17 January 2019

MEMORANDUM

To: Patrick Breen, Marina Coast Water District Groundwater Sustainability Agency
Keith Van Der Maaten, Marina Coast Water District Groundwater Sustainability Agency

From: Vera Nelson, P.E., EKI Environment & Water, Inc.
Tim Ingrum, EKI Environment & Water, Inc.
Tina Wang, P.E., EKI Environment & Water, Inc.

Subject: Draft Hydrostratigraphic Summary for the Marina Coast Water District Study Area (B60094.03)

A draft hydrostratigraphic summary is provided herein for the Marina Coast Water District (MCWD) Study Area, which consists of the Marina Subarea and the Ord Subarea of the Monterey Subbasin. This summary intends to serve as the basis for developing the hydrogeologic conceptual model (HCM) for the MCWD Study Area as part of the Monterey Subbasin Groundwater Sustainability Plan (GSP) (Figure 1).

We understand that MCWD GSA is coordinating with Salinas Valley Basin Groundwater Sustainability Agency (SVBGSA) to develop a single GSP for the Monterey Subbasin, which includes developing a HCM for the entire basin pursuant to California Code of Regulations (CCR) Title 23 Section 354.14. In addition, SVBGSA is preparing the GSP for areas adjacent to the MCWD Study Area in the 180/400 Foot Aquifer Subbasin. Therefore, upon review and approval by MCWD GSA, we recommend that this information to be shared with SVBGSA to coordinate HCM development both within the Monterey Subbasin and with the adjacent basin.

According to the GSP Regulations, the HCM will define significant water-bearing zones as principal aquifers. This designation has important implications because groundwater elevations, groundwater quality, and seawater intrusion must be discussed, monitored, and reported for each principal aquifer within the GSP. Therefore, we recommend careful consideration be given to the identification of principal aquifers within the HCM, as the identification of many principal aquifer zones could drive additional monitoring requirements. The proposed HCM would limit the number of principal aquifers to the following: (1) Principal Shallow Aquifer, (2) Principal Intermediate Aquifer System (3) Principal Deep Aquifer System. Further description of these zones is provided below. Under this structure, zones within each principal aquifer could be evaluated and discussed within the GSP, but monitoring could be limited to the principal aquifer zones if desired.

MCWD STUDY AREA BOUNDARIES

The MCWD Study Area is shown on Figure 1. The western boundary of the MCWD Study Area is defined by extent of Quaternary sand dunes on the shore of Monterey Bay (DWR, 2004). The eastern and northern boundaries of the MCWD Study Area are defined by MCWD jurisdictional boundaries. A portion of the northwestern boundary is coincident with the Monterey Subbasin boundary, which is defined by a groundwater flow divide and the Reliz Fault passing through the MCWD area (DWR, 2016). Similarly, the southwestern boundary is coincident with the Monterey Subbasin boundary, defined by a groundwater flow divide that outlines the Adjudicated Seaside Subbasin (MPWMD, 2016).

HYDROSTRATIGRAPHIC SUMMARY

1. Principal Shallow Aquifer
    a. Fine to medium, well sorted dune sands (Ahtna Engineering, 2013).
    b. Locally named “Dune Sand Aquifer” (Harding ESE, 2001; HWG, 2017) and “A-Aquifer” beneath Fort Ord (Harding Lawson Associates, 1994; Jordan et al., 2005; Harding ESE, 2001).
    c. Recharged primarily by rainfall and surface water infiltration (Harding Lawson Associates, 1994).
    d. Measured horizontal hydraulic conductivity in the Fort Ord area ranges from 0.14 to 120 ft/d, and vertical conductivity ranges from 0.6 to 4.0 ft/d (Harding Lawson Associates, 1994; Harding Lawson Associates, 1999; MACTEC, 2006; HydroGeoLogic, Inc., 2006; Jordan et al., 2005).
    e. In the USGS Salinas Valley Integrated Hydrologic Model (SVIHM), the Shallow Aquifer is represented by model layer 1 (Hanson et al., 2017).
2. Principal Intermediate Aquifer System
    a. Salinas Valley Aquitard
        i. The Salinas Valley Aquitard (SVA) includes the Fort Ord Salinas Valley Aquitard (FO-SVA). The SVA and FO-SVA have distinct characteristics and may have been formed in different depositional environments, but hydraulically they behave similarly in confining the underlying 180-Ft Aquifer (Harding ESE, 2001). The SVA exists under Marina, the northern part of the Fort Ord area, and extends northeast to Salinas (Harding ESE, 2001). The FO-SVA occurs beneath most of Fort Ord (Kennedy/Jenks, 2004; Ahtna Engineering, 2013; MACTEC, 2006).
        ii. The SVA thins to the south (Harding ESE, 2001), and the FO-SVA thins toward the coast and appears to pinch out near Highway 1 (Harding ESE, 2001). The reduction in aquitard thickness increases the vertical hydraulic connection between the Shallow Aquifer and underlying 180-Ft Aquifer.

iii. Airborne electromagnetics (AEM) data AEM collected in the North Salinas Valley (Gottschalk I, Knight R, 2018) showed that fresh groundwater exists in the vicinity of the Salinas River in the 180-Ft Aquifer and 400-Ft aquifer zones. These data indicate that that the Salinas River may recharge these aquifers and that there may be gaps in the SVA/ FO-SVA near the river.
iv. Measured vertical hydraulic conductivity in the Fort Ord area ranges from 5.7×10^{-5} to 2.8×10^{-3} ft/d; no horizontal hydraulic conductivity data are reported (MACTEC, 2006).
v. In the SVIHM, the SVA is represented by model layer 2 (Hanson et al., 2017).

b. 180-Ft Aquifer
   i. The aquifer is comprised of valley fill material including older alluvium and alluvial fan deposits (Greene, 1970). The sediments “extend to submarine outcrops on the floor and canyon walls of Monterey Bay” (Harding ESE, 2001; cf. Greene, 1970; Greene,1977; DWR, 1946).
   ii. South of Marina, in a portion of Fort Ord the 180-Ft Aquifer is separated into “upper” zone of sandy deposits with some gravel and “lower” zone of gravel with sand and clay lenses; the two zones are separated by thin clay (Ahtna Engineering, 2013).
   iii. Receives recharge from Salinas Valley, Monterey Bay, overlying Shallow Aquifer, and the Aromas Sand and Paso Robles formations southeast of the study area (Harding Lawson Associates, 1994).
   iv. Measured horizontal hydraulic conductivity in the Fort Ord area ranges from 0.04 to 390 ft/d; no vertical hydraulic conductivity data are reported (Harding Lawson Associates, 1994; Harding Lawson Associates, 1999; MACTEC, 2006; HydroGeoLogic, Inc., 2006; Jordan et al., 2005).
   v. In the SVIHM, the 180-Ft Aquifer is represented by model layer 3 (Hanson et al., 2017).

c. Middle Aquitard
   i. Confines the 400-Ft Aquifer (Harding ESE, 2001; Kennedy/Jenks, 2004).
   ii. At the boundary between Fort Ord and Marina, an aquitard separating the 180-Ft and 400-Ft Aquifers was not observed, though it was reported elsewhere beneath Fort Ord indicating the aquitard probably “varies laterally throughout the Fort Ord area” (MACTEC, 2006). Kennedy/Jenks (2004) also identify Fort Ord as one of several locations where the aquitard is thin or discontinuous.
   iii. No measured hydraulic conductivity data are available.
   iv. In SVIHM, the Middle Aquitard is represented by model layer 4 (Hanson et al., 2017).

d. 400-Ft Aquifer
    i. The aquifer is comprised of a fine to medium grained sand (Ahtna Engineering, 2013).
    ii. The bottom of the 400-Ft Aquifer has been defined as the bottom of the Aromas Sand (Hanson et al., 2002). Under Fort Ord, the aquifer appears to be composed of portions of the Aromas Sand and Paso Robles formations (Harding Lawson Associates, 1994), but it is difficult to delineate where the two formations occur (Harding ESE, 2001). In the southeast portion of the study area, wind-blown sand deposits equivalent to the Aromas Sand are present in the Fort Ord hills (Geosyntec, 2007).
    iii. Receives recharge from Salinas Valley, Monterey Bay, Paso Robles Formation, and leakage down from the 180-Ft Aquifer (Harding Lawson Associates, 1994). Surface recharge rate for the Aromas-Paso Robles Formation in the southeastern portion of the study area has been estimated as 2–3 inches per year (Geosyntec, 2007).
    iv. Measured horizontal hydraulic conductivity in the Fort Ord area ranges from 7.4 to 230 ft/d; no vertical hydraulic conductivity data is reported (Harding Lawson Associates, 1994; Harding Lawson Associates, 1999; MACTEC, 2006; HydroGeoLogic, Inc., 2006; Jordan et al., 2005).
    v. In the SVIHM, the 400-Ft Aquifer is represented by model layer 5 (Hanson et al., 2017).

3. <u>Principal Deep Aquifer System</u>
    a. Deep Aquitard
        i. Confines the underlying Deep Aquifer (Kennedy/Jenks, 2004).
        ii. No measured hydraulic conductivity data are reported.
        iii. In the SVIHM, the Deep Aquitard is represented by model layer 6 (Hanson et al., 2017).
    b. Deep Aquifer
        i. Locally named “900-Ft Aquifer” (WRIME, 2003; Kennedy/Jenks, 2004).
        ii. Composed of Paso Robles Formation and Purisima Formation deposits (Hanson et al., 2002), and can represent multiple aquifers and aquitards (Kennedy/Jenks, 2004).
        iii. The primary recharge source is leakage from overlying aquifers (Feeney and Rosenberg, 2003).
        iv. Sand and gravel of the Paso Robles Formation apparently extends to the Fort Ord hills in the southeastern portion of the study area, at least as far as HWY-68 (Geosyntec, 2007).
        v. Measured horizontal hydraulic conductivity ranges from 2.5 to 36 ft/d (horizontal) in the Fort Ord area and 2.0 to 25 ft/d in the Marina area; no

vertical hydraulic conductivity data are reported (Harding Lawson Associates, 1994; Harding Lawson Associates, 1999; MACTEC, 2006; HydroGeoLogic, Inc., 2006; Hanson et al., 2002; Feeney and Rosenberg, 2003).

vi. In the SVIHM, the 900-Ft Aquifer is represented by model layers 7 and 8 (Hanson et al., 2017).

HYDROSTRATIGRAPHIC CORRELATION TABLE

<table>
<tr><th>180/400-Foot Aquifer Subbasin
(North of Study Area)</th><th colspan="2">Monterey Subbasin
(Includes MCWD Study Area)</th><th>Seaside Subbasin
(South of Study Area)</th></tr>
<tr><td>“Shallow Aquifer”
“Dune Sand Aquifer”
“35-Ft Aquifer”
“-2-Ft Aquifer”</td><td>Principal Shallow Aquifer</td><td>“Shallow Aquifer”
“A-Aquifer”</td><td>“Surficial deposits”</td></tr>
<tr><td>“Salinas Valley Aquitard” (SVA)</td><td rowspan="4">Principal Intermediate Aquifer System</td><td>“Salinas Valley Aquitard” (SVA)
“Fort Ord Salinas Valley Aquitard” (FO-SVA)</td><td>“Salinas Valley Clay”
“Surficial deposits”</td></tr>
<tr><td>“180-Ft Aquifer”
“Pressure 180-Ft Aquifer”</td><td>“180-Ft Aquifer”</td><td rowspan="2">“Surficial deposits”</td></tr>
<tr><td>”180/400-Ft Aquitard”</td><td>“Middle Aquitard”</td></tr>
<tr><td>“400-Ft Aquifer”
“Pressure 400-Ft Aquifer”</td><td>“400-Ft Aquifer”</td><td rowspan="2">“Paso Robles Aquifer”</td></tr>
<tr><td>”400/900-Ft Aquitard”</td><td rowspan="2">Principal Deep Aquifer System</td><td>“Deep Aquitard”</td></tr>
<tr><td>“900-Ft Aquifer”
“Pressure 900-Ft Aquifer”
“Deep Aquifer”</td><td>“Deep Aquifer”</td><td>“Paso Robles Aquifer”
“Santa Margarita/Purisima Aquifer”
“Deep Aquifer”</td></tr>
</table>

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7 February 2019

General Manager Gary Petersen
Salinas Valley Basin Groundwater Sustainability Agency
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Submitted online via email: peterseng@svbgsa.org

Re: 180-400 Foot Aquifer Subbasin Draft GSP Chapter 4

Dear Mr. Gary Petersen,

The Nature Conservancy (TNC) appreciates the opportunity to comment on the 180-400 Foot Aquifer Subbasin Chapter 4 in the Draft Groundwater Sustainability Plan (GSP) being prepared under the Sustainable Groundwater Management Act (SGMA).

TNC as a Stakeholder Representative for the Environment

TNC is a global, nonprofit organization dedicated to conserving the lands and waters on which all life depends. We seek to achieve our mission through science-based planning and implementation of conservation strategies. For decades, we have dedicated resources to establishing diverse partnerships and developing foundational science products for achieving positive outcomes for people and nature in the Salinas Valley. TNC was part of a stakeholder group formed by the Water Foundation in early 2014 to develop recommendations for groundwater reform and actively worked to shape and pass SGMA.

Our reason for engaging is simple: California's freshwater biodiversity is highly imperiled. We have lost more than 90 percent of our native wetland and river habitats, leading to precipitous declines in native plants and the populations of animals that call these places home. These natural resources are intricately connected to California's economy providing direct benefits through industries such as fisheries, timber and hunting, as well as indirect benefits such as clean water supplies. Given the inextricable connection between the Salinas River and the Salinas Valley's groundwater supply, SGMA must be successful for a sustainable future for the Salinas Valley in which people and nature thrive.

SGMA is now law and the success of SGMA depends on bringing the best available science to the table, engaging all stakeholders in robust dialog, providing strong incentives for beneficial outcomes and rigorous enforcement by the State of California.

Given our mission, we are particularly concerned about the inclusion of nature, as required, in GSPs. The Nature Conservancy has developed a suite of tools based on best available science to help GSAs, consultants, and stakeholders efficiently incorporate nature into GSPs. These tools and resources are available online at GroundwaterResourceHub.org. The Nature

Conservancy’s tools and resources are intended to reduce costs, shorten timelines, and increase benefits for both people and nature.

Addressing Nature’s Water Needs in GSPs

SGMA requires that all beneficial uses and users, including environmental users of groundwater, be considered in the development and implementation of GSPs (Water Code § 10723.2).

The GSP Regulations include specific requirements to identify and consider groundwater dependent ecosystems (23 CCR §354.16(g)) when determining whether groundwater conditions are having potential effects on beneficial uses and users. GSAs must also assess whether sustainable management criteria may cause adverse impacts to beneficial uses. In addition, monitoring networks should be designed to detect potential adverse impacts to beneficial uses due to groundwater. Adaptive management is embedded within SGMA and provides a process to work toward sustainability over time by beginning with the best available information to make initial decisions, monitoring the results of those decision, and using data collected through monitoring to revise decisions in the future. Over time, GSPs should improve as data gaps are reduced and uncertainties addressed.

To help ensure that GSPs adequately address nature as required under SGMA, The Nature Conservancy has prepared a checklist (Attachment A). The Nature Conservancy believes the following elements are foundational for 2020 GSP submittals.

1. Environmental Representation
SGMA requires that groundwater sustainability agencies (GSAs) consider the interests of all beneficial uses and users of groundwater. To meet this requirement, we recommend actively engaging environmental stakeholders by including environmental representation on the GSA board, technical advisory group, and/or working groups. This could include local staff from state and federal resource agencies, nonprofit organizations and other environmental interests. By engaging these stakeholders, GSAs will benefit from access to additional data and resources, as well as a more robust and inclusive GSP.

2. Basin GDE and ISW Maps
SGMA requires that groundwater dependent ecosystems (GDEs) and interconnected surface waters (ISWs) be identified in the GSP. We recommend using the Natural Communities Commonly Associated with Groundwater Dataset (NC Dataset) provided online (https://gis.water.ca.gov/app/NCDatasetViewer/) by the Department of Water Resources (DWR) as a starting point for the GDE map. The NC Dataset was developed through a collaboration between DWR, the Department of Fish and Wildlife and TNC.

3. Potential Effects on Environmental Beneficial Users
SGMA requires that potential effects on GDEs and environmental surface water users be described when defining undesirable results. Because effects to plants and animals are difficult and sometimes impossible to reverse, we recommend erring on the side of caution to preserve sufficient groundwater conditions to sustain GDEs and ISWs.

4. Biological and Hydrological Monitoring
If sufficient hydrological and biological data in and around GDEs is not available in time for the 2020/2022 plan, data gaps should be identified along with actions to reconcile the gaps in the monitoring network.

Our comments related to the 180-400 Foot Aquifer Subbasin GSP Draft Chapter 4 are provided in detail in Attachment B and are in reference to the numbered checklist items in Attachment A.

Thank you for fully considering our comments as you develop your GSP.

Best Regards,

Sandi Matsumoto
Associate Director, California Water Program
The Nature Conservancy

Attachment A: Considering Nature under SGMA: A Checklist

The Nature Conservancy is neither dispensing legal advice nor warranting any outcome that could result from the use of this checklist. Following this checklist does not guarantee approval of a GSP or compliance with SGMA, both of which will be determined by DWR and the State Water Resources Control Board. The checklist is available online: https://groundwaterresourcehub.org/public/uploads/pdfs/TNC_GDE_Checklist_for_SGMA_Sept2018.pdf

GSP Plan Element*		GDE Inclusion in GSPs: Identification and Consideration Elements		Item Number
Admin Info	**2.1.5 Notice & Communication** *23 CCR §354.10*	**Description of the types of environmental beneficial uses of groundwater that exist within GDEs and a description of how environmental stakeholders were engaged throughout the development of the GSP.**		1.
Basin Setting	**2.2.2 Current & Historical Groundwater Conditions** *23 CCR §354.16*	**Interconnected surface waters:**		2.
		Interconnected surface water maps for the basin with gaining and losing reaches defined (included as a figure in GSP & submitted as a shapefile on SGMA portal).		3.
		Estimates of current and historical surface water depletions for interconnected surface waters quantified and described by reach, season, and water year type.		4.
		Basin GDE map included (as figure in text & submitted as a shapefile on SGMA Portal).		5.
		If NC Dataset *was* used:	Basin GDE map denotes which polygons were kept, removed, and added from NC Dataset (Worksheet 1, can be attached in GSP section 6.0).	6.
			The basin's GDE shapefile, which is submitted via the SGMA Portal, includes two new fields in its attribute table denoting: 1) which polygons were kept/removed/added, and 2) the change reason (e.g., why polygons were removed).	7.
			GDEs polygons are consolidated into larger units and named for easier identification throughout GSP.	8.
		If NC Dataset *was not* used:	Description of why NC dataset was not used, and how an alternative dataset and/or mapping approach used is best available information.	9.
		Description of GDEs included:		10.
		Historical and current groundwater conditions described in each GDE unit.		11.
		Ecological condition described in each GDE unit.		12.
		Each GDE unit has been characterized as having high, moderate, or low ecological value.		13.
		Inventory of species, habitats, and protected lands for each GDE unit with ecological importance (Worksheet 2, can be attached in GSP section 6.0).		14.

	2.2.3 Water Budget *23 CCR §354.18*	Groundwater inputs and outputs (e.g., evapotranspiration) of native vegetation and managed wetlands are included in the basin's historical and current water budget.		15.
		Potential impacts to groundwater conditions due to land use changes, climate change, and population growth to GDEs and aquatic ecosystems are considered in the projected water budget.		16.
Sustainable Management Criteria	**3.1 Sustainability Goal** *23 CCR §354.24*	**Environmental stakeholders/representatives were consulted.**		17.
		Sustainability goal mentions GDEs or species and habitats that are of particular concern or interest.		18.
		Sustainability goal mentions whether the intention is to address pre-SGMA impacts, maintain or improve conditions within GDEs or species and habitats that are of particular concern or interest.		19.
	3.2 Measurable Objectives *23 CCR §354.30*	**Description of how GDEs were considered and whether the measurable objectives and interim milestones will help achieve the sustainability goal as it pertains to the environment.**		20.
	3.3 Minimum Thresholds *23 CCR §354.28*	**Description of how GDEs and environmental uses of surface water were considered when setting minimum thresholds for relevant sustainability indicators:**		21.
		Will adverse impacts to GDEs and/or aquatic ecosystems dependent on interconnected surface waters (beneficial user of surface water) be avoided with the selected minimum thresholds?		22.
		Are there any differences between the selected minimum threshold and state, federal, or local standards relevant to the species or habitats residing in GDEs or aquatic ecosystems dependent on interconnected surface waters?		23.
	3.4 Undesirable Results *23 CCR §354.26*	**For GDEs, hydrological data are compiled and synthesized for each GDE unit:**		24.
		If hydrological data *are available* within/nearby the GDE	Hydrological datasets are plotted and provided for each GDE unit (Worksheet 3, can be attached in GSP Section 6.0).	25.
			Baseline period in the hydrologic data is defined.	26.
			GDE unit is classified as having high, moderate, or low susceptibility to changes in groundwater.	27.
			Cause-and-effect relationships between groundwater changes and GDEs are explored.	28.
		If hydrological data *are not available* within/nearby the GDE	Data gaps/insufficiencies are described.	29.
			Plans to reconcile data gaps in the monitoring network are stated.	30.
		For GDEs, biological data are compiled and synthesized for each GDE unit:		31.
		Biological datasets are plotted and provided for each GDE unit.		32.
		Data gaps/insufficiencies are described.		33.
		Plans to reconcile data gaps in the monitoring network are stated.		34.
		Description of potential effects on GDEs, land uses and property interests:		35.

		Cause-and-effect relationships between GDE and groundwater conditions are described.	36.
		Impacts to GDEs that are considered to be "significant and unreasonable" are described.	37.
		Known hydrological thresholds or triggers (e.g., instream flow criteria, groundwater depths, water quality parameters) for relevant species or ecological communities are reported.	38.
		Land uses include and consider recreational uses (e.g., fishing/hunting, hiking, boating).	39.
		Property interests include and consider privately and publicly protected conservation lands and opens spaces, including wildlife refuges, parks, and natural preserves.	40.
Sustainable Management Criteria	**3.5 Monitoring Network** *23 CCR §354.34*	Description of whether hydrological data are spatially and temporally sufficient to monitor groundwater conditions for each GDE unit.	41.
		Description of how hydrological data gaps and insufficiencies will be reconciled in the monitoring network.	42.
		Description of how impacts to GDEs and environmental surface water users, as detected by biological responses, will be monitored and which monitoring methods will be used in conjunction with hydrologic data to evaluate cause-and-effect relationships with groundwater conditions.	43.
Projects & Mgmt Actions	**4.0. Projects & Mgmt Actions to Achieve Sustainability Goal** *23 CCR §354.44*	Description of how GDEs will benefit from relevant project or management actions.	44.
		Description of how projects and management actions will be evaluated to assess whether adverse impacts to the GDE will be mitigated or prevented.	45.

* In reference to DWR's GSP annotated outline guidance document, available at: https://water.ca.gov/LegacyFiles/groundwater/sgm/pdfs/GD_GSP_Outline_Final_2016-12-23.pdf

Attachment B

TNC Evaluation of the 180-400 Foot Aquifer Subbasin GSP Draft Chapter 4

Items 5-8 on Environmental User Checklist (Attachment A) were most relevant to Chapter 4: Hydrologic Conceptual Model.

We support the use of the Natural Communities Commonly Associated with Groundwater Dataset (NC Dataset) to map groundwater dependent ecosystems in the Salinas Valley Groundwater Basin (GSP Draft Figure 4-11). Since the NC Dataset is intended as a starting point, The Nature Conservancy has developed a Guidance Document to assist GSAs and their consultants address GDEs in GSPs. To adequately address GDEs, we offer the following suggestions:

- The identification of GDEs within GSPs is a required GSP element of the Basin Setting Section under the description of Current & Historical Groundwater Conditions (23 CCR §354.16). Recognizing natural points of discharge (seeps & springs) as GDEs is consistent with the SGMA definition of GDEs[1], however, we recommend **the identification of GDEs (GDE map Figure 4-11) for the 180-400 Foot Aquifer be moved to Chapter 5: Groundwater Conditions and elaborated upon with a description of current and historical groundwater conditions in the GDE areas**. Chapter 5 is a more appropriate place for the identification of GDEs, since groundwater conditions (e.g., depth to groundwater, interconnected surface water maps, groundwater quality) are necessary local information and data from the GSP in assessing whether polygons in the NC dataset are connected to groundwater in a principal aquifer. Appendix 4A (Page 27, Chapter 4) was referenced as describing methods used to determine the extent and type of potential GDEs, but that document was not available on the SVBGSA website for us to review.
- Decisions to remove, keep, or add polygons from the NC dataset into a basin GDE map should be based on best available science in a manner that promotes transparency and accountability with stakeholders. Any polygons that are removed, added, or kept should be inventoried in the submitted shapefile to DWR, and mapped in the plan. **We recommend revising Figure 4-11 to reflect this change.**
- Best practices for identifying GDEs in GSPs are outlined in detail in Step 1 of The Nature Conservancy's Guidance Document: "Groundwater Dependent Ecosystems under the Sustainable Groundwater Management Act: Guidance for Preparing Groundwater Sustainability Plans". Here are some highlights:
    - The NC dataset is a starting point for GSAs, and needs to be groundtruthed with aerial photography to screen for changes in land use that many not be reflected in the NC dataset (e.g., recent development, cultivated agricultural land, obvious human-made features).
    - Grouping multiple GDE polygons into larger units by location (proximity to each other) and principal aquifer will simplify the process of evaluating potential effects on GDE due to groundwater conditions under GSP Chapter 7: Sustainable Management Criteria.
    - Groundwater conditions within GDEs should be briefly described within the portion of the Basin Setting Section where GDEs are being identified.

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[1] *Groundwater dependent ecosystem refer to ecological communities or species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface. [23 CCR §351 (m)]*

- When using groundwater levels to confirm that a connection to groundwater in a principal aquifer exists, please refer to Attachment C for best practices in doing so.
- Not all GDEs are created equal. Some GDEs may contain legally protected species or ecologically rich communities, whereas other GDEs may be highly degraded with little conservation value. Including a description of the types of species (protected status, native versus non-native), habitat, and environmental beneficial uses (see Worksheet 2, p.74 of GDE Guidance Document) can be helpful in assigning an ecological value to the GDEs. Identifying an ecological value of each GDE can help prioritize limited resources when considering GDEs as well as prioritizing legally protected species or habitat that may need special consideration when setting sustainable management criteria.

Other Comments

The basin boundary bottom for the aquifer was determined using the 1970 USGS TDS=3,000ppm contour lines ("usable water" boundary), but groundwater extraction well depth data should also be included in the determination of the basin bottom to prevent extractors with wells deeper than the basin boundary from claiming exemption of SGMA due to their well residing outside the vertical extent of the basin boundary. As noted on page 9 in DWR's Hydrogeologic Conceptual Model BMP[2] "the definable bottom of the basin should be at least as deep as the deepest groundwater extractions".

[2] *Available at: https://water.ca.gov/LegacyFiles/groundwater/sgm/pdfs/BMP_HCM_Final_2016-12-23.pdf, accessed Feb 6, 2019.*

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Attachment C

IDENTIFYING GDEs UNDER SGMA
Best Practices for using the NC Dataset

The Sustainable Groundwater Management Act (SGMA) requires that groundwater dependent ecosystems (GDEs) be identified in Groundwater Sustainability Plans (GSPs). The California Department of Water Resources has provided the Natural Communities Commonly Associated with Groundwater Dataset (NC Dataset) online (https://gis.water.ca.gov/app/NCDatasetViewer/) to help Groundwater Sustainability Agencies (GSAs) identify GDEs within a groundwater basin. The NC Dataset is a compilation of 48 publicly available State and Federal agency datasets that map vegetation, wetlands, springs, and seeps commonly associated with groundwater in California[3]. The NC Dataset is intended to be a starting point, and it is the responsibility of the GSAs to utilize best available science and local knowledge on the hydrology, geology, and groundwater levels in an area to verify whether or not a connection to groundwater exists (Figure 1). Guidance on identifying GDEs within a groundwater basin from the NC dataset is available[4]. As detailed in the guidance, one of the key factors to consider when mapping GDEs is the depth to groundwater below the ecosystem. However, detailed groundwater data may not always be available for areas in and around the NC Dataset polygons to confirm whether a connection to groundwater exists.

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[3] For more details on the mapping methods, refer to: Klausmeyer, K., J. Howard, T. Keeler-Wolf, K. Davis-Fadtke, R. Hull, A. Lyons. 2018. Mapping Indicators of Groundwater Dependent Ecosystems in California: Methods Report. San Francisco, California. Available at: https://groundwaterresourcehub.org/public/uploads/pdfs/iGDE_data_paper_20180423.pdf

[4] "Groundwater Dependent Ecosystems under the Sustainable Groundwater Management Act: Guidance for Preparing Groundwater Sustainability Plans" is available at https://groundwaterresourcehub.org/gde-tools/gsp-guidance-document/

This document highlights three best practices that Groundwater Sustainability Agencies (GSAs) and their consultants can apply when using groundwater data to locally confirm a connection to groundwater for the NC Dataset. If sufficient data are not available in time for the 2020/2022 plan, **The Nature Conservancy strongly advises that questionable polygons from the NC dataset be included in the GSP until data gaps are reconciled in the monitoring network.** Erring on the side of caution will help minimize inadvertent impacts to GDEs as a result of groundwater use and management actions during SGMA implementation.

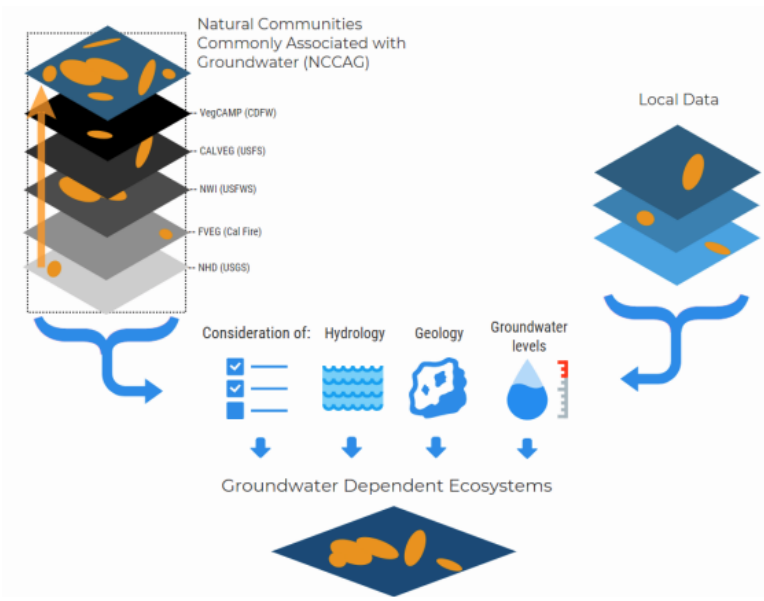


Figure 1. Considerations for the identification of groundwater dependent ecosystems. Source: DWR, 2018[5].

KEY DEFINITIONS

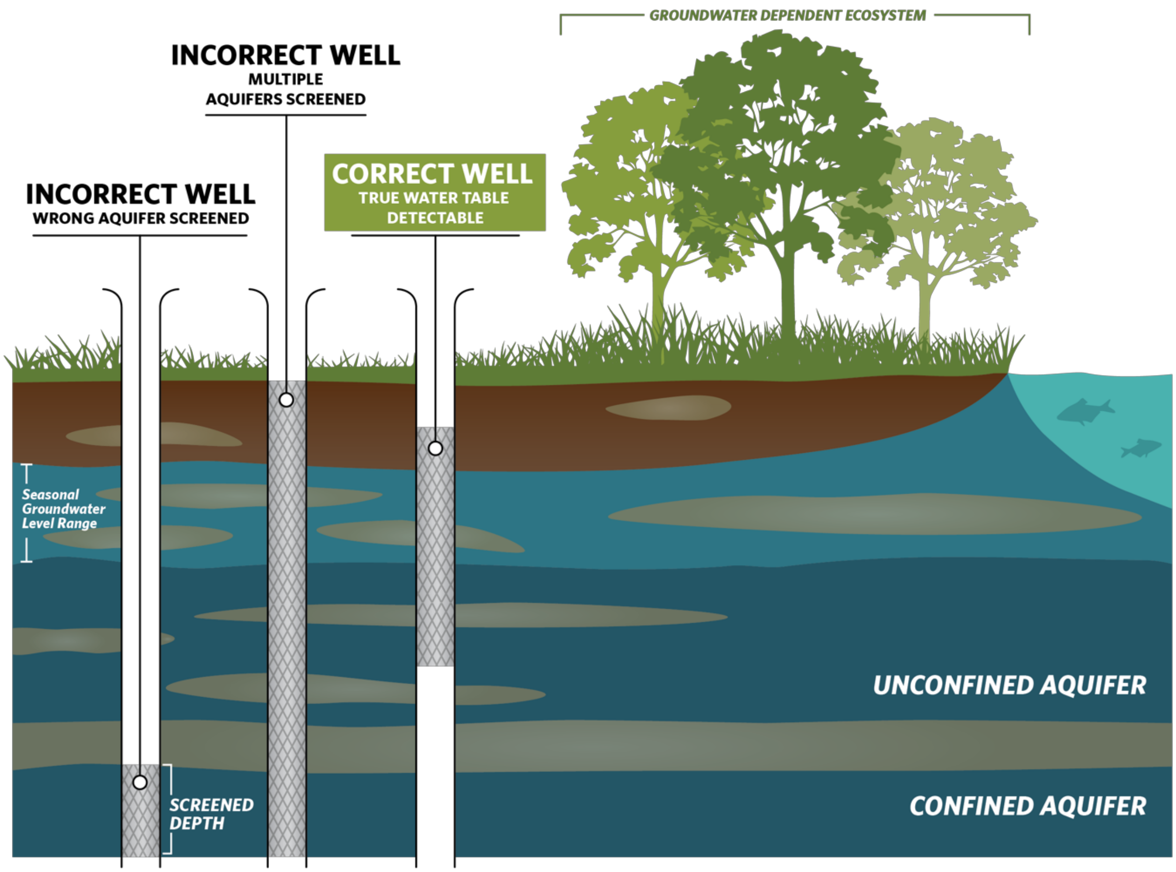
Groundwater Dependent Ecosystem ecological communities or species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface. [23 CCR §351(m)]

Principal aquifers aquifers or aquifer systems that store, transmit, and yield significant or economic quantities of groundwater to wells, springs, or surface water systems [23 CCR §351(aa)]

[5] *"Summary of the "Natural Communities Commonly Associated with Groundwater" Dataset and Online Web Viewer. Available at: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Data-and-Tools/Files/Statewide-Reports/Natural-Communities-Dataset-Summary-Document.pdf*

The NC Dataset indicates the likely presence of a groundwater dependent ecosystems that should be verified locally for its presence or absence, as well as for its dependence on groundwater. To create a map of GDEs in the basin, a hydrologic connection between each GDE to a principal aquifer needs to be confirmed. The most practical approach[6] for a GSA to assess whether polygons in the NC dataset are connected to groundwater is to rely on groundwater elevation data. To do this, we recommend using data from representative wells, interpolating groundwater elevations, and characterizing groundwater conditions that represent the variable fluctuations of groundwater depths due to seasonal and interannual patterns. When assessing the depth of groundwater below a polygon from the NC dataset, follow these three best practices:

BEST PRACTICE #1. Select Representative Groundwater Wells



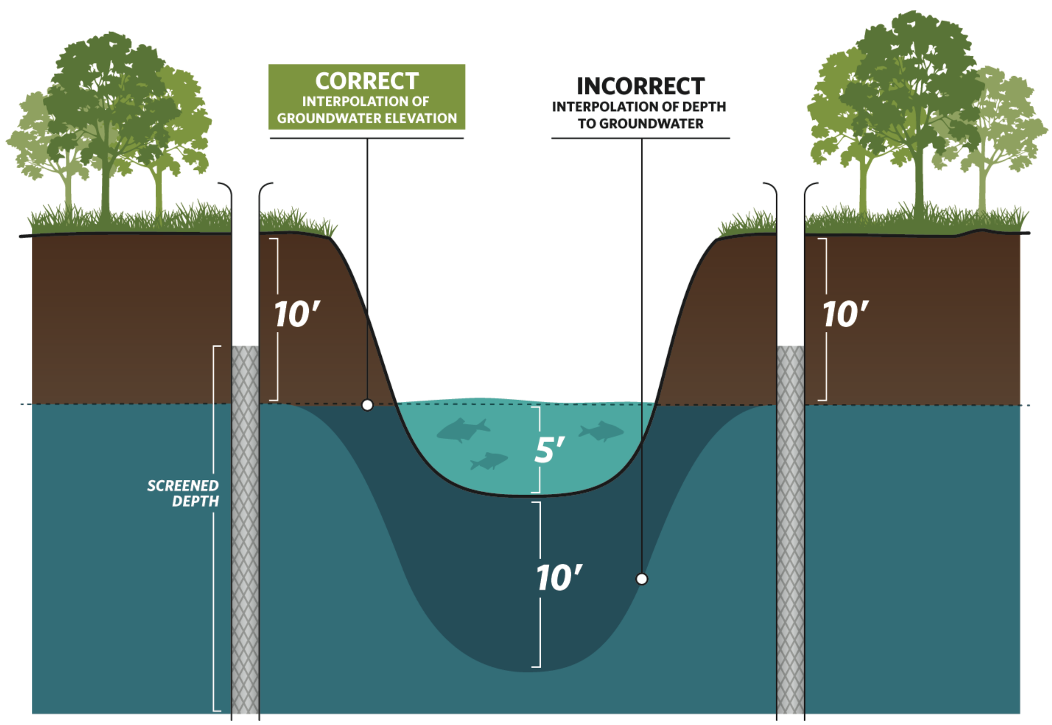
- Consider the subsurface heterogeneity (especially near river/streams where groundwater and surface water interactions occur around

[6] Groundwater reliance can also be confirmed via stable isotope analysis and geophysical surveys. For more information see The GDE Assessment Toolbox (Appendix IV, GDE Guidance Document for GSPs - link in footnote above).

heterogeneous stratigraphic units or aquitards formed by fluvial deposits)

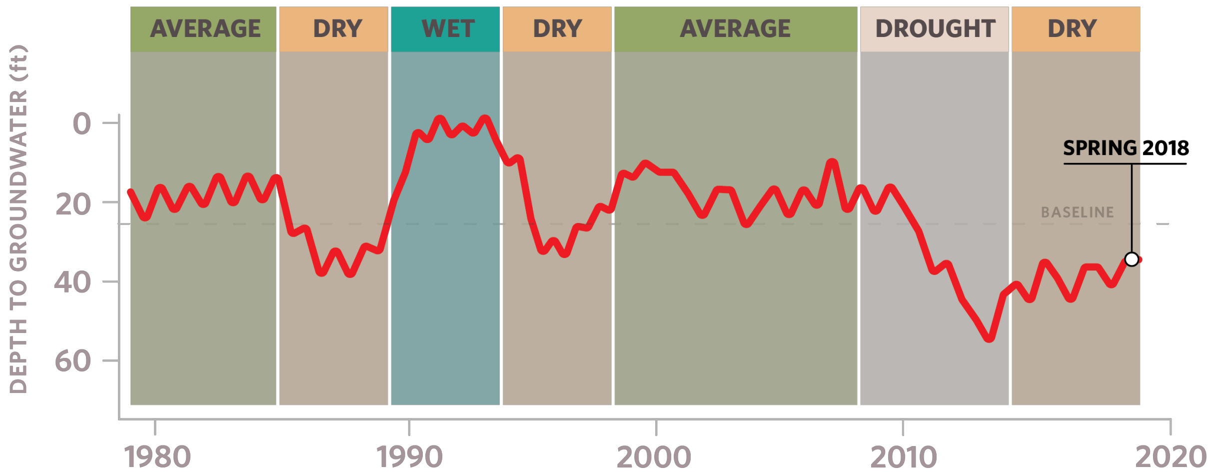
- Choose wells that are within 1 kilometer (0.6 miles) of the NC Dataset polygons, and more likely to reflect the local conditions relevant to the ecosystem.
- Choose wells that are screened within the surficial unconfined aquifer and capable of measuring the true water table.
- Avoid wells that have insufficient well information on the screened well depth interval.

BEST PRACTICE #2. Interpolate Groundwater Depth



- When interpolating groundwater levels in and around surface water features (e.g., streams, wetlands) take land surface elevations into consideration. The most accurate way to interpolate depth to groundwater in GDEs is first interpolate groundwater elevations and then to subtract land surface elevation to get a depth to groundwater measurement.
- Subsurface heterogeneity in and around GDE areas may not be adequately captured if the interpolated well density is too low.

BEST PRACTICE #3. Characterize Groundwater Conditions



SGMA requires GSAs to describe current and historical conditions when identifying GDEs [23 CCR §354.16(g)]. Relying solely on the SGMA benchmark date (January 1, 2015) to characterize groundwater conditions (e.g., depth to groundwater) is inadequate because managing groundwater conditions with data from one point in time fails to capture the seasonal and interannual variability (i.e., wet, average, dry, and drought years) that is characteristic of California's climate.

ABOUT US

The Nature Conservancy is a science-based nonprofit organization whose mission is *to conserve the lands and waters on which all life depends*. To support successful SGMA implementation that meets the future needs of people, the economy, and the environment, TNC has developed tools and resources (www.groundwaterresourcehub.org) intended to reduce costs, shorten timelines, and increase benefits for both people and nature.

eki environment & water

26 March 2019

MEMORANDUM

To: Gary Peterson, Salinas Valley Basin Groundwater Sustainability Agency
Derrik Williams, P.G., C.Hg., Montgomery & Associates

From: Keith Van Der Maaten, P.E., Marina Coast Water District
Patrick Breen, Marina Coast Water District
Vera Nelson, P.E., EKI Environment and Water, Inc.
Tina Wang, P.E., EKI Environment and Water, Inc.

Subject: Preliminary Comments Regarding Salinas Valley Basin Groundwater Sustainability Agency Draft Groundwater Sustainability Plan Chapter 4 (EKI B60094.03)

On behalf of the Marina Coast Water District Groundwater Sustainability Agency (MCWD GSA), EKI has reviewed and prepared preliminary comments on the Salinas Valley Basin Groundwater Sustainability Agency (SVBGSA) draft 180/400 Foot Aquifer Subbasin and Salinas Valley Integrated Groundwater Sustainability Plans (GSPs) Chapter 4, dated 30 November 2018 and updated 3 January 2019.

EKI has provided a majority of these comments during SVBGSA's December 6 Planning Committee Meeting and received concurrence from SVBGSA as identified below.

Comments for 180/400 Foot Aquifer Subbasin GSP, Chapter 4

1. <u>Section 4.4.1 – Principal Aquifers and Aquitards</u>

   The GSP Regulations specifically define the term "Principal Aquifer" (California Code of Regulations (CCR) §351 (aa)) and have plan development as well as monitoring network requirements for identified Principal Aquifers. Currently, GSP Section 4.4.1 appears to have included all alluvial deposits/valley fill deposits from ground surface to the bottom of the subbasin in a single Principal Aquifer.

   As agreed upon during the December 6 Planning Committee Meeting, the 180/400 Foot Aquifer Subbasin GSP should define multiple Principal Aquifers given the definable layers of aquifer and aquitard units in the subbasin. At least one Principal Aquifer should be defined for the Deep Aquifers (i.e. the 900-Foot and 1,500-Foot Aquifers). Per GSP Regulations, groundwater elevation contours, hydrographs, minimum thresholds for seawater intrusion, sufficient monitoring network coverage, etc. should be developed for each Principal Aquifer identified in this GSP.

2. Section 4.4.1 – Principal Aquifers and Aquitards

   In addition to the comment above, this section discusses extensive continuous clay layers within the 180/400 Foot Aquifer Subbasin. However, there are existing wells and abandoned wells that are potentially acting as "conduits" for saline water to flow to the lower aquifers[1]. Airborne electromagnetic analysis conducted in the northern Salinas Valley Basin also showed that there are gaps in the 180/400-Foot Aquitard in the 180/400-Foot Aquifer Subbasin near the coast.

   Please add a discussion of potential conduits of vertical flow in the Subbasin. This comment was not provided during the December 6 Planning Committee Meeting.

3. Section 4.4.2 – Aquifer Properties

   In addition to defining multiple Principal Aquifers, the 180/400 Foot Aquifer Subbasin GSP should provide aquifer properties for each of the defined Principal Aquifers. The GSP should provide storativity, conductivity (per CCR §354.14 (b)(4)(B)), and transmissivity for each Principal Aquifer. We understand that Section 4.7 of the January 2019 update discussed aquifer parameters as a data gap. As agreed upon during the Planning Committee meeting, SVBGSA will obtain these aquifer property parameters from the Water Resources Agency to include in this section.

   This section could benefit from either a table or description on an aquifer and aquitard basis compiling all the relevant data (e.g. from field tests or models) and tabulating ranges for each aquifer or aquitard.

4. Figures 4-6, 4-7, and 4-8 – Cross-Sections

   The Deep Aquifers are unrepresented in cross-sections. Please provide a discussion if this is a data gap.

   This comment has been noted by and concurred to by SVBGSA during the Planning Committee Meeting. Section 4.7 of the January 2019 update has included information on the deep aquifer as a data gap.

5. Section 4.6.2 – Seawater Intrusion

[1] Monterey County Water Resources Agency. Recommendations to Address the Expansion of Seawater Intrusion in the Salinas Valley Groundwater Basin, October 2017.

Please add the following text after the second paragraph on Page 33. This comment was not provided during the December 6 Planning Committee Meeting.

"Groundwater with a total dissolved solid of 3,000 mg/L or less, is groundwater that is considered to be suitable, or potentially suitable, for beneficial uses in accordance with SWRCB Resolution No. 88-63 as adopted in its entirety in the Central Coast Regional Water Quality Control Board's Basin Plan. California Code of Regulations, Title 23, Section 659 – 669 lists the beneficial uses of surface water, which is also applicable to groundwater. Those beneficial uses include (1) domestic use, (2) irrigation use, (3) power use, (4) frost protection use, (5) municipal use, (6) mining use, (7) industrial use, (8) fish and wildlife preservation and enhancement use, (9) aquaculture use, (10) fish and wildlife protection and enhancement, (11) recreational use, (12) water quality use, and (13) stock watering use. In addition, Water Code Section 1242 states that the storing of water underground constitutes a beneficial use."

Comments for Salinas Valley Integrated Subbasin GSP, Chapter 4

1. Section 4.4 – Groundwater Hydrology

   On Page 17, the GSP states

   "The presence of laterally continuous clay layers distinguishes the 180/400-Foot Aquifer Subbasin from the other subbasins in the Valley. As described in the following two subsections, the presence of continuous clay layers affects the following aspects of the basin hydrogeology:
   - *A near-surface clay layer creates relatively shallow confined conditions in the 180/400-Foot Aquifer Subbasin, in contrast to the unconfined conditions over most of the basin*
   - *Deeper clay layers create definable aquifers in the 180/400-Foot Aquifer Subbasin, whereas most of the basin includes only a single undifferentiated aquifer."*

   This section implies that the 180/400 Foot Aquifer Subbasin contains definable aquifer layers, whereas other subbasins in Salinas Valley do not have definable aquifer layers. However, definable aquifers also exist throughout the Monterey Subbasin and throughout most of the Forebay Aquifer Subbasin to just north of King City.

   Additionally, this section should provide a discussion of the sediments across the basin that are stratigraphically equivalent. For example, the shallow zone and deep zones in the Eastside Subbasin "are generally time-stratigraphically equivalent to the Pressure 180-Foot and Pressure 400-Foot Aquifers".[2]

[2] Brown and Caldwell, 2015. State of the Salinas River Groundwater Basin, dated 16 January 2015.

2. Section 4.7.2 – Seawater Intrusion

   Please add the following text on Page 35. This comment was not provided during the December 6 Planning Committee Meeting.

   "Groundwater with total dissolved solids of 3,000 mg/L or less, is groundwater that is considered to be suitable, or potentially suitable, for beneficial uses in accordance with SWRCB Resolution No. 88-63 as adopted in its entirety in the Central Coast Regional Water Quality Control Board's Basin Plan. California Code of Regulations, Title 23, section 659 – 669 lists the beneficial uses of surface water, which is also applicable to groundwater. Those beneficial uses include (1) domestic use, (2) irrigation use, (3) power use, (4) frost protection use, (5) municipal use, (6) mining use, (7) industrial use, (8) fish and wildlife preservation and enhancement use, (9) aquaculture use, (10) fish and wildlife protection and enhancement, (11) recreational use, (12) water quality use, and (13) stock watering use. In addition, Water Code Section 1242 states that the storing of water underground constitutes a beneficial use."

From: Gary Petersen <petерseng@svbgsa.org>
Sent: Thursday, December 6, 2018 1:42 PM
To: Derrik Williams <dwilliams@elmontgomery.com>; Chris Peters <cpeters@elmontgomery.com>
Subject: Fwd: Comments on Water Quality for next chapter (and maybe Chapter 4)

Comments from Heather Lukacs fro this morning.

Gary

---------- Forwarded message ---------
From: **Heather Lukacs** <heather.lukacs@communitywatercenter.org>
Date: Thu, Dec 6, 2018 at 11:52 AM
Subject: Comments on Water Quality for next chapter (and maybe Chapter 4)
To: <peterseng@svbgsa.org>
Cc: <camela@svbgsa.org>

HI Gary (and Ann),

Could you please pass along this email to Derek to make sure these important data sources are included in the water quality sections of Chapter 4 and other chapters?

We have been working on a factsheet on Water Quality and SGMA. We are working with academic partners on informational materials that present geochemistry science on how pumping, recharge, and water level changes in groundwater influence water quality. Therefore, we find it imperative that water quality is considered as it relates to other GSP data and implementation.

For the Salinas Valley Basin, we would specifically like you to start by considering at least the following contaminants for inclusion in the GSP and your monitoring network:
1. Nitrate
2. Arsenic
3. Hexavalent Chromium
4. Uranium
5. 123-TCP
6. DBCP
7. (also, chloride and TDS, as others have mentioned)

This Map Viewer shows state/local small water system water quality data for Nitrate, Arsenic, and Chrom-6. Monterey County does not have the budget to monitor for 123-TCP which has been shown in several pubic water systems including San Jerardo Cooperative (and also in our own testing of private domestic wells). More info about the Map Viewer here. Please let me know if you have any questions.

Thanks!
heather

Integrated Plan to Address Drinking Water and Wastewater Needs of Disadvantaged Communities in the Salinas Valley and Greater Monterey County IRWM Region

Database and Map Viewer: A database and mapping tool was created for this project, and is being hosted on a three-year renewable basis at California State University, Water Resources and Policy Initiatives. A new viewing platform, called the *Greater Monterey County Community Water Tool*, has been created to show the locations of disadvantaged and suspected disadvantaged communities, geographic areas with water quality contamination (including nitrate, arsenic, and hexavalent chromium contamination), and the boundaries of nearby water districts. The GMC Community Water Tool provides a powerful tool for the Greater Monterey County Regional Water Management Group, local agencies, and non-profit community assistance organizations to identify "hot spots" of contamination and to evaluate options for potential consolidation of small disadvantaged communities with nearby water utilities. The GMC Community Water Tool can be viewed at this link.

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Heather Lukacs, PhD
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Community Water Center

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Gary Petersen

Regional Government Services

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SERVING PUBLIC AGENCIES SINCE 2002

Assignmnent:

General Manager

Salinas Valley Groundwater Sustainability Agency

SVBGSA.org

Comment Number	Document	Chapter	Section	Figure	Table	Page	Comment	Commenter	Date	Response
	GSP 180/400	4	4.3.2			14	Line 4 - “Error! Reference source not found.” Should be deleted.	Brian Frus	12/21/18	
	GSP 180/400	4	4.5			29	Line 8 should read “35,000” acre-feet	Brian Frus	12/21/18	
	GSP 180/400	4	4.6.1			31	Suggest this section state in layperson terms what is happening to the concentrations of the constituents discussed as one moves down the valley (or deeper into either the180 or 400 aquifers)	Brian Frus	12/21/18	