water[119] – but refer to groundwater conditions that are not, in and of themselves, significant and unreasonable. Rather, sustainability indicators refer to the effects caused by changing groundwater conditions that are monitored, and for which criteria in the form of minimum thresholds are established by the agency to define when the effect becomes significant and unreasonable, producing an undesirable result.

The following subsections thus consolidate three facets of sustainable management criteria: undesirable results, minimum thresholds, and measurable objectives. Information, as presented in the GSP, pertaining to the processes and criteria relied upon to define undesirable results applicable to the basin, as quantified through the establishment of minimum thresholds, are addressed for each sustainability indicator. However, a submitting agency is not required to establish criteria for undesirable results that the agency can demonstrate are not present and are not likely to occur in a basin.[120]

*4.3.3.1 Chronic Lowering of Groundwater Levels*

The GSP states that the chronic lowering of groundwater levels resulting in a significant and unreasonable depletion of supply is an undesirable result applicable to the Oxnard Subbasin and acknowledges that groundwater production in excess of natural and artificial recharge is the primary cause of the chronic lowering of groundwater levels.[121] Significant and unreasonable lowering of levels may result in net seawater intrusion in the Upper Aquifer System and Lower Aquifer System over climate cycles of drought and recovery.[122] The GSP explains the criterion used to define when and where undesirable results occur is landward migration of the 2015 saline water impact front during the period from 2040 through 2069; and the quantitative criteria is:[123]

1. A number of key wells with water levels below their respective minimum thresholds. The Agency selected fifteen key wells in the Upper Aquifer System and nineteen key wells in the Lower Aquifer System for monitoring and to define undesirable results. In the Upper Aquifer System, undesirable results will occur if water levels in six of the 15 key wells are below their respective minimum thresholds in any single monitoring event. Similarly, the Lower Aquifer System will

[118] 23 CCR § 351(ah).
[119] Water Code § 10721(x).
[120] 23 CCR § 354.26(d).
[121] Oxnard Subbasin GSP, Section 3.3.1 p. 409.
[122] Oxnard Subbasin GSP, Section 3.3.1 p. 409.
[123] Oxnard Subbasin GSP, Section 3.3.7, p. 417-419.

experience undesirable results if water levels in eight of the 19 key wells are below their respective minimum thresholds in any single monitoring event.

2. Water levels going below the historical low at the respective key monitoring wells. Under this definition, an undesirable result would occur if the groundwater elevation at any individual key well is below the historical low water level for that well.

3. A period of time during which groundwater level exceeds the minimum threshold in any key well. Under this definition, an undesirable result would occur if the water level in any key well was below the respective minimum threshold for either three consecutive monitoring events or three of five consecutive monitoring events.

The Agency established minimum thresholds for groundwater levels based on historical groundwater elevation data and future groundwater model scenarios with potential for seawater intrusion. Specifically, the selected minimum thresholds were based on the lowest simulated groundwater elevation between 2040 and 2069, in which net seawater intrusion was minimal. To account for some of the uncertainty in the projected groundwater elevations, the lowest simulated value was rounded down to the nearest 5-foot interval and then raised by two feet to account for predicted sea level rise by 2070. The GSP states that the established minimum thresholds are water levels that would limit net seawater intrusion into the Upper Aquifer System and Lower Aquifer System, limit migration of the 2015 saline water impact front after 2040[124], and indicate that declines in levels during periods of drought will be offset by increases in levels during periods of above-average rainfall. [125] According to the second criterion above, groundwater elevations are higher than previous historical low water levels.

The GSP establishes measurable objectives for each key well as water levels at which there is neither seawater flow into nor freshwater flow out of the Upper Aquifer System or Lower Aquifer System.[126] According to the GSP, there is at least 10 feet between the measurable objective and the minimum threshold water level, which the Agency considers a margin of safety for operational flexibility.

The GSP describes two sets of interim milestones that represent two paths to achieve the sustainability goal for the Subbasin within 20 years of implementation. With the first path, water levels will reach the measurable objectives under average climatic conditions, and with the second path, water levels will reach minimum thresholds under dry conditions.[127] The GSP states that the interim milestones should be reassessed during future GSP updates in conjunction with measured groundwater levels at each key well.[128]

[124] Department staff's understanding of "after 2040" is January 1st, 2041. See Oxnard Subbasin GSP, p. 28 footnote 2 and definition of sustainability goal on p. 408.
[125] Oxnard Subbasin GSP, Section 3.3.1, p. 410, Section 3.4.1, p. 420.
[126] Oxnard Subbasin GSP, Section 3.5.1, p. 427.
[127] Oxnard Subbasin GSP, Table 3-2, p. 437-438, Figure 3-12, p. 469.
[128] Oxnard Subbasin GSP, Section 3.5.1, p. 429.

The GSP states that the minimum thresholds are anticipated to improve conditions for beneficial uses of the Subbasin by limiting seawater intrusion and chronic lowering of groundwater levels.[129] While it seems reasonable to anticipate improvements at the minimum thresholds, the GSP does not provide specific information on how the minimum thresholds may affect the interests of beneficial uses and users of groundwater in the Subbasin. In particular, the Department understands that there are domestic wells in the Subbasin, and the Plan does not provide an assessment of how the minimum thresholds affect domestic wells. Department staff encourage the Plan provide more specific information detailing potential effects of minimum thresholds on beneficial users and uses of groundwater, on land uses, and on property interests in the Subbasin. Nonetheless, established minimum thresholds represent levels above historical lows,[130] which represents an approach that is consistent with SGMA and the GSP Regulations.

Department staff find the sustainable management criteria defined for chronic lowering of groundwater levels is commensurate with the level of understanding of the basin setting and establishes reasonable criteria to achieve the sustainability goal of the Subbasin. Based on the thresholds established by the Agency, the groundwater level will show the first sign of recovery by 2025 when the groundwater level in every key well is anticipated to be above 2015 groundwater levels; groundwater levels will progressively improve until 2040.[131] Establishing sustainable management criteria that aims to prevent advancement of the 2015 saline water impact front is a reasonable approach that will help avoid a significant and unreasonable depletion of groundwater supply in the Subbasin.

*4.3.3.2 Reduction of Groundwater Storage*

The Plan states that the significant and unreasonable reduction of groundwater storage is an undesirable result that applies to Oxnard Subbasin.[132] The Plan acknowledges that the primary cause of reduction in groundwater storage is groundwater production in excess of recharge. The Plan states that significant and unreasonable reduction of groundwater storage may result if the volume of water produced from the Subbasin exceeds the volume of freshwater recharging the Subbasin over cycles of drought and recovery, and this undesirable result that has already occurred in the Subbasin.[133]

The Plan's definition for an undesirable result associated with "reduction in groundwater storage is landward migration of the 2015 saline water impact front after 2040."[134] The minimum thresholds established are the same water levels that limit seawater intrusion in the Subbasin, and indicate that declines in groundwater elevation during periods of drought will be offset by recovery during periods of above-average rainfall.[135] The

[129] Oxnard Subbasin GSP, Section 3.4, p. 421.
[130] Oxnard Subbasin GSP, Section 3.3.1, p. 410.
[131] Oxnard Subbasin GSP, Table 3-2, p. 437-438.
[132] Oxnard Subbasin GSP, Section 3.3.2, p. 411.
[133] Oxnard Subbasin GSP, Section 3.3.2, p. 411.
[134] Oxnard Subbasin GSP, Section 3.3.2, p. 411.
[135] Oxnard Subbasin GSP, Section 3.4.2, p. 421.

established elevations are higher than previous historical low water levels. The measurable objective for seawater intrusion is defined as the groundwater level at which there is neither seawater flow into, nor freshwater flow out of, the Upper Aquifer System and Lower Aquifer System; the measurable objective for each key well is based on the simulated median groundwater elevation between 2040 and 2070 that minimizes the migration of the 2015 saline water impact front after 2040.[136]

The Plan states that undesirable results related to a reduction of groundwater storage have already occurred in the Subbasin.[137] These undesirable results have the potential to impact the beneficial uses and users of groundwater by limiting the volume of groundwater available for agriculture, municipal, industrial, domestic, and environmental uses.

Department staff find the sustainable management criteria defined for reduction of groundwater in storage, in particular connecting the reduction in storage to seawater intrusion, is commensurate with the level of understanding of the basin setting and establishes reasonable criteria for this particular sustainability indicator. Preventing a reduction in groundwater storage in the Subbasin from getting worse than those conditions experienced in 2015 is a reasonable approach that will help avoid a significant and unreasonable depletion of supply in the Subbasin. The Plan states that selected management criteria are anticipated to improve the beneficial uses of the Subbasin by allowing for long-term use of groundwater supplies in the Subbasin without replacing freshwater in the Upper Aquifer System and Lower Aquifer System with seawater. The anticipated improvement appears to be reasonable. However, under the dry condition scenario (i.e., projected water levels at the minimum thresholds) landward migration of seawater, while minimized, is still expected until 2040. If this is the case, analysis should be provided to describe how continued seawater intrusion may affect the interests of beneficial uses and users of groundwater in the Subbasin (see Recommended Corrective Action 2).

#### *4.3.3.3 Seawater Intrusion*

The Plan defines significant and unreasonable seawater intrusion as a net landward migration of the 2015 saline water impact front beyond the already-impacted area from 2040 through 2069.[138] This saline water impact area is characterized by concentrations of chloride greater than 500 milligrams per liter, is generally located west of Highway 1 and south of Hueneme Road, and is sourced by modern seawater as well as non-marine brines and connate water in fine-grained sediments.[139] The Agency plans to limit

[136] Oxnard Subbasin GSP, Section 1.1, Footnote 2, p. 28, Section 3.5.2, p. 429.
[137] Oxnard Subbasin GSP, Section 3.3.2, p. 411.
[138] Oxnard Subbasin GSP, Section 3.3.3, p. 412.
[139] Oxnard Subbasin GSP, Section 3.3.3, p. 412.

seawater intrusion to the area that has already been impacted but does not intend to reverse or improve the historically impacted area.[140]

According to the GSP, modeling by UCWD indicates a strong relationship between groundwater elevation and seawater intrusion and, therefore, the minimum thresholds for seawater intrusion are based on groundwater levels that limit seawater intrusion in the Upper Aquifer System and Lower Aquifer System.[141] The measurable objective for seawater intrusion is defined as the groundwater level at which there is neither seawater flow into nor freshwater flow out of the Upper Aquifer System and Lower Aquifer System; the measurable objective for each key well is based on the simulated median groundwater elevation between 2040 and 2070 that minimizes the migration of the 2015 saline water impact front after 2040.[142] The GSP states that model simulations suggest that if groundwater levels fall below the minimum threshold elevations, the Subbasin is likely to experience net landward migration of seawater intrusion after 2040.[143] The minimum thresholds are anticipated to improve the beneficial uses of the Subbasin by limiting seawater intrusion.[144]

Department staff conclude that the sustainable management criteria defined in the GSP for seawater intrusion are commensurate with the understanding of seawater intrusion in the Subbasin and will be reasonably protective of the beneficial uses and users of groundwater in the Subbasin, and if progress toward the minimum threshold or measurable objective is achieved, will have a positive impact on groundwater users. Furthermore, preventing further long-term seawater intrusion will be beneficial to users in the Subbasin who may reside in areas at risk from further intrusion.

However, Department staff understands that until groundwater levels are at the minimum thresholds there is a potential for further seawater intrusion. Under the dry conditions scenario presented in the Plan, reaching the minimum thresholds may not happen until 2040. Department staff thus recommend the Agency provide additional information on the potential impacts of seawater intrusion on the beneficial uses and users, including domestic users, that are inland of the 2015 saline water impact area if landward migration of the front continues (see Recommended Corrective Action 2).

#### *4.3.3.4 Degraded Water Quality*

The GSP states that significant and unreasonable degraded water quality related to groundwater production is an undesirable result that has the potential to occur in the Subbasin and that the main constituents of concern for SGMA purposes are TDS and chloride.[145] Significant and unreasonable degradation of water quality may occur if there

[140] Oxnard Subbasin GSP, Section 3.3.3, p. 412.
[141] Oxnard Subbasin GSP, Section 3.4.3, p. 422.
[142] Oxnard Subbasin GSP, Section 1.1, Footnote 2, p. 28, Section 3.5.3 p. 430.
[143] Oxnard Subbasin GSP, Section 3.4.3, p. 422.
[144] Oxnard Subbasin GSP, Section 3.4.3, p. 422.
[145] Oxnard Subbasin GSP, Section 3.3.4.1, p. 414.

is an expansion of the areas currently impacted by elevated concentrations of chloride and TDS that limit agricultural and potable use of groundwater.

The GSP states that the sustainable management criteria for chronic lowering of groundwater levels are used as a proxy for water quality, rather than concentrations of chloride and TDS, because the elevated concentrations of chloride and TDS are associated with groundwater production resulting in seawater intrusion and release of connate brines into aquifers. The GSP explains minimum thresholds established are water levels that prevent net migration of the 2015 saline water impact front after 2040.[146] The measurable objective is defined as the groundwater level at which there is neither seawater flow into nor freshwater flow out of the Upper Aquifer System and Lower Aquifer System; the measurable objective for each key well is based on the simulated median groundwater elevation between 2040 and 2070 that minimizes the migration of the 2015 saline water impact front after 2040.[147]

Department staff conclude that the GSP's approach of using groundwater levels as a proxy for its water quality sustainable management criteria for chloride and TDS specifically, is generally reasonable and consistent with the GSP Regulations. However, as recognized in the GSP, the effectiveness of applying a water level proxy to groundwater quality degradation needs to be assessed through continued monitoring.[148] It is not established at this time how groundwater levels will ensure that groundwater use subject to the GSAs jurisdiction does not significantly and unreasonably exacerbate existing degraded water quality conditions. While the Department is unaware of information demonstrating that groundwater production is impacting water quality in the Subbasin, Department staff recommend the GSAs assess water quality monitoring data and coordinate with the appropriate water quality regulatory programs and agencies to better understand how the established groundwater level thresholds are protective of groundwater quality, and not just limited to saline water, and to provide supporting data and information to ensure that groundwater quality is not exacerbated by groundwater use in the Subbasin (see Recommended Corrective Action 4).

In addition, the GSP identifies groundwater from the semi-perched aquifer as one of the primary reasons for degraded water quality[149] and acknowledges that water can migrate vertically from the semi-perched aquifer to the underlying Oxnard aquifer.[150] The GSP lacks adequate assessment and characterization of the potential for migration of degraded water to impair water supplies that may lead to undesirable results.[151] Therefore, Department staff recommend the Agency investigate the potential for

[146] Oxnard Subbasin GSP, Section 3.4.4, p. 424.
[147] Oxnard Subbasin GSP, Section 3.5.4 p. 430-431.
[148] Oxnard Subbasin GSP, Section 3.3.4.1, p. 414.
[149] Oxnard Subbasin GSP, Section 2.3.4.2, p. 151.
[150] Oxnard Subbasin GSP, Section 2.2.3, p. 123.
[151] 23 CCR § 354.28(c)(4).

groundwater pumping to result in migration of impaired water (see Recommended Corrective Action 1).

Lastly, the Plan acknowledges that elevated nitrate concentrations in the Forebay area have resulted in significant and unreasonable impacts to beneficial uses and users of the Subbasin.[152] Notably, nitrate concentrations in UWCD shallow supply wells tend to increase during periods of drought.[153] Nitrate concentrations above water quality objectives and basin management objectives are routinely detected in the Subbasin and likely caused by historical septic discharges and agricultural fertilizer application practices.[154] However, the GSP states that nitrate concentrations are not negatively impacted by their groundwater production, not anticipated to expand geographically, and, therefore, are not considered a SGMA sustainability indicator.[155] No minimum threshold is established for nitrate because the Agency believes nitrate concentrations are not negatively impacted by their groundwater production; will be diluted by maintaining and potentially increasing surface-water recharge from the Santa Clara River; and will decline in the long term due to modern agronomic fertilization practices and cessation of septic discharges. The GSP states that groundwater levels will be used as a proxy to prevent further degradation of groundwater quality in the Forebay area until a separate minimum threshold concentration for nitrate is found to be necessary.[156] At this time, Department staff find the GSP's approach to nitrate to be reasonable and encourage the GSAs to continue monitoring and assessing the relationship between groundwater production and nitrate concentrations.

#### *4.3.3.5 Land Subsidence*

The GSP defines the undesirable result associated with land subsidence as subsidence that substantially interferes with surface land uses.[157] Although the GSP does not explicitly describe whether land subsidence has impacted beneficial uses and users, the Agency recognizes the potential for land subsidence to impact infrastructure and states that subsidence associated with groundwater production has not caused and is not likely to cause undesirable results.[158] Furthermore, the GSP states that the projected 0.1 to 1 feet of subsidence that is anticipated to occur by 2040 will not substantially interfere with surface land uses in the Subbasin.

The GSP discusses historical land subsidence studies and subsidence rates, then hypothesizes that maintaining groundwater levels above historical lows will avoid subsidence related to groundwater production. Thus, the Agency intends to use groundwater levels as a proxy to monitor and avoid undesirable results related to subsidence. Although Department staff find the approach to be reasonable, staff also

[152] Oxnard Subbasin GSP, Section 3.3.4.2, p. 414-415.
[153] Oxnard Subbasin GSP, Section 1.6.2, p. 62.
[154] Oxnard Subbasin GSP, Section 3.3.4.2, p. 414-415.
[155] Oxnard Subbasin GSP, Section 3.3.4.2, p. 415.
[156] Oxnard Subbasin GSP, Section 3.4.4, p. 423.
[157] Oxnard Subbasin GSP, Section 3.3.5, p. 415.
[158] Oxnard Subbasin GSP, Section 3.3.5, p. 416.

recommend the Agency incorporate periodic monitoring (e.g., for each five-year update) for land subsidence that can provide the Agency with quantitative data regarding the performance of the proxy (see Recommended Corrective Action 3).

*4.3.3.6 Depletions of Interconnected Surface Water*

The Plan defines the undesirable result associated with depletion of interconnected surface water in the Oxnard Subbasin as a loss of GDE habitat. The Plan recognizes four GDEs and two potential GDEs and states that the health of GDEs depends on conditions of the semi-perched aquifer. Based on the stable groundwater elevation and low rate of groundwater production from the semi-perched aquifer, the Plan states that the loss of GDEs is not occurring and has not occurred in the past; thus, the Subbasin is not experiencing undesirable results for this sustainability indicator.[159] The Plan acknowledges data gaps regarding the confirmation of the potential GDEs and their hydraulic connection with the semi-perched aquifer.

The Plan explains that the minimum thresholds for depletion of interconnected surface water are water levels that limit seawater intrusion in the Subbasin and indicate that declines in groundwater elevations during periods of future drought will be offset by recoveries during future periods of above-average rainfall.[160] The Plan states that minimum thresholds are not established for the semi-perched aquifer because this unit is not considered a principal aquifer. Instead, the Plan explains that the simulated minimum thresholds established for the underlying Oxnard aquifer, which would prevent landward migration of the 2015 saline water impact front, were also found to result in higher water levels in the semi-perched aquifer.[161] The Plan states that historical groundwater levels in the semi-perched aquifer have supported GDEs and that the minimum thresholds for the Oxnard aquifer would result in higher groundwater elevations in the semi-perched aquifer, which would be protective of GDEs.[162]

Determining the connection between the surface water bodies and the underlying aquifers, including the semi-perched aquifer and the principal aquifers, will be necessary to understand and manage the depletion of interconnected surface water in the Subbasin. Department staff recommend the GSAs improve their understanding of interconnected surface water systems and the potential GDEs that may rely on those systems (see Recommended Corrective Action 1).

Department staff believe that if the proxy of using the minimum threshold established for groundwater levels for the Oxnard aquifer results in higher groundwater elevations in the semi-perched aquifer, this approach is reasonable to avoid the loss of GDEs, given that historical groundwater levels have supported GDEs prior to GSP implementation. However, Department staff believe that there is uncertainty regarding the future

[159] Oxnard Subbasin GSP, Section 3.3.6, p. 416-417.
[160] Oxnard Subbasin GSP, Section 3.4.6, p. 425.
[161] Oxnard Subbasin GSP, Section 3.4.6, p. 425.
[162] Oxnard Subbasin GSP, Section 3.4.6, p. 425.

groundwater condition in the semi-perched aquifer. Because the groundwater level in the semi-perched aquifer has been maintained largely by agricultural return flow,[163] the intended groundwater pumping reduction and agricultural land fallowing[164] could potentially reduce agricultural return flow and affect the future groundwater level conditions in the semi-perched aquifer. Therefore, Department staff believe that the Agency should have a robust monitoring network capable of evaluating whether the use of groundwater levels in the underlying Oxnard aquifer as a proxy for depletion of interconnected surface water is performing as intended and avoiding undesirable results associated with GDEs and the depletion of interconnected surface waters (see Recommended Corrective Action 1).

## 4.4 MONITORING NETWORKS

GSP Regulations require that a monitoring network be developed for each basin including monitoring objectives, monitoring protocols, and data reporting requirements. The network shall promote the collection of data of sufficient quality, frequency, and distribution to characterize groundwater and related surface water conditions in the basin and evaluate changing conditions.[165]

### 4.4.1 Evaluation Summary

The monitoring network for the Subbasin was developed to track and monitor parameters that demonstrate progress toward meeting the sustainability goals. In addition to existing groundwater level monitoring programs, the Agency developed a monitoring network which monitors groundwater levels in the Subbasin. Although there are no monitoring networks newly developed for the other five sustainability indicators, the Agency plans to use groundwater level data as a proxy to assess groundwater conditions related to other sustainability indicators.

Although the GSP's monitoring network substantially complies with GSP regulations, the Plan identifies data gaps in each aquifer and in a management area. Department staff concur that there are critical data gaps that should be addressed early in GSP implementation. Failure to do so may make it difficult to demonstrate that implementation of the Plan is achieving the sustainability goal of the Subbasin, which may influence subsequent plan assessments by the Department.

### 4.4.2 Monitoring Networks

The Agency maintains long-term groundwater and surface water data for groundwater management purposes and to understand Subbasin conditions and responses to climate and land use. Groundwater elevation and surface flow monitoring started in the 1930s, with groundwater extraction data being collected since 1983. Precipitation data has been recorded for more than a century in the Subbasin.

[163] Oxnard Subbasin GSP, Section 2.2.3, p. 123, Section 2.4.1.9, p. 170, Section 2.4.2.2, p. 171,
[164] Oxnard Subbasin GSP, Section 5.6 – Section 5.7, p. 546-551
[165] 23 CCR § 354.32 *et seq*.

The existing groundwater level monitoring network consists of 150 wells that are measured monthly to quarterly; 34 of those wells are selected for representative monitoring. Groundwater level data is being collected by the Ventura County Watershed Protection District and UWCD, which are partner agencies. Because these agencies follow different data collection protocols, the Agency plans to work with these agencies to ensure that future data collection is conducted according to protocol that is consistent with best management practices.[166] The Agency plans to collect groundwater elevation data from the 34 representative wells within a 2-week window in the spring and fall of each year. In addition to manual measurements, the Agency plans to monitor short-term and long-term trends in groundwater elevation using transducers.

The GSP states that the groundwater level monitoring network is structured to provide groundwater elevation data for each primary aquifer and the lateral and vertical gradient within and between the aquifers. The numerical model will be used to calculate the annual change in storage using the collected groundwater level data and will be reported for each aquifer in annual reports.

The Agency has worked with Department's Technical Support Services program to close data gaps by constructing six new monitoring wells in the Oxnard Subbasin. The Agency's rationale for monitoring site selection appears to include wells from all major aquifers and management areas to have temporal and spatial coverage, and the Agency believes that the monitoring network is robust enough to detect Subbasin-wide undesirable results in a timely manner. Because there are no representative monitoring wells located in the East Oxnard Plain Management Area (EOPMA),the Agency intends to use the wells located in the adjacent Oxnard Pumping Depression Management Area to monitor the groundwater conditions in the EOPMA until a monitoring well is installed in the EOPMA.[167] The Agency assumes that the measurable objectives set for the wells located in the Oxnard Pumping Depression Management Area will also protect the EOPMA because of the proximity of the monitoring wells to the EOPMA. Department staff believe that Agency's approach of using key wells located in the adjacent management area for EOPMA is scientifically reasonable and Agency's plan to add a monitoring well in future for an accurate understanding of EOPMA groundwater condition is pragmatic.

The GSP includes over 900 groundwater quality hydrographs which show historical and current water quality data. Some of these hydrographs include water quality data going back to the 1930s. The hydrographs compare the five water quality constituents with Basin Plan Water Quality Objectives or Maximum Contaminant Levels (MCL).[168] The GSP does not include a summary of the historical water quality conditions apart from information provided in hydrographs, but discusses 2011 to 2015 groundwater quality conditions related to the five constituents of concern. The water quality constituents that are currently being monitored in the Subbasin are TDS, chloride, nitrate, sulfate, and

[166] Oxnard Subbasin GSP, Section 4.5, p. 484.
[167] Oxnard Subbasin GSP, Section 3.3.1, p. 410-411.
[168] Oxnard Subbasin GSP, Appendix G, p. 1803-2718.

boron. These water quality constituents are associated with the water quality thresholds either adopted by the Agency or mandated by the LARWQCB. The groundwater quality sampling frequency ranges from quarterly to annually, with data being analyzed to document trends of the constituents identified by FCGMA and the LARWQCB. The Agency chooses not to use the water quality monitoring data for the degraded water quality sustainability indicator; instead, the Agency uses groundwater elevation data as the proxy. The Plan states that the groundwater quality data will continue to be collected and analyzed to assess whether groundwater elevation thresholds are sufficiently protective of groundwater conditions in the Subbasin.[169]

Although the existing water quality monitoring program in the Oxnard Subbasin includes the monitoring of chloride concentration, the Agency chose not to use chloride concentration data to monitor seawater intrusion. Instead, the Agency plans to use groundwater elevation data to monitor and assess seawater intrusion in the Subbasin. The Plan states that their network of 16 dedicated monitoring wells located adjacent to the coast is capable of documenting groundwater elevations that could induce seawater intrusion. The Agency plans to monitor the water quality trends related to seawater intrusion by monitoring each coastal well on an annual basis.

The Agency does not have a monitoring program to directly monitor land subsidence in the Subbasin, stating that it does not anticipate subsidence related to groundwater production to occur because the minimum threshold for groundwater elevations are higher than the historical low groundwater elevations in the Subbasin. The Agency plans to use groundwater elevation data as a proxy for monitoring land subsidence in the Subbasin and states that pre-existing GPS-based benchmarks could be used to monitor land subsidence if the water level falls below historical low levels for an extended period and the potential for land subsidence to substantially interfere with surface land uses is determined.[170] As stated above, Department staff recommend the Agency incorporate periodic monitoring for subsidence, directly, to verify that its assumptions about the proxy are correct (see Recommended Corrective Action 3)

The GSP states that groundwater elevations are monitored in the semi-perched aquifer to document interactions between the semi-perched aquifer and the surface water bodies in the Subbasin, as well as to document potential gradients between the semi-perched aquifer and the underlying Oxnard aquifer.[171] However, the Agency's monitoring network does not include any representative key wells for the semi-perched aquifer; thus, sustainable management criteria are not established for any wells screened solely in the semi-perched aquifer. Although the GSP states that the semi-perched aquifer is not a primary aquifer and is not a significant contributor to groundwater production, the GSP recognizes that impaired groundwater from the semi-perched aquifer[172] could migrate

[169] Oxnard Subbasin GSP, Section 3.3.4.1 - 3.3.4.2, p. 414-415.
[170] Oxnard Subbasin GSP, Section 4.6.4, p. 487.
[171] Oxnard Subbasin GSP, Section 4.3.1, p. 478.
[172] Oxnard Subbasin GSP, Section 2.3.4.7, p. 155.

vertically and impact the underlying Oxnard aquifer.[173] Staff recommend that the GSAs provide additional information to demonstrate that the network can effectively characterize conditions in the semi-perched aquifer and in the vicinity of GDEs (see Recommended Corrective Action 1).

## 4.5 PROJECTS AND MANAGEMENT ACTIONS

GSP Regulations require a description of the projects and management actions the submitting agency has determined will achieve the sustainability goal for the basin, including projects and management actions to respond to changing conditions in the basin.[174]

### 4.5.1 Evaluation Summary

The Agency has already been managing groundwater in the Subbasin by implementing various management actions to address the undesirable results described in the GSP. In addition to the currently operational Advanced Water Purification Facility project, the GSP proposes projects that, if implemented, will likely allow the Subbasin to be operated within its sustainable yield by decreasing reliance on groundwater within the Subbasin.

Furthermore, Department staff find that the management actions, which focus largely on reducing groundwater production, directly relate to the sustainable management criteria and present a generally feasible approach to achieving the sustainability goal of the Subbasin and are generally consistent with the requirements of the GSP Regulations. However, the GSP lacks specific details regarding the pumping reduction plan, the projects and management actions that will be implemented, expected timelines of projects and management actions, and when the Agency expects to see benefits from implemented projects and management actions. Department staff understand that many of these details will be developed during the next several years. Since meeting the sustainability goal for the Subbasin is largely dependent on implementation of the projects and in particular the management actions, failure to implement these projects and management actions, or material modifications, may affect the Department's conclusions regarding the adequacy of the GSP or its implementation in future evaluations.

### 4.5.2 Projects

To meet the sustainability goal of the Subbasin, the Plan provides details for five projects:[175]

1. Complete construction of the Advanced Water Purification Facility (AWPF)
    - Provide City of Oxnard with up to 6.25 million gallons per day for reclaimed water uses

[173] Oxnard Subbasin GSP, Section 2.2.3, p. 122-123, Section 2.3.4.7, p. 156.
[174] 23 CCR § 354.44 *et seq*.
[175] Oxnard Subbasin GSP, Section 5.2, p. 536-548.

2. Expand the capacity of the AWPF to provide additional reclaimed water for recharge
3. River Park-Saticoy Groundwater Replenishment and Reuse Project Recycled Water Project
    - Extend three miles of pipeline to convey water from the AWPF Expansion Project to two groundwater recharge facilities operated by UWCD
4. Freeman Expansion Project
    - Construct facilities capable of diverting Santa Clara River water at higher flow rates and with higher sediment loads
5. Temporary agricultural land fallowing project
    - Use replenishment fees collected by the Agency to lease and temporarily fallow agricultural land in specific areas more susceptible to seawater intrusion

All five projects include a description, the relationship to sustainability criteria, expected benefits, metrics for evaluation, and funding sources. The Plan states that Phase 1 of Project 1 (constructing the AWPF) has already been permitted and constructed and began delivering reclaimed water to agricultural operators in 2016. The AWPF is currently producing up to 4,600 acre-feet of reclaimed water per year

The Agency provided timelines for project implementation to be within 10 years,[176] but the GSP explicitly states that inclusion of these projects in the GSP does not mean the Agency is making a commitment to fund or construct these projects; rather, these projects met various feasibility criteria and were analyzed to understand their impacts on groundwater elevation and the sustainable yield of the Subbasin.[177] The GSP further states that these projects were included because they have quantifiable information for evaluation and modelling rather than because of the project feasibility.[178]

The Agency used the numerical model to simulate scenarios with projects to determine the relationship between projects and groundwater elevations in the Subbasin. The model simulations indicate that groundwater elevations were slightly higher with the proposed projects than without projects[179] and show that the proposed projects are reasonable to address the undesirable results related to seawater intrusion occurring in the Subbasin.[180]

The GSP identifies some uncertainties with respect to the successful implementation of the projects. The operational uncertainties described in the GSP are:

[176] Oxnard Subbasin GSP, Section 5.2, p. 538-548.
[177] Oxnard Subbasin GSP, Section 5.1, p. 535.
[178] Oxnard Subbasin GSP, Section 5.1, p. 535.
[179] Oxnard Subbasin GSP, Section 2.4, p. 177-190; Figure 3-6 - 3-11, p. 449-467.
[180] Oxnard Subbasin GSP, Figure 2-63, p. 361, Appendix E, Figure 4 and Figure 5, p. 1711-1712.

- the source of additional secondary effluent for the expansion of the AWPF project
- the availability of high flow in the Santa Clara River for diversion of additional surface water flow
- the availability of the lessors to participate in the temporary agricultural land fallowing project
- the funding sources for the proposed projects have been identified in the Plan as the replenishment fee and grant fund, but the reliability of these funding sources have not been discussed.

Furthermore, a comment letter received by the Department discusses the disagreement between the agencies regarding implementation of projects 1, 2 and 3, and the letter challenged the Agency's authority to implement the projects identified in the GSP. Department staff recommend FCGMA rectifies the differences between the agencies and arrive at an agreement so that the projects can be implemented in the desired schedule.

Despite the uncertainties discussed above, Department staff find that, at this time, the GSP provides a reasonable discussion of how the projects are related to the basin sustainability and provides a general implementation timeline. The projects are developed by the GSAs to help ensure that the Subbasin will be operated within its sustainable yield and are expected to mitigate the overdraft condition. Therefore, Department staff believe that the projects included in the GSP demonstrate a feasible approach to meet the Subbasin's sustainability goals and appears to help in improving groundwater conditions in the Subbasin.

### 4.5.3 Management Actions

The GSP describes two management actions, which include reducing groundwater production and a water market pilot program. The GSP discusses the relationship between the management actions and sustainability criteria, expected benefits, metrics for evaluation, and funding sources. The GSP states that reducing groundwater production is the primary management action[181] that can be implemented by the Agency and is a critical component of achieving sustainability.[182] The Agency intended to implement these management actions within five years of GSP adoption, upon approval by the FCGMA board.

In regard to the proposed water market pilot program, the program will allow for transfer of extraction allocations, but excludes transfers in the Saline Water Intrusion Management Area and Pumping Depression Management Area if the transfer results in a net increase in the total market allocation for participants. The participants in these management areas may receive a transfer of market allocation only from another participant in the same

[181] Oxnard Subbasin GSP, Executive Summary, p. 25.
[182] Oxnard Subbasin GSP, Section 5.7.2, p. 549.

management area. In placing these parameters on its market allocation transfers, the Agency aims to avoid undesirable impacts related to seawater intrusion.

The GSP provides an overview of how and when the management actions will be implemented, but also identifies that allocations need to be determined and approved by the GSAs. Department staff believe that both the management actions included in the Plan can reasonably mitigate overdraft and, if implemented, appear likely to help the GSAs achieve sustainability in the Subbasin. Department staff's understanding is that the ability of the GSP to achieve the sustainability goal for the Subbasin is largely dependent on successful implementation of a management action to reduce groundwater pumping. As such, the Department will closely monitor the Agency's progress in developing and implementing such a management action.

## 4.6 Consideration of Adjacent Basins/Subbasins

SGMA requires the Department to "…evaluate whether a groundwater sustainability plan adversely affects the ability of an adjacent basin to implement their groundwater sustainability plan or impedes achievement of sustainability goals in an adjacent basin."[183] Furthermore, the GSP Regulations state that minimum thresholds defined in each GSP should be designed to avoid causing undesirable results in adjacent basins or affecting the ability of adjacent basins to achieve sustainability goals.[184]

The Oxnard Subbasin has four adjacent basins/subbasins: Pleasant Valley, Las Posas, Mound, and Santa Paula. The Oxnard Subbasin is in hydraulic communication, in varying degrees, with all of those adjacent basins and subbasins. FCGMA is the lead GSA and exclusive GSA for developing and implementing the respective groundwater sustainability plans in the Oxnard Subbasin, Pleasant Valley Basin, and Las Posas Basin. FCGMA took a regional approach to determine the combined sustainable yield of all three basins and then determined the sustainable yield for each groundwater basin. The sustainable management criteria for each respective groundwater sustainability plan were established with consideration for the sustainability goals of the adjacent basins and to operate each groundwater basin within their sustainable yield.

The GSP of Mound Subbasin is being developed by the Mound Basin GSA, which is a joint powers authority comprised of three local public agencies. Department staff recommend that the Agency continue to collaborate and communicate with the Mound Basin GSA to ensure that the basins in the region do not prevent each other from achieving sustainability.

The Santa Paula Subbasin is an adjudicated basin currently managed by UWCD per the physical solution embodied within the Court Judgment. Department staff recommend that

[183] Water Code § 10733(c).
[184] 23 CCR § 354.28(b)(3).

the GSAs work with UWCD to corroborate that the implementation of Oxnard GSP does not adversely affect the UWCD's management of the Santa Paula.

Department staff understand that the established sustainability management criteria and strategy to reach sustainability in the Oxnard Subbasin is primarily related to improving groundwater levels in the principal aquifers and avoiding seawater intrusion. Based on this strategy, on the Agency's history of actively collaborating with local agencies, other information provided in the Plan, and because the Agency took a regional approach in developing the respective groundwater sustainability plans and provided reasonable consideration to adjacent basins and their sustainability metrics, Department staff determined that the Oxnard Subbasin GSP will not adversely impact the ability of the adjacent basins to be operated sustainably and will not impede the adjacent basins' ability to achieve their respective sustainability goals.

# 5 STAFF RECOMMENDATION

Department staff's recommendation is to approve the GSP with the recommended corrective actions listed below. The Oxnard Subbasin GSP conforms with Water Code Sections 10727.2 and 10727.4 of SGMA and substantially complies with the GSP Regulations. Implementation of the GSP will likely achieve the sustainability goal for the Oxnard Subbasin. The GSAs have identified several areas for improvement of the GSP and Department staff concur that those items are important and should be addressed as soon as possible. Department staff have also identified additional recommended corrective actions that should be considered by the GSAs for the first five-year assessment of its GSP. Addressing these recommended corrective actions will be important to demonstrate that implementation of the GSP is likely to achieve the sustainability goal. The recommended corrective actions include:

### RECOMMENDED CORRECTIVE ACTION 1

Investigate the hydraulic connectivity between the surface water bodies, semi-perched aquifer, and principal aquifers to improve the understanding of potential migration of impaired water, the reliance of two potential GDEs on the semi-perched aquifer, and depletion of interconnected surface water bodies. Also, identify specific locations of gaining and losing reaches of surface water bodies and quantify the depletion of interconnected surface water. Describe schedule and steps that will be taken to fill data gaps identified in the GSP related to shallow groundwater monitoring near surface water bodies and GDEs.

### RECOMMENDED CORRECTIVE ACTION 2

Under the dry climatic condition scenario, the groundwater levels will only reach minimum thresholds by 2040, which will limit seawater intrusion but not necessarily avoid the condition. Discuss the impact of further seawater intrusion and associated loss of storage on beneficial uses and users under the dry climatic condition scenario and the potential impacts to uses and users inland of the 2015 saline water impact area if landward migration of the saline water impact front continues.

### RECOMMENDED CORRECTIVE ACTION 3

Incorporate periodic subsidence monitoring into the GSP's monitoring plan that can be used to quantify whether land subsidence is occurring and whether the groundwater level proxy is avoiding undesirable results associated with land subsidence. As an option, the Department provides statewide InSAR data that can be used for monitoring land subsidence.

## RECOMMENDED CORRECTIVE ACTION 4

Elaborate how the Agency is planning to verify that the groundwater level thresholds are adequate to assess the groundwater quality conditions in the Subbasin. Discuss how the groundwater quality data from the existing monitoring network will be used for sustainable management of the Subbasin. Coordinate with the appropriate groundwater users, as identified in the GSP, and the appropriate water quality agencies in the Subbasin to evaluate how the Agency's current groundwater management strategy is affecting the groundwater quality in the Subbasin.