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STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES

STATEMENT OF FINDINGS REGARDING THE PERIODIC REVIEW AND APPROVAL OF THE SANTA CLARA VALLEY – NILES CONE SUBBASIN ALTERNATIVE GROUNDWATER SUSTAINABILITY PLAN JUNE 27, 2024

Under the Sustainable Groundwater Management Act (SGMA), an alternative to a groundwater sustainability plan (Alternative) must be resubmitted every five years,[1] and the Department of Water Resources (Department) is required to review the Alternative to assess progress in achieving the sustainability goal within the basin and recommend corrective action to address any deficiencies.[2] The Department evaluates updates to Alternatives in accordance with the criteria used to evaluate Groundwater Sustainability Plans, as applicable.[3] This Statement of Findings explains the Department's determination regarding the Alternative submitted on December 29, 2021, by the Alameda County Water District Groundwater Sustainability Agency (GSA) (referred to as the Agency) for the Santa Clara Valley – Niles Cone Subbasin (Basin No. 2-009.01), herein referred to as the Department's "Periodic Review" of the Alternative.

Department management have discussed the Alternative with staff and have reviewed the written assessment titled *Periodic Review of Alternative Groundwater Sustainability Plan, Staff Assessment*, Santa Clara Valley – Niles Cone Subbasin, attached as Exhibit A, and have incorporated the findings, which recommends approval of the Alternative. Department management is satisfied that staff have conducted a thorough evaluation and assessment of the Alternative and concurs with staff's recommendation. The Department therefore **APPROVES** the Alternative and makes the following findings:

A. The Alternative satisfies the conditions listed in 23 CCR Section 358.4 on the grounds that:

    1. The Alternative was submitted within five years of its initial submission date as required by Water Code Section 10733.6(c).

    2. The Department has confirmed that the Alternative is within a basin that is in compliance with Part 2.11 (commencing with Water Code Section 10920) as required by Water Code Section 10733.6(d).

    3. The Alternative is complete and includes the applicable information required by SGMA for the type of alternative submitted. Staff have provided

[1] Water Code § 10733.6(c))
[2] Water Code § 10733.8
[3] 23 CCR § 358.4(b))

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additional guidance for the Agency to consider organizing and consolidating its submitted materials into one planning document that clearly articulates and quantitatively demonstrates the plan to achieve sustainable groundwater management.

4. The Alternative covers the entire basin. The Department determined that the Alternative, as originally submitted, covered the entire basin, and those boundaries remain unchanged.

B. In addition to the grounds listed above, the Department also finds that the Alternative remains consistent with SGMA and is being implemented in a manner that will likely achieve the sustainability goal for the basin because:

1. At this time, there do not appear to be exceedances of any established minimum thresholds or any failures of the Agency to meet any interim milestones which are likely to affect the ability of the Agency to achieve the sustainability goal for the basin within 20 years of implementation of the Alternative (23 CCR Section 355.6(c)(1)). Staff have provided additional guidance for the Agency on how to consider setting metrics for the applicable sustainability indicators.

2. The Agency is implementing projects and management actions consistent with the Alternative (23 CCR Section 355.6(c)(2)).

3. The Agency is addressing data gaps and reducing the levels of uncertainty identified in the Alternative (23 CCR Section 355.6(c)(3)).

4. As explained in the attached Staff Assessment, the Alternative continues to satisfy the criteria described in 23 CCR Section 355.6(c)(4), as applicable.

C. Furthermore, the Department also finds that the Alternative sufficiently demonstrates its ability to achieve the objectives of SGMA at this time because:

1. The Alternative with corrective actions applied is functionally equivalent to the elements of a GSP; and

2. The Agency has taken steps to improve the Alternative by considering the recommended actions previously provided by staff; however, these recommended actions were not fully addressed. To ensure that the Alternative continues to satisfy SGMA's objectives, staff have provided additional recommended corrective actions for the Agency to consider before the Alternative's next Periodic Evaluation.

D. The Department also finds:

1. The Department developed its GSP Regulations consistent with and intending to further the State's human right to water policy through

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implementation of SGMA and the GSP 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 in its evaluation of the Alternative (Water Code Section 106.3; 23 CCR Section 350.4(g)).

2. The California Environmental Quality Act (CEQA) (Public Resources Code Sections 21000 *et seq*.) does not apply to the Department's evaluation and assessment of Alternatives, and the Department's evaluation and assessment of Alternatives is statutorily or categorically exempt from CEQA.

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Accordingly, the Alternative submitted by the Agency for the Santa Clara Valley – Niles Cone Subbasin is hereby **APPROVED.** The recommended corrective actions identified in the attached Staff Assessment will assist the Department's future review of the Alternative's implementation for consistency with SGMA, and the Department, therefore, recommends the Agency address them in the next Periodic Evaluation, which is set to be submitted on December 29, 2026, as required by Water Code Section 10733.6(c). Department staff will continue to monitor and evaluate the progress toward achieving the basin's sustainability goal through continued Annual Reporting and future revisions to the Alternative. Failure to address the Department's recommended corrective actions before future, subsequent Alternative evaluations, may lead to the Alternative being determined incomplete or inadequate.

Signed:

Karla Nemeth

Karla Nemeth, Director
Date: June 27, 2024

Exhibit A: Periodic Review of Alternative Groundwater Sustainability Plan, Staff Assessment, Santa Clara Valley – Niles Cone Subbasin

State of California
Department of Water Resources
Sustainable Groundwater Management Program
Periodic Review of
Alternative Groundwater Sustainability Plan
Staff Assessment

Groundwater Basin Name:	Santa Clara Valley – Niles Cone Subbasin (2-009.01)
Number of GSAs or Local Agencies:	One (1)
Basin Plan Manager:	Michelle Walden
Type of Alternative:	Law Authorizing Groundwater Management
Date Alternative First Submitted:	December 31, 2016
Date Alternative First Approved:	July 17, 2019
Date Periodic Evaluation Submitted:	December 29, 2021
Date Periodic Review Completed:	June 27, 2024
Current Assessment Determination:	Approved

This assessment addresses the Department of Water Resources' (Department) statutory and regulatory responsibility to periodically review and evaluate approved groundwater sustainability plans (GSPs) and approved alternatives to a GSP (Alternative) pursuant to the Sustainable Groundwater Management Act (SGMA)[1] and the GSP Regulations.[2] As stated in the GSP Regulations: "The Department shall periodically review an approved Plan to ensure the Plan, as implemented, remains consistent with the Act and in substantial compliance with this Subchapter, and is being implemented in a manner that will likely achieve the sustainability goal for the basin. The Department shall evaluate approved Plans and issue an assessment at least every five years. The Department review shall be based on information provided in the annual reports and the periodic evaluation of the Plan prepared and submitted by the Agency."[3]

SGMA allows for basins to be managed under alternative groundwater management structures rather than a GSP.[4] An alternative can be based on an existing groundwater management plan or other law authorizing groundwater management, management

[1] Water Code § 10720 *et seq*.
[2] 23 CCR § 350 *et seq*.
[3] 23 CCR §§ 355.6(a) and 355.6(b). For the purposes of this Periodic Review, "Plan" refers to a groundwater sustainability plan as defined in SGMA and the GSP Regulations, while "Alternative" refers to an alternative to a groundwater sustainability plan described in Water Code § 10733.6.
[4] Water Code §10733.6; 23 CCR §§ 358.2 and 358.4.

pursuant to an adjudication action, or an analysis of basin conditions that demonstrates the basin has operated within its sustainable yield over a period of at least ten years. Basins with approved alternatives are not explicitly subject to the Periodic Evaluation requirements like those basins with approved GSPs;[5] however, basins with approved alternatives must submit Annual Reports and the alternative must be submitted to the Department at least every five years for review and assessment.[6] Like GSPs, alternatives are subject to Periodic Reviews, in which the Department issues an assessment evaluating the progress toward achieving or maintaining the basin's sustainability goal.

If an alternative is not amended or is not in some other way materially changed, a Periodic Evaluation may be submitted in lieu of resubmission of the entire, identical alternative that was previously approved by the Department. A Periodic Evaluation, as it applies to alternatives, is a written assessment prepared by the local agency or GSA describing whether the implementation of the alternative, including implementation of projects and management actions, is meeting or maintaining the basin's sustainability goal. As indicated throughout this assessment, the Department's Periodic Review is based on information provided in Annual Reports and any available alternative or Periodic Evaluation submitted by local agencies or GSAs managing the basin for SGMA compliance.[7]

- ***Based on the current evaluation of the Alternative, Department staff recommend that it be approved with the recommended corrective actions described herein.***

This Periodic Review includes the following sections:

- **Section 1 – Alternative Summary**: A description of the basin's alternative submittal, an overview of the Department's responsibility to periodically review and evaluate approved alternatives, and a summary of the alternative's recommended actions.
- **Section 2 – Periodic Review Criteria**: Describes the applicable statutory and regulatory requirements and the Department's evaluation criteria for approved alternatives.
- **Section 3 – Periodic Review of Approved Alternative**: Summarizes the Department's evaluation of the basin's approved alternative and may recommend corrective actions to facilitate the Department's ongoing evaluation of the basin's existing groundwater management program.
- **Section 4 – Progress Towards Addressing 2019 Recommended Actions**: A discussion of whether the agencies in the basin have made progress towards

[5] 23 CCR § 356.4.
[6] 23 CCR § 358.2(b).
[7] Water Code § 10733.8.

addressing the recommended actions identified by the Department in its previous assessment.

- **Section 5 – Staff Recommendation**: Includes the alternative's recommended status for approval, and provides new recommended corrective actions, if necessary.

1 ALTERNATIVE SUMMARY

In the Santa Clara Valley Groundwater Basin – Niles Cone Subbasin (Subbasin) an alternative groundwater sustainability plan (GSP),[8] an alternative based on a law authorizing groundwater management, was prepared and submitted by the Alameda County Water District (ACWD or District) Groundwater Sustainability Agency (GSA) on December 31, 2016. At the same time, the District also submitted an alternative based on an analysis of basin conditions purporting to demonstrate that the basin had operated within its sustainable yield over a period of at least 10 years.[9] The Department briefly reviewed the *Niles Cone Sustainable Yield 10-Year Analysis (December 2016)* document and determined it was not functionally equivalent to a GSP, and, as a result, the 10-year analysis effort was not evaluated.[10] The alternative based on other law authorizing groundwater management, which incorporated substantial information from the 10-year analysis effort, was evaluated and approved by the Department on July 17, 2019, with seven recommended actions.[11]

The Department's 2019 Staff Report stated, "Unlike typical groundwater management plans (e.g., those developed pursuant to AB 3030), the District's plan does not rely on a single document."[12] The alternative relied upon three core documents and numerous other reports and resources that were related to management of the Subbasin. The three core documents include: ACWD's *Groundwater Management Policy* (Amended March 22, 2001); numerous *Survey Report on Groundwater Conditions* (2007-2016); and ACWD's *Groundwater Monitoring Report 2015*. The other reports and documents include *Niles Cone Sustainable Yield 10-Year Analysis (December 2016)*; ACWD's *Groundwater Protection Act*; *Niles Cone and South East Bay Plain Integrated Groundwater and Surface Water Model – Model Development and Calibration Report (2005)*; and approximately 50 other resources uploaded to the Department's SGMA Portal. Collectively, all of these documents, reports, and technical resources are referred to in this assessment as the GSA's 2016 Alternative.

[8] Water Code § 10733.6(b)(1); 23 CCR § 358.2.
[9] Alameda County Water District, Resolution No. 16-075 Authorizing Submittal of an Alternative to a GSP, December 8, 2016. Uploaded to the Department's SGMA Portal on December 31, 2016.
[10] Water Code § 10733.6(b)(3).
[11] https://sgma.water.ca.gov/portal/alternative/print/4.
[12] https://sgma.water.ca.gov/portal/alternative/assessments/4.

The 2016 Alternative's recommended actions, which were identified by the Department to improve the Alternative and facilitate the Department's ongoing evaluation of the Subbasin's existing groundwater management program, are presented in detail in Section 4 of this assessment and generally relate to the following topics:

- Organize and consolidate the submitted materials and information in a way that generally follows the elements of a GSP provided in Article 5 of the GSP Regulations (Recommended Action 1).
- 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 (Recommended Action 2).
- Provide an improved identification of groundwater dependent ecosystems (Recommended Action 3).
- 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 4).
- Include additional explanation of how management of the gradient in the Newark Aquifer impacts the Centerville-Fremont Aquifer and Deep Aquifer (Recommended Action 5).
- Include an improved discussion of the water quality monitoring and water quality monitoring results (Recommended Action 6).
- 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 (Recommended Action 7).

Since the 2016 Alternative was first adopted, the Subbasin's Plan Manager has been submitting Annual Reports to the Department and has been documenting progress of the Subbasin's groundwater management program. At the time this Periodic Review was conducted by Department staff, the most recent Annual Report submitted to the SGMA Portal covered water year 2022.[13]

The GSA's Board of Directors approved an update to the 2016 Alternative at a public meeting held on December 9, 2021, and submitted the *Alameda County Water District Alternative Update 2022, Niles Cone Groundwater Basin (Subbasin 2.09-01)*, *December 29, 2021* (2022 Alternative) to the Department on December 29, 2021.[14] The 2022 Alternative states, "This Alternative Update is not a plan amendment but is a written

[13] https://sgma.water.ca.gov/portal/alternative/annualreport/68.
[14] https://sgma.water.ca.gov/portal/alternative/periodiceval/preview/4.

assessment that describes and provides an update on ACWD's groundwater management efforts, an explanation of how the Alternative Update is functionally equivalent to elements of a Groundwater Sustainability Plan (GSP), incorporates DWR's seven recommended actions, and includes information on proposed projects and next steps, to ensure the continued sustainable management of the Niles Cone."[15] Like the 2016 Alternative, the 2022 Alternative relies upon numerous "planning and operational documents and policies under which ACWD manages the Niles Cone" and indicates, again, that "there are three documents which are considered the core to the sustainable management of the Niles Cone" including the *Groundwater Management Policy* (2001); the annual *Survey Report on Groundwater Conditions* (2021); and the annual *Groundwater Monitoring Report* (2021).[16] Department staff note that, like the 2016 Alternative, the 2022 Alternative also relies upon numerous other reports and documents, including the updated *Niles Cone 10-Year Sustainability Analysis (December 2021)*. Additionally, the GSA provided a table that was intended to explain how aspects of the 2022 Alternative were functionally equivalent to the elements of a Periodic Evaluation and the elements of a GSP; the table, however, only indicated what document and page number contained the required information, without explanation.

1.1 Recommendation Summary

As discussed in detail below, the 2022 Alternative, like the 2016 Alternative before it, remains unorganized to an extent that presents a significant impediment to efficient evaluation by the Department. The Department's 2019 Staff Report included Recommended Action 1, which requested that the GSA "organize and consolidate its submitted materials and information" in order to "greatly facilitate the Department's ongoing evaluation and assessment of the Alternative."[17] The reorganized 2022 Alternative does not necessarily facilitate the Department's ongoing evaluation and assessment of the Alternative. In the opinion of Department staff, Recommended Action 1 from 2019 has not been sufficiently addressed (see Section 4.1 of this assessment) and Recommended Corrective Action 1 has been provided to help with the organization and management structure of the alternative.

Despite the organizational problems and unclear presentation of information, Department staff conclude that the 2022 Alternative generally includes the components of a functionally equivalent GSP, with corrective actions applied. Department staff will continue to monitor and evaluate the progress toward achieving the Subbasin's sustainability goal through continued Annual Reporting and future revisions to the Alternative.

For reference, the sustainability goal of the Subbasin is:

[15] ACWD Alternative Update 2022, Section ES-1, p. 16.
[16] ACWD Alternative Update 2022, Section ES-2, p. 18-19.
[17] https://sgma.water.ca.gov/portal/alternative/assessments/4.

> "From a general policy standpoint, the District's sustainability goal is to continue to carry out the purposes of the Replenishment Assessment Act of the ACWD (ACWD, 1974) and ACWD's Groundwater Management Policy (ACWD, 2001) to protect and improve groundwater resources for the benefit of ACWD's customers and private (non-ACWD) well owners by taking actions designed to meet the objectives outlined in ACWD's Groundwater Management Policy adopted by ACWD's Board of Directors in 2001, which clearly articulates the existing policy direction of the Board and summarizes the current objectives and ongoing programs required to implement the policy."[18]

Additionally, from an engineering standpoint, "*the operating goal for the Niles Cone is to maintain groundwater water levels in their current established range. This will allow ample use of the basin for beneficial use while slowly flushing brackish groundwater back to San Francisco Bay*."[19]

Based on the current evaluation of the 2016 Alternative, and after considering information provided by the Subbasin's GSA, Department staff recommend that the 2022 Alternative be approved with recommended corrective actions, which relate to the organization and management structure of the Alternative, the improvement of the Subbasin's representative monitoring network, establishment of metrics to track sustainability through empirical data, guidance on interconnected surface water, and consideration of adjacent basins. Additional evaluation details, implementation observations, and recommendations are provided herein.

2 PERIODIC REVIEW CRITERIA

At least every five years after the initial submission of a plan prepared pursuant to Water Code Section 10733.4, the Department is required to review any available GSP, as well as any alternative[20] submitted in accordance with Water Code Section 10733.6.[21] The Department is required to periodically review an approved alternative to ensure it remains consistent with the objectives of SGMA and continues to substantially comply with the GSP Regulations.[22] The Department is also required to ensure that an approved alternative is being implemented in a manner that will likely achieve the basin's sustainability goal.[23]

The Department's Periodic Review is based on information provided in the Annual Reports as well as the alternative's functionally equivalent Periodic Evaluation, which may be either a Periodic Evaluation prepared in accordance with Section 356.4 of the GSP

[18] ACWD Alternative Update 2022, Section 3.2, p. 295.
[19] ACWD Alternative Update 2022, Section 3.2, p. 295.
[20] 23 CCR § 358.2.
[21] 23 CCR § 358.4. The Periodic Evaluation and Periodic Review requirements of an approved GSP are the same as those for an approved alternative.
[22] 23 CCR §§ 355.6 and 358.4.
[23] 23 CCR § 355.4(b).

Regulations or an amended version of its approved alternative.[24] In both cases, the entity submitting an alternative is required to explain how the elements of the alternative are functionally equivalent to the elements of a GSP.[25]

The Department considers the following in determining whether an alternative and its implementation remains consistent with SGMA and the GSP Regulations:[26]

- Whether the exceedances of any minimum thresholds or failure to meet any interim milestones are likely to affect the ability of the local agencies and/or GSAs in the basin to achieve the basin's sustainability goal.
- Whether the local agencies and/or GSAs in the basin are implementing projects and management actions consistent with the alternative, or that the local agencies and/or GSAs have demonstrated that actions described in the alternative have been rendered unnecessary based on changing basin conditions or an improved understanding of basin conditions.
- Whether the local agencies and/or GSAs are addressing data gaps in the basin and reducing the levels of uncertainty identified in the alternative.
- Whether the alternative continues to satisfy the evaluation criteria described in Section 355.4 of the GSP Regulations.

Following its Periodic Review of the approved alternative, the Department is required to issue a written assessment of its findings and potentially make a new determination of the alternative's status, as follows: approved,[27] incomplete,[28] or inadequate.[29] The assessment may recommend corrective actions to address any new or remaining regulatory deficiencies identified by the Department.

As defined in the GSP Regulations, the Department may request any information it deems necessary to evaluate the progress toward achieving the basin's sustainability goal and the potential for adverse effects on adjacent basins.[30] Additionally, the Department may evaluate the implementation of an alternative at any time to determine whether it is consistent with the objectives of SGMA and in substantial compliance with the GSP Regulations.[31]

[24] 23 CCR §§ 358.2(d) and (e).
[25] 23 CCR § 358.2(d).
[26] 23 CCR § 355.6(c).
[27] 23 CCR § 355.6(d)(1).
[28] 23 CCR § 355.6(d)(2).
[29] 23 CCR § 355.6(d)(3).
[30] 23 CCR § 355.6(e).
[31] 23 CCR § 355.6(f).

3 PERIODIC REVIEW OF APPROVED ALTERNATIVE

Pursuant to the GSP Regulations, the Department is required to consider basin conditions and associated minimum thresholds, the status of projects and management actions, and efforts taken to address data gaps and uncertainty when determining whether an alternative remains consistent with SGMA and continues to substantially comply with the GSP Regulations.[32] The Department's assessment of whether an alternative continues to satisfy Section 355.4 of the GSP Regulations in a functionally equivalent manner is provided below in Section 5.

As part of its Periodic Review responsibilities, the Department must also assess whether the implementation of an alternative will adversely affect the ability of an adjacent basin to implement its alternative or its GSP, and Department staff must ensure that the monitoring network described in the alternative aligns with the data uploaded to the SGMA Portal Monitoring Network Module. Staff perspective regarding adjacent basins and monitoring networks is provided within this section.

3.1 Minimum Thresholds

The GSP Regulations require that the description of minimum thresholds include the information and criteria relied upon to establish and justify the thresholds established for each sustainability indicator.[33] The numeric value used to define those thresholds should represent a point in the basin that, if exceeded, may cause undesirable results.[34] As part of its Periodic Review responsibility, the Department is required to consider whether the exceedances of any minimum thresholds, or failure to meet any interim milestones, are likely to affect the ability of the local agencies and/or GSAs to achieve the basin's sustainability goal.[35] The sections below provide information for each of the applicable sustainability indicators discussed in the 2022 Alternative.

Additionally, under SGMA, a GSA may establish management areas within a basin and identify different minimum thresholds, measurable objectives, monitoring, or projects and management actions based on differences in water use sector, water source type, geology, aquifer characteristics, or other factors.[36] The Subbasin is hydraulically subdivided into two smaller locally-defined "subbasins" which the GSA considers to be two separate management areas – Above Hayward Fault (AHF) and Below Hayward Fault (BHF).[37] As stated in the 2022 Alternative, "Due to the different hydrogeological settings of the AHF and BHF sub-basins, ACWD operates the two sub-basins as separate management areas" and "...has generated a detailed output of the storage contributions and groundwater budget for individual zones (including management areas) as well as

[32] 23 CCR § 355.6.
[33] 23 CCR § 354.28(b)(1).
[34] 23 CCR § 354.28(a).
[35] 23 CCR § 355.6(c)(1).
[36] 23 CCR § 351(r).
[37] ACWD Alternative Update 2022, Section 2.4, p. 205.

for the Niles Cone Subbasin in its entirety."[38] ACWD's classification of these two management areas requires minimum thresholds and measurable objectives to be quantified for each management area in order to be functionally equivalent to a GSP. The following sections provide discussions on the individual management areas, as well as the entire Subbasin.

Department staff note the 2022 Alternative does not present data related to sustainability indicators in a manner that clearly explains that the Subbasin is on track to achieve sustainability – much of the data and explanations of functionally-equivalent SGMA information that the Department relies upon to evaluate sustainable conditions in the Subbasin continues to be located among multiple documents. Department staff have reviewed the 2022 Alternative and supporting documents and have identified that minimum thresholds representing basin-wide conditions that can be directly compared to empirical data have not been provided for many of the sustainability indicators and some sustainability indicators lack minimum thresholds, as further discussed below.

3.1.1 Chronic Lowering of Groundwater Levels

The GSP Regulations state that the minimum threshold for chronic lowering of groundwater levels shall be the groundwater elevation indicating a depletion of supply at a given location that may lead to undesirable results, with minimum thresholds supported by information describing the rate of groundwater elevation decline based on historical trends, water year type, and projected water use in the basin, and potential effects on other sustainability indicators.[39]

As discussed in the 2019 Staff Report, the 2016 Alternative identified generalized undesirable results for two different management areas on either side of the Hayward fault, which the District characterizes as a low-permeability barrier between aquifers.[40] Below the fault, on the western side of the basin bordering San Francisco Bay, the District identified further seawater intrusion into the aquifer as an undesirable result and set the minimum threshold at 0 feet mean sea level (msl), except during multi-year droughts. Above the fault, to the east, the District identified the loss of yield of private wells as an undesirable result and set the minimum threshold at 15 feet msl. The Department accepted that the District's criteria for managing groundwater levels to maintain groundwater levels to prevent sea water intrusion and avoid the loss of operation of shallow wells were functionally equivalent to the elements of a GSP and would achieve the objectives of SGMA. However, because the District relies on two primary indicator wells, screened in unconfined aquifers located in the vicinity of recharge facilities, the Department recommended the District provide additional information regarding Representative Monitoring sites to "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

[38] ACWD Alternative Update 2022, Section 2.4, p. 205.
[39] 23 CCR § 354.28(c)
[40] 2019 Staff Report, p. 18.

other monitoring including groundwater storage, land subsidence, and seawater intrusion."[41]

The 2022 Alternative discusses sustainable management criteria and the sustainability status for chronic lowering of groundwater levels in Section 3.[42] As stated, "The long-term critical minimum operating levels, as measured in ACWD's two primary indicator monitoring wells, are +15 feet [mean sea level] MSL for the AHF Sub-basin and 0 feet MSL for the BHF Sub-basin."[43] Additionally, "a short-term level of -5 feet MSL at the BHF indicator well is the current expected worst case for a multi-year critical drought."[44] The minimum thresholds established in the Subbasin for chronic lowering of groundwater levels, as shown in Table 3-1 of the 2022 Alternative, are provided below.[45] As reported by the GSA, "Based on an in-depth review of basin conditions, knowledge of the historical hydrogeology, and absence of remaining undesirable results, ACWD has concluded, as it did in 2016, that maintaining water levels above these minimums is sufficient for overall sustainability (that is, prevent the identified potential undesirable results)."[46]

Management Area	Sustainability Indicator	Frequency of Measurement	Minimum Threshold	Governing Undesirable Result
AHF Sub-basin	Water levels at indicator well 4S/1W-27D008	Weekly	15 feet msl	Lowering of groundwater levels (may cause loss of yield of private wells in the AHF Sub-basin)
BHF Sub-basin	Water levels at indicator well 4S/1W-29A006	Weekly	0 feet msl (for times other than rare multi-year drought) -5 feet msl (for rare critical drought)	Seawater intrusion in BHF Sub-basin
Source: ACWD Alternative Update 2022, Table 3-1, pp. 296-297.				

As stated in the 2022 Alternative, the two primary indicator wells "…are screened in unconfined aquifers and located in the greater proximity of the recharge facilities (Figure 2-5). Through correlation and multiple decades of data, these wells have been found to be reasonable indicators or predictors of: basin storage, incipient saltwater intrusion (BHF Sub-basin) and inadequate supply (AHF Sub-basin) at the low end of water level ranges, and diminishing return of additional artificial recharge at high ends of water level ranges."[47] ACWD states the rationale used to determine the governing minimum

[41] 2019 Staff Report, Recommended Action 7, p. 27.
[42] ACWD Alternative Update 2022, Section 3, pp. 295-308.
[43] ACWD Alternative Update 2022, Section 3.4, p. 307.
[44] ACWD Alternative Update 2022, Section 3.4, p. 307.
[45] ACWD Alternative Update 2022, Table 3-1, pp. 296-297.
[46] ACWD Alternative Update 2022, Section 3.3, p. 299.
[47] ACWD Alternative Update 2022, Section 3.4, p. 307.

thresholds is provided in the 2022 Alternative, Appendix A *Niles Cone 10-Year Sustainability Analysis (December 2021).*[48] As stated in that analysis, "In the BHF, heads in the Centerville-Fremont and Deep aquifers are typically 15 feet below heads of the Newark Aquifer, although patterns of rise and fall in the Centerville-Fremont and Deep aquifers trend closely with those of the Newark Aquifer" and "fluctuation in piezometric head in the Centerville-Fremont and Deep Aquifers do not significantly change volumetric water storage in the Niles Cone because these aquifers are confined."[49] Based on data presented in Figure 3.2 in Appendix A of the 2022 Alternative, groundwater levels at the two main indicator wells (4S/1W-27D008 and 4S/1W-29A006) are above minimum thresholds in the Subbasin.

Department staff reviewed the Annual Reports covering water years ending on September 30 in 2021 and 2022, which were prepared after the 2022 Alternative was submitted. ACWD provides hydrographs for selected wells in the AHF, Newark, Centerville-Fremont, and Deep Aquifers in Figures 4 through 7, respectively.[50] The figures depict water levels in the two primary indicator wells, in addition to a number of "selected wells" in the primary aquifers (AHF, Newark, Centerville-Fremont, and Deep).[51] ACWD does not provide an explanation as to why these wells have been selected and why they are not used as additional indicator wells. Additionally, since ACWD has only set thresholds for the two primary indicator wells, it is not clear what groundwater conditions the "selected wells"[52] are justifying or how they are representative of conditions in other portions of the Subbasin. This concern was identified in the Department's 2019 Staff Report as part of Recommended Action 7.

Recommended Action 7 requested that the GSA "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."[53] The GSA included a discussion of representative monitoring in Section 4.5 of the 2022 Alternative,[54] which then referenced other sections of the 2022 Alternative for added detail, as well as separate groundwater conditions monitoring reports, and indicated an overall explanation was provided "in Appendix A" (*Niles Cone 10-Year Sustainability Analysis (December 2021)*,[55] which simply provided a history of groundwater management by ACWD and a lengthy narrative as to how the Subbasin has been managed sustainably. Table 2-1 in the 2022 Alternative indicates there is extensive groundwater monitoring in the Subbasin and presents this data as contour maps for the

[48] ACWD Alternative Update 2022, Appendix A, Section 2.3, pp. 372-377.
[49] ACWD Alternative Update 2022, Appendix A, Section 2.3, p. 372.
[50] https://sgma.water.ca.gov/portal/alternative/annualreport/68.
[51] ACWD SGMA Annual Report, April 2023, Section 2.3.2, pp. 43-46.
[52] ACWD SGMA Annual Report, April 2023, Section 2.3.2, pp. 43-46.
[53] https://sgma.water.ca.gov/portal/alternative/assessments/4.
[54] ACWD Alternative Update 2022, Section 4.5, pp. 321-322.
[55] ACWD Alternative Update 2022, Appendix A, pp. 343-474.

various aquifers.[56] The 2022 Alternative additionally states, "A network of approximately 200 wells were selected for water level monitoring for compliance with SGMA (Figure 4-1)."[57] The District provides the water level monitoring data for the "approximately 200 wells" in Appendix D[58] and Appendix E[59] of the 2022 Groundwater Monitoring Report for spring and fall, respectively. In the opinion of Department staff reviewing the 2022 Alternative, Recommended Action 7 has not been sufficiently addressed (see Section 4.7 in this assessment). The information provided seems to be a reiteration of the justification provided in the 2016 Alternative and a narrative describing past groundwater management efforts rather than a plan to achieve and maintain sustainable groundwater conditions.

In the initial Alternative and the 2022 Alternative, the Agency has not provided sufficient justification for how the Subbasin's two primary indicator monitoring wells, both located near recharge facilities and on opposite sides of the Hayward Fault, are representative of basin-wide conditions. As a result, it is difficult to determine if the Subbasin is on track to achieve its defined conditions of sustainability. Department staff recommend the District expand the current representative monitoring network for the chronic lowering of groundwater levels to characterize groundwater conditions in the basin and evaluate changing conditions that occur through the implementation of the Alternative. The District should provide adequate evidence for each identified representative monitoring site that the entirety of the basin and each principal aquifer is sufficiently reflected. Each representative monitoring site should have a clearly defined quantitative value that represents sustainable conditions at that general location within the Subbasin (see Recommended Corrective Action 2).

Despite the lack of sufficient representative monitoring identified in the Alternative, this flaw does not preclude continued approval of the Alternative because the District has a robust monitoring network of over 200 wells, and groundwater conditions in the basin appear to be stable at this time. Improvements to the representative monitoring network will allow the Alternative to better define what sustainability is for the Niles Cone Subbasin and allow the District to clearly communicate how its management under the Alternative is leading to sustainable groundwater management throughout the Subbasin.

3.1.2 Reduction of Groundwater Storage

The sustainability status for reduction of groundwater storage is briefly discussed in Section 3 of the 2022 Alternative and in Appendix A.[60] As stated within Table 3-2 of the 2022 Alternative, "Groundwater storage is met by maintaining groundwater levels in main indicator wells above governing minimum thresholds (Table 3-1) and confirming the relationship between [Niles East Bay Integrated Model] NEBIM model-simulated zone

[56] ACWD Alternative Update 2022, Table 2-1, p. 152; Figures 2-23 through 2-30, pp. 154-161.
[57] ACWD Alternative Update 2022, Section 4.3, p. 311.
[58] ACWD SGMA Annual Report, April 2023, Appendix C, pp. 189-196.
[59] ACWD SGMA Annual Report, April 2023, Appendix C, pp. 197-204.
[60] ACWD Alternative Update 2022, Section 3, pp. 295-308; Appendix A, Section 4.2, pp. 413-414.

storage (zone budget module), and heads at main indicator wells."[61] Statements of sustainability with respect to groundwater storage are not clearly provided in Section 3; however, based on Department staff's interpretation of the hydrographs shown in Figure 3-2 in Appendix A of the 2022 Alternative,[62] groundwater levels at the two main indicator wells are above minimum thresholds in the AHF (4S/1W-27D008) and BHF (4S/1W-29A006) management areas.

ACWD indicates it relies on the weekly water level measurements in the two primary indicator wells discussed in Section 3.1.1 of this assessment to monitor groundwater storage. As stated, "Storage is not easily measured directly, so ACWD relies on the calibrated NEBIM groundwater model for estimates. NEBIM's zone budget module was run to output the water budget, including storage, for the AHF and BHF sub-basins individually. Model-simulated storage for each sub-basin was then plotted against model simulated heads at the indicator wells; i.e. 4S/1W-27D008 for the AHF and then 4S/1W-29A006 for the BHF….Both plots give reasonably high R-squared values, with 0.88 for the AHF and 0.92 for the BHF, giving confidence in the efficacy of the indicator wells as gages of storage for the entirety of each sub-basin."[63] The GSA additionally indicates, "Per the slopes of the regression lines, storage is calculated to be 528 acre-feet in the AHF per foot of change of piezometric head at indictor 4S/1W-27D008, and 1,010 acre-feet in the BHF per foot of change at indicator well 4S/1W-29A006" and further states "the interval of storage within the full operating range of AHF and BHF heads is calculated to be 11,800 acre-feet for the AHF and 20,200 acre-feet for the BHF, combining to approximately 32,000 acre-feet for the entire Niles Cone Groundwater Basin."[64] Given these various quantified volumes generated by the NEBIM, and others located throughout the separate technical resources provided as part of this 2022 Alternative, it is unclear what is considered sustainable groundwater storage conditions in the Subbasin, other than maintaining groundwater levels in the Subbasin's only two indicator wells.

Cumulative change in storage information is shown in Table 2-2 of the 2022 Alternative, and the GSA states that "ACWD's *Survey Report on Groundwater Conditions* provides changes in storage for the preceding Fiscal Year. Also, ACWD's *SGMA Annual Report* has graphs depicting estimates of the change in groundwater storage including groundwater use and water year type and provides cumulative change in storage from Water Year 1974/75 to WY 2019/20 with data from the former groundwater model [Niles Cone East Bay Plain Integrated Groundwater Surface Water Mode] NEBIGSM (ACWD, 2021a)."[65] For Water Year 2019/2020 the cumulative change in storage for the Niles Cone Subbasin was reported to be 13,455 acre-feet. Additionally, the 2022 Alternative indicates, "Assumption that groundwater storage has fluctuated within acceptable levels of groundwater head measured at these indicator wells (the governing sustainability

[61] ACWD Alternative Update 2022, Section 3.3, Table 3-2, pp. 301.
[62] ACWD Alternative Update 2022, Appendix A, Figure 3-2, p. 382.
[63] ACWD Alternative Update 2022, Appendix A, Section 2.3, p. 373.
[64] ACWD Alternative Update 2022, Section 2.3, pp. 373-375.
[65] ACWD Alternative Update 2022, Section 2.3.3, p. 166-168.

criteria) is supported by model-simulated storage versus head relationships as described in more detail in the *Niles Cone 10-Year Sustainable Analysis* [December 2021]."[66] Department staff note that the updated 10-year sustainability analysis document included as Appendix A, includes the same level of detail, not more, as the main text of the 2022 Alternative.

For more information about groundwater storage, Department staff reviewed the Annual Reports covering water years ending on September 30 in 2021 and 2022. ACWD explains "the reported storage change is associated with model (i.e., simulated) heads, not actual heads" and the "reasonably good agreement between model heads and observations in WY 2021/22 is a basis of confidence in the volume of change in storage indicated throughout this report."[67] ACWD provides "NEBIM Simulated Changes in Storage for Water Year 2021/22" in Table 6 of the Annual Report,[68] which shows a total change in storage in the Subbasin of -2,351 acre-feet; however, this storage comparison by management area was not found by Department staff in the 2022 Alternative. As stated in the Annual Report, "Because chronic overdraft in the Niles Cone has been eliminated (i.e., the long-term trend of water level goals has been attained), short-term reductions in storage in some years followed by increased in other years are to be expected, with consequential fluctuation in heads within an acceptable operating range (i.e., governing sustainability criteria under SGMA). The decreases in simulated storage, given by a decrease in model heads, are consistent with the pattern of actual changes in head measured in the monitoring wells. Changes in actual heads for the three principal aquifers are mapped in Figure 9 through Figure 12."[69] Additionally, "Figure 13 through Figure 15 consist of graphs depicting water year type, groundwater use, annual change in storage, and cumulative change in storage from WY 1974/75 through WY 2021/22 for the AHF and BHF management areas, individually, and the combined AHF and BHF management areas, respectively."[70] Again, Department staff note that this explanation of storage is not part of the 2022 Alternative.

The Department's 2019 Staff Report provides the following as it pertains to the use of groundwater elevations as a proxy for the reduction of groundwater storage sustainability indicator, "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."[71] Department staff note that groundwater levels in additional wells screened in the Centerville-Fremont (CF) Aquifer and Deep Aquifer are below sea level; however, those wells do not have functionally equivalent minimum thresholds or measurable objectives established. In the opinion of Department staff reviewing the 2022 Alternative,

[66] ACWD Alternative Update 2022, Section 2.3.3, p. 166.
[67] ACWD SGMA Annual Report, April 2023, Section 2.4.4, p. 54.
[68] ACWD SGMA Annual Report, April 2023, Section 2.4.4, Table 6, p. 56.
[69] ACWD SGMA Annual Report, April 2023, Section 2.4.4, p. 55.
[70] ACWD SGMA Annual Report, April 2023, Section 2.4.4, p. 61.
[71] https://sgma.water.ca.gov/portal/alternative/assessments/4.

Recommended Action 7, which requested an improved discussion related to representative monitoring sites in the Subbasin, has not been sufficiently addressed (see Section 4.7 in this assessment).

Department staff encourage the GSA to better define and explain sustainable conditions of groundwater storage (see Recommended Corrective Action 3a), increase the number of indicator wells used as a proxy to evaluate storage throughout the entire Subbasin (see Recommended Corrective Action 2), and to be consistent across its multiple documents with that information (see Recommended Corrective Action 1). Nonetheless, based on the data found by Department staff in the 2022 Alternative, ACWD's *Survey Report on Groundwater Conditions,* the *Niles Cone 10-Year Sustainable Analysis (December 2021)*, and the Water Year 2022 Annual Report, groundwater storage in the Subbasin appears to be relatively stable, so the District has time to address this concern.

3.1.3 Seawater Intrusion

The 2022 Alternative identifies three "sustainability indicators" for seawater intrusion in Table 3-2.[72] The three sustainability indicators are 1) Flow direction in the Newark Aquifer; 2) Chloride concentrations in principal aquifers; and 3) Geographic extent of areas of legacy brackish water in the principal aquifers. These sustainability indicators and their minimum thresholds are specific to the BHF Subbasin and are shown in the following table. However, this information is presented differently in Table 2-6 of the 2022 Alternative.[73] Department staff additionally note, and concur, that the thresholds defined in the Subbasin are likely not applicable to the AHF Management area because "The Hayward Fault acts as a low-permeability barrier between BHF aquifers and the AHF aquifer."[74]

[72] ACWD Alternative Update 2022, Section 3.3, Table 3-2, pp. 302.
[73] ACWD Alternative Update 2022, Section 2.4.2, Table 2-6, pp. 209-210.
[74] ACWD Alternative Update 2022, Section 2.4.1, Table 2-5, p. 207.

Undesirable Result	Sustainability Indicator	Minimum Threshold or Objective to Prevent Undesirable Result	Metrics Collected by ACWD to Verify Protectiveness of Governing Thresholds in Table 3-1	Frequency of Collected Metrics or Analysis
Seawater Intrusion	Flow direction in the Newark Aquifer	An inland flow direction would indicate new seawater intrusion, a bay-ward flow direction indicates protection against new sea water intrusion.	Preparation of water level contour maps to verify flow direction.	Semiannual
	Chloride concentrations in principal aquifers	250 mg/L chloride is the criterion that defines brackish water; but assessing occurrence of seawater intrusion involves review of concentration trends in multiple wells and the position of chloride concentration contours (see below).	Groundwater monitoring involving approximately 80-170 wells.	Semiannual
			Analysis of trends of chloride in individual wells.	Annual
	Geographic extent of the areas of legacy brackish water in the principal aquifers	Position of chloride concentration contours, whether the contour is moving inland or expanding over time.	Update of chloride concentration contour maps.	Annual
Source: ACWD Alternative Update 2022, Table 3-2, pp. 301-304. Note: These thresholds are different than those presented in Table 2-6, Section 2.4.2, pp. 209-210.				

ACWD provides a discussion on “Saltwater Intrusion Conditions” in Section 2.3.4.2 of the 2022 Alternative.[75] As stated, “ACWD has used chloride concentrations since the 1960s as the primary indicator of saltwater intrusion in the groundwater basin, with [total dissolved solids] TDS added as an additional indicator within the last 25 years. Historically, chloride concentrations have been highest in the Newark Aquifer close to the Bay, decreasing with depth to the Centerville-Fremont Aquifer, and again decreasing with depth to the Deep Aquifers.”[76] Within Section 2.3.4.2 of the 2022 Alternative, the discussion references ACWD’s *2020 Groundwater Monitoring Report* to provide chloride and TDS analytical results; however, at the time this assessment was conducted by Department staff, the data was only available for review online via the GSA’s website, but the link provided in the “References and Technical Studies”[77] section was broken. Department staff did find the *2020 Groundwater Monitoring Report* in Appendix B of the GSA’s SGMA Annual Report from April 2021. In that document, the GSA concluded that “Chloride concentrations at the AHF Aquifer are slightly lower during Fall 2020 compared

[75] ACWD Alternative Update, Section 2.3.4.2, p. 172-185.
[76] ACWD Alternative Update, Section 2.3.4.2, p. 173.
[77] ACWD Alternative Update, Section 6, p. 337-342.

to Fall 2019; all chloride concentrations are below the Secondary [Maximum Contaminant Level] MCL. Chloride concentrations for the Newark, Centerville-Fremont, and Deep Aquifers are similar between the two programs."[78] The document also concluded that "ACWD will continue to monitor the residual impact of the historical saltwater intrusion and identify potential vertical conduits and mitigate them as appropriate."[79] Department staff reiterate the GSA should provide all relevant information related to applicable sustainability indicators in the Subbasin in a common document to prevent the loss of critical information and provide more definitive descriptions of sustainable conditions as previously discussed (see Recommended Corrective Action 1).

With respect to undesirable results in the Subbasin, the 2022 Alternative states, "the *Niles Cone 10-Year Sustainability Analysis* [December 2021] summarizes conclusions from data measured at various locations across the basin (contributing specific sustainability indicators) to determine whether undesirable results were experienced in the last ten years" and "the contributing specific sustainability indicators, associated specific minimum thresholds or objectives to prevent undesirable results, and metrics collected by ACWD and studies that were considered to evaluate efficacy of the governing minimum thresholds are summarized in Table 3-2 and explained in detail in Sections 4.1 through 4.6 of the *Niles Cone 10-Year Sustainability Analysis* [December 2021]."[80] Due to the manner in which information is presented throughout the multiple documents provided as part of the 2022 Alternative, it is difficult for Department staff to determine whether or not undesirable results related to seawater intrusion are occurring in the Subbasin; however, the GSA does state that, "The Support Study element of the *Groundwater Basin Flow Model Upgrade and Alternative Update Project*, in conjunction with analysis conducted as part of the *Niles Cone 10-Year Sustainability Analysis* [December 2021] (Appendix A), has provided a compelling argument that undesirable results in the Niles Cone were not experienced over the last ten years..."[81]

Section 4.3 of the updated 10-year sustainability analysis document acknowledges that "DWR requested that ACWD provide additional evidence to support this contention [that the basin likely did not suffer new seawater intrusion], as maps in the *Groundwater Monitoring Report* indicate increases in area of brackish water zones in the Centerville-Fremont Aquifer and Deep Aquifer since 1962."[82] In response to the Department's concerns in its 2019 Staff Report, the GSA states, "In this section, ACWD addresses this request in the context of water quality trends experienced in the last 10 years and an additional explanation as to how ACWD uses brackish water."[83] Department staff reiterate that the alternative was not approved using "an analysis of basin conditions that demonstrates that the basin has operated within its sustainable yield over a period of at

[78] ACWD SGMA Annual Report, April 2021, Appendix B, Section 8, p. 128.
[79] ACWD SGMA Annual Report, April 2021, Appendix B, Section 8, p. 129.
[80] ACWD Alternative Update 2022, Section 3.3, pp. 299-300.
[81] ACWD Alternative Update 2022, Section 3.4, p. 308.
[82] ACWD Alternative Update 2022, Appendix A, Section 4.3, p. 414.
[83] ACWD Alternative Update 2022, Appendix A, Section 4.3, p. 414.

least 10 years"[84] but instead was approved based on "other law authorizing groundwater management"[85] and, again, requests that the GSA more clearly define its efforts to manage seawater intrusion in the Subbasin. The information provided in Section 4.3 of the updated 10-year analysis did not directly provide an analysis of the minimum threshold criteria described in the table presented above in this section of the assessment, but did provide maps showing chloride trends from 2010-2020, referenced the *2020 Groundwater Monitoring Report*, and included a table showing 2010-2020 chloride trends. The GSA states, "The overall majority of wells decreasing in chloride for each of the three principal BHF aquifers is a basis for confidence that none of the aquifers sustained net new saltwater intrusion within the last 10 years."[86]

For more information about seawater intrusion, Department staff reviewed the Annual Reports covering water years ending on September 30 in 2021 and 2022, which were prepared after the 2022 Alternative was submitted. In the Water Year 2022 Annual Report, "Saltwater Intrusion" is summarized in Section 3.1.1[87], but more details were provided in Appendices A and B which contain ACWD's *Survey Report on Groundwater Conditions (February 2023)* and *2022 Groundwater Monitoring Report*, respectively. Again, while the GSA does not directly address the minimum thresholds established for seawater intrusion, Department staff found the following.

- The minimum threshold for "Flow direction in the Newark Aquifer" is stated as, "An inland flow direction would indicate new seawater intrusion, a bay-ward flow direction indicates protection against new sea water intrusion."[88] The *2022 Groundwater Monitoring Report* provides Spring and Fall water elevation contour maps for the AHF and BHF aquifers in Figure 4 through Figure 11.[89] Department staff observe that, in the spring of 2022 (Figure 5) the groundwater flow direction in the Newark Aquifer was bay-ward; however, cones of depression below sea level were shown in the Centerville-Freemont Aquifer (Figure 6) and in the Deep Aquifer (Figure 7).

- The minimum threshold for "Chloride concentrations in principal aquifers" is stated as, "250 [milligram per liter] mg/L is the criterion that defines brackish water; but assessing occurrence of seawater intrusion involves review of concentrations trends in multiple wells and the position of chloride concentration contours."[90] ACWD provides discussion on the chloride results for the Subbasin's primary aquifers and depicts these results in Figure 12 through Figure 15 of the *2022 Groundwater Monitoring Report*.[91] Based on the data presented in the figures,

[84] Water Code § 10733.6(b)(3).
[85] Water Code § 10733.6(b)(1).
[86] ACWD Alternative Update 2022, Section 4.3, p. 421.
[87] ACWD SGMA Annual Report, April 2023, Section 3.1.1, pp. 65-68.
[88] ACWD Alternative Update 2022, Section 3.3, Table 3-2, pp. 302.
[89] ACWD SGMA Annual Report, April 2023, Appendix B, pp. 163-170.
[90] ACWD Alternative Update 2022, Section 3.3, Table 3-2, pp. 302.
[91] ACWD SGMA Annual Report, April 2023, Appendix B, pp. 171-174.

chloride concentrations generally decrease with depth and increases in salinity, likely due to seawater intrusion, are localized.

- The minimum threshold for the "Geographic extent of areas of legacy brackish water in the principal aquifers" is stated as, "Position of chloride concentration contours, whether the contour is moving inland or expanding over time."[92] Historic chloride concentrations to the most recent 2022 data was graphed for the Newark, Centerville-Fremont, and Deep Aquifers in Figure 16 through Figure 18 of the *2022 Groundwater Monitoring Report*.[93] The *2022 Groundwater Monitoring Report* also includes Figure 19 through Figure 21 to show "comparison of 250 ppm chloride contours" from Fall 1962 to Fall 2022.[94] The figures show seawater intrusion has been improving since 1962. The best example of this can be seen in the Newark Aquifer.

Department staff acknowledge the effort and actions taken by ACWD to reduce chloride concentrations in the Subbasin due to legacy saltwater intrusion, and the Subbasin seems to show progress in evading further seawater intrusion. Chloride concentrations appear to be improving or are being maintained. Department staff concur "the report demonstrates that saltwater intrusion is being prevented and legacy saltwater intrusion continues to be attenuated."[95] With respect to seawater intrusion, the Subbasin appears to be making progress toward sustainability.

While the District is making progress on attenuating seawater intrusion, the Alternative is unclear about what is defined as sustainable conditions within the Subbasin under the management of the Alternative. Department staff recommend the GSA define consistent descriptions of minimum thresholds in the Subbasin and what would constitute undesirable results related to seawater intrusion (see Recommended Corrective Action 3b).

3.1.4 Degraded Water Quality

Measurable objectives, interim milestones, and minimum thresholds related to degraded water quality conditions were not provided in the 2022 Alternative. In the "Undesirable Results" section of the 2022 Alternative, the only relevant management criteria related to degraded water quality was found within Table 3-2, which states that the minimum threshold or objective to prevent undesirable results was "Verify water quality is not degraded by basin operations. Monitoring of groundwater in principal aquifers and surface water for artificial recharge indicates concentrations of various constituents are generally less than primary Maximum Contaminant Levels (MCLs). Known plumes from chemical spills are being managed through existing water quality programs so they do not cause

[92] ACWD Alternative Update 2022, Section 3.3, Table 3-2, pp. 302.
[93] ACWD SGMA Annual Report, April 2023, Appendix B, pp. 175-177.
[94] ACWD SGMA Annual Report, April 2023, Appendix B, pp. 178-180.
[95] ACWD SGMA Annual Report, April 2023, Section 3.1.1, p. 68.

shutdown of existing water wells."[96] As in Section 4.6, most of the water quality discussion is a narrative history of ACWD's historical water quality monitoring efforts and not a plan to achieve or maintain sustainable conditions.

Basic information regarding water quality conditions is presented in Section 2.3.4 of the 2022 Alternative. As stated, "To assess for potential water quality concerns, water quality data from all ACWD production wells from 2010-2020 were evaluated and compared to the applicable California Primary and Secondary Maximum Contaminant Levels (MCLs)."[97] The GSA states that, "Only chloride, TDS, and manganese were detected above their respective Secondary MCLs in the raw groundwater."[98] ACWD briefly discusses current groundwater conditions as related to chloride and TDS concentrations, manganese, nitrate, and PFAs in the 2022 Alternative.[99] ACWD states, "Groundwater in the Niles Cone is generally of good quality."[100]

The "Minimum Thresholds and Measurable Objectives" section of the 2022 Alternative does not discuss water quality (other than chloride), but instead references the *Niles Cone 10-Year Sustainability Analysis (December 2021)* for more information.[101] Section 4.4 (Water Quality Degradation) of the updated 10-year sustainability analysis document includes a single paragraph which partly states, "Unlike chloride and TDS related to legacy saltwater intrusion, it does not appear that the Niles Cone contains plumes of chemicals that presently limit beneficial uses of groundwater. However, the occurrence of [Per- and Polyfluoroalkyl Substances] PFAS, though at low levels, is a concern for which ACWD is working to determine the extent of PFAS in groundwater and identify sources. There currently isn't an MCL for PFAS. Additional details are provided in the Alternative Update. At this time, seawater intrusion, discussed in Section 4.3, remains the primary water quality concern whose successful management is dependent on maintaining piezometric head in the Newark Aquifer above local sea level, which in turn, is dependent upon adequate recharge to offset pumping."[102] Department staff note that the redirection from the 10-year analysis document back to the 2022 Alternative does not provide much additional discussion but does direct the reader to ACWD's *Water Quality Monitoring Plan (January 2020)*, ACWD's *Urban Water Management Plan*, and ACWD's *Groundwater Protection Program*.[103]

ACWD has a Groundwater Protection Program that requires ACWD to take "an active role in 1) assisting with the identification of potential groundwater contamination, 2) implementing monitoring systems at hazardous materials storage sites, and 3) providing technical oversight for investigations and cleanups at hazardous materials spill sites."[104]

[96] ACWD Alternative Update 2022, Table 3-2, pp. 302-303.
[97] ACWD Alternative Update 2022, Section 2.3.4, p. 169.
[98] ACWD Alternative Update 2022, Section 2.3.4, p. 169.
[99] ACWD Alternative Update 2022, Section 2.3.4, pp. 168-170.
[100] ACWD Alternative Update 2022, Section 2.3.4, p. 168.
[101] ACWD Alternative Update 2022, Section 3.4, p. 306-308.
[102] ACWD Alternative Update 2022, Appendix A, Section 4.4, p. 422.
[103] ACWD Alternative Update 2022, Section 2.3.4, pp. 168-172.
[104] ACWD Alternative Update 2022, Section 2.3.4.1, p. 171.

The GSA provides a history of its Groundwater Protection Program in the 2022 Alternative but does not provide a discussion related to how implementation of the Groundwater Protection Program is affecting the Niles Cone Subbasin. While Department staff acknowledge ACWD's Groundwater Protection Program encourages groundwater protection, Department staff are uncertain if this program is producing the anticipated results due to lack of detail in the 2022 Alternative.

Department staff are encouraged by the progress made in the Subbasin related to concentrations of chloride and TDS and, based on the information provided by ACWD, it appears the Subbasin is being monitored for various constituents of concern; however, it is difficult for Department staff to confirm since these results are not presented in a clear manner. Department staff recommend the District clearly define what sustainable conditions in the Subbasin are for each constituent of concern and what constitutes an undesirable result. Providing this information in a clear, consistent way will be critical to understanding whether Subbasin is being managed sustainably (see Recommended Corrective Action 3c).

3.1.5 Land Subsidence

The sustainable management criteria and the sustainability status for land subsidence are briefly discussed in the 2022 Alternative within Table 3-2. As stated, the minimum threshold or objective to prevent land subsidence is to "Maintain groundwater levels tens of feet higher than historical minimums."[105] ACWD provides the rationale used to determine the governing minimum thresholds in Section 2.3.5 of the 2022 Alternative. As stated, "Despite extreme and chronic overdraft in the Niles Cone prior to the early 1960s, consequential subsidence in the Niles Cone was minimal (in spite of the historical low water levels)" and "actions taken since the early 1960s to reclaim the basin from saltwater intrusion has drastically increased water levels in all BHF Aquifers."[106]

ACWD referenced Interferometric Synthetic Aperture Radar (InSAR) data to confirm the logic used to set the minimum thresholds for land subsidence in the Niles Cone Subbasin, and Department staff concur this is an acceptable approach to monitor land subsidence. As stated, "Figure 2-44 below presents a map utilizing the InSAR satellite data from the SGMA Data Viewer to depict estimated subsidence derived from InSAR data in the Niles Cone between January 2015 and October 2020."[107] As described by the 2022 Alternative, "the vertical displacement layer applied to the Niles Cone falls within the ranges between a maximum of -0.25 to 0 feet and 0 to 0.25 feet, indicating that no appreciable subsidence has occurred in the area of the Niles Cone between January 2015 and October 2020. However, most vertical displacement data points were in hundredths (e.g. 0.05) or thousands of feet (e.g., 0.002) (whether positive or negative)…indicating that much of the vertical displacement data for the Niles Cone is less than the vertical accuracy of the

[105] ACWD Alternative Update 2022, Section 3.3, Table 3-2, pp. 303.
[106] ACWD Alternative Update 2022, Section 2.3.5, p. 196.
[107] ACWD Alternative Update 2022, Section 2.3.5, p. 197-198.

dataset and, therefore, unappreciable."[108] Department staff concur that the use of InSAR data to determine that land subsidence is not currently occurring in the Subbasin relies upon the best available science and information.

With respect to land subsidence, the Subbasin appears to be on track to achieve or maintain sustainable conditions. Department staff encourage the GSA to continue to coordinate regionally, and especially with adjacent basins, to ensure that land subsidence related to groundwater extraction does not occur. Should land subsidence be observed in the Subbasin, Department staff encourage the GSA to consider the following:

- Identify land uses and property interests that are likely to be affected by land subsidence in the basin and identify a cumulative amount of tolerable subsidence that, if exceeded, would substantially interfere with groundwater and land surface beneficial uses and users in the basin.
- Establish a monitoring network for land subsidence that directly measures land elevation change such as remote sensing data, survey monuments, or global positioning system stations. Collect data at a minimum of every five years from the network.

3.1.6 Depletions of Interconnected Surface Water

ACWD does not establish minimum thresholds or measurable objectives for depletions of interconnected surface water; however, ACWD does establish thresholds and objectives in the context of groundwater dependent ecosystems (GDEs) and fishery protection. The 2022 Alternative provides these thresholds and objectives in Table 3-2.[109] Interconnected surface water in the Niles Cone Subbasin is discussed in Section 2.2.3 of the 2022 Alternative.[110] A stated, "In ACWD's 2016 Alternative, ACWD explained that water bodies known or likely to be in contact with regional groundwater affected by ACWD's operations included the [Alameda Creek Flood Control Channel] ACFCC segment east of I-880, recharge ponds near the ACFCC and the Hayward Fault, and potentially the inland segment of Old Alameda Creek. The 2022 Alternative continued to explain that when groundwater heads approach maximum operating levels, the rate of rise in piezometric head appears slow in response to additional recharge."[111]

The *Niles Cone 10-Year Sustainability Analysis* [December 2021] discusses depletion of interconnected surface water in Section 4.6.[112] As stated, "As part of the support study element to the Model Upgrade and Alternative Update Project, Woodard and Curran (2021d) evaluated potential groundwater dependent ecosystems (GDEs) and interconnected streams within the Niles Cone. ACWD staff performed additional analysis to determine timing of groundwater flows to the Alameda Creek Flood Control Channel

[108] ACWD Alternative Update 2022, Section 2.3.5, pp. 197.
[109] ACWD Alternative Update 2022, Section 3.3, Table 3-2, p. 304.
[110] ACWD Alternative Update 2022, Section 2.2.3, pp. 139-145.
[111] ACWD Alternative Update 2022, Section 2.2.3, p. 139.
[112] ACWD Alternative Update 2022, Appendix A, Section 4.6, pp. 424-461.

(ACFCC), which has been identified as a viable watercourse for migration of Steelhead Trout."[113] Additionally, "[The] degree of interconnection was qualitatively assessed by comparing hydrographs of wells screened in the Newark Aquifer with nearby wells screened in the [shallow water bearing zone] SWBZ."[114] ACWD depicts the "qualitative degrees of interconnection" in Figure 4.15[115] and explains these results in Table 4.6.[116] The 2022 Alternative states, "Although the conclusions in the 10-year analysis are well supported and validate the continued use of ACWD's minimum thresholds for the next five years, ACWD has planned next steps or projects, such as conducting field studies and processing of possible other existing data to verify assumptions and increase confidence in the evaluation of GDEs and interconnected streams and channels."[117]

A more detailed explanation of the District's approach to interconnected surface water and groundwater dependent ecosystems can be found in Section 4.2. With respect to depletions of interconnected surface water, the District appears to be making progress. Department staff have provided additional guidance related to interconnected surface water and groundwater dependent ecosystems (see Recommended Corrective Action 4).

3.2 Projects and Management Actions

The GSP Regulations require a description of the projects and management actions the local agencies and/or GSAs in the basin have determined will achieve the established sustainability goal, including projects and management actions to respond to changing conditions.[118] As part of its Periodic Review responsibility, the Department is required to determine whether the local agencies and/or GSAs in the basin are implementing projects and management actions consistent with the alternative, or that the local agencies and/or GSAs have demonstrated that actions described in the alternative have been rendered unnecessary based on changing basin conditions or an improved understanding of basin conditions.[119]

The 2022 Alternative briefly discusses the efforts the GSA has determined "have resulted in sustainable groundwater management of the Niles Cone" in Sections 5 and 5.1.[120] Additional projects and management actions recommended by ACWD for its next five-year periodic evaluation are listed in Section 5.2.[121] As stated, "Many of these actions have benefits that roll into other objectives, which have resulted in improving water supply reliability and groundwater quality in an environmentally sensitive way, all of which have resulted in sustainable management of the Niles Cone."[122]

[113] ACWD Alternative Update 2022, Appendix A, Section 4.6, p. 424.
[114] ACWD Alternative Update 2022, Appendix A, Section 4.6, p. 434.
[115] ACWD Alternative Update 2022, Appendix A, Figure 4.15, p. 435.
[116] ACWD Alternative Update 2022, Appendix A, Section 4.6, p. 434.
[117] ACWD Alternative Update 2022, Appendix A, Section 5, p. 462.
[118] 23 CCR § 354.44(a).
[119] 23 CCR § 355.6(c)(2).
[120] ACWD Alternative Update 2022, Section 5, pp. 325-327.
[121] ACWD Alternative Update 2022, Section 5.2, pp. 327- 330.
[122] ACWD Alternative Update, Section 5, p. 325.

ACWD discusses "Groundwater Management Programs" in Section 1.4. of the 2022 Alternative.[123] As stated, "The management activities discussed in Section ES-3, as well as those identified in ACWD's *Groundwater Management Policy* (Policy) (2001 Update; ACWD, 2001), were developed and implemented under ACWD's pre-existing authority and ensure a reliable supply of high-quality water that satisfies present and future water needs for ACWD's distribution system customers, owners and operators of private wells, and the environment."[124] Additionally, "Information about projects and management actions can be found in the ACWD Adopted Budget (ACWD, 2021e) and ACWD's 25-Year Capital Improvement Program (ACWD, 2011a) or by visiting www.acwd.org."[125]

Department staff reviewed the referenced documents, ACWD's *Groundwater Management Policy*[126] and ACWD's 25-Year Capital Improvement Program,[127] to obtain more information on the projects and management actions in the Subbasin. The referenced documents provide additional details about the projects and management actions; however, Department staff could not locate information regarding the status of the identified projects and management actions.

The *Niles Cone 10-Year Sustainability Analysis (December 2021)* provides a "Summary of Groundwater Management Policy" in Section 3.6.[128] As stated, "Table 3.1, below, provides a summary of these programs, and as such, expresses the legacy of the history of ACWD's actions from its early days to sustainably operate the Niles Cone Groundwater Basin."[129] While Department staff appreciate ACWD's implementation of its Groundwater Management Policy, it is still unclear how the project and management actions are helping ACWD manage the Subbasin above the thresholds it has established.

The 2022 Alternative and the many referenced documents contain several explanations about how long the Subbasin has been operating sustainably, which claims that management efforts have been successful and groundwater conditions are sustainable in the Subbasin. The 2022 Alternative, however, does not effectively convey this same message through data and evidence. Department staff are encouraged by the projects and management actions discussed in the 2022 Alternative and referenced documents; however, Department staff are unable to determine if the identified projects and management actions are leading to sustainability. Many of the projects and management actions have been in place for several years, with some being implemented prior to SGMA. Department staff are optimistic these projects and management actions are contributing to groundwater management in the Subbasin, but Department staff cannot make a clear determination due to the lack of information regarding how these projects

[123] ACWD Alternative Update 2022, Section 1.4, pp. 64-76.
[124] ACWD Alternative Update 2022, Section 1.4, p. 64.
[125] ACWD Alternative Update 2022, Section 5, p. 325.
[126] https://www.acwd.org/DocumentCenter/View/125/Groundwater-Management-Policy-2001?bidId=.
[127] https://acwd.org/DocumentCenter/View/110/25-yr.
[128] Niles Cone Alternative Update, Appendix A, Section 3.6, pp. 387-388.
[129] Niles Cone Alternative Update, Appendix A, Section 3.6, p. 387.

and management actions are leading to, or have led to, sustainable conditions (see Recommended Corrective Action 1).

3.3 Data Gaps

Data gaps can relate to information about the physical setting and characteristics of a basin, a basin's current conditions, its hydrogeologic conceptual model, or its monitoring network.[130] As part of its Periodic Review responsibility, the Department is required to determine whether the local agencies and/or GSAs are addressing the basin's data gaps and are reducing the levels of uncertainty identified in the approved alternative.[131]

Data gaps are discussed in several sections of the 2022 Alternative. The Periodic Evaluation Elements Guide provided by ACWD[132] indicates data gaps are discussed in Sections 2.2.4 ("Data Gaps and Uncertainty"), 4.6 ("Assessment and Improvement of Monitoring Network"), and 5.2 ("Recommended Actions for Next 5-Year Update"). As stated, "Within the Niles Cone proper, installation of monitoring wells by ACWD has improved understanding of depth occurrence and lateral continuity of the principal aquifers and has enabled better definition of the extent of legacy saltwater intrusion."[133] Additionally, "Existing wells in [the southern and southeastern portions of the Niles Cone] are relatively shallow and widely spaced, resulting in necessary interpolation of their lithologic logs and greater uncertainty in the associated hydrogeologic characteristics. This uncertainty was acknowledged during development of the cross-sections and 'Data Limitations and Uncertainties' section of *Technical Memorandum 2 – Cross Section Development* (Appendix C)."[134] ACWD continues to state, "Improved understanding of the hydrogeologic properties of the southern and southeastern portions of the Niles Cone can be accomplished in the future through data refinement as new data and information become available. To accomplish this, ACWD has proposed implementing a project to review the Niles Cone monitoring network and evaluate data gaps within portions of the basin for potential construction of additional monitoring wells."[135]

ACWD has also identified data gaps related to groundwater dependent ecosystems (GDEs). As stated, "Technical Memorandum 4 identified areas of potential future studies with the goal of improving understanding of connectivity between shallow and regional aquifers in defined areas and in the southern area covered with physiographic alluvial deposits."[136] Additionally, "a GDE field assessment has been proposed as a project in Next Steps and Ongoing Management Actions as well as data gaps analysis of the southern and southeastern portion of the basin in both AHF and BHF as part of the continued evaluation."[137] Department staff appreciate ACWD's efforts to address

[130] 23 CCR §§ 354.12; 354.15(b)(5); 354.38.
[131] 23 CCR § 355.6(c)(3).
[132] https://sgma.water.ca.gov/portal/service/alternative/periodiceval/elements/export/4.
[133] ACWD Alternative Update 2022, Section 2.2.4, p. 145.
[134] ACWD Alternative Update 2022, Section 2.2.4.2, p. 147.
[135] ACWD Alternative Update 2022, Section 2.2.4.2, p. 147.
[136] ACWD Alternative Update 2022, Section 2.2.4.3, p. 148.
[137] ACWD Alternative Update 2022, Section 2.2.4.3, p. 148.

Department staff's Recommended Action 3 from the 2019 assessment and fill data gaps related to GDEs.

In response to the Department's previous Recommended Action 4, ACWD developed projected water budgets for four different climate scenarios. ACWD identified "some of the input datasets did not contain daily data and/or…daily data were not continuous across the entire 82-year period (from January 1, 1922, through December 31, 2003)."[138] To fill these data gaps, "where daily data were not available…ACWD used the known monthly Niles Cone rainfall totals from the data gaps to identify months for which daily rainfall data were available and whose monthly totals were closest to the monthly rainfall totals from the data gap months."[139] ACWD continues to say, "there are impacts from climate change which may not be reflected in this analysis" and "because the magnitude and significance of impacts from climate change are currently unknown, planning for climate change is subject to uncertainty."[140] To account for these uncertainties, "ACWD will continue to consider and incorporate potential impacts from climate change in its planning documents, including the forthcoming 2025 [Integrated Resources Plan] IRP Update and [Climate Action Plan] CAP; see Section 1.3.2."[141] Department staff agree with ACWD's approach to filling data gaps for the projected water budgets for the various climate scenarios and are encouraged by ACWD's efforts to continue refining future water budgets.

Based on the information presented in the 2022 Alternative and supporting documentation, ACWD appears to be addressing the existing data gaps, identifying new data gaps, and reducing levels of management uncertainty.

3.4 Consideration of Adjacent Basins

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 the achievement of sustainability goals in an adjacent basin."[142] Furthermore, the GSP Regulations state that minimum thresholds defined in each GSP be selected to avoid causing undesirable results in adjacent basins or affecting the ability of adjacent basins to achieve sustainability goals.[143]

The Niles Cone Subbasin has three adjacent basins. The Santa Clara Valley – East Bay Plain Subbasin is located to the north, the Santa Clara Valley – San Mateo Plain Subbasin is located to the west, and the Santa Clara Valley – Santa Clara Subbasin is located to the south and southwest. The East Bay Plain is designated by the Department as a medium priority and has an approved GSP. The San Mateo Plain Subbasin is designated

[138] ACWD Alternative Update 2022, Section 2.5.4.1.2, p. 286.
[139] ACWD Alternative Update 2022, Section 2.5.4.1.2, p. 286.
[140] ACWD Alternative Update 2022, Section 2.5.4.1.2, p. 291.
[141] ACWD Alternative Update 2022, Section 2.5.4.1.2, p. 291.
[142] Water Code § 10733(c).
[143] 23 CCR § 354.28(b)(3).

as a very low priority and is not required by SGMA to be managed under a GSP. The Santa Clara Subbasin is designated as a high priority and has an approved Alternative.

The GSA should be aware of the adjacent basins' sustainability goals and actively coordinate with the respective Plan Managers to ensure the Niles Cone Subbasin's groundwater management program is not affecting the adjacent basins. Furthermore, the GSA should be aware of the recommended corrective actions that adjacent basins are actively working to address. Department staff recommend the GSA provide an explanation in future updates or Periodic Evaluations of its Alternative how inter-basin items, such as: thresholds across basin boundaries; monitoring networks; hydrogeologic conceptual models, including principal aquifer designations; water budgets; and management of interconnected surface water have been coordinated (see Recommended Corrective Action 5).

The 2022 Alternative, at this time, does not anticipate any negative impacts to the adjacent basins resulting from the minimum thresholds defined for the Niles Cone Subbasin, and the Department is not aware of any information, at this time, suggesting or claiming that adjacent basins' implementation of plans have been, or will be, negatively impacted by implementation of the Subbasin's 2022 Alternative. While Department staff are not aware of any information that would refute this position, additional information related to coordination with adjacent basins may be warranted. Department staff will continue to review the GSA's Periodic Evaluations to assess whether the implementation of the Niles Cone Subbasin Alternative is potentially impacting GSPs in the adjacent basins.

3.5 Alignment of Monitoring Network

The GSP Regulations describe the monitoring network that must be developed for each sustainability indicator including monitoring objectives, monitoring protocols, and data reporting requirements. Collecting monitoring data of sufficient quality and quantity is necessary for the successful implementation of an alternative or a GSP. The GSP Regulations require a monitoring network of sufficient quality, frequency, and distribution to characterize groundwater and related surface water conditions in the basin and evaluate changing conditions that occur through the implementation of the alternative or GSP.[144] Specifically, a monitoring network must be able to monitor impacts to beneficial uses and users,[145] monitor changes in groundwater conditions relative to measurable objectives and minimum thresholds,[146] capture seasonal low and high conditions,[147] include required information such as location and well construction, and include maps and tables clearly showing the monitoring site type, location, and frequency.[148]

[144] 23 CCR § 354.32.
[145] 23 CCR § 354.34(b)(2).
[146] 23 CCR § 354.34(b)(3).
[147] 23 CCR § 354.34(c)(1)(B).
[148] 23 CCR §§ 354.34(g-h).

Department staff encourage local agencies and GSAs to collect monitoring data as specified in their respective plans, follow SGMA data and reporting standards,[149] fill data gaps,[150] update monitoring network information as needed, follow monitoring best management practices, and submit all monitoring data to the Department's Monitoring Network Module immediately after collection, including any additional groundwater monitoring data that is collected within the respective plan area that is used for making groundwater management decisions. Department staff note that if agencies do not fill their identified data gaps, the agencies' understanding of the basin may not represent the best available science for use in monitoring basin conditions.

Department staff recommend the GSA ensure the monitoring network details included in its Alternative are consistent with the information contained in the SGMA Portal Monitoring Network Module (see Recommended Corrective Action 2).

3.6 Consideration of Climate Change and Future Conditions

Since the 2022 Alternative was adopted and submitted, climate change conditions have advanced faster and more dramatically. It is anticipated that the hotter, drier conditions will result in a loss of ten percent of California's water supply. As California adapts to a hotter, drier climate, local agencies and GSAs should be preparing for these changing conditions as they work to sustainably manage groundwater within their jurisdictional areas. Specifically, the Department encourages local agencies and GSAs to:

- Explore how their proposed groundwater level thresholds have been established in consideration of groundwater level conditions in the basin based on current and future drought conditions.
- Explore how groundwater level data from the existing monitoring network will be used to make progress towards sustainable management of the basin given increasing aridification and effects of climate change, such as prolonged drought.
- Take into consideration changes to surface water reliability and the potential impact on groundwater conditions.
- Evaluate updated watershed studies that may modify assumed frequency and magnitude of recharge projects, if applicable.
- Continually coordinate with the appropriate groundwater users, including but not limited to domestic well owners and state small water systems, as well as the appropriate overlying county jurisdictions developing drought plans and establishing local drought task forces, to evaluate how their respective groundwater management strategy aligns with drought planning, response, and mitigation efforts within the basin.

[149] 23 CCR § 352.4 *et seq*.
[150] 23 CCR § 354.38(d).

4 PROGRESS TOWARDS ADDRESSING 2019 RECOMMENDED ACTIONS

The July 17, 2019, *Statement of Findings Regarding the Approval of the Niles Cone Subbasin Alternative* explains the Department's decision to review and approve the GSA's Alternative. As stated in the Statement of Findings, "Based on its review of the Staff Report, Department management is satisfied that [Department] staff have conducted a thorough evaluation and assessment of the Alternative and concurs with staff's recommendation and all the recommended actions and thus hereby approves the Alternative [on the following grounds:]."[151] The Statement of Findings further states, "The recommended actions identified in the Staff Report will assist the Department's review of the Alternative's implementation for consistency with SGMA and are thus recommended to be included in the resubmitted Alternative, due on January 1, 2022, as required by Water Code Section 10733.6(c)."[152]

The GSA's efforts to address the Department's recommended actions are summarized below. New recommended corrective actions and considerations for improvement of the 2022 Alternative are provided in Section 5.

4.1 Recommended Action 1

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.

The 2016 Alternative consisted of numerous documents related to the Subbasin's historical management of groundwater. The Department's 2019 Staff Report stated that "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 website. However, after considerable effort to review the documentation submitted, Department staff are able to determine that the information relied upon by the District for their Alternative contains detailed and credible information sufficient to support a conclusion to conclude that implementation of the Alternative is reasonably likely to lead to sustainable groundwater management of the Niles Cone Subbasin."[153] The purpose of Recommended Action 1 was to have the GSA prepare updates to the 2016 Alternative in a manner that organized data around the general structure of a GSP as defined in Article 5 of the GSP Regulations and not require Department staff to constantly refer to information in multiple documents to determine functional equivalency to a GSP. Although the District took steps to address this

[151] https://sgma.water.ca.gov/portal/alternative/assessments/4.
[152] https://sgma.water.ca.gov/portal/alternative/assessments/4.
[153] https://sgma.water.ca.gov/portal/alternative/assessments/4.

recommended action, in the opinion of Department staff, the District did not go far enough. The collection of documents submitted by the District remains a patchwork of poorly organized information whose review imposed a significant administrative burden on the Department. Of greater concern, the lack of clear organization of the submitted materials has forced Department staff to make a recommendation based on information about which there is a high degree of uncertainty.

As summarized in the 2022 Alternative in response to Recommended Action 1, the GSA reiterates "There are three documents which are considered to be core to the sustainable management of the Niles Cone…: (1) the *Groundwater Management Policy* (Policy), which was adopted in 1989, and last amended in 2001 (ACWD, 2001); (2) the annual *Survey Report on Groundwater Conditions* (ACWD, 2021d); and (3) the annual *Groundwater Monitoring Report* (ACWD, 2021c)."[154] The core documents, as well as the additional information related to management of the Subbasin, were, in the opinion of Department staff, submitted individually in 2016 without a clear management structure. The GSA has consolidated much of the information from the 2016 Alternative into one portable document format (PDF) document rather than numerous PDF documents, and the GSA states the 2022 Alternative has been reformatted to "generally follow Article 5 [of the GSP Regulations] as recommended."[155] However, Department staff still found the 2022 Alternative to be lacking a clear management structure with well-organized information.

While Department staff appreciate the GSA's effort to organize its submitted material and information, the 2022 Alternative does not necessarily facilitate the Department's ongoing evaluation and assessment of the Alternative. The 2022 Alternative does not present data related to sustainability indicators in a way that makes it clear to Department staff whether or not the Subbasin is on track to achieve sustainability – much of the data and explanation of functionally equivalent SGMA information that the Department requires in order to evaluate sustainable conditions in the Subbasin continues to be located among multiple documents.

The GSA relies heavily on one document in particular, the *Niles Cone 10-Year Sustainability Analysis (December 2021)*, provided in Appendix A of the 2022 Alternative.[156] As stated, "ACWD's groundwater management programs and activities have ensured adequate pressurization of aquifers, importation of purchased water when needed to supplement local water, basin-wide monitoring, mitigation of legacy saltwater intrusion, metering and administration of replenishment assessment program as part of a basin management framework which has resulted in the operation and sustainable management of Niles Cone within its sustainable yield over the last five decades, including the most recent 10-year period from 2010-2020, as provided in the enclosed

[154] ACWD Alternative Update 2022, Section ES-5, p. 27.
[155] https://sgma.water.ca.gov/portal/alternative/assessments/4.
[156] ACWD Alternative Update 2022, Appendix A, pp. 343-474.

Niles Cone 10-Year Sustainability Analysis (see Appendix A)."[157] ACWD previously submitted the *Niles Cone 10-Year Sustainability Analysis (December 2016)* as a potential alternative for the Niles Cone Subbasin; however, this approach was not approved by the Department.

The 2022 Alternative continues to reference many documents to help explain the rationale behind groundwater management decisions in the Subbasin. Having the information spread across multiple documents made the review of the 2022 Alternative by Department staff, once again, confusing and required considerable effort to locate and check cross-referenced material. There were several instances where ACWD claims sustainable groundwater management is occurring and indicates which document contains the rationale behind the decision; however, the rationale was not always presented clearly, or the explanation was not provided at all. Department staff note the rationale was often incomplete, with references made to other documents.

It is not clear to Department staff how the approach taken by the GSA to show functional equivalency to a GSP in the 2022 Alternative is fundamentally different from the 2016 Alternative. It is evident ACWD made efforts to provide a document that generally follows the outline of a GSP, but Department staff were still required to search for information from multiple sources and draw conclusions since explanations were not clearly stated or readily made by the GSA.

While ACWD is acknowledged to have extensive experience managing the Subbasin, Department staff are required to evaluate the nature of that management, including the specific physical characteristics and basin conditions that ACWD uses to define sustainability to determine whether it is consistent with SGMA. The lack of systematic explanations of how thresholds were determined or how maintaining those thresholds leads to sustainability introduces a high degree of uncertainty in any staff recommendation regarding whether the basin is being managed in a manner that is consistent with SGMA. That uncertainty will only increase over time and may undermine the Department's ability to fulfill its statutory obligation to evaluate whether the implementation of a plan in one basin adversely affects the ability of an adjacent basin to implement its plan or impedes the achievement of sustainability goals in an adjacent basin.

4.1.1 Staff Assessment of Agency's Response to Recommended Action 1

Based on the information provided in the 2022 Alternative, Department staff have determined that Recommended Action 1 has not been sufficiently addressed. The 2022 Alternative contains the relevant information from the previously submitted Alternative, but the information is not presented in a way that facilitates the Department's ongoing evaluation and assessment of the Alternative. Department staff have recommended

[157] ACWD Alternative Update 2022, Section 1.1, p. 52.

corrective actions related to the organization and management structure of the 2022 Alternative (see Recommended Corrective Action 1).

4.2 Recommended Action 2

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.

In response to Recommended Action 2, the GSA states, "To address this recommended action, a thorough analysis of water levels from wells in both the Above Hayward Fault (AHF) and Below Hayward Fault (BHF) sub-basins of the Niles Cone was conducted to show where the AHF or the Newark Aquifer (in the BHF) are likely connected to and likely disconnected from the Shallow Water-Bearing Zone (SWBZ), areas where there is likely to be direct surface water-groundwater interactions, and areas where there is likely no connection."[158] The information in the 2022 Alternative indicates "the aquifers that are directly recharged by surface water are the AHF Aquifer (in the AHF Sub-basin) and the Newark Aquifer (BHF Sub-basin)" and that "the complete analysis is provided as *Technical Memorandum 4 – Interconnected Surface Water and Groundwater Dependent Ecosystems* (Appendix C), which is further expanded upon as discussed in the *Niles Cone 10-Year Sustainability Analysis* (Appendix A)."[159] The GSA indicates that "The conclusions of this analysis indicate that concern for depletion of surface water in the ACFCC is not a basis for ACWD to adjust its operational criteria (governing minimum thresholds) and that groundwater levels below the thalweg of the ACFCC (whether in the AHF or the BHF Sub-basin) did not constitute an undesirable result through depletion of surface water."[160]

As stated in the *Niles East Bay Integrated Model (NEBIM) & Alternative Update Support Study Report*, "ACWD has implemented the Groundwater Basin Flow Model Upgrade and Alternative Update Project to: 1) upgrade ACWD's existing groundwater model to both enable the Alternative Update and provide a planning tool for ongoing management of the groundwater basin under current and expected future conditions, and 2) prepare an Alternative Update that will include improvements previously identified by ACWD and incorporate the recommended actions documented in DWR's Alternative approval."[161] As part of the Support Study, ACWD "utilized existing data and undertook the following:

[158] ACWD Alternative Update 2022, Section ES-5, pp. 27-28.
[159] ACWD Alternative Update 2022, Section ES-5, pp. 28.
[160] ACWD Alternative Update 2022, Section ES-5, p. 28
[161] ACWD Alternative Update 2022, Appendix C, p. 618.

- Prepare geologic cross sections to document geologic characterization of the Niles Cone, and its transition with the neighboring groundwater subbasins: East Bay Plain Subbasin, Santa Clara Subbasin, and San Mateo Plain Subbasin.
- Evaluate and interpret hydrogeologic data to assess potential for groundwater flow between the Niles Cone and neighboring groundwater basins.
- Evaluate water bodies within the Niles Cone to determine: 1) potential surface water-groundwater interaction; 2) if there are potential groundwater-dependent ecosystems (GDEs); and 3) if the above are significant means of groundwater from to/from the Niles Cone."[162]

The support study includes four technical memoranda: 1) Technical Memorandum 1 – *Data Collection* (TM #1); 2) Technical Memorandum 2 – *Cross Section Development* (TM #2); 3) Technical Memorandum 3 – *Hydrologic Interactions* (TM #3); and 4) Technical Memorandum 4 – *Interconnected Surface Water and Groundwater Dependent Ecosystems* (TM #4).[163]

- *Technical Memorandum 1 – Data Collection* "documents the data collection effort for the support study."[164] As stated, "Primary data in electronic format was provided by ACWD for the Niles Cone, whereas agencies managing and/or involved with adjacent subbasins provided primary water level and geologic data from parts of those neighboring subbasins close to the boundary with the Niles Cone. Data from neighboring basins was sought to further understand potential geologic and hydraulic interactions between the Niles Cone and these subbasins, which is one of the goals of the project. Neighboring subbasins include the East Bay Plain to the north, the San Mateo Plain to the west, and the Santa Clara Subbasin to the south and the southwest."[165]
- *Technical Memorandum 2 – Cross Section Development* documents the process of developing cross -sections "to improve understanding of the subsurface stratigraphy of the Niles Cone and the relationship of Niles Cone stratigraphy with neighboring East Bay Plain, San Mateo Plain, and Santa Clara subbasins. The complied cross-sections contained in this TM address ACWD's goal for updated cross-sections in its 5-year Alternative Plan Update, provides a means which will be considered in refining model layers in the Niles Cone and transition zone areas within the domain of an upgrade of the groundwater basin flow model, and provides the geologic basis of interpretations of potential hydraulic interactions with neighboring basins discussed in Support Study TM3."[166]

[162] ACWD Alternative Update 2022, Appendix C, pp. 618-619.
[163] ACWD Alternative Update 2022, Appendix C, pp. 614-753.
[164] ACWD Alternative Update 2022, Appendix C, Technical Memorandum 1, Section 1, p. 624.
[165] ACWD Alternative Update 2022, Appendix C, Technical Memorandum 1, Section 1, p. 624.
[166] ACWD Alternative Update 2022, Appendix C, Technical Memorandum 2, Section 1, pp. 635-636.

- *Technical Memorandum 3 – Hydraulic Interactions* utilized information presented in TM #1 and TM #2 to gain a better understanding of subsurface hydrogeology. As stated, "Transition zone groundwater level monitoring data from wells in the Niles Cone and neighboring subbasins, but close to the boundary of the Niles Cone, were reviewed to assist the evaluation of interaction between the Niles Cone and San Mateo Plain and Santa Clara subbasins. Long -term groundwater level data were not available in sufficient quantity and quality to evaluate interaction between the Niles Cone and East Bay Plain subbasins at the time of analysis; however, pump tests conducted in the Easy Bay Plain Subbasin were considered (Section 4.1)."[167]
- *Technical Memorandum 4 – Interconnected Surface Water and Groundwater Dependent Ecosystems* "[evaluates] potential GDEs and interconnections between surface water bodies and regional aquifers in the Niles Cone."[168] As stated, "This improved understanding of interconnected surface water bodies and GDEs will be used to inform options for modeling these systems in the upgraded groundwater basin flow model, including grid refinement to allow for more robust modeling of hydraulic interactions between regional aquifers and surface water bodies and/or wetlands, including potential GDEs in the Niles Cone. The analysis will also be used to support ACWD's Alternative Plan Update."[169]

Department staff acknowledge the efforts of ACWD to address Recommended Action 2, as well as Recommended Action 3. The technical memoranda seem to provide adequate background and information for ACWD to determine that quantification of the quantity and timing of depletion of interconnected surface waters is necessary for both above and below the Hayward Fault. ACWD identified locations within the Subbasin that have the potential for interconnected surface water; however, the quantity and timing of depletions of interconnected surface water is still unclear to Department staff. Department staff acknowledge this is a challenging topic and appreciate ACWD's efforts to present the discussion and data related to interconnected surface water.

4.2.1 Staff Assessment of Agency's Response to Recommended Action 2

Based on the information provided in the 2022 Alternative, Department staff have determined that Recommended Action 2 has been sufficiently addressed. ACWD did clarify a quantification of the quantity and timing of depletion of interconnected surface waters is necessary for both above and below the Hayward Fault. As discussed in Section 3.1.6, ACWD will continue to "verify assumptions and increase confidence in the evaluation of GDEs and interconnected streams and channels."[170] To further assist the

[167] ACWD Alternative Update 2022, Appendix C, Technical Memorandum 3, Section 3.1, p. 651.
[168] ACWD Alternative Update 2022, Appendix C, Technical Memorandum 4, Section 1, p. 687.
[169] ACWD Alternative Update 2022, Appendix C, Technical Memorandum 4, Section 1, p. 687.
[170] ACWD Alternative Update 2022, Appendix A, Section 5, p. 462.

GSA, Department staff have provided recommended corrective actions related to interconnected surface water (see Recommended Corrective Action 4).

4.3 Recommended Action 3

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.

In response to Recommended Action 3, the GSA states, "Technical Memorandum 4 in Appendix C describes the activities conducted to evaluate water bodies within the Niles Cone to determine potential interconnected surface water bodies with subsurface aquifers and Groundwater Dependent Ecosystems (GDEs) in the Niles Cone as part of the Support Study conducted under the *Groundwater Basin Flow Model Upgrade and Alternative Update Project* for ACWD. The work in the Technical Memorandum builds upon ACWD's 2018 Preliminary Assessment of Groundwater Dependent Ecosystems included in ACWD's previous annual SGMA reports (ACWD, 2021a)."[171]

As discussed in Section 4.2 of this assessment, ACWD prepared a support study as part of the 2022 Alternative which includes four technical memoranda: 1) Technical Memorandum 1 – *Data Collection* (TM #1); 2) Technical Memorandum 2 – *Cross Section Development* (TM #2); 3) Technical Memorandum 3 – *Hydrologic Interactions* (TM #3); and 4) Technical Memorandum 4 – *Interconnected Surface Water and Groundwater Dependent Ecosystems* (TM #4).[172] As stated, "This section addresses how GDEs were identified and provides evidence that ongoing operation of the Newark Aquifer by ACWD are not likely to adversely affect GDEs that have connectivity in the Newark Aquifer."[173] The *Niles Cone 10-Year Sustainability Analysis (December 2021)* provides an additional discussion on the "Hydrologic Study of Groundwater Dependent Ecosystems" in Section 4.6.[174]

As stated in the *Niles East Bay Integrated Model (NEBIM) & Alternative Update Support Study Report* located in Appendix C of the 2022 Alternative, "Based on the above information, in addition to Section 6 and Attachment B of Technical Memorandum 4 (Woodard and Curran 2021d), ACWD has provided a defensible analysis of how GDEs were identified in the Niles Cone, and indicates that ACWD's operation of the regional aquifers for water supply purposes does not adversely impact probable GDEs overlying the Newark Aquifer, AHF Aquifer, or SWBZ. To provide additional confidence that GDEs

[171] ACWD Alternative Update 2022, Section ES-5, p. 29.
[172] ACWD Alternative Update 2022, Appendix C, pp. 614-753.
[173] ACWD Alternative Update 2022, Appendix C, p. 715.
[174] ACWD Alternative Update 2022, Appendix A, Section 4.6, pp. 424-461.

are not adversely impacted, ACWD is considering a field assessment of probable GDEs at up to 15 locations per the recommendations of the preliminary desktop assessment."[175]

4.3.1 Staff Assessment of Agency's Response to Recommended Action 3

Based on the information provided in the 2022 Alternative, Department staff have determined that Recommended Action 3 has been sufficiently addressed. The support study provided by ACWD in Appendix C of the 2022 Alternative discusses in detail the processes used to identify groundwater dependent ecosystems in the Subbasin. The District should continue to address data gaps related to groundwater dependent ecosystems.

4.4 Recommended Action 4

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.

In response to Recommended Action 4, the GSA states "Chapter 3 in the *Urban Water Management Plan 2020-2025*, Sources of Supply, discusses and incorporates anticipated climate change impacts into future water supply planning wherever possible (ACWD, 2021b). To address DWR's recommended action in this Alternative Update, ACWD used DWR-provided change factors estimating future climate conditions in the development of time-series inputs in the groundwater model, Niles East Bay Integrated Model (NEBIM)."[176]

As stated in the 2022 Alternative, "[ACWD] has developed projected water budgets for four (4) future climate scenarios: one scenario incorporating estimated climate change projections for 2030, and three scenarios incorporating estimated climate change projections for 2070."[177] The four future climate scenarios are as follows:

- "Estimated 2030 conditions (2030)
- Estimated 2070 conditions under a typical scenario (2070-Typical)
- Estimated 2070 conditions under a drier with extreme warming scenario (2070-Dry)
- Estimated 2070 conditions under a water with moderate warming scenario (2070-Wet)."[178]

As stated, "The results of the projected water budget analysis suggest several climate-related impacts to the groundwater budget compared to the current/historical water

[175] ACWD Alternative Update 2022, Appendix A, Section 4.6, p. 438.
[176] ACWD Alternative Update 2022, Section ES-5, p. 30.
[177] ACWD Alternative Update 2022, Section 2.5.4, p. 263.
[178] ACWD Alternative Update 2022, Section 2.5.4, p. 264.

budget. There is a direct relationship between the degree of precipitation assumed under the future climate scenarios with the projected levels of deep percolation and hillside runoff inflows to the Niles Cone."[179] ACWD provides the "Annual Niles Cone Groundwater Budget" for the various scenarios in Table 2-13 through Table 2-16 of the 2022 Alternative.[180] Hydrographs for the Subbasin's two indicator wells for the four specified scenarios are shown in Figure 2-62 through Figure 2-65.[181] The referenced figures show "groundwater levels, for the most part, are not projected to exceed the groundwater level operating conditions described in Section 3."[182] Groundwater levels in the BHF, however, do appear to go slightly below the minimum groundwater level operating conditions for the 2070 Dry scenario.[183]

ACWD provides a discussion on the assumptions made for the four projected future scenarios in Section 2.5.4.1 of the 2022 Alternative.[184] Department staff agree with the approach taken by ACWD to generate projected water budgets and groundwater conditions to better understand the potential effects from climate change.

The *Niles Cone 10-Year Sustainability Analysis (December 2021)* continues to state, "Also, ACWD anticipates gaining additional insight on effects of climate change on the basin through the Climate Change Adaptation Plan. These actions may suggest eventual future modification of the governing minimum thresholds which would be considered as part of the Integrated Resources Plan Update. This is especially true for the BHF sub-basin, which is subject to sea-level rise and thus some increased potential of at least temporary seawater intrusion during severe droughts."[185] Department staff are encouraged by ACWD's ongoing efforts to ensure climate change and sea level rise are incorporated into the analysis of the projected water budget.

4.4.1 Staff Assessment of Agency's Response to Recommended Action 4

Based on the information provided in the 2022 Alternative, Department staff have determined that Recommended Action 4 has been sufficiently addressed. ACWD has generated projected water budgets for four different climate scenarios and clearly documented the processes and assumptions made to create the water budgets. Efforts to address this recommended corrective action and continue filling data gaps to evaluate potential climate impacts are appreciated. The District should continue to refine the projected water budget to include climate change and sea level rise, as well as continue filling data gaps for future climate scenarios.

[179] ACWD Alternative Update 2022, Section 2.5.4, p. 265.
[180] ACWD Alternative Update 2022, Section 2.5.4, pp. 267-274.
[181] ACWD Alternative Update 2022, Section 2.5.4, p. 275-278.
[182] ACWD Alternative Update 2022, Section 2.5.4, p. 266.
[183] ACWD Alternative Update 2022, Section 2.5.4, p. 278.
[184] ACWD Alternative Update 2022, Section 2.5.4.1, pp. 279-292.
[185] ACWD Alternative Update 2022, Appendix A, Section 5, 462.

4.5 Recommended Action 5

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.

In response to Recommended Action 5, the GSA states, "The strong interconnection between the Newark Aquifer and San Francisco Bay renders the Niles Cone a coastal system subject to risk of saltwater intrusion. However, as explained throughout ACWD's Alternative and this Update, ACWD, through artificial recharge in balance with production well pumping, maintains heads in the Newark Aquifer above sea level in order to prevent saltwater intrusion."[186]

The 2022 Alternative further states, "Although water levels in the Centerville-Fremont and Deep Aquifers are typically below sea level, the Centerville-Fremont and Deep Aquifers are not naturally subject to risk of saltwater intrusion, provided brackish water in the Newark Aquifer is maintained outside (west of) the greater forebay area and abandoned wells have been sufficiently sealed. DWR requested that ACWD provide an additional explanation of how management of the gradient of the Newark Aquifer impacts the Centerville-Fremont Aquifer and Deep Aquifers. The *Niles Cone 10-Year Sustainability Analysis* [December 2021] provides an additional explanation including providing coefficients of correlation between heads in aquifers in the BHF Sub-basin (Newark, Centerville-Fremont, and Deep) in support of reliance on the Newark Aquifer main indicator well as governing sustainability criteria for the BHF Sub-basin (Appendix A). It also explains in more detail how the Newark Aquifer gradient is also sufficient for management of saltwater intrusion for the deeper aquifers. ACWD's review shows that legacy saltwater intrusion has generally attenuated in the Centerville- Fremont and Deep Aquifers as well as in the Newark Aquifer."[187]

Furthermore, "The overall majority of wells decreasing in chloride for each of the three principal BHF aquifers is a basis for confidence that none of the aquifers sustained net new saltwater intrusion within the last 10 years. This result, in turn, supports the concept that, with sufficient sealing of abandoned wells in brackish areas, saltwater intrusion would have to first occur in the Newark Aquifer before impacting the Centerville-Fremont Aquifer and Deep Aquifer. The ratios of the number of wells decreasing to increasing in chloride levels in each of the three principal BHF Aquifers, along with the prevailing bay-ward groundwater flow direction in the Newark Aquifer, supports the efficacy of the governing minimum threshold water levels at the BHF main indicator well 4S/1W-29A006 to prevent saltwater intrusion in all three principal BHF Aquifers."[188]

[186] ACWD Alternative Update 2022, Section ES-5, p. 32.
[187] ACWD Alternative Update 2022, Section ES-5, pp. 32-33.
[188] ACWD Alternative Update 2022, Section ES-5, pp. 32-33.

Department staff note that the location of the "additional explanation"[189] in the *Niles Cone 10-Year Sustainability Analysis* (December 2021) is not provided, which required staff to interpret the GSA's information. Staff believe the additional explanation is provided in Section 4.1 of the 10-year analysis.[190] However, the information in Section 4.1 is more of a historical narrative of management efforts in the Subbasin rather than a clear explanation of how the management of the gradient in the Newark Aquifer impacts the Centerville-Fremont Aquifer and Deep Aquifer.

4.5.1 Staff Assessment of Agency's Response to Recommended Action 5

Based on the information provided in the 2022 Alternative, Department staff have determined that Recommended Action 5 has not been sufficiently addressed. With the exception of the brief explanation provided in the Executive Summary, ACWD does not clearly articulate the rationale for managing the Newark Aquifer other than a historical narrative of management efforts in the Subbasin. The District should explain, through clearly defined sustainable management criteria relying on empirical data, how the management of the Newark Aquifer impacts the Centerville-Fremont and Deep Aquifer (see Recommended Corrective Action 3).

4.6 Recommended Action 6

Recommended Action 6. Staff recommend the Alternative be updated to include an improved discussion of the water quality monitoring and water quality monitoring results.

In the Department's 2019 Staff Report, the following observation was made, "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. 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."[191] Department staff also indicated in its 2019 assessment, "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)."[192]

In response to Recommended Action 6, the GSA states, "To address this recommended action, ACWD included [in the 2022 Alternative] additional information and an improved discussion on water quality monitoring in Section 2.3 (Groundwater Conditions) and Section 2.3.4 (Groundwater Quality). Groundwater in the Niles Cone is generally of good quality. The primary water quality concern is related to historical seawater intrusion in the BHF Sub-basin. However, ACWD's water sources are vulnerable to potentially contaminating activities. As a result, ACWD has agreements with other agencies and

[189] ACWD Alternative Update 2022, Section ES-5, pp. 32.
[190] ACWD Alternative Update, Appendix A, Section 4.1, pp. 398-413.
[191] https://sgma.water.ca.gov/portal/alternative/assessments/4.
[192] https://sgma.water.ca.gov/portal/alternative/assessments/4.

partners to protect imported water supplies and manages a number of groundwater protection programs identified in Section 1.4 to ensure the protection and reliability of local groundwater resources within the service area."[193] Department staff note that water quality information continues to be dispersed among multiple documents and reports.

The 2022 Alternative provides a brief discussion on water quality and water quality monitoring results in Section 2.3.4 and Section 4.5. As stated in Section 4.5, "In addition to the Indicator Wells, a network of monitoring wells is also selected to monitor short-term, seasonal, and long-term water level trends throughout the Niles Cone. Selected wells in the monitoring network are also sampled to assess any movement and trends in chloride and TDS concentrations due to historical seawater intrusion and basin operations."[194] ACWD provides a discussion with supporting data to document concentrations for chloride and TDS and states that legacy seawater intrusion has been mitigated. Department staff are encouraged by ACWD's efforts to manage seawater intrusion in the Subbasin; however, Department staff note the discussion on degraded water quality continues to lack comprehensive data.

As discussed in Section 3.1.4 of this assessment, degraded water quality (other than seawater intrusion) is briefly discussed in the 2022 Alternative, but no data is provided. As stated, "To assess for potential water quality concerns, water quality data from all ACWD production wells from 2010-2020 were evaluated and compared to the applicable California Primary and Secondary Maximum Containment Levels (MCLs). Only chloride, TDS, and manganese were detected above their respective Secondary MCLs in the raw groundwater."[195] The District provides chloride and TDS results for the "network of approximately 200 wells" in Appendix D[196] and Appendix E[197] of the 2022 Groundwater Monitoring Report for spring and fall, respectively. While ACWD does provide a clear discussion on chloride and TDS results with data, manganese results are not clear. ACWD does not provide manganese or nitrate results in the 2022 Alternative or in the referenced documentation.

Additionally, ACWD does not clearly identify where the wells being monitored for water quality exceedances are located in the Subbasin. Department staff note specific wells monitored for PFAS are referenced and depicted in the Annual Report for Water Year 2022, in Figures 16 and 17;[198] however, ACWD does not provide any information related to the wells being monitored for manganese or nitrate.

Department staff acknowledge ACWD's Groundwater Protection Program, which is part of its Groundwater Management Policy, that requires "ACWD [to] maintain an active role in: 1) assisting with the identification of potential groundwater contamination, 2)

[193] ACWD Alternative Update 2022, Section ES-5, p. 33.
[194] ACWD Alternative Update 2022, Section 4.5, p. 322.
[195] ACWD Alternative Update 2022, Section 2.3.4, p. 169.
[196] ACWD SGMA Annual Report, April 2023, Appendix C, pp. 189-196.
[197] ACWD SGMA Annual Report, April 2023, Appendix C, pp. 197-204.
[198] ACWD SGMA Annual Report, April 2023, Section 3.1.2, pp. 71-72.

implementing monitoring systems at hazardous materials storage sites, and 3) providing technical oversight for investigations and cleanups at hazardous materials spill sites."[199] This information supports ACWD's efforts to mitigate groundwater contamination from hazardous materials. However, Department staff could not locate information or results from this program in the 2022 Alternative or any of the referenced documentation. It is unclear how ACWD's Groundwater Protection Program is leading to sustainable management of the Subbasin, or how it is considering beneficial uses and users of groundwater.

4.6.1 Staff Assessment of Agency's Response to Recommended Action 6

Based on the information provided in the 2022 Alternative, Department staff have determined that Recommended Action 6 has not been sufficiently addressed. ACWD does not provide data for water quality results in the Subbasin, except for chloride and TDS. The lack of data being presented, and no clear minimum thresholds for the water quality sustainability indicator, makes it challenging for Department staff to determine if the Subbasin is being managed sustainably. Department staff have recommended corrective actions related to water quality monitoring and water quality monitoring results (see Recommended Corrective Action 3c).

4.7 Recommended Action 7

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.

In response to Recommended Action 7, the GSA states, "The *Niles Cone 10-Year Sustainability Analysis* [December 2021] and Section 3 and 4 [of the 2022 Alternative] provide a detailed discussion and include coefficients of correlation between heads in aquifers in the BHF Sub-basin (Newark, Centerville-Fremont, and Deep) in support of reliance on the Newark Aquifer main indicator well as governing sustainability criteria for the BHF Sub-basin. Section 2.3.5 also provides additional information to confirm why subsidence criteria is not warranted as indicated in ACWD's Alternative."[200]

As discussed in Section 3.1.1 and Section 3.1.2 of this assessment, ACWD relies on two primary indicator wells to monitor for chronic lowering of groundwater levels and reduction of groundwater storage for the entire Niles Cone Subbasin. The rationale provided by the GSA is located in the *Niles Cone 10-Year Sustainability Analysis (December 2021),* as well as the Annual Reports covering water years 2021 and 2022. The *Niles Cone 10-Year Sustainability Analysis (December 2021)* indicates "reasonably high R-squared values, with 0.88 for the AHF and 0.92 for the BHF, giving confidence in the efficacy of the

[199] ACWD Alternative Update 2022, Section 2.3.4.1, p. 171.
[200] ACWD Alternative Update 2022, Section ES-5, p. 34.

indicator wells as gages for storage for the entirety of each sub-basin."[201] The Annual Report for Water Year 2022 states, "High coefficients of correlation were again observed between Newark and Centerville-Fremont indicator wells (0.84) and Newark Aquifer and Deep Aquifer indicator wells (0.80). These high coefficients of correlation support reliance on heads in the Newark Aquifer main indicator wells as governing sustainability criteria for the BHF Sub-basin."[202]

ACWD provides the "coefficients of correlation in water levels in indicator wells for BHF aquifers between 1991 to 2022" in Table 7 of the Water Year 2022 Annual Report.[203] Department staff acknowledge this discussion does generally explain how the two indicator wells are indicators for basin storage; however, it does not explain how these two indicator wells are representative of conditions throughout the Subbasin. As stated, "A network of approximately 200 wells were selected for water level monitoring for compliance with SGMA (Figure 4-1)."[204] Department staff are encouraged by ACWD's efforts to monitor approximately 200 wells; however, Department staff would like to see ACWD utilize monitoring data from the 200 wells to establish minimum thresholds related to chronic lowering of groundwater levels in other areas of the Niles Cone Subbasin.

It is not clear to Department staff why ACWD claims to monitor water levels in approximately 200 wells for compliance with SGMA but does not use this data to establish thresholds for the Subbasin. The 2022 Alternative includes Table 2-1 that shows "Groundwater Monitoring Currently Conducted by ACWD."[205] The table describes the frequency and number of wells that are being monitored, as well as the type of measurement and purpose. As stated, "ACWD's existing Monitoring Network is a highly robust system that accurately reflects and tracks the sustainability of the groundwater basin. In its Alternative Update (ACWD, 2021a), ACWD provided a summary of the groundwater monitoring conducted by ACWD which is and can be adjusted as necessary to assess the effectiveness of management of the basin, as well as, to prevent any adverse impacts to users of the groundwater basin or adjacent basins."[206] It is difficult for Department staff to determine if ACWD's monitoring network "accurately reflects and tracks sustainability of the groundwater basin"[207] since the data is not well presented or discussed.

4.7.1 Staff Assessment of Agency's Response to Recommended Action 7

Based on the information provided in the 2022 Alternative, Department staff have determined that Recommended Action 7 has not been sufficiently addressed. The 2022 Alternative does not clearly state how the two primary indicator wells are representative of conditions throughout the Subbasin. ACWD heavily relies upon its determination of

[201] ACWD Alternative Update 2022, Appendix A, Section 2.3, p. 373.
[202] ACWD SGMA Annual Report, April 2023, Section 3.2, pp. 73.
[203] ACWD SGMA Annual Report, April 2023, Section 3.2, Table 7, p. 74.
[204] ACWD Alternative Update 2022, Section 4.3, p. 311.
[205] ACWD Alternative Update 2022, Section 2.3.1, p. 152.
[206] ACWD SGMA Annual Report, April 2023, Section 3.2, p. 73.
[207] ACWD Alternative Update 2022, Section 4.6, p. 323.

how long the Subbasin has been operating sustainably, which creates a narrative that management efforts have been successful and groundwater conditions are sustainable in the Subbasin. Department staff have provided recommendations related to representative monitoring sites in the Niles Cone Subbasin (see Recommended Corrective Action 2).

5 STAFF RECOMMENDATIONS

The Department previously approved the Alternative submitted for the Subbasin based on the grounds presented in the July 17, 2019, *Statement of Findings Regarding the Approval of the Niles Cone Subbasin Alternative*. As part of its ongoing Periodic Review responsibility, the Department is required to assess whether the approved 2016 Alternative continues to satisfy the evaluation criteria described in Section 355.4 of the GSP Regulations and determine whether the 2022 Alternative should be considered approved, incomplete, or inadequate.[208]

Based on the current evaluation of the 2016 Alternative, and after considering information provided by the Subbasin's GSA, Department staff recommend that the 2022 Alternative for the Niles Cone Subbasin be approved with recommended corrective actions. Department staff conclude that, once the new recommended corrective actions are sufficiently addressed, the 2022 Alternative will include the components of a functionally equivalent GSP and will demonstrate a thorough understanding of the Subbasin based on the best available science and information.

5.1 Recommended Corrective Actions

Although Department staff believe that the 2022 Alternative continues to comply with the objectives of SGMA and substantially complies with the GSP Regulations, new corrective actions have been recommended.[209] Although the issues addressed by the recommended corrective actions do not, at this time, preclude approval of the 2022 Alternative, they are intended to facilitate progress in achieving the Subbasin's sustainability goal and guide the Department's ongoing evaluation process. Additionally, the new recommended corrective actions will allow the Department to better evaluate whether implementation of the 2022 Alternative could adversely affect an adjacent basin from reaching its sustainability goal. As with GSPs, the failure to address the Department's recommended corrective actions could potentially lead to an alternative being determined incomplete or inadequate.

Recommended Corrective Action 1

Organize and consolidate submitted materials into one planning document that clearly articulates and quantitatively demonstrates the plan to achieve sustainable groundwater

[208] 23 CCR §§ 355.6(c)(4) and 355.6(d).
[209] Water Code § 10733.8.

management in the Niles Cone Subbasin. The District should clearly explain how the elements of its Alternative are functionally equivalent to the elements of a GSP.[210] This explanation should include a detailed discussion of proposed projects and management actions and a description of how the projects and management actions are leading to, or have led to, sustainable conditions throughout the Subbasin.

Recommended Corrective Action 2

Expand the current representative monitoring network for the chronic lowering of groundwater levels to characterize groundwater conditions in the basin and evaluate changing conditions that occur through implementation of the Alternative. The District should provide adequate evidence for each identified representative monitoring site that the entirety of the basin and each principal aquifer is sufficiently reflected. Each representative monitoring site should have a clearly defined quantitative value that represents sustainable conditions at that general location within the Subbasin.

Additionally, the District should ensure the monitoring network details included in the Alternative are consistent with the information contained in the Department's SGMA Portal Monitoring Network Module.

Recommended Corrective Action 3

Improve the metrics related to the sustainability indicators listed below. By improving the metrics, management of the Newark Aquifer, Centerville-Fremont Aquifer, and Deep Aquifer can be better explained through empirical data. Department staff have provided suggested guidance on how to consider setting metrics for the applicable sustainability indicators.

a. Provide a clear measurable description of the undesirable result for changes in groundwater storage that the District is trying to avoid, and what beneficial uses and users would be impacted if undesirable results occur.

b. Establish consistency for the sustainable management criteria established for seawater intrusion. Provide consistent descriptions of minimum thresholds in the Subbasin and what would constitute undesirable results related to seawater intrusion.

c. Establish sustainable management criteria for degraded water quality for all constituents of concern, based on quantitative values using the same metrics and monitoring sites as used for establishing minimum thresholds.

Recommended Corrective Action 4

Department staff understand that estimating the location, quantity, and timing of stream depletion due to ongoing, basin-wide pumping is a complex task and that developing

[210] 23 CCR § 358.2(d).

suitable tools may take additional time; however, it is critical for the Department's ongoing and future evaluations of whether implementation of an alternative, or GSP, is on track to achieve sustainable groundwater management. The Department plans to provide guidance on methods and approaches to evaluate the rate, timing, and volume of depletions of interconnected surface water and support for establishing specific sustainable management criteria in the near future. This guidance is intended to assist GSAs and local agencies to sustainably manage depletions of interconnected surface water.

GSAs and local agencies should work to address the following items by the next alternative update:

a. Consider utilizing the interconnected surface water guidance, as appropriate, when issued by the Department to establish quantifiable minimum thresholds, measurable objectives, and management actions.

b. Continue to fill data gaps, collect additional monitoring data, and implement the current strategy to manage depletions of interconnected surface water and define segments of interconnectivity and timing.

c. Prioritize collaborating and coordinating with local, state, and federal regulatory agencies as well as interested parties to better understand the full suite of beneficial uses and users that may be impacted by pumping induced surface water depletion within the basin.

Recommended Corrective Action 5

Provide an explanation in future Alternative updates on how inter-basin items, such as: thresholds across basin boundaries; monitoring networks; hydrogeologic conceptual models, including principal aquifer designations; water budgets; and management of interconnected surface water along basin boundaries have been coordinated.