

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

Groundwater Basin Name: Coachella Valley – Indio (Basin No. 7-021.01)  
Submitting Agency: Coachella Valley Water District  
Recommendation: Approve  
Date Issued: July 17, 2019

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## I. Summary

The Coachella Valley Water District, Coachella Water Authority, Desert Water Agency, and the Indio Water Authority (collectively referred to as Agencies) submitted an alternative (Indio Subbasin Alternative *or* Alternative) to the Department of Water Resources (Department) for evaluation and assessment as provided by the Sustainable Groundwater Management Act (SGMA).<sup>1</sup> The Agencies submitted an existing plan<sup>2</sup> and rely primarily on the Coachella Valley Water Management Plan 2010 Update (2010 WMP). After a review of the 2010 WMP and prior water management plans, other related documents, and consideration of public comments, Department staff believe that the Indio Subbasin Alternative satisfies the objectives of SGMA for the Indio Subbasin (*or* Subbasin) and recommends approval of the Alternative.

In 1994, the Coachella Valley Water District (CVWD) and the Desert Water Agency (DWA) commenced development of the 2002 Coachella Valley Water Management Plan (2002 WMP), with the goal of eliminating overdraft, assuring adequate quantities of safe and high-quality water, and establishing management objectives. The purpose of the 2010 Coachella Valley Water Management Plan Update (2010 WMP) was to update the 2002 WMP to respond to changing conditions regarding water demands and water supplies and to refine the management goal and objectives. Department staff conclude that technical information in the 2002 and 2010 WMPs and related documents demonstrate a detailed understanding of the geology and hydrology of the Subbasin, the direct and indirect adverse effects of past groundwater management practices that led to overdraft conditions, and that the Agencies have demonstrated a commitment to eliminating overdraft to stop those adverse effects and to prevent them from occurring in the future. The Alternative quantifies objectives for sustainable management and for

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<sup>1</sup> Water Code § 10720 *et seq.*

<sup>2</sup> Water Code § 10733.6(b)(1)

correcting groundwater problems and contains a robust set of plans and management actions designed to eliminate overdraft and associated adverse impacts to groundwater conditions. Department staff find the Agencies have set forth a reasonable and feasible approach to eliminating overdraft, which will, in turn, have a beneficial effect to the overall groundwater conditions in the Indio Subbasin, sufficient to avoid undesirable results.

In addition to the reasons stated above, Department staff acknowledge that there are important issues with how groundwater is managed in the Indio Subbasin that still need to be resolved. With regard to the issue of federally-reserved groundwater rights, Department staff recognize that ongoing management of the Subbasin will need to account for the groundwater usage based on those rights.<sup>3</sup> Department staff found the information regarding current and future groundwater use to be sufficient and credible. To the extent groundwater use in the Indio Subbasin changes significantly due to reliance on federally-reserved groundwater rights, or the Agencies' ability to manage the Subbasin is significantly affected by the outcome of current litigation, then the Department will likely have to reassess the Alternative's ability to satisfy the objectives of SGMA. At this time, however, it is not known with any reasonable degree of certainty when the litigation will be ultimately resolved, what the outcome of the litigation will be, or how that outcome will affect groundwater management throughout the Coachella Valley. As such, Department staff find the Alternative's current approach to managing the Subbasin, including its understanding of current and future groundwater usage, to be reasonable and likely to achieve sustainable groundwater management, while also acknowledging that the current approach may need to change in order to respect federally-reserved groundwater rights in full.

Department staff also considered comments submitted by Mission Springs Water District with regard to jurisdictional conflicts and local governance. Ultimately, Department staff concluded that those comments did not undermine the technical sufficiency of the Indio Subbasin Alternative or demonstrate the Alternative is invalid or its implementation infeasible. Department staff do recognize, however, that for the Indio Subbasin to be sustainably managed, the water management and land use agencies within the Subbasin must be able to work together in a coordinated and collaborative manner. At this time, however, there is a water management plan in place that is reasonably likely to achieve sustainable groundwater management for the Indio Subbasin. Should the lack of cooperation and coordination in the future affect the Alternative's implementation, either for a technical or legal reason, the Department will have to consider, as part of its ongoing review of Alternative implementation, whether there remains a water management plan in place that satisfies the objectives of SGMA.

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<sup>3</sup> Water Code § 10720.3(d)

Department staff also want to acknowledge the issue of salt management in the Indio Subbasin and the Coachella Valley Groundwater Basin in general. Salt loading that results from groundwater recharge using Colorado River water is an important issue for the Coachella Valley and is discussed, but not directly addressed, in the Alternative. Instead, the Alternative identifies other options that the Agencies are investigating which would reduce water quality impacts of recharging the aquifer using Colorado River water. The Alternative also states that a Salt and Nutrient Management Plan was developed and submitted to the Colorado River Regional Water Quality Control Board (Colorado River RWCWB). In recommending approval of the Alternative, Department staff have concluded that the Agencies have demonstrated a sufficient understanding of the impacts associated with using Colorado River to recharge groundwater in the Coachella Valley. Department staff also find that continued investigations into ways to reduce water quality impacts associated with importing Colorado River water and implementation of an approved Salt and Nutrient Management Plan appears to represent a reasonable near-term path toward sustainability with regard to salt management. However, Department staff recommend that the Agencies take aggressive steps to further quantify the nature and scope of water quality issues associated with importing water into the Subbasin, establish reasonable and achievable standards, and begin to adopt and implement projects and management actions that will achieve sustainability with regard to groundwater quality, and to do so on an accelerated basis (see Recommended Actions, below).

Lastly, the 2010 WMP for the Indio Subbasin does not follow the precise organization or include the identical elements that are required of a Groundwater Sustainability Plan (GSP). The differences between the elements of the Alternative and the required elements of a GSP, as prescribed in the GSP Regulations, do not preclude the Department from determining that the existing water management plans established in the Coachella Valley satisfy the objectives of SGMA. However, staff identified recommended actions for the Agencies that are designed to facilitate the Department's ongoing evaluation of the 2010 WMP implementation and determination of whether the 2010 WMP adversely affects an adjacent basin.

The remainder of this assessment is organized as follows:

- **Section II. Review Principles** describes legal and other considerations regarding Department staff's assessment and evaluation of alternatives.
- **Section III. Alternative Materials** describes materials (i.e., plans, reports, data, and other information) submitted by the Agencies that, collectively, the Department staff considered as the Alternative.
- **Section IV. Required Conditions** describes whether the Alternative satisfies each of the four conditions required for the Department to review an alternative.

- **Section V. Alternative Contents** describes the information contained in the Alternative submittal.
- **Section VI. Assessment** describes Department staff's evaluation of the Alternative, whether it satisfies the objectives of SGMA, and, if applicable, describes recommended actions proposed for the first five-year update.

## II. Review Principles

On behalf of the Agencies, the CVWD submitted an alternative based on an existing water management plan to the Department for evaluation and assessment to determine whether the alternative satisfies the objectives of SGMA for the Indio Subbasin. To satisfy the objectives of SGMA, an alternative based on a groundwater management plan prepared pursuant to Part 2.75 of Division 6 of the Water Code<sup>4</sup> or a plan developed pursuant to another law authorizing groundwater management must demonstrate that implementation of the plan has led to or will lead to sustainable groundwater management, which means the management and use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results.<sup>5</sup> Undesirable results are defined quantitatively by the managing agency.<sup>6</sup>

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

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<sup>4</sup> Water Code § 10750 *et seq.*

<sup>5</sup> Water Code § 10721(v)

<sup>6</sup> 23 CCR § 354.26

<sup>7</sup> Water Code § 10733.6(c)-(d)

<sup>8</sup> 23 CCR § 358.4(a)

<sup>9</sup> 23 CCR § 350 *et seq.*

<sup>10</sup> 23 CCR § 358.4(b) (emphasis added)

<sup>11</sup> Procedural requirements, including submissions by the agency, posting by the Department, and the public comment period, apply equally to plans and alternatives (23 CCR § 355.2(a)-(c)). The periodic review of Plans (23 CCR § 355.6(a)) applies to alternatives prospectively but does not apply to initial submissions. Other regulatory provisions are inapplicable to alternatives, including the two-year review period (23 CCR § 355.2(e)), which is based on the statutory time-frame that applies to Plans but not alternatives (Water Code § 10733.4(d)); the "incomplete" status that allows the agency to address "one or more deficiencies that preclude approval, but which may be capable of being corrected by the Agency in a timely manner" (23 CCR § 355.2(e)(2)), which applies to plans undergoing development, but not alternatives that purportedly satisfy the objectives of SGMA at the time of their submission (Water Code § 10733.6(a)); and, for the same reason, corrective actions to address deficiencies in plans (23 CCR § 355.4(a)(4)), which

the purpose of the evaluation is to determine whether an alternative satisfies the objectives of SGMA.<sup>12</sup> The agency must explain how the elements of an alternative are “functionally equivalent” to the elements of a GSP required by Articles 5 and 7 of the GSP Regulations and are sufficient to demonstrate the ability of an alternative to achieve the objectives of SGMA.<sup>13</sup> The explanation by the agency that elements of an alternative are functionally equivalent to elements of a GSP furthers the objective of demonstrating that an alternative satisfies the objectives of SGMA. Alternatives based on groundwater management plans or historical basin management practices that predate the passage of SGMA or adoption of GSP Regulations, although required to satisfy the objectives of SGMA, are not necessarily expected to conform to the precise format and content of a GSP. The Department’s assessment is thus focused on the ability of an alternative to satisfy the objectives of SGMA as demonstrated by information provided by the agency; it is not a determination of the degree to which an alternative matched the specific requirements of the GSP Regulations.

When evaluating whether an alternative satisfies the objectives of SGMA and thus is likely to achieve the sustainability goal for the basin, staff review the information provided by and relied upon by the agency for sufficiency, credibility, and consistency with scientific and engineering professional standards of practice.<sup>14</sup> The Department’s review considers whether there is a reasonable relationship between the information provided and the assumptions and conclusions made by the agency, whether sustainable management criteria and projects and management actions described in an alternative are commensurate with the level of understanding of the basin setting, and whether those projects and management actions are feasible and likely to prevent undesirable results.<sup>15</sup> Staff will recommend that an alternative be approved if staff believe, in light of these factors, that alternative has achieved or is likely to achieve the sustainability goal for the basin.<sup>16</sup>

An alternative that relies on an existing plan may be approved based on information that demonstrates the basin is being or will be managed sustainably based on groundwater management pursuant to that plan, including any related projects and management actions, as necessary. Even when staff review indicates that an alternative will satisfy the objective of SGMA, the Department may recommend actions to facilitate future evaluation of that alternative and to allow the Department to better evaluate whether an alternative

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applies to plans developed after the adoption of SGMA, but is inapplicable to alternatives that predate SGMA.

<sup>12</sup> 23 CCR § 358.2(d), based on the statutory threshold of “whether the alternative satisfies the objectives of [SGMA] for the basin” (Water Code § 10733.6(a)).

<sup>13</sup> 23 CCR § 358.2(d)

<sup>14</sup> 23 CCR § 351(h)

<sup>15</sup> 23 CCR § 355.4(b)(1), (3), and (5).

<sup>16</sup> 23 CCR § 355.4(b)

adversely affects adjacent basins. The Department proposes that recommended actions be addressed by the submission date for the first periodic evaluation.

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

### III. Alternative Materials

On behalf of the Agencies, the CVWD submitted an alternative based on an existing water management plan pursuant to Water Code Section 10733.6(b)(1). The Indio Subbasin Alternative thus relies primarily upon the following document:

- Coachella Valley Water Management Plan 2010 Update, January 2012 (2010 WMP)

The CVWD submitted the following additional plans and reports that Department staff have determined to be sufficiently related to the 2010 WMP to warrant their consideration as part of the Alternative:

- SGMA Alternative Groundwater Sustainability Plan Bridge Document for the Indio Subbasin, Dec. 2016 (Bridge Document). The Bridge Document was prepared to demonstrate the 2010 WMP and other submitted documents include information that are functionally equivalent to the required elements of the GSP Regulations. The Bridge Document references the sections of existing documents to show where the relevant functionally-equivalent information can be found.
- Subsequent Program Environmental Impact Report: Coachella Valley Water Management Plan Update, July 2011 (2011 EIR). The 2011 EIR evaluates the environmental impacts of implementing the 2010 WMP and potential new projects and programs. The document discusses mitigation measures and considers alternative management scenarios to the 2010 WMP.
- Coachella Valley Water Management Plan, September 2002 (2002 WMP). The 2002 WMP was prepared in response to the groundwater overdraft occurring in the Indio Subbasin. The 2002 WMP describes the physical setting, historical land

uses, water management efforts, and includes a plan to meet the goals and objectives established for the Coachella Valley Groundwater Basin. The goals and objectives of the 2002 WMP included preventing continued declines of groundwater levels, decreasing groundwater basin storage, addressing degradation of water quality and land subsidence, and expanding water conservation programs.

- Program Environmental Impact Report for Coachella Valley Water Management Plan and State Water Project Entitlement Transfer, June 2002 (2002 EIR). The 2002 EIR evaluates the environmental impacts of implementing the 2002 WMP and potential new projects and programs. The document discusses mitigation measures and considers alternatives to the 2002 WMP.
- 2014 Status Report for the 2010 Coachella Valley Water Management Plan Update (2014 Status Report). The 2014 Status Report evaluates changes, since the publication of the 2010 WMP, in the planning area that impact water demand projections, implementation progress of the 2010 WMP programs, reviews the effectiveness of the 2010 WMP, and recommends new implementation targets.
- Coachella Valley Water District, Engineer's Report on Water Supply and Replenishment Assessment – 2016-2017, April 2016 (2016-2017 Engineer's Report). The 2016-2017 Engineer's Report is an annual report that is developed to provide information regarding groundwater supply conditions, groundwater replenishment, and the assessment of fees associated with groundwater replenishment in the *areas of benefit* within the jurisdiction of the CVWD.
- Desert Water Agency, Engineer's Report – Groundwater Replenishment and Assessment Program for the Whitewater River, Mission Creek, and Garnet Hill Subbasins – 2016/2017, May 2016 (DWA Engineers Report). The DWA Engineer's Report is an annual report that is developed to provide information regarding groundwater supply conditions, groundwater replenishment, and the assessment of fees associated with groundwater replenishment in the *areas of benefit* within the jurisdiction of the DWA.
- Mission Creek and Garnet Hill Subbasins Water Management Plan, January 2013 (Garnet Hill WMP). This water management plan was not included in the Alternative submittal but was referenced in the Bridge Document, as the locally-defined Garnet Hill Subbasin (Garnet Hill area) is part of the Indio Subbasin. The plan was developed by the CVWD, DWA, and Mission Springs Water District. The Coachella Valley Groundwater Model is discussed in Appendix C of this document.

The Agencies submitted the Bridge Document in lieu of an Alternative Elements Guide and submitted the most recent annual reports, as of the deadline for submission of the

Alternative.<sup>17</sup> Other material submitted by the CVWD, public comments, other documents submitted by third parties, correspondence, and other information provided to or relied upon by the Department have been posted on the Department's web site.<sup>18</sup>

## IV. Required Conditions

An alternative, to be evaluated by the Department, must be submitted by the statutory deadline and be within a basin that complies with Part 2.11 of Division 6 of the Water Code.<sup>19</sup> The submitted alternative must also be complete and must cover the entire basin.<sup>20</sup>

### A. Submission Deadline

SGMA requires that an alternative for a basin categorized as high- or medium-priority as of January 31, 2015, be submitted no later than January 1, 2017.<sup>21</sup>

The CVWD submitted the Indio Subbasin Alternative on December 29, 2016, before the statutory deadline.

### B. Part 2.11 (CASGEM) Compliance

SGMA requires that the Department assess whether an alternative is within a basin that is in compliance with Part 2.11 of Division 6 of the Water Code,<sup>22</sup> which requires that groundwater elevations in all groundwater basins be regularly and systematically monitored and that groundwater elevation reports be submitted to the Department.<sup>23</sup> To manage its obligations under this law, the Department established the California Statewide Groundwater Elevation Monitoring (CASGEM) Program. The acronym CASGEM is used in this document to denote both the program and the groundwater monitoring law.<sup>24</sup>

SGMA specifies that an alternative does not satisfy the objectives of SGMA if the basin is not in compliance with the requirements of CASGEM.<sup>25</sup> The Department confirmed that the Indio Subbasin was in compliance with the requirements of CASGEM prior to

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<sup>17</sup> The Annual Report is not part of the Alternative and was not reviewed by the Department for the purpose of approving the Alternative.

<sup>18</sup> <https://sgma.water.ca.gov/portal/#alt>

<sup>19</sup> Water Code § 10733.6(c)-(d)

<sup>20</sup> 23 CCR § 358.4(a)

<sup>21</sup> Water Code § 10733.6(c). Pursuant to Water Code § 10722.4(d), a different deadline applies to a basin that has been elevated from low- or very low-priority to high- or medium-priority after January 31, 2015.

<sup>22</sup> Water Code § 10733.6(d)

<sup>23</sup> Water Code § 10920 *et seq.*

<sup>24</sup> Stats.2009-2010, 7th Ex.Sess., c. 1 (S.B.6), § 1

<sup>25</sup> Water Code § 10733.6(d)



evaluating this Alternative and confirmed that the Subbasin remained in compliance with CASGEM through the last reporting deadline, prior to issuing this assessment.

### C. Completeness

GSP Regulations specify that the Department shall evaluate an alternative if that alternative is complete and includes the information required by SGMA and the GSP Regulations.<sup>26</sup> An alternative submitted pursuant to Water Code Section 10733.6(b)(1) must include a copy of the groundwater management plan and an explanation of how the elements of the Alternative are functionally equivalent to the elements of a GSP required by Articles 5 and 7 of the GSP Regulations and are sufficient to demonstrate the ability of the Alternative to achieve the objectives of SGMA.<sup>27</sup>

The CVWD submitted the completed and final 2010 WMP for the Indio Subbasin and several complementary documents, as indicated above, along with a Bridge Document that includes the Agencies' explanation of how the elements of the Alternative are functionally equivalent to the elements of a GSP. Department staff found the Alternative to be complete and to contain the required information, sufficient to warrant an evaluation by the Department.

### D. Basin Coverage

An alternative must cover the entire basin.<sup>28</sup> An alternative that is intended to cover the entire basin may be presumed to do so if the basin is fully contained within the jurisdictional boundaries of the submitting agency. However, an alternative submitted by an agency whose jurisdictional boundaries do not include all areas of the basin may nevertheless be found to effectively cover the entire basin. Because the intent of SGMA is to provide for the sustainable management of groundwater basins,<sup>29</sup> with sustainability defined as the management and use of groundwater that does not cause undesirable results,<sup>30</sup> an alternative effectively covers the entire basin if it results in groundwater management that avoids undesirable results. An alternative that cannot avoid undesirable results is not sustainably managing the basin even if the entire basin is within the jurisdiction of the managing agency, but an alternative that avoids undesirable results throughout the basin is sustainably managing that basin even if some part of the basin lies outside the jurisdiction of that agency.

The Indio Subbasin, as defined in the Department's Bulletin 118, is locally-named and locally-divided by the Agencies into the Garnet Hill Subbasin and the Whitewater River

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<sup>26</sup> 23 CCR § 358.4(a)(3)

<sup>27</sup> 23 CCR § 358.2(c)-(d)

<sup>28</sup> 23 CCR § 358.4(a)(4)

<sup>29</sup> Water Code § 10720.1(a)

<sup>30</sup> Water Code § 10721(v)

Basin. The locally-defined Whitewater River Basin is further divided into the West and East Whitewater River Subbasins (see Figure 1, below).<sup>31</sup> In the 2010 WMP, these areas are further divided into management areas, locally referred to as *areas of benefit* for the purpose of issuing groundwater replenishment assessments (see Figure 2, below).<sup>32</sup>

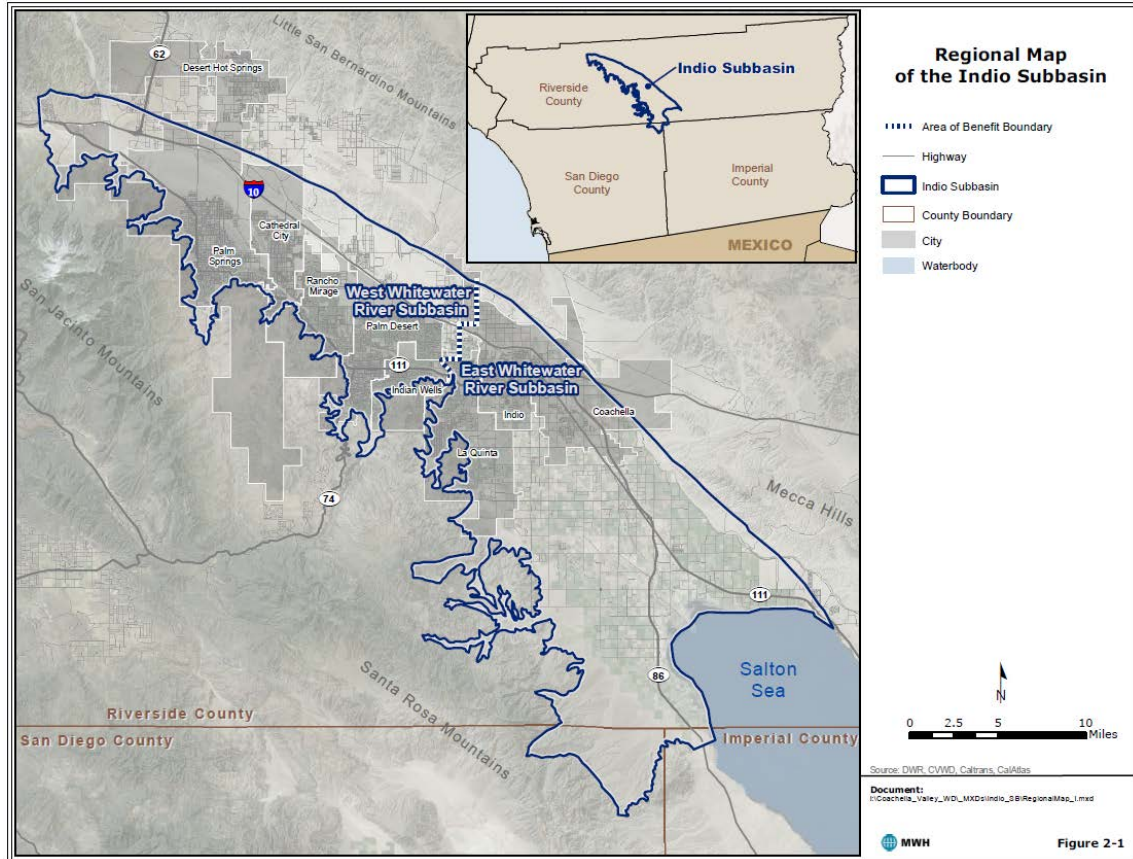


Figure 1. Regional Map of the Indio Subbasin – Locally-Defined West and East Whitewater River Subbasins (From Bridge Document Figure 2-1)

<sup>31</sup> Bridge Document, Figure 2-1

<sup>32</sup> Bridge Document, Figure 3-5

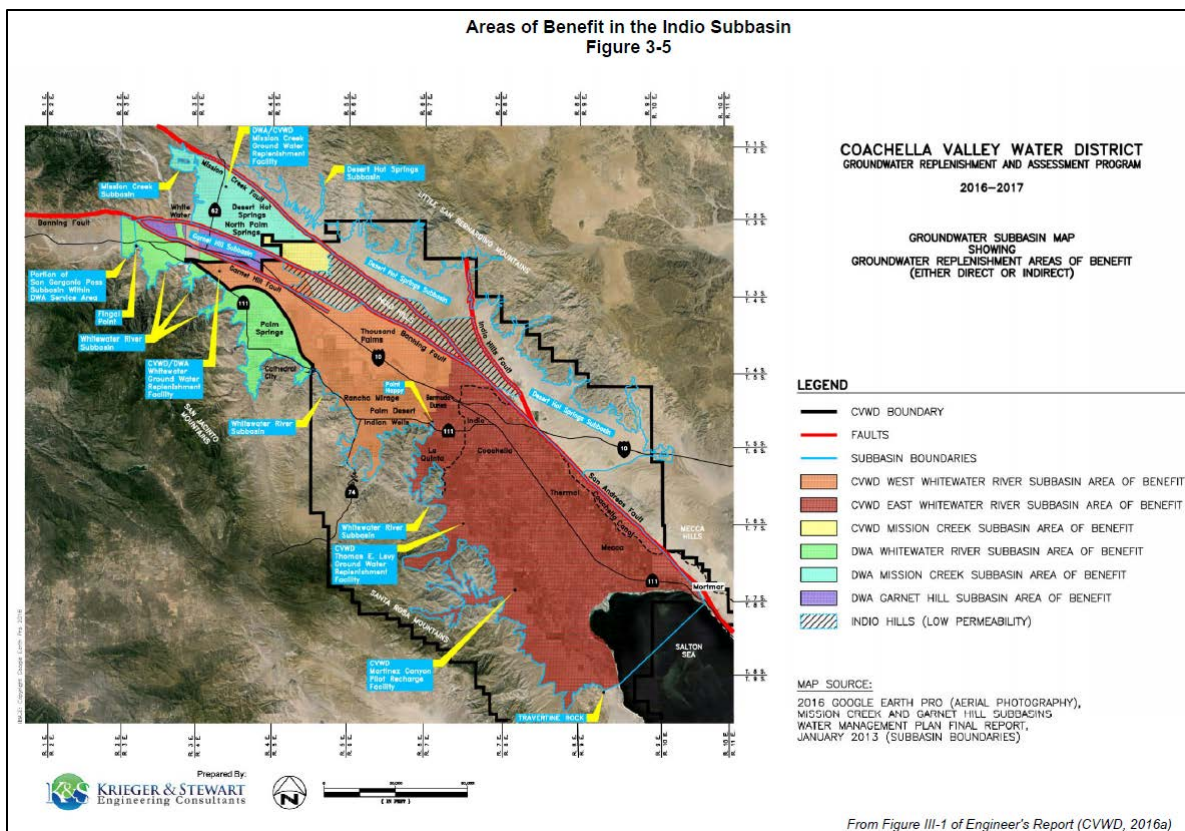


Figure 2. Areas of Benefit Defined in the Coachella Valley Groundwater Basin (From Bridge Document Figure 3-5)

The Bridge Document states that the planning area of the Alternative and the 2010 WMP “includes the entirety of the Indio Subbasin.”<sup>33</sup> The Department understands this to mean that the Agencies intend to cover the entire Subbasin through implementation of the Alternative, even though the 2010 WMP does not cover the entire Indio Subbasin, as defined in the Department’s Bulletin 118.<sup>34</sup> A portion of the Indio Subbasin, the locally-defined Garnet Hill area, is managed under another water management plan, titled the Mission Creek and Garnet Hill Subbasins Water Management Plan (Garnet Hill WMP). The Garnet Hill WMP was developed by CVWD, DWA, and Mission Springs Water District in coordination with the 2010 WMP and relying on the same growth forecasts.<sup>35</sup> While not explicitly incorporated into the 2010 WMP, the Bridge Document references the Garnet Hill WMP, stating that the Garnet Hill area was evaluated in the Garnet Hill WMP. The portion of the Garnet Hill area within the jurisdiction of the CVWD is grouped within the description and the management of the West Whitewater River area. Department staff found the information regarding the Garnet Hill area provided in the Garnet Hill WMP to

<sup>33</sup> Bridge Document, Executive Summary, p. ES-2, Section 2.2, pp. 2-6 to 2-7

<sup>34</sup> 2010 WMP, Figure 1-1

<sup>35</sup> Bridge Document, Section 1, p. 1-1

be sufficient to understand how that area affects and is affected by groundwater management activities in the larger Indio Subbasin. In addition, the groundwater modeling boundary<sup>36</sup> covers nearly the entire Indio Subbasin, including the Garnet Hill area. As such, Department staff find that the entire Indio Subbasin is effectively covered by the Alternative even though information regarding the Garnet Hill area is provided in another water management plan. To facilitate future review, however, Department staff recommend incorporating information regarding groundwater conditions in the Garnet Hill area into future updates to the Alternative plan for the Indio Subbasin (see Recommended Action 1).

## V. Alternative Contents

GSP Regulations require the submitting agency to explain how the elements of an alternative are functionally equivalent to the elements of a GSP as required by Article 5 of the GSP regulations<sup>37</sup> and are sufficient to demonstrate the ability of an alternative to achieve the objectives of SGMA.<sup>38</sup>

As stated previously, alternatives based on historical basin management practices that predate the passage of SGMA or adoption of GSP Regulations, although required to satisfy the objectives of SGMA, are not necessarily expected to conform to the precise format and content of a GSP, and the criteria for adequacy of an alternative is whether the Department is able to determine that an alternative satisfies the objectives of SGMA. Department staff rely on the submitting agency's determination of functional equivalence of alternative elements to facilitate its evaluation and assessment of an alternative (see Assessment, below). Although the exact components of a GSP are not required for an alternative, for organizational purposes the discussion of information contained in the 2010 WMP and related documents provided by the Agencies generally follows the elements of a GSP provided in Article 5 of the GSP Regulations. The reference to requirements of the GSP Regulations at the beginning of each section is to provide context regarding the nature of the element discussed but is not meant to define a strict standard applicable to alternatives.

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<sup>36</sup> 2002 WMP, Appendix C, p. C-2; Groundwater Flow Model of the Mission Creek and Garnet Hill Subbasins and Palm Springs Subarea, Figure 5

<sup>37</sup> 23 CCR § 354-354.44

<sup>38</sup> 23 CCR § 358.2(d). The requirements pertaining to Article 7 of the GSP Regulations (23 CCR § 356-356.4) relate to annual reports and periodic evaluation and are not applicable to review of the initial alternative.

## A. Administrative Information

GSP Regulations require information identifying the submitting agency, describing the plan area, and demonstrating the legal authority and ability of the submitting agency to develop and implement a plan for that area.<sup>39</sup>

The 2010 WMP and the Bridge Document each include an executive summary, a description of the Agencies that are implementing the Alternative, explanations of groundwater governance, an overview of the general funding structure of the Agencies, a description of water management programs in the Coachella Valley, and the statutory authorities and water management responsibilities of the Agencies in their respective areas.

Each of the submitting Agencies have statutory authority over water supply and groundwater management.<sup>40</sup> In particular, CVWD and DWA have legal authority to manage and replenish groundwater and collect replenishment assessment fees under their existing legislations.<sup>41</sup> For purposes of water management, the Indio Subbasin is locally-divided into the West and East Whitewater River management areas. The management areas, referred to by the Agencies as *areas of benefit*, are for replenishment assessment purposes.<sup>42</sup>

A large amount of land in the Coachella Valley is held in trust for five Native American tribes: Agua Caliente Band of Cahuilla Indians, Augustine Band of Cahuilla Indians, Cabazon Band of Mission Indians, Torres Martinez Desert Cahuilla Indians, and Twenty-Nine Palms Band of Mission Indians. In 2013, the Agua Caliente Band of Cahuilla Indians (Agua Caliente) filed a lawsuit against CVWD and DWA, alleging that Agua Caliente has federal reserved rights and aboriginal rights in the groundwater for its reservation and that the Tribe has related rights to the “pore space” beneath the reservation. According to the Bridge Document, Agua Caliente is seeking to prevent CVWD and DWA from over-drafting the groundwater basin and recharging the basin with imported water of a lesser quality than the native groundwater.<sup>43</sup>

Since the time the Alternative was submitted, the Agua Caliente litigation has progressed. In the initial phase of the litigation, the United States District Court (U.S. District Court) ruled that Agua Caliente’s federal reserved water rights may extend to include

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<sup>39</sup> 23 CCR § 354.2 et seq.

<sup>40</sup> Bridge Document, Section 1, p. 1-6

<sup>41</sup> Bridge Document, Section 1, p. 1-6

<sup>42</sup> Bridge Document, Section 2, p. 2-7

<sup>43</sup> Bridge Document, Section 2.6.3, p. 2-19

groundwater.<sup>44</sup> That decision was affirmed by the United States Court of Appeals for the 9<sup>th</sup> Circuit.

In April 2019, the U.S. District Court ruled on the second phase of the Agua Caliente litigation, in essence, whether Agua Caliente owns the pore space underlying its reservation, whether there is a water quality component to Agua Caliente's federal reserved water right, and what the appropriate legal standard is to quantify Agua Caliente's reserved water right.<sup>45</sup> In its ruling, the U.S. District Court found that Agua Caliente has standing to pursue the declaratory relief for its pore space claim but does not have standing to pursue its quantification and quality claims.<sup>46</sup> With regard to the quantification claim, the U.S. District Court concluded that Agua Caliente did not provide evidence that it is currently unable to use sufficient water to fulfill the purposes of the reservation, nor that its need for water will increase in the future such that its use will conflict with CVWD and DWA's use.<sup>47</sup> Likewise, the U.S. District Court also found that Agua Caliente failed to provide evidence of harm, actual or imminent, to its ability to use water of sufficient quality to fulfill the purposes of the reservation and, as such, lacks standing for its water quality claim.<sup>48</sup> The remaining claim in this litigation concerns the pore space. The U.S. District Court deferred to Phase III the "narrow issue of whether [Agua Caliente] owns sufficient pore space to store its federally-reserved water right."<sup>49</sup> Phase III will not determine whether to enjoin CVWD and DWA from infringing on the pore space right, if it exists, because Agua Caliente did not provide evidence of actual or imminent injury to its alleged ownership.<sup>50</sup>

## B. Basin Setting

GSP Regulations require information about the physical setting and characteristics of the basin and current conditions of the basin, including a hydrogeologic conceptual model, a description of historical and current groundwater conditions, and an assessment of the water budget.<sup>51</sup>

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<sup>44</sup> Bridge Document, Section 2.6.3, p. 2-19

<sup>45</sup> *Agua Caliente Band of Cahuilla Indians v. Coachella Valley Water District, et al.*, 5:13-cv-00883-JGB-SP, Document 318 (C.D. Cal. April 19, 2019) (Agua Caliente) at 2

<sup>46</sup> *Agua Caliente* at 1

<sup>47</sup> *Agua Caliente* at 16

<sup>48</sup> *Agua Caliente* at 19

<sup>49</sup> *Agua Caliente* at 21

<sup>50</sup> *Agua Caliente* at 21

<sup>51</sup> 23 CCR § 354.12 et seq.

## 1. Hydrogeologic Conceptual Model

The GSP Regulations require a descriptive hydrogeologic conceptual model of the basin that includes a written description supported by cross sections and maps.<sup>52</sup>

The Bridge Document<sup>53</sup> discusses the physical setting of the Indio Subbasin. Table 3-1 in the Bridge Document references publications by consultants and agencies to correlate the functionally equivalent information in existing plans with the required elements of the GSP Regulations.<sup>54</sup> The 2002 EIR and 2002 WMP discuss the groundwater model for the Coachella Valley. The 2002 WMP references some of the previous hydrologic studies in the Coachella Valley, which include detailed descriptions of the geology and hydrogeology and three studies by the United States Geological Survey (USGS) regarding groundwater flow and transport models. The USGS groundwater models focused on the Upper Coachella Valley, which is the western portion of the Indio Subbasin where the Whitewater Spreading Facility is located. The groundwater model developed for the 2002 WMP (Coachella Valley Groundwater Model) includes the Upper and Lower Coachella Valleys and covers nearly the entire Indio Subbasin – small undeveloped areas in the southern portion of the Indio Subbasin were outside of the model area.<sup>55</sup>

The Coachella Valley Groundwater Model simulates groundwater conditions using estimated components of the water budget and was calibrated using hydrogeologic parameters but does not include a quantified safe or sustainable yield for the Indio Subbasin. The Model includes considerations for natural recharge, artificial recharge, irrigation return flows, groundwater production, evapotranspiration, drain flows, and the interaction of groundwater with the Salton Sea.<sup>56</sup> The boundary conditions of the Coachella Valley are defined by the surrounding mountains, the Banning and San Andreas faults, and the Salton Sea. The 2002 WMP includes descriptions of the aquifer conditions. The Upper Valley is primarily composed of coarse sand and gravel, and groundwater pumped from this portion of the Valley is primarily used for domestic purposes and golf course irrigation; the Lower Valley consists of sands, silts, and clays that form a semi-perched aquifer, an aquitard, and an upper and lower aquifer.<sup>57</sup> The quantitative values of aquifer thickness, hydraulic conductivity, specific yield, and specific storage were derived from previous studies or were estimated for the development of the Model in the 2002 WMP. The 2002 EIR describes the process for constructing the Model, calibrating the Model using water level data and drain flow data from 1936 to 1996, verifying the Model using data from 1997 to 1999, and the peer review.<sup>58</sup> The peer review

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<sup>52</sup> 23 CCR § 354.14(a)

<sup>53</sup> Bridge Document, Section 3, pp. 3-1 to 3-30

<sup>54</sup> 23 CCR § 354.14; 23 CCR § 354.16; 23 CCR § 354.18; 23 CCR § 354.20

<sup>55</sup> 2002 WMP, Appendix C, Coachella Valley Groundwater Model, Figure C-1

<sup>56</sup> 2002 WMP, Appendix C, p. C-3 to C-4

<sup>57</sup> 2002 WMP, Section 2, p. 2-16

<sup>58</sup> 2002 Environmental Impact Report, p. 6-3 and Appendix D; 2002 WMP, Appendix C

concluded that the overall Coachella Valley Groundwater Model is valid and can be used to evaluate and compare management scenarios.<sup>59</sup> The Model simulated projected scenarios and groundwater conditions up to 2077.<sup>60</sup> The Model was updated for the 2010 WMP using input and output data from 2000 through 2009.

## 2. Groundwater Conditions

The GSP Regulations require a description of historical and current groundwater conditions in the basin that includes information related to groundwater elevations, groundwater storage, seawater intrusion, groundwater quality, subsidence, and interconnected surface water, as applicable. The GSP Regulations also require an identification of groundwater-dependent ecosystems.<sup>61</sup>

The Bridge Document describes the historical groundwater conditions and references various sections, figures, and tables in the existing water management plans and EIRs. The 2010 WMP was developed based on historical groundwater conditions and data through 2009, including land uses, projected growth, and water demand. The CVWD and the DWA prepare annual Engineer's Reports that document groundwater conditions for each *area of benefit* that are used for assessing aquifer replenishment fees in each respective area and for calculating the water balance for the Indio Subbasin and the change in groundwater in storage.<sup>62</sup>

Groundwater elevations are discussed in the Coachella Valley Groundwater Model, the 2010 WMP, and the 2016-2017 Engineer's Report. Various groundwater elevation contour maps and hydrographs include historical and current information. The groundwater levels in the Indio Subbasin experienced declines in the early 1900s and stabilized soon after the importation of Colorado River water in 1949. The groundwater level remained fairly stable until the 1980s, then declined about 1.5 to 3.5 feet per year from 1980 to 2000.<sup>63</sup> Hydrographs generally show declines through about 2009 to 2010.<sup>64</sup> The 2014 Status Report shows that the areas of groundwater level decrease and increase have shifted in recent decades, with conditions mostly improving from 2003 to 2013. The 2014 Status Report states that "[o]ne of the key implementation efforts... was to increase imported water supplies... [T]he benefits of additional recharge at Whitewater and Thomas E. Levy replenishment facilities are verified by the increase in groundwater levels at [the] east and west ends of [the Coachella Valley]."<sup>65</sup> For the period of 2005 to 2015, a period beginning with abundant precipitation and then affected by drought, the 2016-2017

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<sup>59</sup> 2002 WMP, Appendix C, pp. C-6 to C-8

<sup>60</sup> 2002 EIR, Section 6, p. 6-3

<sup>61</sup> 23 CCR § 354.16

<sup>62</sup> Bridge Document, Table 3-1

<sup>63</sup> Bridge Document, Section 4, p. 4-4

<sup>64</sup> 2010 WMP, Figure 4-2; 2002 WMP, Section 1, p. 1-1

<sup>65</sup> 2014 Status Report, pp. 5-6



Engineer's Report generally shows increases to no change in groundwater levels in the northwestern and southern portions of the Indio Subbasin and shows slight decreases in the western and central portions of the Subbasin.<sup>66</sup>

The groundwater storage capacity of the Indio Subbasin is estimated to be approximately 30 million acre-feet.<sup>67</sup> The Agencies estimate that approximately 1.4 million acre-feet of water was withdrawn from the Subbasin between 1936 and 1999, and an additional 1.1 million acre-feet was withdrawn between 2000 and 2009, resulting in approximately 2.5 million acre-feet of groundwater removed from the Subbasin between 1936 and 2009.<sup>68</sup>

The change in groundwater in storage is calculated annually by the CVWD and the DWA and presented in their respective Engineer's Report for each *area of benefit*. "Since 2009, groundwater conditions have significantly improved... and approximately 350,000 [acre-feet] has been added to storage as a result of increased recharge, conversion of golf course pumping to imported and recycled water, and water conservation."<sup>69</sup> Decreased rates of subsidence and uplift associated with recovering groundwater levels are evidence of improving conditions since 2009.<sup>70</sup>

The 2014 Status Report states that long-term overdraft will be eliminated in the Palm Springs area and the East Valley by 2021 if the 2010 WMP continues to be implemented. The groundwater level change maps for the period of 2003 to 2013<sup>71</sup> and the period of 2005 to 2015<sup>72</sup> show evidence of recovering groundwater levels in those areas. Groundwater levels in the Mid-Valley Area are expected to continue declining until programs are implemented in this area to reduce groundwater loss. These Mid-Valley programs include urban conservation programs to reduce municipal pumping by 20 percent by 2020, source substitution programs including non-potable water system expansion to golf courses, Colorado River treatment for domestic water use, and direct groundwater recharge.<sup>73</sup>

The change in groundwater in storage is determined for nearly the entire Indio Subbasin annually in the Engineer's Reports by the DWA and the CVWD. The change in storage for the entire Garnet Hill area does not occur annually. However, groundwater levels are

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<sup>66</sup> 2016-2017 Engineer's Report, Figure VII-7; Desert Water Agency Engineer's Report, Exhibit 3

<sup>67</sup> 2010 WMP, Executive Summary, p. ES-1

<sup>68</sup> Bridge Document, Section 4.3.2, p. 4-5

<sup>69</sup> Bridge Document, Section 4.3.2, p. 4-5

<sup>70</sup> Land Subsidence, Groundwater Levels, and Geology in the Coachella Valley, California, 1993-2010, p. 42

<sup>71</sup> 2014 Status Report, Figure 3

<sup>72</sup> 2016-2017 Engineer's Report, Figure VII-7

<sup>73</sup> 2014 Status Report, p. 2

monitored and reported in the DWA's annual Engineer's Report. For the period of 2005 to 2015, the hydrographs for the Garnet Hill area appear to be stable or have risen.<sup>74</sup>

The Salton Sea is more saline than ocean water and is located adjacent to the southeastern portion of the Indio Subbasin at the downgradient end. The Bridge Document states that "there may be a potential for Salton Sea water to intrude the shallow aquifer in the East Valley if groundwater levels are not sufficiently high to prevent intrusion." If groundwater levels are at or above the modeled results, then the potential for saline intrusion should be minimized.<sup>75</sup> The Bridge Document and the 2016-2017 Engineer's report describe the monitoring wells for saline intrusion and states that current groundwater levels range from 17 feet below to 19 feet above the elevation of the Salton Sea, and no evidence of saline intrusion has been observed. However, the Bridge Document states that brackish groundwater has been observed in two deep monitoring wells, but it has not been determined whether the brackish groundwater is associated with active saltwater intrusion or with residual saline water from previous incarnations of the Salton Sea (Lake Cahuilla), which occurred numerous times as a result of Colorado River flows.<sup>76</sup> The 2016-2017 Engineer's Report shows 1,220 acre-feet of inflow from the Salton Sea to the eastern portion of the Indio Subbasin.<sup>77</sup>

Groundwater quality is described in the 2010 WMP<sup>78</sup> and 2002 WMP. In general, the quality of groundwater that is delivered to urban customers is high and only receives conventional disinfection.<sup>79</sup> The Alternative discusses a variety of topics including emerging issues, federal, state, and regional requirements, and water treatment methods and facilities. The groundwater constituents of primary concern include arsenic, fluoride, chromium, dibromochloropropane (DBCP), and salinity. The arsenic is naturally-occurring and appears to be associated with faults and geothermal activity. The CVWD constructed three groundwater treatment facilities that remove arsenic from the groundwater in 2006, which continue to operate. Some private wells in a few communities have arsenic levels that exceed the maximum contaminant level and use treatment filters to reduce arsenic levels.<sup>80</sup>

Fluoride is naturally-occurring and found in concentrations exceeding drinking water regulations in portions of the Indio Subbasin, commonly near faults and geothermal areas. The CVWD typically avoids drilling wells in these areas, but private drinking water wells

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<sup>74</sup> Desert Water Agency 2016-2017 Engineer's Report, Exhibit 3

<sup>75</sup> Bridge Document, Section 4.3.3, pp. 4-5 to 4-6

<sup>76</sup> Bridge Document, Section 4.4.4, p. 3-21

<sup>77</sup> 2016-2017 Engineer's Report, Tables III-3 and VII-3

<sup>78</sup> 2010 WMP, Section 5.1.3, pp. 5-10 to 5-15, Section 6.7.3, pp. 6-38 to 6-39

<sup>79</sup> 2010 WMP, Section 6.7.3, p. 6-38

<sup>80</sup> 2010 WMP, Executive Summary, p. ES-25, Section 5.1.3.1, pp. 5-10 to 5-11

in these areas may have high fluoride concentrations. Reverse osmosis or filtration can remove fluoride from the groundwater.<sup>81</sup>

Regarding chromium, about 30 percent of the drinking water wells have hexavalent chromium levels above the maximum contaminant level.<sup>82</sup> The Indio Water Authority is currently treating three wells to remove chromium, and the CVWD initiated a pilot project to treat water with hexavalent chromium. The pilot project may lead to the construction of treatment facilities expected to be operational in 2020.<sup>83</sup>

Between 1955 and 1977, DBCP was injected into the soil in portions of the Indio Subbasin to control parasites and prevent damage to crops and plants. The detected DBCP concentrations do not exceed drinking water regulations. Public supply wells are typically not drilled in these areas, and water managers have avoided constructing recharge facilities in these areas, so as to not raise groundwater levels and allow the DBCP to migrate to wells supplying potable water.<sup>84</sup>

The primary source of salt added to the basin is water imported from the Colorado River, which has a salt content of about one ton per acre-foot. The salt-addition to the Indio Subbasin around the time that the 2002 WMP was developed was 265,000 tons of salt per year and increased to about 350,000 tons of salt per year around the time the 2010 WMP was developed. The 2010 WMP identified the mechanisms to improve the Subbasin's salt balance as reducing imported water salt load, increasing salt export via the subsurface drain, managing salt additions such as fertilizers, or a combination of these.<sup>85</sup> Calculations and projections of salt balance show general increases in the Subbasin from 2000 to 2015, with a steep decrease in salt added after 2015 in the East Valley due to increased groundwater in storage and drain flows, and a gradual increase of salt-addition in the West Valley.<sup>86</sup>

Land subsidence has been documented in three areas of the Indio Subbasin, near Palm Desert, Indian Wells, and La Quinta. The Bridge Document summarizes a 2014 USGS report indicating that subsidence induced by groundwater withdrawal occurred in the eastern and western portions of the Indio Subbasin between 1993 and 2010. The USGS report, which used data as recent as 2010, states that “[c]ontinued monitoring in the southern Coachella Valley is warranted because groundwater levels continue to decline to record-low levels in some areas of the valley, and the considerable magnitudes and

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<sup>81</sup> 2010 WMP, Section 6.7.3, pp. 6-38 to 6-39

<sup>82</sup> Bridge Document, Section 6.2.5, p. 6-10

<sup>83</sup> Bridge Document, Section 6.2.5, p. 6-10

<sup>84</sup> 2010 WMP, Section 6.7.3, p. 6-38

<sup>85</sup> 2010 WMP, Section 7.4.1.2, pp. 7-22 to 7-23; 2002 WMP, Executive Summary, p. 16

<sup>86</sup> 2010 WMP, Section 7.4.1.2, pp. 7-22 to 7-23

steady or increasing subsidence rates...are...expected to continue.”<sup>87</sup> However, decreased rates of subsidence and associated uplift of the ground surface, as a result of recovering groundwater levels and the positive net-change of groundwater in storage, were observed in the La Quinta area in 2010. According to the Bridge Document, the USGS is actively investigating the Subbasin for subsidence and was expected to publish a report in 2018; as of the end of the first quarter of 2019, a more recent USGS report was not publicly available.

Interconnected surface water is described in the Bridge Document as not being present in the West Valley because groundwater levels are generally much lower than the ground surface. In the East Valley, the Bridge Document discusses an ancient lakebed in the East Valley that created semi-perched groundwater conditions causing groundwater levels to be nearer to the ground surface and to allow salts to accumulate. To reduce the salinity of the area, an agricultural drainage system, locally referred to as the subsurface drain, “was installed in the 1950s through mid-1970s to maintain shallow groundwater levels below the rooting zone and convey brackish irrigation-return water to the Salton Sea.”<sup>88</sup> The subsurface drain system consists of 166 miles of pipe ranging in diameter from 18 inches to 72 inches, along with 21 miles of open ditches to serve as a drainage network for irrigated lands. All agricultural drains empty into the Coachella Valley Stormwater Channel or the Salton Sea.<sup>89</sup> To reduce the salinity in the area, the Coachella Valley Water District estimates that the subsurface drain requires flows of about 100,000 acre-feet per year by 2045 to maintain salt export from the region while minimizing groundwater losses. Projected drain flow in 2045 is estimated to be 42,000 acre-feet per year, meaning an additional 60,000 acre-feet per year of net groundwater inflow would be required.<sup>90</sup>

Groundwater-dependent ecosystems were not mapped when the 2002 WMP or the 2010 WMP was prepared. However, the groundwater balance and groundwater model include the consumption of water by phreatophytic vegetation on undeveloped land overlying the semi-perched aquifer area.<sup>91</sup>

### 3. Water Budget

GSP Regulations require a water budget for the basin that provides an accounting and assessment of the total annual volume of groundwater and surface water entering and

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<sup>87</sup> Land Subsidence, Groundwater Levels, and Geology in the Coachella Valley, California, 1993-2010, p. 42

<sup>88</sup> Bridge Document, Table 3-1, Section 3.4.7, p. 3-22, Section 4.3.6, p. 4-7

<sup>89</sup> 2010 WMP, Section 4.1.1.2, p. 4-5

<sup>90</sup> 2010 WMP, Section 4.8, p. 4-33

<sup>91</sup> Bridge Document, Section 3.4.8, p. 3-22

leaving the basin, including historical, current and projected water budget conditions, and the change in the volume of water stored, as applicable.<sup>92</sup>

The Bridge Document describes the water budget developed for the Coachella Valley Groundwater Model in the 2002 WMP and 2002 EIR. The “original [water] budget incorporates all known inflows and outflows to the basin for the period 1936 through 1996, which was used for model calibration.”<sup>93</sup> Inflows to the Subbasin include mountain runoff, subsurface inflow from adjacent basins, percolation of applied water or return flows, imported water used for artificial recharge. Outflows include groundwater extraction, subsurface drain flow, evapotranspiration, and subsurface outflow.<sup>94</sup>

The historical water demand is discussed in detail in the 2002 WMP and the 2002 EIR.<sup>95</sup> The agricultural acreage in 1936 was about 1,500 acres, with a water demand of about 84,000 acre-feet per year. Total agricultural demand in 1999 was about 359,000 acre-feet per year and primarily in the Lower Valley. The historical urban demand in 1936 was about 12,200 acre-feet per year compared with about 310,000 acre-feet per year in 1999.<sup>96</sup> The water balance for the period of 2000 to 2009 is provided in the 2010 WMP.<sup>97</sup> The 2016-2017 Engineer’s Report contains an annual water balance calculation for each management area, locally referred to as *areas of benefit*. The 2015 net-change for the West Whitewater River management area, which includes the portion of the Garnet Hill area within CVWD’s jurisdiction, was negative 68,100 acre-feet, meaning 68,100 acre-feet was removed from the area.<sup>98</sup> The net-change for the East Whitewater River management area in 2015 was positive 26,900 acre-feet, meaning 26,900 acre-feet was added to the Subbasin. An annual water balance for the Garnet Hill area outside of the CVWD’s jurisdiction was not found in the Alternative; however, the 2013 Mission Creek/Garnet Hill WMP shows a graph of the historical change in groundwater storage for the Garnet Hill area that includes the period of 1935 to 2010.<sup>99</sup> This graph shows a general increase of groundwater in storage since the beginning of the recharge program at the Whitewater River Spreading Facility in 1973.<sup>100</sup>

A quantified estimate of sustainable yield was not provided in the Alternative. Instead, the Agencies use a proxy of “[maintaining] a positive annual change in groundwater storage under average supply conditions.”<sup>101</sup> The 2010 WMP uses a calculation of change in

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<sup>92</sup> 23 CCR § 354.18

<sup>93</sup> Bridge Document, Section 3.5, pp. 3-22 and 3-25

<sup>94</sup> 2010 WMP, Table 4-1

<sup>95</sup> EIR, Section 6.3.1, pp. 6-14 to 6-21; 2002 WMP, Section 3, pp. 3-2 to 3-5; Bridge Document, Section 3.5, pp. 3-22 and 3-25

<sup>96</sup> 2002 WMP, Section 3, pp. 3-2 to 3-5

<sup>97</sup> 2010 WMP, Table 4-1

<sup>98</sup> 2016-2017 Engineer’s Report, Table VI-4

<sup>99</sup> Mission Creek/Garnet Hill Water Management Plan, Figure 4-12

<sup>100</sup> Mission Creek/Garnet Hill Water Management Plan, Section 4, p. 4-32

<sup>101</sup> Bridge Document, Section 3.5.3, p. 3-26

storage based on long-term local hydrology and imported water deliveries to estimate long-term overdraft. The 2010 WMP states that using long term average values for inflows such as recharge is preferred because local hydrology and imported water availability vary greatly from year to year. “Other inflows and outflows are estimated using the groundwater model. This approach dampens the variations in the annual change in storage and gives a more accurate indication of long-term overdraft.” Using this method, the 2010 WMP estimates the average annual overdraft for 2000 through 2009 to be 70,000 acre-feet per year.<sup>102</sup> Since about 2010, the change in groundwater in storage of the Indio Subbasin has been net-positive.<sup>103</sup>

The 2002 WMP discusses water budget projections up to 2035 using four management scenarios with assumed conditions. The scenarios include doing nothing, restricting pumping by adjudicating water rights, managing water demand using water conservation methods while maintaining the volume of imported water, and a combination of the management scenarios. The Agencies chose to use a combination of management programs. Detailed information regarding the projected scenarios and alternative management strategies is in the 2002 WMP.<sup>104</sup>

#### 4. Management Areas

GSP Regulations authorize, but do not require, an agency to define one or more management areas within a basin if the agency has determined that creation of management areas will facilitate implementation of the GSP.<sup>105</sup>

The use of management areas is an important component of the management structure of the Subbasin. The Indio Subbasin is divided into management areas, locally referred to by the Agencies as *areas of benefit*. The primary objective of defining the *areas of benefit* is related to how groundwater replenishment costs are assessed by the CVWD and the DWA to recover costs associated with importing water and other water management activities.<sup>106</sup>

The activities and conditions in each *area of benefit* are described in the respective annual Engineer’s Reports. The annual Engineer’s Reports discuss the replenishment water sources, methods for calculating the replenishment assessment fees based on groundwater production, the water balance for each management area, and the change in groundwater in storage.

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<sup>102</sup> 2010 WMP, Executive Summary, p. ES-4

<sup>103</sup> 2016-2017 Engineer’s Report, Figure VI-4, Figure VII-4; Mission Creek/Garnet Hill Water Management Plan, Figure 4-13

<sup>104</sup> 2002 WMP, Section 5, pp. 5-1 to 5-16, Section 6, pp. 6-1 to 6-26

<sup>105</sup> 23 CCR § 354.20

<sup>106</sup> Bridge Document, Table 3-1

## C. Sustainable Management Criteria

GSP Regulations require a sustainability goal that defines conditions that constitute sustainable groundwater management for the basin, the characterization of undesirable results, and establishment of minimum thresholds and measurable objectives for each applicable sustainability indicator, as appropriate.<sup>107</sup>

### 1. Sustainability Goal

GSP Regulations require that sustainable management criteria include a sustainability goal that culminates in the absence of undesirable results within the appropriate timeframe, and includes a description of the sustainability goal, describes information used to establish the goal for the basin, describes measures that will be implemented to ensure the basin operates within its sustainable yield, and contains an explanation of how the sustainability goal will be met.<sup>108</sup>

The Bridge Document provides an overview of the existing goals for the Indio Subbasin. The sustainability goal was established in the 2002 WMP and “is to reliably meet current and future water demands in a cost effective and sustainable manner. The 2002 WMP<sup>109</sup> specified four specific objectives for the entire Coachella Valley, which consists on more than just the Indio Subbasin, and include:

- Eliminate groundwater overdraft and its associated adverse impacts, including:
  - Groundwater storage reductions
  - Declining groundwater levels
  - Land subsidence
  - Water quality degradation
- Maximize conjunctive use opportunities
- Minimize adverse economic impacts to Coachella Valley water users
- Minimize environmental impacts

The 2010 WMP<sup>110</sup> modified and expanded the objectives to become:

- Meet current and future water demands with a 10 percent supply buffer
- Eliminate long-term groundwater overdraft
- Manage and protect water quality
- Comply with state and federal laws and regulations
- Manage future costs

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<sup>107</sup> 23 CCR § 354.22

<sup>108</sup> 23 CCR § 354.24

<sup>109</sup> 2002 WMP, Executive Summary, pp. 9 to 10

<sup>110</sup> 2010 WMP, Section 1, pp. 1-2 to 1-3

- Minimize adverse environmental impacts

According to the 2002 WMP and 2010 WMP, a key objective is to reduce groundwater overdraft and its associated adverse impacts, with the goal of eliminating overdraft by 2030.<sup>111</sup> The 2014 Status Report states continued implementation of the 2010 WMP “ensures that long-term overdraft will be eliminated by 2021.”<sup>112</sup> The Agencies monitor and evaluate the progress toward achieving the sustainability goals and objectives using a combination of water level monitoring, water budget evaluation, subsidence monitoring, and water quality monitoring.<sup>113</sup>

## 2. Sustainability Indicators

GSP Regulations specify that an agency define conditions that constitute sustainable groundwater management for a basin, including the characterization of undesirable results and the establishment of minimum thresholds and measurable objectives for each applicable sustainability indicator.<sup>114</sup>

Sustainability indicators are defined as any of the effects caused by groundwater conditions occurring throughout the basin that, *when significant and unreasonable*, cause undesirable results.<sup>115</sup> Sustainability indicators thus correspond with the six undesirable results – chronic lowering of groundwater levels indicating a depletion of supply if continued over the planning and implementation horizon, reduction of groundwater storage, seawater intrusion, degraded water quality, including the migration of contaminant plumes that impair water supplies, land subsidence that substantially interferes with surface land uses, and depletions of interconnected surface water that have adverse impacts on beneficial uses of the surface water<sup>116</sup> – but refer to groundwater conditions that are not, in and of themselves, significant and unreasonable. Rather, sustainability indicators refer to the effects caused by changing groundwater conditions that are monitored, and for which criteria in the form of minimum thresholds are established by the agency to define when the effect becomes significant and unreasonable, producing an undesirable result.

This section thus consolidates three facets of sustainable management criteria: undesirable results, minimum thresholds, and measurable objectives. Information pertaining to the processes and criteria relied upon to define undesirable results applicable to the basin, as quantified through the establishment of minimum thresholds, are addressed for each sustainability indicator. However, a submitting agency is not

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<sup>111</sup> Bridge Document, Section 4.3.2, p. 4-5

<sup>112</sup> 2014 Status Report, p. 11

<sup>113</sup> Bridge Document, Section 4.1, p. 4-1

<sup>114</sup> 23 CCR § 354.22

<sup>115</sup> 23 CCR § 351(ah)

<sup>116</sup> Water Code § 10721(x)



required to establish criteria for undesirable results that the agency can demonstrate are not present and are not likely to occur in a basin.<sup>117</sup>

*a. Chronic Lowering of Groundwater Levels.*

GSP Regulations specify that the minimum threshold for chronic lowering of groundwater levels be based on groundwater elevations indicating a depletion of supply that may lead to undesirable results.<sup>118</sup>

The Alternative does not specify a minimum threshold for this sustainability indicator. Instead, the Bridge Document states that the 2002 WMP and 2010 WMP seeks to “eliminate undesirable effects [in the Subbasin] by maintaining a positive water balance and meeting the groundwater level targets established through modeling.”<sup>119</sup>

*b. Reduction of Groundwater Storage*

GSP Regulations specify that the minimum threshold for reduction of groundwater storage shall be a total volume of groundwater that can be withdrawn from the basin without causing conditions that may lead to undesirable results.<sup>120</sup>

The Alternative does not specify a minimum threshold for this sustainability indicator. A goal of the 2010 WMP, however, “is to maintain a positive annual change in groundwater storage under average supply conditions both now and in the future.”<sup>121</sup>

*c. Seawater Intrusion*

GSP Regulations specify that the minimum threshold for seawater intrusion be defined by a chloride concentration isocontour for each principal aquifer where seawater intrusion may lead to undesirable results.<sup>122</sup>

The Bridge Document states that groundwater elevations need to be maintained above modeled elevations to minimize the potential for saltwater intrusion from the Salton Sea, but the specific elevation is not provided.<sup>123</sup> The Bridge Document states there is a low potential for Salton Sea water to intrude the shallow aquifer in the East Valley if groundwater levels are not sufficiently high to prevent intrusion. “Protective elevations that would prevent saltwater intrusion were not determined during preparation of the 2002 WMP or the 2010 [WMP]. Instead, groundwater modeling was used to estimate potential

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<sup>117</sup> 23 CCR § 354.26(d)

<sup>118</sup> 23 CCR § 354.28(c)(1)

<sup>119</sup> Bridge Document, Section 4.4, p. 4-8

<sup>120</sup> 23 CCR § 354.28(c)(2)

<sup>121</sup> Bridge Document, Section 3.5.3, p. 3-26

<sup>122</sup> 23 CCR § 354.28(c)(3)

<sup>123</sup> Bridge Document, Section 4.3.3, p. 4-5

subsurface inflows from the Salton Sea... Therefore, management alternatives were evaluated with the goal of minimizing subsurface Salton Sea inflows to the basin.”<sup>124</sup>

#### *d. Degraded Water Quality*

GSP Regulations specify that the minimum threshold for degraded water quality shall be the degradation of water quality, including the migration of contaminant plumes that impair water supplies or other indicator of water quality that may lead to undesirable results.<sup>125</sup>

The Bridge Document states that the 2002 WMP identified water quality degradation as a significant adverse impact related to groundwater overdraft. The 2002 WMP evaluated the potential for water quality degradation using a salt balance approach and determined that net salt addition to the Subbasin is unavoidable due to the dependence on imported water supplies from the Colorado River. The 2010 WMP identified a variety of water quality constituents of concern in the Indio Subbasin and did not establish specific water quality thresholds or goals that were stricter than existing drinking water regulations. The Agencies conduct water quality monitoring in accordance with federal and state drinking water requirements and analyze water samples for more than 100 regulated and unregulated substances.<sup>126</sup>

The East Valley is subject to salinity issues in the shallow aquifer due to semi-perched groundwater conditions. To reduce water quality impacts in this area, the 2010 WMP established a subsurface drain flow target of about 100,000 acre-feet per year by 2045 in order to maintain salt export while minimizing groundwater losses.<sup>127</sup> The drain flow has been relatively stable and has averaged about 54,000 acre-feet per year since 2009.<sup>128</sup>

The aquifer replenishment using Colorado River water adds significant quantities of salt, on the order of 200,000 tons to 350,000 tons per year, to the Indio Subbasin. The Bridge Document states that net salt addition is unavoidable due to the dependence on Colorado River water. The 2010 WMP described methods for improving the salt balance, which include reducing the salt load of imported water using alternative water sources and desalination, reducing fertilizer usage, reducing agricultural production, increasing salt export via the subsurface drain by raising groundwater levels and groundwater in storage, and conservation. The Bridge Document mentions that a *Salt and Nutrient Management Plan* was developed by the CVWD, DWA, and the Indio Water Authority and submitted to the Colorado River RWQCB in 2015. The *Salt and Nutrient Management Plan* discusses the hydrogeology, ambient groundwater quality, projected water quality, objectives, management strategies, and a monitoring plan. The objective for total dissolved solids is

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<sup>124</sup> Bridge Document, Section 4.3.3, pp. 4-5 to 4-6

<sup>125</sup> 23 CCR § 354.28(c)(4)

<sup>126</sup> Bridge Document, Section 4.3.4, p. 4-6

<sup>127</sup> Bridge Document, Section 4.3.4, p. 4-6; 2010 WMP, Section 7.4.1.2, p. 7-22

<sup>128</sup> Bridge Document, Section 4.3.6, p. 4-7

to be under 1,000 mg/L and 45 mg/L for nitrate.<sup>129</sup> However, the State Water Resources Control Board has not made a determination regarding the *Salt and Nutrient Management Plan*. The annual Engineer's Reports do not appear to show recent or ongoing salt balance determinations.

#### *e. Land Subsidence*

GSP Regulations specify that the minimum threshold for land subsidence shall be the rate and extent of subsidence that substantially interferes with surface land uses and may lead to undesirable results.<sup>130</sup>

The CVWD entered into a cooperative agreement with the USGS in 1996 to investigate historical and active land subsidence. The 2002 WMP identified the potential risk of land subsidence caused by continued overdraft. Groundwater levels in 1999 were associated with land subsidence, and further declines were correlated with a relatively high risk for continued subsidence.<sup>131</sup>

The 2010 WMP states that it will be important to maintain groundwater levels at or above the level of the compressible clays, which, for much of the East Valley means that groundwater levels should not be allowed to drop below 2005 levels.<sup>132</sup>

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

GSP Regulations specify that the minimum threshold for depletions of interconnected surface water shall be the rate or volume of surface water depletions caused by groundwater use that has adverse impacts on beneficial uses of the surface water and may lead to undesirable results.<sup>133</sup>

The Bridge Document states that there are few areas of interconnected surface water with groundwater in the Indio Subbasin because groundwater levels are generally much lower than the ground surface.<sup>134</sup>

### D. Monitoring Networks

GSP Regulations require that each basin be monitored, and that a monitoring network include monitoring objectives, monitoring protocols, and data reporting requirements be developed that shall promote the collection of data of sufficient quality, frequency, and

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<sup>129</sup>Salt and Nutrient Management Plan, Tables ES-1 and ES-2

<sup>130</sup> 23 CCR § 354.28(c)(5)

<sup>131</sup> 2002 WMP, Section 3, pp. 3-31 to 3-34

<sup>132</sup> 2010 WMP, Section 7.4.1.5, p. 7-26

<sup>133</sup> 23 CCR § 354.28(c)(6)

<sup>134</sup> Bridge Document, Figure 3-4

distribution to characterize groundwater and related surface water conditions in the basin and evaluate changing conditions.<sup>135</sup>

The Bridge Document<sup>136</sup> includes a section called Monitoring Networks and Data Management, and Table 5-1 provides the explanations of functional equivalency of content in existing plans to a GSP.<sup>137</sup> The monitoring network and the associated data are primarily described in the 2010 WMP.<sup>138</sup> The 2010 WMP states that “[t]he primary objective of the monitoring and data management program is to evaluate the effectiveness of the water management programs and projects identified in the Plan.” According to the 2010 WMP, the components of the monitoring network for the Coachella Valley include:

- Weather data – precipitation, temperature, and evapotranspiration data are collected. As of 2010, the National Climate Data Center maintains records from 12 stations, and the Department’s California Irrigation Management Information System (CIMIS) maintains six stations.
- Hydrologic data – USGS maintains 16 stream gauging stations in the Coachella Valley. The location of these gauging stations was not provided in an existing plan.
- Well logs – CVWD stores well completion reports for wells drilled in the Coachella Valley area.
- Groundwater production – the reporting threshold for pumpers within the CVWD *area of benefit* is 25 acre-feet per year, while the threshold for pumpers within the DWA *area of benefit* is 10 acre-feet per year. No groundwater production information is collected outside of these jurisdictional areas or from groundwater producers below the respective thresholds.
- Water levels – CVWD states that it monitors water levels from nearly 600 public and private wells three times per year. The Bridge Document includes a map showing monitoring well locations with recent data.
- Water quality – surface water and groundwater quality monitoring are reportedly performed by various agencies in the Coachella Valley and are performed in accordance with federal and state drinking water requirements. Water samples are analyzed for more than 100 regulated and unregulated substances<sup>139</sup> and the results are reported to the California Department of Public Health and to customers in annual consumer confidence reports. The quality of imported water and the presence of Quagga mussels, an invasive species, are monitored on a monthly basis.<sup>140</sup>

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<sup>135</sup> 23 CCR § 354.32

<sup>136</sup> Bridge Document, Section 5, pp. 5.1 to 5-14

<sup>137</sup> Bridge Document, Table 5-1

<sup>138</sup> 2010 WMP, Appendix C, pp. C-1 to C-7

<sup>139</sup> Bridge Document, Section 4.3.4, p. 4-6

<sup>140</sup> 2010 WMP, Section 5.3, p. 5-19, Appendix C, p. C-3

- Subsidence – USGS actively monitors subsidence in the East Coachella Valley. Since 1996, the CVWD has invested over \$1,000,000 to investigate historical and ongoing land subsidence. The USGS published five reports regarding the investigations and was expected to publish a sixth report in 2018.
- Reporting – CVWD and DWA prepare annual reports on water supply and replenishment assessment for the groundwater basins within their respective service areas that are subject to a groundwater replenishment assessment. Consumer confidence reports regarding water quality are provided to all customers on an annual basis.

The information regarding the monitoring network include a variety of action items related to each of the monitoring network components listed above,<sup>141</sup> such as identifying data gaps as of 2010, discussing new monitoring and additional data evaluation elements compared to the 2002 WMP, and the proposed and completed improvements to the monitoring network. Additional details related to the monitoring network established in the Coachella Valley, including the action item specified in the 2010 WMP and its implementation status, are provided in the Bridge Document.<sup>142</sup>

The Bridge Document states that the Agencies in the Indio Subbasin are in compliance with CASGEM reporting requirements, and of the 70 CASGEM wells in the Coachella Valley Groundwater Basin, 57 are located in the Indio Subbasin.<sup>143</sup>

## E. Projects and Management Actions

GSP Regulations require a description of the projects and management actions the submitting agency has determined will achieve the sustainability goal for the basin, including projects and management actions to respond to changing conditions in the basin.<sup>144</sup>

The projects and management actions from the 2002 WMP included water conservation, development of additional water sources, source substitution, and groundwater recharge, with the goal of meeting the water demand at that time and future demands while eliminating groundwater overdraft in the Coachella Valley. Since the adoption of the 2002 WMP, the planning conditions in the Coachella Valley changed, which required modification of the elements included in the 2002 WMP.

During development of the 2010 WMP, the Agencies considered the water management plan elements from the 2002 WMP and additional management options and water quality

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<sup>141</sup> 2010 WMP, Appendix C, pp. C-1 to C-7; Bridge Document, Section 5, pp. 5-1 to 5-15

<sup>142</sup> Bridge Document, Section 5, pp. 5-1 to 5-15

<sup>143</sup> Bridge Document, Section 5.4, pp. 5-13 to 5-14

<sup>144</sup> 23 CCR § 354.44

improvements.<sup>145</sup> The 2010 WMP discusses the objectives for the Coachella Valley, the conservation targets and strategies, sources of water, opportunities to import or procure more water, water recycling, desalination of imported water and agricultural drain water, the need for flexibility, and other information.<sup>146</sup>

The 2010 WMP discusses the major sources of imported water and their quantity, quality, and reliability. Although the CVWD and the DWA contracted for water from the State Water Project (SWP), there are no physical facilities to deliver SWP water to the Coachella Valley. The two agencies exchange the allocated SWP water with the Metropolitan Water District for Colorado River Water, which is imported via the All-American Canal and the Coachella Canal. The CVWD receives approximately 330,000 acre-feet per year of Colorado River water via the Coachella Canal. As a result of a 2003 *Quantification Settlement Agreement* with the Imperial Irrigation District and the Metropolitan Water District, the CVWD entered into water transfer agreements that increased its imported supplies by an additional 129,000 acre-feet per year.<sup>147</sup> The SWP exchange water has been used to recharge the Indio Subbasin at the Whitewater River Recharge Facility since 1973. The 2002 WMP established a goal of maintaining an average amount of SWP exchange water recharge at 140,000 acre-feet per year in the Indio Subbasin.<sup>148</sup> The CVWD has acquired other water transfers to increase the amount of imported water to the Indio Subbasin, which are discussed in the 2010 WMP.<sup>149</sup>

The 2010 WMP states that the Department's SWP Delivery Reliability Report shows a decreased reliability of the SWP over time, which is accounted for in the CVWD planning and forecasting. The Agencies further reduce the reliability factor to conservatively account for uncertainties in the SWP deliveries.<sup>150</sup> To meet the water demand, the 2010 WMP discusses other projects and management actions and includes the utilization of surface water, a detailed discussion regarding the use of recycled water, and environmental enhancement and mitigation projects.

The CVWD operates six water reclamation plants, three of which generate recycled water for irrigation of golf courses and large landscaped areas. The City of Palm Springs operates a wastewater treatment plant, and the DWA provides tertiary treatment to effluent from this plant, then delivers the recycled water to golf courses and parks in the Palm Springs area. Each wastewater facility in the Indio Subbasin is briefly described in the 2010 WMP.<sup>151</sup> Based on 2009 data, the West Valley used 11,700 acre-feet of recycled water for irrigation, and the East Valley used 700 acre-feet. The 2010 WMP includes a

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<sup>145</sup> 2010 WMP, Section 6, p. 6-1

<sup>146</sup> 2010 WMP, Section 6, pp. 6-1 to 6-45, Section 8, pp. 8-1 to 8-22

<sup>147</sup> 2010 WMP, Section 4.2.1, p. 4-15

<sup>148</sup> 2010 WMP, Section 4.3, p. 4-17

<sup>149</sup> 2010 WMP, Section 4.3.2, p. 4-18

<sup>150</sup> 2010 WMP, Section 4.3.4, p. 4-20

<sup>151</sup> 2010 WMP, Section 4.5, pp. 4-22 to 4-26

table showing the 2005 volume of recycled water and project the volume of recycled water to 2045.

Water conservation projects are discussed in the 2010 WMP.<sup>152</sup> Since the 2002 WMP, the projects and actions that were accomplished include urban conservation in the form of a Landscape Ordinance that was passed in 2003 and updated in 2007, and again in 2009, to be consistent with the State's updated model landscape ordinance. In 2007, the CVWD appointed a water conservation coordinator with full-time staff. Tiered domestic water pricing was implemented to encourage conservation. Local cities implemented a turf buy-out program. Local agencies offer free water audits to large water users and assist with implementing the recommended improvements. The goal of reducing agricultural water use by seven percent was met and exceeded; agricultural water use declined by about 9.9 percent through 2008. The 2002 WMP set a goal for the reduction of golf course irrigation of five percent and up to 25 percent for new courses; the 2009 Landscape Ordinance expected to reduce golf course usage by about 22 percent.<sup>153</sup> The 2010 WMP projected the water demand in the Coachella Valley to 2045. The 2014 Status Report contains an updated table showing the projected water demand to 2045; the updated projection shows decreased water demand for each 5-year time period. The 2014 Status Report notes that the projected water demand was not eliminated, but strategically deferred to later years to extend the build-out time and reduce the annual demand.<sup>154</sup>

The 2014 Status Report discusses the action items specified in the 2010 WMP that were completed, which include establishing urban water conservation baseline, investigating the amount of water lost to leakage in the initial 49 miles of the Coachella Canal, and evaluating the feasibility for corrective actions, preparing a master plan for Mid-Valley Pipeline Phase 2, developing policy requiring the installation of non-potable water systems for new developments, investigating groundwater storage opportunities with the Imperial Irrigation District, and developing well construction, destruction, and abandonment policies. Other projects that were completed, are underway, or deferred are specified in Table 8-1 of the 2014 Status Report.<sup>155</sup>

The 2010 WMP describes a pilot study investigating the feasibility of desalinating agricultural drainage water from the Coachella Valley Storm Channel. A variety of desalination technologies were compared, and reverse osmosis was the chosen technology. The pilot study concluded that the agricultural drainage water could be effectively treated for re-use as non-potable water and potentially as potable water. The

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<sup>152</sup> 2010 WMP, Section 8.1.1.1, pp. 8-2 to 8-4

<sup>153</sup> 2010 WMP, Executive Summary, p. ES-7

<sup>154</sup> 2014 Status Report, pp. 9 to 10

<sup>155</sup> 2014 Status Report, Table 8-1

estimated cost to desalinate the water was \$480 to \$740 per acre-foot.<sup>156</sup> The 2010 WMP estimated the initial rate of treatment at 4,000 acre-feet per year by 2013 and increasing to 11,000 acre-feet by 2023. Agricultural drain water would be desalted to a quality equivalent to the water imported via the All-American Canal. The 2010 WMP indicates the potential to desalinate between 95,000 and 115,000 acre-feet per year of drain water by 2045 and recommends additional investigations of feasibility. However, the Alternative does not discuss additional investigations or plans to construct a desalination plant.

## VI. Assessment

The following describes the evaluation and assessment of the Alternative for the Indio Subbasin as determined by Department staff. In undertaking this assessment, Department staff did not conduct geologic or engineering studies, although Department staff may have relied on publicly available geologic or engineering or other technical information to verify claims or assumptions presented in the Alternative.<sup>157</sup> As discussed above, Department staff have determined that the Indio Subbasin Alternative satisfied the conditions for submission of an alternative.<sup>158</sup> The Alternative was submitted within the statutory period, the Indio Subbasin was found to be in compliance with the reporting requirements of CASGEM, and the staff find the Alternative to be complete and to cover the entire Indio Subbasin (see Required Conditions, above). Based on its evaluation and assessment of the Indio Subbasin Alternative, the Department staff find that the Alternative satisfies the objectives of SGMA.<sup>159</sup>

### A. Evaluation of Alternative Contents

The Agencies submitted their 2010 WMP as the primary document relied upon to demonstrate compliance with the objectives of SGMA. The 2002 WMP and 2010 WMP were developed and implemented through a process that included participation from a wide range of interests representing various beneficial uses and users of groundwater.<sup>160</sup> The 2010 WMP and the Bridge Document describe the Agencies' authorities to manage groundwater within their respective statutory boundaries. It is noted that there is pending litigation between Mission Springs Water District and Desert Water Agency regarding the extent of Desert Water Agency's statutory boundaries; however, the established water management plans, projects, objectives, and monitoring already in place are sufficiently detailed and thorough for Department staff to determine that there is a reasonable path towards sustainability.

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<sup>156</sup> 2010 WMP, Section 2.2.2, pp. 2-3 to 2-4, Section 6.4.7, p. 6-21

<sup>157</sup> Instances where the Department review relied upon publicly available data that was not part of the Alternative are specifically noted in the assessment.

<sup>158</sup> 23 CCR § 358.4(a)

<sup>159</sup> Water Code § 10733.6(a); 23 CCR § 358.4(b)

<sup>160</sup> Bridge Document, Section 2.7, pp. 2-20 to 2-21



The Alternative demonstrates a detailed and sufficient understanding of the groundwater conditions of the Indio Subbasin. Department staff consider the technical documents, including the 2010 WMP, EIRs, the annual Engineer's Reports, and the Coachella Valley Groundwater Model, to be based on the best available information and best available science, and that their conclusions are scientifically reasonable. The hydrogeologic conceptual model described in the 2002 EIR<sup>161</sup> incorporates the relevant hydrologic processes and hydrogeologic conditions in the Subbasin based on previous studies. The groundwater model appears to be reasonably well-calibrated, using data from 1936 to 1996 which was verified using data from 1997 to 1999 and then peer-reviewed, to support the analyses presented in the 2002 WMP. The groundwater model is used to generate a detailed and thorough water budget that includes many of the components required by the GSP Regulations and is used to simulate hydrogeologic conditions throughout the Coachella Valley to the year 2077. The Agencies' understanding of the Indio Subbasin setting appears adequate to develop and implement a plan for sustainable groundwater management.

The 2010 WMP establishes a key objective of eliminating overdraft in the Indio Subbasin by 2030<sup>162</sup> and identifies adverse effects caused by existing groundwater use that are equivalent to undesirable results. Those existing adverse conditions are overdraft of portions of the aquifer system that has resulted in lowering of groundwater levels, reduction of storage, lack of optimal flow in the subsurface drain to convey brackish groundwater to the Salton Sea, and land subsidence. The Bridge Document and 2010 WMP describes the evolution of these conditions through time and describes actions taken to date to address them, noting the progress made towards correcting the adverse conditions and the implementation progress of projects and programs identified in the 2002 WMP and the 2010 WMP. The 2010 WMP proposes a suite of management actions and projects to accomplish the goal of eliminating the adverse conditions noted above. The Agencies have a reasonable sustainability goal and have planned for and completed many projects and actions to move towards sustainability (see Projects and Management Section).

Although the 2010 WMP did not establish quantitative criteria for groundwater levels and the reduction of groundwater in storage, the Agencies determine, at least on an annual basis, the change in groundwater in storage and monitor a variety of components including groundwater levels, groundwater quality, agricultural drain flow, and land subsidence. The Bridge Document states that "groundwater levels and water balance serve as the primary measurement to determine if the plan is being successfully implemented. Groundwater levels determined by modeling serve as both a measurable

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<sup>161</sup> 2002 EIR, Appendix D, pp. D-1 to D-9

<sup>162</sup> 2010 WMP, Section 7.4.1, p. 7-19

sustainability objective and interim objectives for assessing plan success.”<sup>163</sup> The 2010 WMP quantifies the overdraft that led to chronic lowering of groundwater levels, storage depletion, and subsidence, and it is expected that eliminating the long-term overdraft will improve overall groundwater conditions. In fact, the change in groundwater levels from 2003-2013 show improvements in most of the Subbasin, which is supported by the USGS report recognizing decreased subsidence rates and some uplift in the La Quinta area during mid-2009 to 2010.<sup>164</sup> The groundwater elevation contour maps comparing 2005 to 2015 levels in the 2016-2017 Engineer’s Report showed, for about half of the Indio Subbasin, no change to increases in elevation despite most of those years having relatively little precipitation.<sup>165</sup> Based on the groundwater elevation contour maps from 1983 to 2015<sup>166</sup> and the annual determinations of change in storage showing a net-positive change,<sup>167</sup> Department staff find the groundwater conditions in the Indio Subbasin have noticeably improved in recent decades, especially since about 2009 or 2010.<sup>168</sup> Therefore, in the judgment of Department staff, the management actions and projects that have been implemented in the Indio Subbasin and described in the Alternative appear likely to achieve the sustainability goal for the Subbasin and avoid undesirable results.

Nonetheless, because SGMA requires the Department to evaluate alternatives and GSPs on an ongoing basis, specific quantitative criteria for groundwater levels, reduction of groundwater in storage and subsidence are necessary for the Department to objectively determine whether the Alternative is meeting the Subbasin’s sustainability goal. The Agencies should establish those criteria to facilitate the Department’s objective evaluation of the Alternative. The Alternative appears to identify a quantitative threshold for land subsidence in the East Valley that is equivalent to 2005 groundwater levels.<sup>169</sup> Because the land subsidence in the Subbasin is associated with declining groundwater levels and reduction of groundwater in storage, the threshold for land subsidence may also be suitable for the sustainability indicators of declining groundwater levels and reduction of groundwater in storage (see Recommended Action 2).

Although the Bridge Document states that specific water quality thresholds and goals were not established in the water management plans, the primary objectives of the 2010 WMP include managing and protecting water quality and complying with state and federal laws and regulations.<sup>170</sup> The water quality discussion includes constituents of concern in

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<sup>163</sup> Bridge Document, Section 4.3, p. 4-3

<sup>164</sup> Land Subsidence, Groundwater Levels, and Geology in the Coachella Valley, California, 1993-2010, Scientific Investigations Report 2014-5075

<sup>165</sup> 2016-2017 Engineer’s Report, Figures VI-2 and VII-2

<sup>166</sup> 2014 Status Report, Figure 3; 2016-2017 Engineer’s Report, Figures VI-2 and VII-2

<sup>167</sup> 2016-2017 Engineer’s Report, Figures VI-4 and VII-4

<sup>168</sup> Bridge Document, Figure 3-4

<sup>169</sup> 2010 WMP, Section 7.4.1.5, p. 7-26

<sup>170</sup> Bridge Document, Executive Summary, p. ES-3, Section 4.2, p. 4-3

the Subbasin, emerging issues, reporting requirements, treatment facilities and methods, well construction standards, well permitting, waste discharge requirements, data gaps, and proposed projects. As mentioned above, in order to comply with federal and state regulations, “[w]ater agencies conduct water quality monitoring in accordance with federal and state drinking water requirements, and analyze water samples for more than 100 regulated and unregulated substances; more than 300 wells are routinely monitored for water levels and quality.”<sup>171</sup> The water sample results are reported to the California Department of Public Health and to customers that receive that water. The quality of imported water is monitored on a monthly basis. By complying with federal and state drinking water requirements, and by constructing water treatment plants to treat contaminated water and to recycle wastewater, Department staff find that the Agencies have reasonable quantifications and standards related to groundwater quality. However, there are no maps that show the areas of the Subbasin that are affected by the primary water quality constituents of concern mentioned in the 2010 WMP (see Groundwater Conditions, above). The Agency should provide maps to facilitate the Department’s ongoing evaluation of the Alternative (see Recommended Action 3).

Regarding the salt balance in the Indio Subbasin, the Agencies submitted a Salt and Nutrient Management Plan to the Colorado River RWQCB in 2015, which is being reviewed. Department staff find that implementing an approved Salt and Nutrient Management Plan to address, in part, salt management in the Subbasin appears to be a reasonable path forward. Once the Salt and Nutrient Management Plan is approved by the Colorado River RWQCB, Department staff recommend incorporating that plan into the Alternative (see Recommended Action 4). However, Department staff recognize that salt management issues associated with imported water may require that, to ensure that the Subbasin is sustainably managed over the long-term, the Agencies may need to implement plans and management actions beyond those associated with existing regulatory programs. Department staff recommend that the Agencies take immediate steps to define objectives related to water quality and adopt feasible measures to achieve those objectives (see Recommended Action 4a).

The Bridge Document states that there is minimal risk for seawater intrusion from the Salton Sea if groundwater levels are maintained above a certain elevation determined by the Coachella Valley Groundwater Model. However, the modeled elevation was not quantitatively described in the Alternative. The 2016-2017 Engineer’s Report shows that the 2015 water balance calculation includes 1,220 acre-feet of inflow from the Salton Sea to the eastern portion of the Indio Subbasin; based on the references, from reports published in 2000 and 2011,<sup>172</sup> for this value of inflow into the Subbasin, the volume apparently originates in reports that were not submitted as a part of the Alternative and

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<sup>171</sup> Bridge Document, Executive Summary, p. ES-4, Section 4.3.4, p. 4-6

<sup>172</sup> 2016-2017 Engineer’s Report, Table III-3

were not evaluated by the Department. The Bridge Document states that two sets of nested wells located near the Salton Sea are monitored for groundwater levels and quality and that recent monitoring shows groundwater levels are 17 feet below to 19 feet above the elevation of the Salton Sea.<sup>173</sup> Because monitoring for saltwater intrusion is occurring and because the minimum threshold for preventing saltwater intrusion appears to be known based on the modeled elevation, which was not provided, the Agency should provide the quantified modeled groundwater elevation that minimizes the risk of saltwater intrusion, so as to facilitate the Department's ongoing evaluation of the Alternative (see Recommended Action 5).

The Bridge Document<sup>174</sup> discusses the history, purpose, and optimal flow of the subsurface drain, which is to convey brackish water away from the agricultural areas that overlie a perched fine-grained deposit associated with an ancient lakebed. As previously mentioned, the optimal flow in the drain is about 100,000 acre-feet per year, but average drain flows since 2009 have averaged 54,000 acre-feet per year. The 2010 WMP states that projected flows in the drain will increase as the East Valley recovers from groundwater declines as a result of management activities. Although it is clear to the Department staff that the optimal flow of about 100,000 acre-feet per year is not occurring on an annual basis, it is not clear whether there are significant and unreasonable undesirable results present, and it is unclear whether there is a minimum threshold associated with the amount of flow in the subsurface drain in order to prevent significant and unreasonable impacts to water quality and agricultural production. Department staff have identified measures to clarify these issues regarding the subsurface drain (see Recommended Action 6).

Although the Bridge Document discussed the subsurface drain in the *Depletions of Interconnected Surface Water* section of the document, Department staff do not consider the subsurface drain and the conveyance of brackish water as a surface water system. The Bridge Document states that "there is no direct interconnection between surface water and groundwater" in the West Valley. However, in regard to groundwater dependent ecosystems, the Bridge Document states that the groundwater balance and groundwater model included the consumption of shallow groundwater by phreatophytic vegetation. Department staff also recommend that the Agencies, in addition to accounting for the consumption of phreatophytic vegetation, include an identification of groundwater-dependent ecosystems (see Recommended Action 7).

The Alternative for the Indio Subbasin aims to eliminate overdraft, and is consistent with Water Code Section 106.3, which establishes the State policy that "every human being has the right to safe, clean, affordable, and accessible water adequate for human

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<sup>173</sup> Bridge Document, Section 3.4.4, p. 3-21

<sup>174</sup> Bridge Document, Section 4.3.6, p. 4-7

consumption, cooking, and sanitary purposes.” Department staff consider that the Alternative, which is expected to stop the long-term decline of groundwater levels, to also be consistent with the public trust doctrine.

## B. Recommended Actions

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

### Recommended Action 1.

Staff recommend that the Agencies incorporate the information and management activities in the Garnet Hill area from the Garnet Hill WMP into the Alternative for the Indio Subbasin.

### Recommended Action 2.

Staff recommend that the Agencies describe whether the 2005 groundwater levels can be used as a threshold for land subsidence in the East Valley and the Indio Subbasin generally. Department staff also recommend the Agencies determine whether those groundwater levels could also be used as a threshold for other sustainability indicators, such as declining groundwater levels and groundwater storage. If it is determined that the 2005 groundwater levels are not appropriate thresholds or a proxy for thresholds, then the Agencies should provide other quantitative thresholds for groundwater levels, groundwater in storage, and subsidence.

### Recommended Action 3.

Staff recommend that the Agencies provide maps showing the areas affected by the primary water quality constituents of concern, which include, at a minimum, fluoride, arsenic, hexavalent chromium, and DBCP. The particular wells that are known to be affected by these constituents should be shown on a map.

### Recommended Action 4.

Staff recommend that the Agencies incorporate an approved Salt and Nutrient Management Plan into future iterations of the Alternative.

### Recommended Action 4a.

Staff recommend that the Agencies continue efforts to study the rate and level of increased salt contents in groundwater due to the importation of Colorado River water,

identify limits for the Subbasin, and begin to develop and implement plans and management action that will achieve and maintain the Subbasin within those limits.

#### Recommended Action 5.

Staff recommend that the Agencies provide the modeled groundwater elevation that minimizes the risk of saltwater intrusion and discuss how the recent groundwater levels near the Salton Sea referenced in the Alternative compare to the modeled elevation. The Alternative should discuss why the water balance includes inflow from the Salton Sea to the Indio Subbasin and should correlate that inflow with recent groundwater levels and the groundwater model.

#### Recommended Action 6.

Staff recommend that the Agencies clarify whether there is a minimum threshold associated with the amount of flow in the subsurface drain, below which significant and unreasonable undesirable results would occur, and what that quantified minimum threshold is, if applicable, and the implementation horizon for when the goal for the amount of subsurface flow will be achieved, so as to avoid undesirable results.

#### Recommended Action 7.

Staff recommend that the Agencies provide an identification of groundwater-dependent ecosystems in the Subbasin.