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

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| Groundwater Basin Name: | Santa Clara Valley– Niles Cone (Basin No. 3-002.01) |
| Submitting Agency: | Alameda County Water District |
| Recommendation: | Approve |
| Date Issued: | July 17, 2019 |

## I. Summary

Alameda County Water District (District) submitted an alternative (Niles Cone Subbasin Alternative or Alternative) to the Department of Water Resources (Department) for evaluation and assessment as provided by the Sustainable Groundwater Management Act (SGMA).[1] The District submitted an existing plan[2] and relies on numerous reports and supporting documents. After reviewing the Alternative and considering public comments, Department staff find the Niles Cone Subbasin Alternative satisfies the objectives of SGMA and recommends approval of the Alternative.

Alameda County Water District was formed under the County Water District Act in 1914 to protect the groundwater Subbasin, conserve water in the Alameda Creek watershed, and develop supplemental water supplies. Additional authority for groundwater management in the Niles Cone Subbasin, as explained in the Alternative, was provided to the District under the Replenishment Assessment Act of 1961. The Replenishment Assessment Act was passed in response to deteriorating groundwater conditions from seawater intrusion in the Newark Aquifer caused by overdraft in the Subbasin below the Hayward Fault. Subsequent efforts to restore groundwater elevations above sea level included importing surface water from the State Water Project and San Francisco Public Utilities Commission Hetch-Hetchy Project to reduce demand on groundwater and recharge the aquifers. These efforts appear successful, and on-going management has been focused on improving managed aquifer recharge operations, banking groundwater outside the Subbasin, and mitigating legacy water quality issues related to sea water intrusion in the deeper aquifers. Based on the provided information, Department staff believe the District has a sufficient understanding of the geology and hydrology of the

[1] Water Code § 10720 *et seq*.
[2] Water Code § 10733.6(b)(1)

Subbasin and the direct and indirect adverse effects of past groundwater management practices that led to overdraft conditions. The District quantifies criteria used to manage the Subbasin to prevent historical groundwater problems from returning and documents actions and operations implemented to eliminate overdraft and reverse seawater intrusion by restoring and maintaining groundwater levels above sea level. Department staff find maintaining groundwater elevations at a level that prevents seawater intrusion below the Hayward Fault and avoids declining yield in wells above the Hayward Fault is a reasonable approach that is likely to avoid other potential adverse effects in the Subbasin and is sufficient to avoid undesirable results for the Subbasin.

The Niles Cone Subbasin Alternative does not follow the organization of, or include the identical elements that are required of, a Groundwater Sustainability Plan (GSP). In fact, Alternative is not well organized, with information spread across more than 80 files uploaded to the Department's web site. However, after considerable effort to review the documentation submitted, Department staff believe that the information relied upon by the District for their Alternative is sufficiently detailed and credible to conclude that implementation of the Alternative is reasonably likely to lead to sustainable groundwater management of the Niles Cone Subbasin.[3] Department staff have identified recommended actions for the District that are designed to improve organization of the Alternative and to facilitate the Department's ongoing evaluation of the Alternative's implementation and determination of whether it adversely affects an adjacent basin.

The remainder of this assessment is organized as follows:

- **Section II. Review Principles** describes legal and other considerations regarding Department staff's assessment and evaluation of alternatives.
- **Section III. Alternative Materials** describes materials (i.e., plans, reports, data, and other information) submitted by the District that, collectively, the Department staff considered as the Alternative.
- **Section IV. Required Conditions** describes whether the Alternative satisfies each of the four conditions required for the Department to review an alternative.
- **Section V. Alternative Contents** describes the information contained in the Alternative submittal.
- **Section VI. Assessment** describes Department staff's evaluation of the Alternative, whether it satisfies the objectives of SGMA, and, if applicable, describes recommended actions proposed for the first five-year update.

[3] Water Code § 10721(v). See also discussion in Section II. Review Principles. Sustainable groundwater management is achieved by meeting the basin's sustainability goal.

# II. Review Principles

The Alameda County Water District submitted an alternative based on a groundwater management plan to the Department for evaluation and assessment to determine whether it satisfies the objectives of SGMA for the Niles Cone Subbasin. To satisfy the objectives of SGMA, an alternative based on a groundwater management plan prepared pursuant to Part 2.75 of Division 6 of the Water Code[4] or a plan developed pursuant to another law authorizing groundwater management must demonstrate that implementation of the plan has led to or 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.[5] Undesirable results are defined quantitatively by the managing agency.[6]

An alternative, to be evaluated by the Department, must be submitted by the statutory deadline and be within a basin that complies with Part 2.11 of Division 6 of the Water Code.[7] The submitted alternative must also be complete and must cover the entire basin.[8] The GSP Regulations[9] require the Department to evaluate an Alternative "in accordance with Sections 355.2, 355.4(b), and Section 355.6, *as applicable*, to determine whether the Alternative complies with the objectives of the Act".[10] The elements of the cited sections are not all applicable to alternatives. Some provisions apply to GSPs and alternatives alike, to alternatives only prospectively, or do not apply to alternatives at all.[11] Ultimately, the purpose of the evaluation is to determine whether an alternative satisfies the objectives of SGMA.[12] The agency must explain how the elements of an alternative are

[4] Water Code § 10750 *et seq.*
[5] Water Code § 10721(v)
[6] 23 CCR § 354.26
[7] Water Code § 10733.6(c)-(d)
[8] 23 CCR § 358.4(a)
[9] 23 CCR § 350 *et seq.*
[10] 23 CCR § 358.4(b) (emphasis added)
[11] Procedural requirements, including submissions by the agency, posting by the Department, and the public comment period, apply equally to plans and alternatives (23 CCR § 355.2(a)-(c)). The periodic review of Plans (23 CCR § 355.6(a)) applies to alternatives prospectively but does not apply to initial submissions. Other regulatory provisions are inapplicable to alternatives, including the two-year review period (23 CCR § 355.2(e)), which is based on the statutory time-frame that applies to Plans but not alternatives (Water Code § 10733.4(d)); the "incomplete" status that allows the agency to address "one or more deficiencies that preclude approval, but which may be capable of being corrected by the Agency in a timely manner" (23 CCR § 355.2(e)(2)), which applies to plans undergoing development, but not alternatives that purportedly satisfy the objectives of SGMA at the time of their submission (Water Code § 10733.6(a)); and, for the same reason, corrective actions to address deficiencies in plans (23 CCR § 355.4(a)(4)), which applies to plans developed after the adoption of SGMA, but is inapplicable to alternatives that predate SGMA.
[12] 23 CCR § 358.2(d), based on the statutory threshold of "whether the alternative satisfies the objectives of [SGMA] for the basin" (Water Code § 10733.6(a)).

"functionally equivalent" to the elements of a GSP required by Articles 5 and 7 of the GSP Regulations and are sufficient to demonstrate the ability of an alternative to achieve the objectives of SGMA.[13] The explanation by the agency that elements of an alternative are functionally equivalent to elements of a GSP furthers the objective of demonstrating that an alternative satisfies the objectives of SGMA. Alternatives based on groundwater management plans or historical basin management practices that predate the passage of SGMA or adoption of GSP Regulations, although required to satisfy the objectives of SGMA, are not necessarily expected to conform to the precise format and content of a GSP. The Department's assessment is thus focused on the ability of an alternative to satisfy the objectives of SGMA as demonstrated by information provided by the agency; it is not a determination of the degree to which an alternative matched the specific requirements of the GSP Regulations.

When evaluating whether an alternative satisfies the objectives of SGMA and thus is likely to achieve the sustainability goal for the basin, staff reviews the information provided by and relied upon by the agency for sufficiency, credibility, and consistency with scientific and engineering professional standards of practice.[14] The Department's review considers whether there is a reasonable relationship between the information provided and the assumptions and conclusions made by the agency, whether sustainable management criteria and projects and management actions described in an alternative 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.[15] Staff will recommend that an alternative be approved if staff believe, in light of these factors, that alternative has achieved or is likely to achieve the sustainability goal for the basin.[16]

An alternative that relies on an existing plan may be approved based on information that demonstrates the basin is being or will be managed sustainably based on groundwater management pursuant to that plan, including any related projects and management actions, as necessary. Even when staff review indicates that an alternative will satisfy the objective of SGMA, the Department may recommend actions to facilitate future evaluation of that alternative and to allow the Department to better evaluate whether an alternative adversely affects adjacent basins. The Department proposes that recommended actions be addressed by the submission date for the first periodic evaluation.

Staff assessment of an alternative involves the review of information presented by the agency, including models and assumptions, and an evaluation of that information based

[13] 23 CCR § 358.2(d)
[14] 23 CCR § 351(h)
[15] 23 CCR § 355.4(b)(1), (3), and (5).
[16] 23 CCR § 355.4(b)

on scientific reasonableness. The assessment does not require Department staff to recalculate or reevaluate technical information provided in an alternative or to perform its own geologic or engineering analysis of that information. The staff recommendation to approve an alternative does not signify that Department staff, were they to exercise the professional judgment required to develop a plan for the basin, would make the same assumptions and interpretations as those contained in an alternative, but simply that Department staff has determined that the assumptions and interpretations relied upon by the submitting agency are supported by adequate, credible evidence, and are scientifically reasonable.

# III. Alternative Materials

The District submitted an alternative based on a plan developed pursuant to its statutory authority under County Water District Law. Unlike typical groundwater management plans (e.g., those developed pursuant to AB3030), the District's plan does not rely on a single document. Instead, the District states that the following three documents submitted to the Department are core to the sustainable management of the Niles Cone Subbasin[17]:

- Alameda County Water District, Groundwater Management Policy (Policy). 2001. The Groundwater Management Policy was prepared as a guide for District management and explanation of groundwater management programs for the public. The policy provides a high-level description of the eight major groundwater management programs developed and implemented by the District.
- Alameda County Water District, Survey Report on Groundwater Conditions, (provided yearly from 2007 through 2016) (Survey Reports). The Survey Reports on Groundwater Conditions are developed annually as required under the Replenishment Assessment Act of 1961. The Report includes information used by the Board to determine annual overdraft, accumulated overdraft and the extent of seawater intrusion as well as planning estimates for annual overdraft and accumulated overdraft for the current and ensuing water years. The Report also includes recommendations for quantities of water to purchase and estimates of costs related to replenishment of groundwater in the Subbasin.
- Alameda County Water District, Groundwater Monitoring Report (Monitoring Report), 2015. The Groundwater Monitoring Report documents groundwater flow and quality through measurements and samples. The Report also presents an evaluation of wells that are part of the monitoring program.

[17] Executive Summary, p. 5; ACWD Urban Water Management Plan, 2015-2020, pp. 4-6

Additionally, the following reports and other documents that Department staff determined to be sufficiently related to Subbasin management and planning efforts to warrant their consideration as part of the Alternative were reviewed:

- Alameda County Water District, Executive Summary
- Alameda County Water District, Niles Cone Sustainable Yield 10-Year Analysis, December 2016.[18]
- Replenishment Assessment Act of the Alameda County Water District (Chapter 1942 of the Statutes of 1961, as Amended September 14, 1970 and September 18, 1974) (Replenishment Assessment Act).
- Alameda County Water District, Integrated Resources Planning Study. 1995.
- Alameda County Water District, Integrated Resources Planning Study 10-Year Review. 2006.
- Alameda County Water District, Reliability by Design: Integrated Resources Planning at the Alameda County Water District. 2014.
- Alameda County Water District, Part I Hydrogeologic Conceptual Model. 2016.
- Alameda County Water District, Urban Water Management Plan 2015-2020. 2016.
- Niles Cone and South East Bay Plain Integrated Groundwater and Surface Water Model – Model Development and Calibration Report (NEBIGSM Model.
- Development and Calibration Report) WRIME, 2005.
- DWR Bulletin 118-1 – Evaluation of Ground Water Resources South Bay Appendix A: Geology (1967)
- Luhdorff and Scalmanini East Bay Plain Aquifer Test Project (2003)

Other submitted documents are contained in the List of References and Technical Studies.

The District submitted an Alternative Elements Guide and a description of how the Alternative covers the entire Subbasin. The District has also submitted Annual Reports.[19] Other material submitted by the District, public comments, other documents submitted by third parties, correspondence, and other information provided to or relied upon by the Department have been posted on the Department's web site.[20]

[18] The Niles Cone Sustainable Yield 10-Year Analysis Report is considered part of the Plan because it is based on existing and publicly available information that has been compiled from other references for submission of the Alternative.
[19] The Annual Report is not part of the Alternative and was not reviewed by the Department for the purpose of approving the Alternative.
[20] https://sgma.water.ca.gov/portal/#alt

# IV. Required Conditions

An alternative, to be evaluated by the Department, must be submitted by the statutory deadline and be within a basin that complies with Part 2.11 of Division 6 of the Water Code.[21] The submitted alternative must also be complete and must cover the entire basin.[22]

## A. Submission Deadline

SGMA requires that an alternative for a basin categorized as high- or medium-priority as of January 31, 2015, be submitted no later than January 1, 2017.[23]

The Alameda County Water District submitted its Alternative on December 31, 2016, before the statutory deadline.

## B. Part 2.11 (CASGEM) Compliance

SGMA requires that the Department assess whether an alternative is within a basin that is in compliance with Part 2.11 of Division 6 of the Water Code,[24] which requires that groundwater elevations in all groundwater basins be regularly and systematically monitored and that groundwater elevation reports be submitted to the Department.[25] To manage its obligations under this law, the Department established the California Statewide Groundwater Elevation Monitoring (CASGEM) Program. The acronym CASGEM is used in this document to denote both the program and the groundwater monitoring law.[26]

SGMA specifies that an alternative does not satisfy the objectives of SGMA if the basin is not in compliance with the requirements of CASGEM.[27] The Department confirmed that the Niles Cone Subbasin was in compliance with the requirements of CASGEM prior to evaluating this Alternative and confirmed that the Subbasin remained in compliance with CASGEM through the last reporting deadline prior to issuing this assessment.

[21] Water Code § 10733.6(c)-(d)
[22] 23 CCR § 358.4(a)
[23] Water Code § 10733.6(c). Pursuant to Water Code § 10722.4(d), a different deadline applies to a basin that has been elevated from low- or very low-priority to high- or medium-priority after January 31, 2015.
[24] Water Code § 10733.6(d)
[25] Water Code § 10920 *et seq*.
[26] Stats.2009-2010, 7th Ex.Sess., c. 1 (S.B.6), § 1
[27] Water Code §10733.6(d)

## C. Completeness

GSP Regulations specify that the Department shall evaluate an alternative if that alternative is complete and includes the information required by SGMA and the GSP Regulations.[28] An alternative submitted pursuant to Water Code Section 10733.6(b)(1) must include a copy of the groundwater management plan and an explanation of how the elements of the Alternative are functionally equivalent to the elements of a GSP required by Articles 5 and 7 of the GSP Regulations and are sufficient to demonstrate the ability of the Alternative to achieve the objectives of SGMA.[29]

The District submitted its Groundwater Management Policy along with the Replenishment Assessment Act and current versions of the Monitoring Report, as well as numerous other documents, that it purports to constitute the plan for managing groundwater resources in the Subbasin, consistent with its statutory authorities. While not well organized, the District's submittal does provide a detailed formulation of a program of action to manage groundwater in the Subbasin.[30] The District also submitted an Alternative Elements Guide, which includes the Agency's explanation of how the elements of the Alternative are functionally equivalent to the elements of a GSP. Department staff found the Alternative to be complete and containing the required information, sufficient to warrant an evaluation by the Department.

## D. Basin Coverage

An alternative must cover the entire basin.[31] An alternative that is intended to cover the entire basin may be presumed to do so if the basin is fully contained within the jurisdictional boundaries of the submitting agency. However, an alternative submitted by an agency whose jurisdictional boundaries do not include all areas of the basin may nevertheless be found to effectively cover the entire basin. Because the intent of SGMA is to provide for the sustainable management of groundwater basins,[32] with sustainability defined as the management and use of groundwater that does not cause undesirable results,[33] an alternative effectively covers the entire basin if it results in groundwater management that avoids undesirable results. An alternative that cannot avoid undesirable results is not sustainably managing the basin even if the entire basin is within the jurisdiction of the managing agency, but an alternative that avoids undesirable results

[28] 23 CCR § 358.4(a)(3)
[29] 23 CCR § 358.2(c)-(d)
[30] See "plan." Merriam-Webster.com. Merriam-Webster, 2019. Web. 10 June 2019
[31] 23 CCR § 358.4(a)(4)
[32] Water Code § 10720.1(a)
[33] Water Code § 10721(v)

throughout the basin is sustainably managing that basin even if some part of the basin lies outside the jurisdiction of that agency.

The jurisdictional boundary of the District effectively covers the entire Niles Cone Subbasin. However, there is a small fringe area in the southwest portion of the Subbasin where the District's boundary does not precisely align with the Subbasin boundary defined by the Department (*see* Figure 1, below). Department staff understand this area to be within the Don Edwards San Francisco Bay National Wildlife Refuge and within the tidal inundation zone. There are no wells in the fringe area and there is no reasonable expectation for the District to manage this area. In addition, it appears the intent of the District is to cover the entire Subbasin and therefore, this difference in the boundary does not preclude the District's coverage of the entire Niles Cone Subbasin.


*Figure 1. Jurisdictional boundary of Alameda County Water District*

# V. Alternative Contents

GSP Regulations require the submitting agency to explain how the elements of an alternative are functionally equivalent to the elements of a GSP as required by Article 5 of the GSP regulations[34] and are sufficient to demonstrate the ability of an alternative to achieve the objectives of SGMA.[35]

As stated previously, alternatives based on historical basin management practices that predate the passage of SGMA or adoption of GSP Regulations, although required to satisfy the objectives of SGMA, are not necessarily expected to conform to the precise format and content of a GSP, and the criteria for adequacy of an alternative is whether the Department is able to determine that an alternative satisfies the objectives of SGMA. Department staff rely on the submitting agency's determination of functional equivalence of alternative elements to facilitate its evaluation and assessment of an alternative (*see* Assessment, below). Although the exact components of a GSP are not required for an alternative, for organizational purposes the discussion of information contained in the Plan and related documents provided by the Agency generally follows the elements of a GSP provided in Article 5 of the GSP Regulations. The reference to requirements of the GSP Regulations at the beginning of each section is to provide context regarding the nature of the element discussed but is not meant to define a strict standard applicable to alternatives.

## A. Administrative Information

GSP Regulations require 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]

The District gets its legal authority for groundwater management through the County Water District Act[37] and the Replenishment Assessment Act.[38] The County Water District Act provides the District with authority to protect the Subbasin, conserve water in the Alameda Creek Watershed, and develop supplemental water supplies. This was initially for agricultural uses, but the authority was later expanded to include urban use in 1930. The Replenishment Assessment Act authorizes the District to take actions necessary to replenish groundwater supplies or to prevent seawater intrusion. The Replenishment

[34] 23 CCR § 354-354.44
[35] 23 CCR § 358.2(d). The requirements pertaining to Article 7 of the GSP Regulations (23 CCR § 356-356.4) relate to annual reports and periodic evaluation and are not applicable to review of the initial alternative.
[36] 23 CCR § 354.2 et seq.
[37] Water Code § 30000 et seq.
[38] Executive Summary, p. 1; Replenishment Assessment Act of the Alameda County Water District

Assessment Act also directs the District to prepare reports each year documenting groundwater conditions in the Subbasin, groundwater production, estimates of overdraft if applicable, an estimate of water available for replenishment, the quantity of water recommended for purchase for replenishment during the current and ensuing water year, and an estimate of the cost of that replenishment.[39] The District provided its annual Survey Reports on Groundwater Conditions from 2007 to 2015 to document compliance with the requirements of the Replenishment Assessment Act.

## B. 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 an assessment of the water budget.[40]

### 1. Hydrogeologic Conceptual Model

The GSP Regulations require a descriptive hydrogeologic conceptual model of the basin that includes a written description supported by cross sections and maps.[41]

The hydrogeologic conceptual model of the Niles Cone Subbasin is provided in the Hydrogeologic Conceptual Model document and is based on two technical studies, one from DWR in 1967[42] and another by Luhdorff and Scalmanini in 2003[43]. The hydrogeologic conceptual model describes the physical and geologic setting of the Niles Cone as the combination of alluvial fan deposits of Alameda Creek[44] and marine deposits related to rising and falling sea levels. The Hayward Fault provides a barrier to northeast-southwest groundwater flow in the Niles Cone Subbasin and effectively separates the Niles Cone Subbasin into two areas, above the Hayward Fault and below the Hayward Fault.[45] Below the Hayward Fault, the Subbasin is delineated into four principal confined aquifers named, from shallow to deep, as the Newark, Centerville, Fremont, and Deep aquifers. Above the Hayward Fault, the aquifer is treated as a single unnamed, unconfined aquifer. The hydrogeologic conceptual model identifies the primary water quality concerns in the principal aquifers below the fault to be related to brackish water from legacy sea water intrusion from groundwater pumping. The primary uses of each aquifer are identified as municipal with some pumping occurring for construction

[39] Replenishment Assessment Act of the Alameda County Water District, Section 7, p. 5
[40] 23 CCR § 354.12 et seq.
[41] 23 CCR § 354.14(a)
[42] DWR Bulletin 118-1 – Evaluation of Ground Water Resources South Bay Appendix A: Geology (1967)
[43] Luhdorff and Scalmanini East Bay Plain Aquifer Test Project (2003)
[44] ACWD Integrated Resources Planning Study 1995, Chapter II, p. II-2
[45] Part I Hydrogeologic Conceptual Model (2016), pp. 1-2

dewatering, the Aquifer Recovery Program including desalination, pumping for landscape irrigation and industrial purposes. Managed aquifer recharge operations through the quarry lakes are described as well as the primary well fields for both the Above Hayward Fault and Below Hayward Fault portions of the Niles Cone Subbasin.

## 2. Groundwater Conditions

The GSP Regulations require a description of historical and current groundwater conditions in the basin that includes information related to groundwater elevations, groundwater storage, seawater intrusion, groundwater quality, subsidence, and interconnected surface water, as applicable. The GSP Regulations also require an identification of groundwater dependent ecosystems.[46]

Groundwater elevations below the Hayward Fault are discussed in each annual Survey Report on Groundwater Conditions. Those reports illustrate fall groundwater elevations from 2006 through 2015 with groundwater contour maps for each principal aquifer in the Subbasin.[47] The groundwater contour maps demonstrate the relationship between managed aquifer recharge and groundwater levels in the Subbasin. Groundwater elevation contours in the upper Newark aquifer appear to consistently be above sea level, with groundwater flow directions outward from the interior of the Subbasin, and particularly from the recharge ponds, towards the bay. Groundwater elevation contours in the Centerville-Fremont and Deep aquifers show depressions in the central portion of the Subbasin, consistent with the location of groundwater extraction at the District's production and aquifer reclamation program (ARP) wells (the ARP is discussed in Projects and Management Actions, below). Groundwater elevations above the Hayward Fault are discussed in Groundwater Monitoring Report for 2015 only.

Changes in groundwater storage are calculated using the District's numerical groundwater model.[48] Groundwater levels and metered pumping volumes are used with the model to calculate an annual overdraft for the Subbasin, as defined in the Replenishment Assessment Act, as well as estimates of subsurface outflow and percolation of precipitation. [49] The District uses the results to quantify the annual overdraft[50] amount which is used under the Replenishment Assessment Act to help determine how much water to import. The District also determines whether accumulated overdraft has occurred. Accumulated overdraft is assumed to be the volume of water

[46] 23 CCR § 354.16
[47] Survey Reports on Groundwater Conditions, 2007 to 2016, Plates 5-7
[48] Niles Cone Sustainable Yield 10-Year Analysis, Section 3.6, p. 18
[49] Survey Reports on Groundwater Conditions, 2007 to 2016, p. 10
[50] Annual overdraft, as defined by the Replenishment Assessment Act, is effectively the difference between the amount of pumping of groundwater from the basin and the amount of water recharged from local water supplies for the fiscal year. (Survey Report on Groundwater Conditions, 2016, p. 11)

required to raise the water levels in the Newark Aquifer to mean sea level.[51] Accumulated overdraft of the Subbasin has been eliminated since early 1972, and water levels in the Newark Aquifer have remained above sea level since then, except for a period in 1990 during construction in the recharge facilities.[52]

The Niles Cone Sustainable Yield 10-Year Analysis Report addresses the potential for subsidence in the Subbasin by explaining that subsidence is unlikely to occur due to the District's operations keeping groundwater levels above the historical minimums observed in the Subbasin (*see* Land Subsidence, below).[53]

Numerous documents, including the Replenishment Assessment Act, which specifically identifies preventing seawater intrusion as its primary purpose[54] (see *Administrative Information*), identify the primary water quality concerns within the Subbasin as being related to seawater intrusion. The annual Survey Report on Groundwater Conditions maps the position of the seawater intrusion front in the Subbasin for each principal aquifer and year between 2006 and 2015.[55] The maps also show the relation to the Fall 1962 seawater intrusion front and depicts any expansion or reduction in chloride concentration relative to the 250 ppm contour. The seawater intrusion maps show that the seawater front in the Newark aquifer has migrated toward the bay, relative to conditions in 1962, and that the seawater intrusion front has been relatively stable through time. Seawater in the Centerville-Fremont and Deep aquifers shows some areas of reduced concentrations, relative to 1962, particularly in the vicinity of the recharge ponds, and some areas of expansion which is attributed to mixing of highly saline seawater with low salinity recharge water or vertical movement through poorly constructed wells or natural connections through the aquitards.[56]

Water quality is discussed in the Integrated Resources Plan, Urban Water Management Plan and the Niles Cone Sustainable Yield 10-Year Analysis Report. The District indicates that other water quality concerns, such as hazardous spill sites, are handled by other regulatory programs.[57] As described below (see *Degraded Water Quality*), potable water is subject to drinking water standards. The District is also preparing a salt and nutrient management plan.[58]

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[51] Survey Report on Groundwater Conditions, 2016, p. 14
[52] Survey Report on Groundwater Conditions, 2016, p. 14; Niles Cone Sustainable Yield 10-Year Analysis, Section 2.1, pg. 4
[53] Niles Cone Sustainable Yield 10-Year Analysis, Section 3.5 p. 17
[54] Replenishment Assessment Act of 1961, Section 2, p. 2
[55] Survey Reports on Groundwater Conditions, 2007 to 2016, Plates 8-10
[56] 2015 Groundwater Monitoring Report, p. 16
[57] Niles Cone Sustainable Yield 10-Year Analysis, Section 4.7, p. 21
[58] ACWD Urban Water Management Plan, Chapter 4, pp. 4-3

Documentation submitted with the Alternative does not specifically describe interconnected surface water, but the District indicates that groundwater discharge to the Alameda Creek Flood Control Channel may occur under very high groundwater heads.[59] It is further explained that this occurs in relation to the managed aquifer recharge operations when the indicator wells are near the maximum limit.

None of the submitted documents specifically identify groundwater dependent ecosystems in the Niles Cone Subbasin. Alameda Creek is the primary surface water inflow to the Niles Cone Subbasin. It also acts as a primary conveyance for the Nile Cone managed aquifer recharge operations through the quarry lakes. The District states that groundwater levels have not adversely impacted aquatic ecosystems, and it is unaware of ecosystems reliant on groundwater to be above a specific elevation. The District admits that groundwater discharge to the saltwater wetlands and ponds is possible. However, the District indicates that the Newark aquiclude has low permeability and is relatively thick near these areas and would not support geographically extensive discharge.[60] The District also explains that artificial recharge operations are ineffective when water levels are high and as a result the Subbasin is managed to limit losses of groundwater to the bay. The Alternative does discuss habitat restoration efforts for steelhead on Alameda Creek and efforts to improve fish passage. In addition, the District recognizes the linkage between Alameda Creek and groundwater for recharge and Subbasin conjunctive management.

## 3. Water Budget

GSP Regulations require a water budget for the basin that provides an accounting and assessment of the total annual volume of groundwater and surface water entering and leaving the basin, including historical, current and projected water budget conditions, and the change in the volume of water stored, as applicable.[61]

The Alternative provides quantitative information on groundwater recharge and discharge in the Niles Cone Subbasin.[62] The Niles Cone Sustainable Yield 10-Year Analysis Report includes a comprehensive historical water budget based on a combination of measured data and the integrated groundwater surface water model of the Subbasin, described in the NEBIGSM Model Development and Calibration Report, that quantifies the major inflows and outflows (*see* Groundwater Conditions, above).[63] The primary inflows to the Subbasin are from managed aquifer recharge operations from local water supplies and imports as well as natural recharge from Alameda Creek and the contributing watershed

[59] Niles Cone Sustainable Yield 10-Year Analysis, Section 3.4, p. 16
[60] Niles Cone Sustainable Yield 10-Year Analysis, p. 16
[61] 23 CCR § 354.18
[62] Survey Reports on Groundwater Conditions, 2007 to 2016, Table 2 and Plate 11
[63] Niles Cone Sustainable Yield 10-Year Analysis (2016), Table 5-1, p. 30

area. The primary outflows from the Subbasin are from pumping and natural outflows. The information is provided as a "water balance" and shows that recharge exceeded pumping from 2007 to 2016, except for a few years during the recent drought.[64]

### 4. Management Areas

GSP Regulations authorizes, but does not require, an agency to define one or more management areas within a basin if the agency has determined that creation of management areas will facilitate implementation of the GSP.[65]

The District effectively uses two management areas, the Above Hayward Fault (AHF) and Below Hayward Fault (BHF) to manage the Niles Cone Subbasin.[66] The justification for this separation of the Subbasin is provided in the Hydrogeologic Conceptual Model[67] as a barrier to groundwater flow. Above the Hayward Fault, the aquifer is essentially treated as a single unconfined aquifer. Below the Hayward Fault, the aquifer is separated into the four principal aquifers.

## C. Sustainable Management Criteria

GSP Regulations require a sustainability goal that defines conditions that constitute sustainable groundwater management for the basin, the characterization of undesirable results, and establishment of minimum thresholds and measurable objectives for each applicable sustainability indicator, as appropriate.[68]

### 1. Sustainability Goal

GSP Regulations require that sustainable management criteria include a sustainability goal that culminates in the absence of undesirable results within the appropriate timeframe, and includes a description of the sustainability goal, describes information used to establish the goal for the basin, describes measures that will be implemented to ensure the basin operates within its sustainable yield, and contains an explanation of how the sustainability goal will be met.[69]

The District identifies goals for groundwater management in the Replenishment Assessment Act[70] and Groundwater Management Policy.[71] The Replenishment

[64] Niles Cone Sustainable Yield 10-Year Analysis (2016), p. 29
[65] 23 CCR § 354.20
[66] See footnote in Niles Cone Sustainable Yield 10-Year Analysis, Section 2.1, p. 4
[67] Part I Hydrogeologic Conceptual Model (2016), pp. 1-2
[68] 23 CCR § 354.22
[69] 23 CCR § 354.24
[70] Replenishment Assessment Act of the Alameda County Water District, Chapter 1942 of the Statutes of 1961
[71] ACWD Groundwater Management Policy (2001)

Assessment Act establishes the objective of replenishing groundwater supplies and preventing seawater intrusion into those groundwater supplies.[72] The Policy further documents that it is the District's goal to protect and manage the Niles Cone Groundwater Subbasin for water supply and activities that could negatively affect water quality. The Niles Cone Sustainable Yield 10-Year Analysis describes these objectives as the sustainability goal for the Niles Cone Subbasin.[73] The operating goal for the Subbasin is to maintain groundwater levels in their current range.[74]

## 2. 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.[75]

Sustainability indicators are defined as any of the effects caused by groundwater conditions occurring throughout the basin that, *when significant and unreasonable*, cause undesirable results.[76] Sustainability indicators thus correspond with the six undesirable results – chronic lowering of groundwater levels indicating a depletion of supply if continued over the planning and implementation horizon, reduction of groundwater storage, seawater intrusion, 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 adverse impacts on beneficial uses of the surface water[77] – 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.

This section thus consolidates three facets of sustainable management criteria: undesirable results, minimum thresholds, and measurable objectives. Information 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

[72] Replenishment Assessment Act of the Alameda County Water District, Section 4, pp. 3-4
[73] Niles Cone Sustainable Yield 10-Year Analysis (2016), Section 2.1, p. 1
[74] Niles Cone Sustainable Yield 10-Year Analysis (2016), Section 2.1, p. 1
[75] 23 CCR § 354.22
[76] 23 CCR § 351(ah)
[77] Water Code § 10721(x)

required to establish criteria for undesirable results that the agency can demonstrate are not present and are not likely to occur in a basin.[78]

### *a. Chronic Lowering of Groundwater Levels.*

GSP Regulations specify that the minimum threshold for chronic lowering of groundwater levels be based on groundwater elevations indicating a depletion of supply that may lead to undesirable results.[79]

Sustainable management criteria for chronic lowering of groundwater levels are discussed in the Integrated Resources Planning Study 10 Year Review and the Niles Cone Sustainable Yield 10-Year Analysis Report. Below the Hayward Fault, the District maintains groundwater levels in the Newark Aquifer to prevent sea water intrusion.[80] The District uses an operating range based on groundwater levels from one indicator well and has different thresholds depending on the year. The minimum operating condition for groundwater levels below the Hayward Fault is stated as 0 feet mean seal level as a default minimum operating value, and a temporary operating condition of -5 feet mean sea level (5 feet below sea level) allowable as an end of drought low point.[81] Above the Hayward Fault, the District maintains groundwater levels to prevent loss of operation of shallow private wells.[82] This area also uses an operating range based on groundwater levels from one indicator well and has different rules depending on the year. The aquifer above the Hayward Fault is operated where recharge and extractions are generally equal.[83] The minimum operating condition for groundwater levels above the Hayward Fault is a temporary operating condition of 15 feet mean sea level at one indicator well.[84]

### *b. Reduction of Groundwater Storage*

GSP Regulations specify that the minimum threshold for reduction of groundwater storage shall be a total volume of groundwater that can be withdrawn from the basin without causing conditions that may lead to undesirable results.[85]

Sustainable management criteria for reduction of groundwater storage is discussed in the Niles Cone Sustainable Yield 10-Year Analysis. The District does not provide quantitative metrics for reduction in storage. However, the District indicates that undesirable results for reduction in groundwater storage would be the same as those for chronic lowering of

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[78] 23 CCR § 354.26(d)
[79] 23 CCR § 354.28(c)(1)
[80] Integrated Resources Planning Study 10 Year Review, Chapter 2.4, p. 21
[81] Integrated Resources Planning Study 10 Year Review, Figure 2-7, p. 23; Niles Cone Sustainable Yield 10-Year Analysis, Figure 2-1, p. 9
[82] Niles Cone Sustainable Yield 10-Year Analysis, Section 2.3, p. 5
[83] Integrated Resources Planning Study, Chapter 2.4, p. 21
[84] Niles Cone Sustainable Yield 10-Year Analysis, Figure 2-2, p. 10
[85] 23 CCR § 354.28(c)(2)

groundwater levels (see *Chronic Lowering of Groundwater Levels*). The District further explains that operating the Subbasin to keep water levels at the indicator wells above the water level thresholds for sea water intrusion will ensure that undesirable results do not occur due to reduction in groundwater storage.[86] The Alternative indicates that the sustainable yield in the Subbasin for pumping is between 19,000 acre-feet per year and 32,000 acre-feet per year with an average over the last 10 years of 25,000 acre-feet per year.[87] The sustainable yield is the same as pumping over this time and includes the contributions of managed aquifer recharge to augment the natural recharge to the Niles Cone Subbasin.

### *c. Seawater Intrusion*

GSP Regulations specify that the minimum threshold for seawater intrusion be defined by a chloride concentration isocontour for each principal aquifer where seawater intrusion may lead to undesirable results.[88]

Sustainable management criteria for seawater intrusion are discussed in numerous documents, including the Replenishment Act, Integrated Resources Planning Study and 10-Year Review, and the Niles Cone Sustainable Yield 10-Year Analysis. Seawater intrusion in the Niles Cone Subbasin is only applicable below the Hayward Fault because the fault acts as a barrier to groundwater flow (see Hydrogeologic Conceptual Model). For seawater intrusion, the District provides three sustainability indicators: flow direction in the Newark Aquifer, chloride concentration in the Newark Aquifer, and water levels.[89] For flow direction, the minimum threshold is defined as a shift from westerly to easterly flow direction, presumably, for saltwater in the Newark Aquifer.[90] For chloride concentration in the Newark Aquifer, 250 ppm is provided as the minimum threshold.[91]

The District manages seawater intrusion by maintaining groundwater levels in the Newark Aquifer (*see* Chronic Lowering of Groundwater Levels, above). As part of managing seawater intrusion, the District illustrates the extent of seawater intrusion through time for each principal aquifer (see *Groundwater Conditions*, above) and relative to the historical extent of seawater intrusion in 1962.[92] The salinity contour maps use chloride isocontours of 250 ppm. The District describes how historical overdraft in the Subbasin resulted in groundwater levels falling below sea level, which induced the flow of seawater from offshore into onshore aquifers. The District then explains how imported water,

[86] Niles Cone Sustainable Yield 10-Year Analysis (2016), Table 2-1, p.6
[87] Niles Cone Sustainable Yield 10-Year Analysis (2016), Section 2.2, pp. 4-5
[88] 23 CCR § 354.28(c)(3)
[89] Niles Cone Sustainable Yield 10-Year Analysis (2016), Table 2-2, p.7
[90] Niles Cone Sustainable Yield 10-Year Analysis (2016), Table 2-2, p. 7
[91] Niles Cone Sustainable Yield 10-Year Analysis (2016), Table 2-2, p. 7
[92] Survey Reports on Groundwater Conditions, 2007 to 2016

desalination, and managed aquifer recharge have successfully been implemented to restore groundwater levels above sea level in the Newark Aquifer to push seawater out of the production zones (see *Projects and Management Actions*, below).

### *d. Degraded Water Quality*

GSP Regulations specify that the minimum threshold for degraded water quality shall be the degradation of water quality, including the migration of contaminant plumes that impair water supplies or other indicator of water quality as determined by the Agency that may lead to undesirable results.[93]

Sustainable management criteria for degraded water quality is discussed in the Sustainable Yield 10-Year Analysis and the District Urban Water Management Plan. The District indicates that the primary water quality concern is related to seawater intrusion below the Hayward Fault (see *Seawater Intrusion*) but that known contaminant plumes are managed through other regulatory programs for water quality and undesirable results related to degraded water quality are such that it causes shutdown of existing water wells in the Subbasin.[94] The Alternative also indicates that preparation of a salt and nutrient management plan is underway, but that generally water quality meets regulatory objectives. However, a few wells in the Centerville-Fremont Aquifer did show exceedances of nitrate MCLs. According to the District Urban Water Management Plan, the raw water sources may be susceptible to contamination. [95] However, the blending and treatment facilities ensure that the potable water demands are met following all applicable state and federal regulatory standards. The Integrated Resources Planning Study also includes a target hardness of 150 mg/L for delivered water.[96] In addition, desalination is performed on brackish water from the aquifers due to former sea water intrusion effects (*see* Seawater Intrusion, above).

### *e. Land Subsidence*

GSP Regulations specify that the minimum threshold for land subsidence shall be the rate and extent of subsidence that substantially interferes with surface land uses and may lead to undesirable results.[97]

Sustainable management criteria for land subsidence are discussed in the Niles Cone Sustainable Yield 10-Year Analysis Report. The District has not developed separate minimum thresholds and measurable objectives for land subsidence. Subsidence, in the

[93] 23 CCR § 354.28(c)(4)
[94] Niles Cone Sustainable Yield 10-Year Analysis (2016), Table 2-1, p. 6
[95] ACWD Urban Water Management Plan 2015-2020, Section 3.4, pp. 3-13
[96] ACWD Reliability by Design – Integrated Resources Planning (2014), p. 8
[97] 23 CCR § 354.28(c)(5)

Niles Cone Subbasin, is not expected to be significant because groundwater levels are currently maintained at levels in the Subbasin much higher relative to historical lows in the mid-1960s. [98] The District states that there is low risk to subsidence under the current operations and fluctuations in groundwater levels.[99]

### *f. Depletion of Interconnected Surface Water*

GSP Regulations specify that the minimum threshold for depletions of interconnected surface water shall be the rate or volume of surface water depletions caused by groundwater use that has adverse impacts on beneficial uses of the surface water and may lead to undesirable results.[100]

Applicability of depletion of interconnected surface water is discussed in the Niles Cone Sustainable Yield 10-Year Analysis. The District does not establish minimum thresholds or measurable objectives for depletions of interconnected surface water, but it indicates that surface water and associated ecosystems are not affected by groundwater operations.

## D. Monitoring Networks

GSP Regulations require that each basin be monitored, and that a monitoring network include monitoring objectives, monitoring protocols, and data reporting requirements be developed that 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.[101]

The District summarizes the existing groundwater monitoring network and describes the type and the frequency of monitoring.[102] Water levels in seven wells are measured weekly to assist with making decisions related to artificial recharge and production well pumping. Fifty wells, including the 26 wells part of the CASGEM program, are measured monthly for assessing groundwater responses throughout the Subbasin and to assist with longer-term planning. The Alternative also indicates that an additional number of wells are measured in the spring and fall of each year. The number of wells varies from year to year and type of measurement (quality or water levels). The District meters all but two non-District wells with discharge lines greater than two inches in diameter and two District wells (see *Groundwater Conditions*).[103] The annual Survey Reports on Groundwater

[98] Niles Cone Sustainable Yield 10-Year Analysis, p. 17
[99] Niles Cone Sustainable Yield 10-Year Analysis, p. 17 and Table 2-1, p. 6
[100] 23 CCR § 354.28(c)(6)
[101] 23 CCR § 354.32
[102] Niles Cone Sustainable Yield 10-Year Analysis, Table 4-1, p. 20
[103] Survey Reports on Groundwater Conditions, February 2016, p.11

Conditions, indicate that feasibility of metering the remaining unmetered wells is assessed to determine if it is cost-effective.

The Survey Report on Groundwater Conditions relies on data collected from the monitoring network to describe groundwater and surface water conditions, and to characterize groundwater and surface water quality. The District utilizes the monitoring data to develop contour maps of groundwater conditions for each principal aquifer in the Subbasin. The monitoring data is used in the numerical groundwater model to estimate outflows and percolation rates into the Niles Cone Subbasin for water budgeting and water supply forecasting.

## E. 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.[104]

Projects and management actions described in the Alternative have been implemented to eliminate seawater intrusion, maintain water levels in the Newark Aquifer above sea level, and remove brackish water from the Centerville-Fremont Aquifer and Deep Aquifer from the legacy seawater intrusion from the 1960s. The projects include importing water from the State Water Project and SFPUC Hetch-Hetchy System beginning in 1962 and 1964, respectively, which allowed the district to restore groundwater levels above sea level by 1972. The Aquifer Reclamation Program (ARP) was established in 1974. Its purpose was initially to extract brackish water from the Centerville-Fremont and Deep Aquifers and discharge from the Subbasin. In 2003, the Newark Desalination Facility Phase I was completed allowing the ARP pumping to be used as part of supply. In addition, rehabilitation efforts to improve managed aquifer recharge operations in the quarry lakes as well as demand reduction measures through the construction of water treatment plants and blending facilities have been used to enhance management of the Subbasin.[105] Groundwater Banking with Semitropic Water Storage District has been used since 1996 to address the year-to-year variability of the SWP supply.[106] Other projects include discussions and agreement with the National Marine Fisheries Service (NMFS) and California Department of Fish and Wildlife (CDFW) to develop a minimum bypass flow schedule on Alameda Creek to support steelhead restoration in 2011.[107]

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[104] 23 CCR § 354.44
[105] Niles Cone Sustainable Yield 10-Year Analysis (2016), Figure 3-1, p. 13
[106] ACWD Reliability by Design Integrated Resources Planning (2014), p. 11; Niles Cone Urban Water Management Plan 2015-2020, pp. 3-7
[107] Niles Cone Urban Water Management Plan 2015-2020, pp. 3-11

# VI. Assessment

The following describes the evaluation and assessment of the Alternative for the Niles Cone Subbasin as determined by Department staff. In undertaking this assessment, Department staff did not conduct geologic or engineering studies, although Department staff may have relied on publicly available geologic or engineering or other technical information to verify claims or assumptions presented in the Alternative.[108] As discussed above, Department staff has determined that the Niles Cone Subbasin Alternative satisfied the conditions for submission of an alternative.[109] The Alternative was submitted within the statutory period, the Subbasin was found to be in compliance with the reporting requirements of CASGEM, and staff finds the Alternative to be complete and to cover the entire Subbasin (*see* Required Conditions, above). Based on its evaluation and assessment of the Niles Cone Subbasin Alternative, as discussed below, Department staff finds that the Alternative satisfies the objectives of SGMA.[110]

## A. Evaluation of Alternative Contents

Department staff reviewed the Groundwater Management Policy along with the District's Replenishment Assessment Act and current versions of the Districts Groundwater Monitoring Report and annual Survey Reports on Groundwater Conditions as an existing plan allowed for by Water Code Section 10733.6(b)(1). While the documents, together, do not provide information in an orderly arrangement, they do provide a detailed formulation of a program of action to manage the Subbasin. The District's Groundwater Management Policy and supporting reports reflect the institutional framework established through the legislation, which details how the District is to manage the Subbasin. The supporting documents submitted by the District provide the additional, necessary technical information and also demonstrate the District's planning horizon with respect to water supplies and demand are in line with SGMA's timeframe.[111] As such, Department staff concluded that the District's submittal was equivalent to an existing plan under Section 10733.6(b)(1). However, to facilitate the Department's ongoing evaluation and assessment of the Alternative, Department staff recommend that the District organize and consolidate as much as possible the information that details its program of action to manage the Subbasin (see Recommended Action 1).

The District describes in sufficient detail its authority to manage groundwater within its statutory boundaries, which accounts for the vast majority of surface area and water use

[108] Instances where the Department review relied upon publicly available data that was not part of the Alternative are specifically noted in the assessment.
[109] 23 CCR § 358.4(a)
[110] Water Code § 10733.6(a); 23 CCR § 358.4(b)
[111] See generally Niles Cone Urban Water Management Plan 2015-2020

within the Niles Cone Subbasin. The County Water District Law and the Replenishment Assessment Act of the Alameda County Water District documents the District's legal authority. The Survey Reports on Groundwater Conditions describe past and current rate-setting efforts that were used to finance completed projects. That experience provides a reasonable level of confidence that the District can finance the continued sustainable management of the Niles Cone Subbasin. Additionally, the District appears to have participation from a wide range of interests representing the beneficial uses and users of groundwater and provides opportunities for public comment at the monthly board meetings.

The Hydrogeologic Conceptual Model and associated technical studies demonstrate a satisfactory understanding of the basin setting, including the geology and groundwater conditions of the Niles Cone Subbasin. The technical description, including the Part I Hydrogeologic Conceptual Model, the Niles Cone Sustainable Yield 10-Year Analysis Report, and the Luhdorff and Scalmanini East Bay Plain Aquifer Test Project Report, appear to rely on best available information and best available science and their conclusions are consistent with Department staff's understanding of conditions in the Niles Cone Subbasin. The hydrogeologic conceptual model and numerical model described in the NEBIGSM Model Development and Calibration Report incorporate the relevant hydrologic processes in the entire Subbasin and the numerical model appears to be reasonably well-calibrated to support analysis presented in the Alternative. Measured data and the numerical model are used each year to generate a current water budget and two-year projected water budget that includes the components required by the GSP Regulations. The Department staff's understanding is that the Urban Water Management Plan provides projections of District demand and surface water supply (SWP and SFPUC) through 2040. The Agency's understanding of the basin setting is sufficient to sustainably manage groundwater in the Subbasin. However, Department staff recommend that the Agency better address whether there are interconnected surface waters in the Subbasin and provide an identification of groundwater dependent ecosystems (see Recommended Actions 2 and 3). Department staff also recommend that the Agency directly incorporate climate change in the projected water budget, as it is only discussed qualitatively as a source of uncertainty (see Recommended Action 4).

The Alternative provides a reasonable sustainability goal for the Subbasin and identifies previous adverse effects caused by groundwater use that are equivalent to undesirable results. Those adverse conditions are overdraft of the aquifer system that has resulted in lowering of groundwater levels, reduction of storage, and seawater intrusion. The Alternative describes the evolution of these conditions through time and describes actions taken to date to address them, while noting that those prior actions were sufficient to correct the adverse conditions. The Alternative explains a suite of management actions and projects, including managed aquifer recharge, desalination, surface water imports

from the State Water Project and San Francisco Public Utilities Commission, used to accomplish the Alternative's goal of eliminating the adverse conditions noted above. The Alternative includes tracking quantitative targets annually for Subbasin management through groundwater elevations at indicator wells. The District uses groundwater levels as a proxy for seawater intrusion and reductions in groundwater storage, and sufficiently explains why subsidence criteria are not warranted. The District has functionally met the requirements for a sustainability goal and understanding of undesirable results for each of the applicable sustainability indicators in the Subbasin.

While the indicator wells provide valuable information and appear to have been adequate for the District's management of the Subbasin, the District does not provide a complete justification for the use of the proxy, especially for the deeper aquifers. The District states that the goal is to maintain the groundwater gradient in the Newark Aquifer toward the San Francisco Bay and the below Hayward Fault indicator well is used to manage for those conditions. The District indicates that the Centerville-Fremont Aquifer and Deep Aquifer are not directly connected to the San Francisco Bay, but that the aquifers are connected near the below Hayward Fault indicator well and appears to imply that managing the Newark Aquifer gradient will also manage the Centerville-Fremont Aquifer and Deep Aquifer. However, the chloride contours provided for the Deep Aquifer show increases in salinity near the northwest part of the Subbasin away from the indicator well. Overall, Department staff find that the approach to managing seawater intrusion is reasonable and the District has demonstrated successful management in the Newark Aquifer. However, Department staff recommends a more thorough explanation with regard to how the District's approach also works for the deeper aquifers (See Recommended Action 5).

Technical information presented by the District demonstrates an adequate monitoring network for sustainable groundwater management. The Annual Survey Reports on Groundwater Conditions, Niles Cone Sustainable Yield 10-Year Analysis Report, and the District Groundwater Monitoring Report use and describe historical monitoring data for groundwater levels and seawater intrusion as well as metered extractions and managed aquifer recharge operations. In addition, the municipal supply must meet water quality standards for potable use and there is an ongoing effort to develop a salt and nutrient management plan. Department staff find that there is adequate monitoring information with regard to groundwater levels and seawater intrusion to demonstrate the Subbasin groundwater conditions are well-known and whether management actions are having their intended effects. However, Department staff recommend providing additional information regarding water quality monitoring and a more thorough explanation of the use of Representative Monitoring sites (*see* Recommended Actions 6 and 7).

The Alternative for the Niles Cone Subbasin aims to prevent seawater intrusion and reductions in groundwater storage, and is consistent with Water Code Section 106.3,

which establishes the state policy that “every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes.” Department staff consider that the Alternative, which is expected to maintain groundwater levels above sea level, to also be consistent with the public trust doctrine.

## B. Recommended Actions

The following recommended actions are improvements that should be included in the first five-year update of the Alternative to facilitate the Department’s ongoing evaluation and determination of whether implementation of the Alternative is achieving the sustainability goal.

### Recommended Action 1.

Staff recommend that the District organize and consolidate its submitted materials and information. Organizing the information in a way that generally follows the elements of a GSP provided in Article 5 of the GSP Regulations would greatly facilitate the Department’s ongoing evaluation and assessment of the Alternative.

### Recommended Action 2.

Staff recommend that the District clarify whether a quantification of the quantity and timing of depletion of interconnected surface waters is necessary for both above and below the Hayward Fault. As noted above, the District identifies interconnected surface water occurring when groundwater levels are high where the Alameda Creek Flood Control Channel is incised into the Newark Aquiclude and minor groundwater discharge to the salt ponds.

### Recommended Action 3.

Staff recommend that the District provide an improved identification of groundwater dependent ecosystems. While the Niles Cone Sustainable Yield 10-Year Analysis Report indicates there are no known aquatic ecosystems that require groundwater levels to be maintained above a certain point, the District does not describe how that determination was made.

### Recommended Action 4.

Staff recommend the Alternative be updated to incorporate climate change projections and sea level rise into the analysis of the projected water budget to better understand the potential effects climate change will have on the budget and groundwater conditions.

## Recommended Action 5.

Staff recommend that the Alternative be updated to include additional explanation of how management of the gradient in the Newark Aquifer impacts the Centerville-Fremont Aquifer and Deep Aquifer.

## Recommended Action 6.

Staff recommend the Alternative be updated to include an improved discussion of the water quality monitoring and water quality monitoring results.

## Recommended Action 7.

Staff recommend the District improve the discussion related to the Representative Monitoring sites in the Niles Cone Subbasin to justify that they are representative of conditions in the Subbasin and that groundwater elevations may be used as a proxy for other monitoring including groundwater storage, land subsidence, and seawater intrusion.